PROGRAMMABLE CALCULATOR

CASIO FX-700P

INSTRUCTION MANUAL

BFC英

First of all, we would like to thank you very much for purchasing this product. This instrument is a high performance, programmable calculator which incorporates microcircuitry to provide for repetitious or complex calculation. The most important feature of this instrument is that it uses BASIC program language. This provides a conversation type language for problem solving. Operation is easy, even for a beginner. Additionally, programming is simple using one key commands which permit highly efficient keying.

This instrument's calculation management functions are generally separated as follows.

- 1. Manual Calculation
- 2. Program Calculation

It not only performs high level program calculations like a computer but is also designed for easy operation as a scientific calculator.

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Use Precautions

This instruction manual explains how to use the calculator. Please read it thoroughly before using. Master each function and use it with care to provide long life.

 Do not use any other equipments than the optional one: · While the calculator is performing calculations; a wall be displayed. Key operation buting this time will not be effective except for one success to please pay attention, to the display as all times and press · Conjecting the battaries, even when the calculator is not used to any great extent, please cannot the Thom out batteries are used, they may leak and dayise damade to the To dealess (4 states) us asoft, dry clean or a damp cloth and mild determent to wipe 15 off. Never use In che of the lot to the tip store where I was purches ed to a marby dealer. Prior to seeking namity namics place regulation for the formal policy of seeking also check the play or supply a Hew as

This instrumentuses two lithium batteries (CR2032) for a power supply; If the contrast is weak even when the contrast control is adjusted for maximum contrast (refer to, page 81. this means that the batteries are worn out. Therefore, please replace the batteries at the earliest opportunity Chapter 3. Manual Calculation of Allstropy by the property of the property of

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Error Message List Program Command List

Specifications

Prior to Use

This calculator is brought to you as a result of our highly developed electronic technology. Strict quality control procedures and a rigid inspection process were employed in its production. Please follow the precautions below to ensure long equipment life, on for purchasing this product. This instrument is a high

Use Precautions

- This calculator is composed of precision electronic parts. Never try to take it apart. Avoid dropping or throwing. Do not permit it to undergo extreme temperature variations. Do not store or leave in any location where there is dampness, high temperature or dust. During periods of low temperature, the display response may be slower or there may be no display. Normal display will resume when the temperature returns to normal.
- Do not use any other equipments than the optional ones.
- While the calculator is performing calculations, a "-" will be displayed. Key operation during this time will not be effective except for one section so please pay attention to the display at all times and press the keys carefully.
- Concerning the batteries, even when the calculator is not used to any great extent, please change the batteries every 2 years. If worn out batteries are used, they may leak and cause damage to the instrument. Never leave worn out batteries in the instrument.
- To clean the calculator, use a soft, dry cloth or a damp cloth and mild detergent to wipe it off. Never use paint thinner or benzine.
- In case of malfunction, contact the store where it was purchased or a nearby dealer.
- Prior to seeking maintenance, please read the instruction manual again and also check the power supply
 as well as program or operational error.

■ Power Supply and Battery Replacement

This instrument uses two lithium batteries (CR2032) for a power supply.

If the contrast is weak even when the contrast control is adjusted for maximum contrast (refer to page 8), this means that the batteries are worn out. Therefore, please replace the batteries at the earliest opportunity using the following procedure.

Furtheremore, even though the instrument is functioning normally, be sure to replace the batteries every 2 years.

How to Replace the Batteries

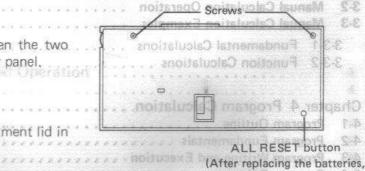
- After turning the power switch off, loosen the two screws on the rear panel and remove the rear panel.
- (2) While pressing (A), slide the battery compartment lid in the direction of the arrow and remove it.
- (3) Remove the old batteries,

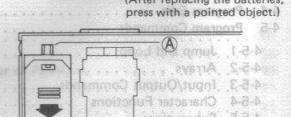
35

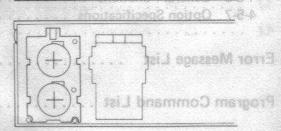
30

(This will be easier if you tap the instrument lightly with the battery compartment facing down.)

- (4) Using a dry cloth, wipe off the new batteries and insert them with the \oplus side facing up.
- (5) While pressing the batteries down with the battery compartment lid, slide it closed.
- (6) Replace the rear panel and tighten the screws and after turning the power switch on, press the ALL RESET button
- * Be sure to replace both batteries.
- * Never throw the old batteries into a fire. This is very dangerous as they might explode.
- * Be sure to position the \oplus and \ominus terminals correctly.



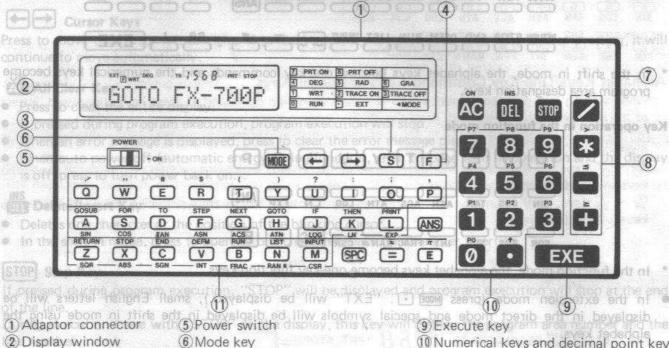




Specifications

Chapter 1

Each Section's Nomenclature and Operation



- 2 Display window
- 3 Shift key
- 4 Function key
- Display contrast control
- (8) Calculation command keys
- 10 Numerical keys and decimal point key

Shift in mode using the extension mode

AC DEL STOP

Alphabet keys short notenerxs arts griles about sortion

1-1 Each Section's Nomenclature

Each key has 3 separate operations,

Press the keys directly for the function printed on the key. Press 3 and then the key for the function printed above the key. Press I and then the key for the function printed below the key.

Example

GOSUB was Shift in mode ass to call out the calculation result (answer) of the previous calculation

A . . . Direct mode

SIN ... Function mode

S Shift Key (symbolized by S hereafter)

If this key is pressed, the shift in mode is selected ("S" is displayed) and the function printed above each key can be used at los may be a maximum care of the district of the control of the control

F Function Key (symbolized by E hereafter)

If this key is pressed, the function mode is selected (" F" is displayed) and the function printed below each key can be used, each resident to the control of the control

Key operation in the direct mode (5) Numerical Keys/Program Flunder Keys



a W Q sell singlish letter and s

Demorraged as not A S D F G H

iting can be performed. V B N M SPC =

Key operation	on in the shift in mode	AC INS STOP C
	MODE (\$) S) F)	P7 P8 P9 >
		P4 P5 P6 S
	GOSUB FOR TO STEP NEXT GOTO IF THEN PRINT ANS	P1 P2 P3 ≥
to hope an	RETURN STOP END DEFM RUN LIST INPUT SPC = 72	PO TEXE
* (In the sh	nift in mode, the alphabet keys become one-key comman area designation keys.	
Key operati	ion in the function mode and the calculator is not used to	The state of the s
Barrenes (B) structures	OWERTYUIOP	HO-4 (2)
Pantahi pantahi	SIN COS TAN ASN ACS ATN LOG LN EXP ANS	A D W O
Prior of as well at	SQR ABS SGN INT FRAC RAN# CSR SPC = E	
* In the fu	nction mode, the alphabet keys become one-key function ke	eys. Hos — hos — nos —
	qwertyuiop	4 American Americans Americans Separate operations
	q we r t y u i o p	
he function	d then the key for the function printed below the key.	Press the keys directly for the fur- printed above the key. Press 🗈 and Scample =
	zxcvbnm	OSUE . 9. Shift in mode
Shift in mo	de using the extension mode compartment lid in section of the arrow and remove it.	Shure Fundamade
	% o	Shart Key leymbolized by (3)
		f this key is pressed the shift in ach key can be used produced F Function Key (symbolized by
woled below		t this key is pressed, the function
* In the ex	ktension mode, the alphabet keys followed by the 🗉 (functi	on) Key display the capital letters.
MODE Mode This is press	arrange the furthering down wish the nation	e su pue de la mare la
Security Charles	"EXT" is displayed and the extension mode is designat symbols can be used. To release the extension mode press	
MODE Ø	"RUN" is displayed and manual calculation and program ("WRT" is displayed and program write-in and checking/ed	
٠., ناست	WITT is displayed and program write in and enceking/ed	

Wood 3 When "TR" is displayed, it will be extinguished and the execution trace function will be
released. "DEG" is displayed and the angular unit will be designated as "degree", "unit to be use the second of th
MODE 7 "PRT" is displayed and if a printer is connected, printout can be performed. MODE 8 When "PRT" is displayed, it will be extinguished and the printout function will be released.
Cursor Keys
Press to move the cursor left or right. If pressed once, it moves one character. If you keep pressing, it will continue to move automatically.
Alphabet Keys/One-Key Command Keys/Character Keys
• Press to clear the entire display. Termoo notional/bnammoo na pritting to margora a ni pritting nertil
If pressed during program execution, program execution will stop.
 When an error message is displayed, press to clear the error message display. When auto power off (automatic energy saving function, refer to page 9) is in operation and the display
is off, press to turn power back on. The expanded to 222 For memory explanations of line and the expanded to 222 For memory explanations of line are
Delete/Insert Key has white se white the one-key function which see with the first Delete/Insert Key
Deletes one character at the position of the blinking cursor.
In the shift in mode, press to open up one character space for character insertion.
STOP Stop Key 26 1568
If pressed during program execution, "STOP" will be displayed and program execution will stop at the end
of the line. During execution trace with "STOP" on the display, this key will display the program area number and the
line number. 46 - 14080ts TR9 2 2 RT AROGARDEG WUR SE TX3
EXE Execute Key
 When the result of a manual calculation is required, press instead of "=". In the "WRT" mode, when writing in a program, press to write (store) each line in the computer. If this key is not pressed, nothing will be written in.
• In the "RUN" mode, press for data input during program execution or press to continue program execution while "STOP" is displayed. To election of the program of the prog
displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or displayed as 0.)
Answer Key For manual calculation, press to call out the calculation result (answer) of the previous calculation. Init of T
π mole: Exponent/Pi Key i of splayed arit to notion of the upper portion of the displayed like (Exponent/Pi Key) of splayed arit to notion of the upper portion numerical display is available on the upper portion of the displayed in the upper portion of the displayed in the upper portion of the upper
When inputting exponential value, press after inputting the mantissa portion.
Example: 12.56×1034 of the district of the dis
* The exponential portion may be a maximum of ±99. If this is exceeded, an error will occur.
pressed), "[]" (when the [] Key is pressed), "用办"对行的 mede), "对行" (现代产mode), "TR", 善用
• Press when using a substitution statement or for comparison when using an IF statement (equal sign).
A Cit FM command is also used to confirm the number of memories which are EMPERAY TRANSPORT
7 8 9 Numerical Keys/Program Number Keys
4 5 6 the decimal point. PO P9
P1 P2 P3 • In the shift in mode, 1 through 1 become the program number designation keys and when a program has been written in, the program will start.
Po $\stackrel{\bullet}{\bullet}$ The $\stackrel{\bullet}{\bullet}$ Key is pressed in the shift in mode when a power (x^{y}) is required.
designation is attempted which would cause an insufficient number of steps, an error will occur (ERR 1
The exclusive character variable (\$) is not counted when designating sints it is a special memory.

When performing addition, subtraction, multiplication and division, press at the respective locations.

So is used for multiplication (corresponds to "x"). In the shift in mode, press for comparison of a judgement in an IF statement.

In the shift in mode, press for comparison of a judgement in an IF statement.

GOSUB FOR TO STEP NEXT GOTO IF THEN PRINT

SIN COS TAN ASN ACS ATN LOG LIN EXP

RETURN STOP END DEFM RUN LIST INPUT SPC

SOR ABS SGN INT FRAC RAN# CSR

When writing in a program or writing an command/function command, if these keys are pressed, letters of the alphabet will be displayed. Press the SPC Key when a space is required.

GOSUB FOR TO STEP NEXT GOTO IF THEN PRINT

Alphabet Keys/One-Key Command Keys/Character Keys

When writing in a program or writing an command/function command, if these keys are pressed, letters of the alphabet will be displayed. Press the SPC Key when a space is required.

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When writing in a program or writing an command/function command, if these keys are pressed, letters of the alphabet will be displayed.

GOND FOR THE STORY OF THE STORY OF

GISDIAYED.

GOSUB ~ INPUT Keys: In the shift in mode, the one-key commands which are written on the panel above the keys will be displayed.

Keys: In the function mode, the one-key functions which are written on the panel below the keys will be displayed.

In the shift in mode, press to open the one chargorer space for character insertion.

When the result of a manual calculation

middly darly about "TRV" ent mile

1-2 How to Read the Display

EXT S RUN DEGRADGRA TR 1558 PRT STOP

Displays the calculation value or result. The respective display positions are composed of 5 horizontal and 7 vertical dots. Up to a maximum of 12 positions are available for display of numbers or characters. (Zero is displayed as 0.) If a formula or statement exceeds 12 positions, the numbers or characters will move to the left and up to a maximum of 62 characters can be input.

The blinking cursor is displayed until 55 characters have been input. From the 56th character on, a blinking " will be displayed instead.

A 4-position numerical display is available on the upper portion of the display to indicate the number of remaining steps.

Furthermore, during operation, a "-" will be displayed in the rightmost position of the 4-position display on the upper portion of the display.

Also, various symbols such as "DEG", "RAD" and "GRA" for angular units, "\$" (when the \$\infty\$ Key is pressed), "\$\infty\$" (when the \$\infty\$ Key is pressed), "RUN" (RUN mode), "WRT" (WRT mode), "TR" (TR mode), "PRT" (PRT mode) and "STOP" will be displayed to indicate the respective situation.

Alphabet display example

aidt fil.

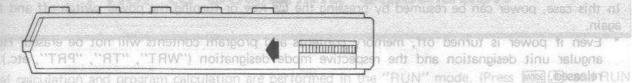
HBCCEFGHIJK

Symbol display example

delnother drift own and de whem as downed

1-3 Contrast Adjustment

Adjustment of display contrast can be performed using the adjustment control located on the right side of the instrument.



Turn in the direction of the arrow to increase contrast. Turn in the opposite direction to reduce contrast. This is used to compensate contrast of the display in accordance with battery capacity or to adjust to compensate for the viewing angle.

1-4 Memory Expansion

There are normally 26 memories (variables). The number of steps at this time is 1568. The maximum number of memories can be expanded to 222. For memory expansion, program steps are converted to memory using 8 steps per memory. As follows:

Number of Memories	Number of Program Steps
26	1568
Multiplicate 27 and divisio	(*and/) 1560 ************************************
Addition an 28 ubtraction	(+and -) 1552 (1974) (1
Senter and the second	Learning Burners
	1312=2 1408
	grand of the state of
94	1024
	:
200	176
222	0

Memory expansion is performed in units of 1 using a DEFM command, antissa portion and 2 positions for the

Example:

Expand by 30 and make 56.

Operation: per of purply positions is 10 positions for the mantissa portion and 2 positions for the exponential

Select the RUN mode (press MODE 0) or the WRT mode (press MODE 1), positions) is exceeded, up to 12

***VAR: 56

DEFM can be input by pressing DEFM or by pressing S ...

A DEFM command is also used to confirm the number of memories which are currently designated.

Example:

A total of 56 memories are designated.

14285.71429

***VAR: 56

- When a large number of program steps are already in use, in order to protect the existing program, if a designation is attempted which would cause an insufficient number of steps, an error will occur. (ERR 1 insufficient number of steps)
- The exclusive character variable (\$) is not counted when designating since it is a special memory.

1-5 Auto Power Off

This is an automatic energy-saving function which prevents wasted power consumption when you forget to turn off the power switch. Approximately 7 minutes after the last key operation (except during program execution), power will go off automatically.

In this case, power can be resumed by pressing the Key or turning the power switch off and then on again.

* Even if power is turned off, memory contents and program contents will not be erased. However, angular unit designation and the respective mode designation ("WRT", "TR", "PRT", etc.) are all released.

Turn in the direction of the arrow to increase contrast. Turn in the direction to reduce contrast to This is used to compensate contrast of the display in accordance with battery capacity or to adjust to compensate for the viewing angle.

• The display is accordance with battery capacity or to adjust to compensate for the viewing angle.

• The display of the displ

When writing in a program or writing an command/function command, if these keys are pressed, letters

Of the atchaint will be a spin on a Proposition of Key whome concess required

Shere are normally 26 memories wariables by the number of steps at this time is 1568t at a vex the state of the maximum number of memories can be expanded to 222. For memory expansion, about a memory expansion, about an entropy of the steps per memory of the steps per memory of the steps of the steps per memory of the steps of t

	Number of Program Steps	Number of Memories
	1568	26
2. How to Regulate Display	0.03	
	1562	80
P mini		
EXTERNAL DEGRADGRATA 1558	PRT STOPSOAT	24 m./ Seines
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	9,00,00, 1	
	1024	NO
		200
plays the calculation value or result. The of		of the Shortzontal an
tical dots, Up to a maximum of 12 position		aprile and a securious (Zer

The blinking cursor is displayed until the unered as have better the court character on, a bunking the will be displayed instead.

**Better the displayed instead.

**Better the displayed instead.

**Better the displayed instead.

A 4-position numerical display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display sharibing of the display of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display is available on the upper portion of the display sharibing of the display is available on the upper portion of the display is available.

Furthermore, during operation, a " will be displayed to the represent position of the General HOMENDO on the upper portion of the displayed press." (a) and the upper portion of the displayed (a) and the upper portion of the displayed (b) and the upper portion of the displayed (c) and the upper portion of the displayed (c) and the upper portion of the displayed (c) and the upper portion of the upper portion of the displayed to publicate the respective structure of the upper portion of the

Co see Suspense of Anna of Ann

A DEFM command is also used to confirm the number of memories which are directly designated from

HBCCEFGHIJK

A total of 56 memories are designated

***VAK: 20

EFM ES

When a large number of program steps are already in use, in order to protect the existing program, if a designation is attempted which would cause an insufficient number of steps, an error will occur, (ERR to manificient number of steps)

The exclusive character variable (\$) is not counted when designating since it is a special memory.

Chapter 2

Prior to Beginning Calculation

Manual calculation and program calculation are performed in the "RUN" mode. (Press MODE @ and RUN The exponential portion of displayed along with an exponential following the man (beyong bed like Furthermore, with respect to "DEG", "RAD" and "GRA", since these only apply to angular unit, the display of these has no effect for a calculation which has nothing to do with angular unit.

1.234 40000 to played to low in the calculation can be used \$210000 = 0000 to 4884.

2-1 Calculation Priority Sequence (True Algebraic Logic)

This unit determines the calculation priority sequence internally and will perform calculations based on that sequence.

The calculation priority sequence is determined as follows.

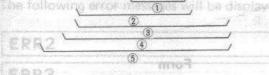
- (1) Functions (SIN, COS, TAN, etc.)
- (2) Power
- (3) Multiplication and division (* and /) max and
- 4 Addition and subtraction (+ and -)

When the priority is the same, calculation will begin from the left. Small one stoomy? notestable? T.E.S.

Furthermore, when parentheses are used, these have the highest priority.

Example: 9 power (x t y) however, when y

2+3*SIN(17+13) 12=2.75



nessages will be displayed during manual calculation Charles manual calculation 3 2 2 4 5 - 2 4 5

atural number, an error **grass sensilonoche displa**

838*2

2-2 Input/Output Number of Positions and Operation Number of Positions

The number of input positions for this unit are 12 positions for the mantissa portion and 2 positions for the exponential portion. Internal operations are also performed using 12 positions for the mantissa portion and 2 positions for the exponential portion.

The range is $1 \times 10^{-99} - \pm 9.99999999999 \times 10^{+99}$ and 0,

The number of output positions is 10 positions for the mantissa portion and 2 positions for the exponential portion. However, if an exponential portion is attached, the mantissa portion will be 8 positions.

For function results, etc., when the number of display positions (12 positions) is exceeded, up to 12 positions will be displayed, including the 0 and the decimal point.

Example:

Example:
$$(1 \times 10^5) \div 7 = 14285.71429$$
 Level 10x 10 \times an undertail or order of superior (1 × 10⁵) $\div 7 = 14285.71429$ Level 10x 10 \times an undertail or order or

1E5/7E

14285.71429

1 厘 5 2 7 2 14285 0 0

0.7142857

N X QVA

Change to Absolute Value

In the case of the RND function, the argument must be enclosed in parentheses

Positive Number ->

EXP is a command to call out the numerical value of the exponential table.

When the calculation result exceeds 1010 (10,000,000,000) or is below 10-3 (0.001), it is automatically displayed using an exponential display. Example: 1234567890×10=12345678900 (=1.23456789×10¹⁰) 1234567890 🗷 10 🕮 1,2345678E10 angular unit designation and the respective mode designation ("WRT" Tre" represented sign Manual calculation and program calculation are performed in the "RUN" mode. (Press 1000 Counties) * The exponential portion is displayed along with an exponential sign following the mantissa portion. Furthermore, with respect to "DEG", "RAD" and "GRA", since these only apply to angular unit, the Example: display of these has no effect for a calculation which has nothing to do with angular unit. 1.234÷10000=0.0001234 $(=1.234\times10^{-4})$ no besed anotatuolso mached II.234 210000 Ex pag viila 234 ET 040 and senimetab fine sid The calculation priority sequence is determined as follows. 2-3 Basic Calculation Functions (SIN, COS, TAN, etc.) 2-3-1 Calculation Symbols and Function Commands Using BASIC calculation symbols, + and - symbols are the same as standard symbols for addition and subtraction but \$\ and \ are used for multiplication and division symbols, bns +) noisostidus bns noisibbA (*) For instance: 2+3-4x5÷6 2+3*SIN(17+13 is expressed as 2+3-4*5/6 Also, this instrument incorporates the following functions. **Function Name** Form Trigonometric Function sin xSINX COSX COSX TANX Inverse Trigonometric Function sin x 12 positions for tx and the function of the first positions for the first position of the first positions for the first position of the first positions for the first position of the first position sitions for the mantissa portion and exponential pom a reaction of the second second second using the contract of t 2 positions for (To) nential XNTA The number of selections AROS positions for the mantissa set 2 positions for toon supplied the following set to the selection of the selections and the selections are the selections and the selections are selected as the selection of the select Exponential Function III worthood assistance assistance and the mortion of the mo For function of the formula of the first positions and the formula of the formula of the formula of the first positions with a place of the dead to be stored and the coordinate of Common Logarithm

INTX Change to Integer Example: Cancel Integer Portion FRACX F FRAC Change to Absolute Value |x|Change to Symbol Positive Number →

Negative Number Rounding Off (10^{y}) of x is rounded off Random Numbers

- In the case of the RND function, the argument must be enclosed in parentheses.
- EXP is a command to call out the numerical value of the exponential table.

		tion is stored	until the next calc	ulation has been executed
	an be displayed by préssing the 🚇			irst, turn the power ON.
Example:	TAALOFO AFOO		a sereleciscadi bio LIST	READY POT is displayed a
	2431-1593-838	を で で で で で で で で で で で で で で で で で で で	RUA	, Key Input
Operation:	741	852	741+852	Algoritossessi (nguty-
ABBUO	, move the cursor to the position	to be exerced	1593	A NEW TINGET LINES OF THE SERVICE AND A SERV
resid, one	character is deleted and the 24	3 1 - ANS	2431- 159	3 noilleanio
Example:	Delete one of the "1" character	s from EXE N	838	Example: Input SIN
Also, the nu	mber value displayed following th	e calculation c	an be used as is in th	ne next calculation.
Example:	(Subsequently to the above)			Either one key command
- Admpie:	838×2=1676		SIIN	Numerical Input
Operation:		Press (E)	Sin	Evaluate mountles
	Pelete "X;" from "INPUT X;	*2	838*2	
	: Move the cursor 3 positions to	tine left	1676	Operation
2-3-3 Erro		tine mit.		Example: Input 96.3
o make an	ig error messages will be displayed insertion. At take producing put & haracter, number or symbol key.		ructure error)	ill be opened uponstago
ERR3	Change TRAS to Taras	(mathematic	F	fxample: loggr ¥ΣΩ
The followin	Maria de la companya			Describon
	on error messages will be displayed	l during progra	推力學而但是	Operation:
		during progra	m calculation, soon	Operation:
	ng error messages will be displayed		m calculation,	
ERR2 F	PO-10		m calculation, according to the second secon	loput of numbers with a
ERR2 F program an (A sentence	PO-10 	e 10 in program	m calculation. A 3 T = A 3 O 1 > A 3	Example: Input 7.896
ERR2 F program ar (A sentence	PO-10 rea line number structure error has occured at line	a 10 in program	m calculation.	Input of numbers with ex Example: Input 7.806 Operation:
program and (A sentence) ERR3 F (A mathema)	rea line number structure error has occured at line 2-20 tical error has occurred at line 20	a 10 in program	m calculation.	Input of numbers with an Example: Input 7,896 Operation: Example: Input +2,386 Operation:
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ocupativa mosei isan monistroi School S		r vellere er k	ne result of a manual or program calculation his result can be displayed by pressing the [68] h
First, turn the power ON. "READY PO" is displayed an	d the calculator is		put.
/=1.	29456769×		xample: 741+852=1593 2431-1593=838
Key Input Alphabetical Input	LOAK CTOOAL	Minasa .	i 1 2345678e10
	741+852	(E)(E)	GEOGETH TO THE STREET
Example: Input ABC	1593 -	76 (10) , 199	Exponential sign
Operation: ntial portion	242 toyot 645	ABC	ABC in following the mantises consider.
Example: Input SIN	838		
Operation:	SIN (C	r Fan)	lso, the number value displayed following Ru
* Either one key command of	or alphabetical co	mmand may	be used.
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Example: Input 123	11 77 4 X X Y 123 7 C	NO NEW YORK TO SEE THE SECOND	
	838#2	(2) 8.3	penations a series of the series and the series of the ser
Operation:	1676	123	123
Example: Input 96.3	ls and Function	n Comman	de la companya de la
Operation:		96.3	96.3
Symbol Input	the na one nut to	o emit edi 1	lation range is exceeded an error will occur
neve have dein actions lum an	BZ26EN TOTAS NG . 19	atural numb	prograing power $(x \uparrow y)$ however, when y is a n x is smaller than 0 (zero). The following error y
Example: Input \$#?	5 / B.noiJaluolad	ring manual	to beyoldaile ad this sagassom nome printed at
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and was selected and the selected as	(4)(13)		TANX Y U W W
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Operation:	7.89	STATION OF THE	7.896E15
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Operation:	2.369	5- 415	-2.369E-45
Common Logarities	lead a land	DE ID TO TO THE TO	TO CHARLES TO LESS TO A CONTROL OF THE PROPERTY OF THE PROPERT
2. Changing Input Conte	nts (correction	, deletion a	chermore, for the evening of the ever mess When the calculation range ((noitreani bn i
			error message is displayed. Also, below 1.0x
For correction, move the cu press the correct character, n			rrected (using $lacktriangledown$ and $lacktriangledown$) and at that position
Example: Correct "A\$"	to "B\$".	umber = 1.	A\$_
Operation: Move the curs	or 2 character po	sitions to the	e left. RAN # [
 In the case of the RND full 		+ +	A\$ o parentheses
THE SHEET STATE OF THE PARTY AND	A REPORT OF STATE	SOLVE THE SOLVE LAB	

Example:	Correct "LIST" to "RUN".	LIST_
Operation:	Move the cursor 4 character positions to the	left.
		LIST
	Press RUNSPC or S RUN.	RUN _
	move the cursor to the position to be delete haracter is deleted and the characters to the rig	d and press the @ Key. Each time the key is ght of that will move one position to the left.
		For manual calculation, calcula NII 2 Tor."
Operation:	Move the cursor 2 character positions to the	e left. bellas are selds for variables are called .ffel
	of Cultulation Examples	SIIN
	Press 🛍 .	SIN meno nobolicito No Single Margarette Single Sin
Addition, s	Delete "X," from "INPUT X,"Y" des noisiv	
Operation:	Move the cursor 3 positions to the left.	Example: 12+36-9×5+4=36.75
	3+4,5-53=-25.5	INPUT X.Y
	3+4,5-53=-25.5 ← ← ← 4\3×8-38+5 Press ® ®.	INPUT X, Y
ample: 2	Press ® ® .	INPUT Y
Insertion of make an in	Press © ©. move the cursor to a position located just to	the right of the character after which you wan he character space will be opened up. Then present the right of the character space will be opened up. Then present the right of the character space will be opened up. Then present the right of the character after which you want to the character after the cha
Insertion or insertion, o make an inhe desired characteristics.	Press ID ID. move the cursor to a position located just to sertion. At that position, press ID ID and or aracter, number or symbol key.	the right of the character after which you wan he character space will be opened up. Then presonul tests nestring a section of telegraphs and telegraphs.
Insertion or insertion, o make an inhe desired characteristics.	Press © ©. move the cursor to a position located just to sertion. At that position, press © and or aracter, number or symbol key. Change "T=A\$" to "T\$=A\$".	the right of the character after which you wan he character space will be opened up. Then presonul tests nestring a section of telegraphs and telegraphs.
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Insertion or insertion, o make an in he desired cha Example: Operation: Press Example: Operation: Application: Operation: Operation: Operation:	Press ID ID. move the cursor to a position located just to sertion. At that position, press ID ID and or aracter, number or symbol key. Change "T=A\$" to "T\$=A\$". Move the cursor 3 character positions to the ID	the right of the character after which you wanter character space will be opened up. Then pressure algebraic look. Data is written after the other pressure. T=A\$ e left. T=A\$ T
Insertion or insertion, o make an in he desired cha Example: Operation: Press Ample: Coperation: Press Ample: In both a structure of the structure of t	Press © © . move the cursor to a position located just to sertion. At that position, press © and or aracter, number or symbol key. Change "T=A\$" to "T\$=A\$". Move the cursor 3 character positions to the least of the cursor 1 character position to the	the right of the character after which you wanter character space will be opened up. Then present the alternation and present the alternation
Insertion or insertion, o make an in he desired cha Example: Operation: Press Annual Example: Operation: Operation: The above are	Press (III) (III) (III) (III) (III) (IIII) (IIII) (IIII) (IIIIIII) (IIIIIIII	the right of the character after which you wante character space will be opened up. Then present after the present of the pres

Chapter 3

Manual Calculation

Deletion

3-1 Explanation of Manual Calculation

For manual calculation, calculations are not automatically performed using previously stored formulas as in program calculation. Operations for moving numbers from right to left, calculating by hand and calling out contents of variables are called manual calculations.

3-2 Manual Calculation Operation

Addition, subtraction, multiplication and division are by true algebraic logic. 🖶 , 🖃 , 🗱 (X), 🗷 (÷) and [XE] (=) are used. The [XE] Key is used to obtain calculation results and functions as "=".

Example: $12+36-9\times5\div4=36.75$

Operation:

12+36-9*5/4

12+36-9*5/4

Operation: Move the cursor 3 positions to the left.

36.75

Function calculation includes addition, subtraction, multiplication and division and is the same as true algebraic logic. Data is written after function commands.

for insertion, move the cursor to a nosition located just to the right of the character after which you want

Example:

log 1.23=0.0899051114

Operation:

LOG 1:123 retrue ent svol maissago

ZA=T 2A= T

EXE

mit look look

0.0899051114

Change "T=A5" to "T3=A5, L

Letters and numbers will be written in this manual without frames.

Example: SINS(15+8S)EE

Example: Change WICE 8 510 MIN &

- Function and program commands can be written using either one key commands or alphabetical commands but will be written in this manual using alphabetical commands.
- Calculations such as memory calculations used to store number values or calculation results and to obtain totals will use variables. These variables are alphabetical letters (A-Z), or letters and numbers (0-9) in combination (when the memories are used as the array variables). To put a number value or calculation result into a variable, use substitution.

Example: Store 1234 in variable A

Operation: Nove the cursor 2 character A = 1234

A=1234

Press the B Key

Example: Add the result of 23 x 56 to variable K Memory Calculation K=K+23*56 KEK#238356 Operation: This method is the manual way to perform the same operation as sentence substitution in programs. sin12.3456°=0.2138079为1年日本 To make corrections prior to pressing the EXE Key, move the cursor to the position to be corrected and press the correction key: (See Chapter 2) Press the AC Key to cancel the entire display. 23+9=32 Example: 2-sin45°x cos 65, 1°=0, 5954345575 Manual Calculation Examples 253 N456 C0565.159 3-3-1 Fundamental Calculations Addition, subtraction, multiplication and division Example: 23+4.5-53=-25.5 2.5× (SIN) 23 + 4 • 5 - 53 © Operation: -25.5 $56 \times (-12) \div (-2.5) = 268.8$ Example: Operation: 268.8 56* SU = 1250 / SU = 2.550 M (may be omitted) 12369×7532×74103=6.9036806×10¹² (=6903680600000) Example: 12369日7532日74103回 Operation: 6.9036806E12 Example: $1.23 \div 90 \div 45.6 = 2.9970760 \times 10^{-4} (= 0.00029970760)$ Operation: 1 · 23 2 90 2 45 · 6 00 | 2.9970760E04 Example: * When the result is greater than 10^9 or less than 10^{-3} , it will be displayed exponentially. Example: $7 \times 8 + 4 \times 5 = 76$ Operation: 7×8+4×500 76 Logarithmic Functions (log, In) and Exponential Functions (e., x³) $12+(2.4\times10^5)\div42.6-78\times36.9=2767.602817$ Example: Operation: 12 12 14 15 2 42 16 178 36 19 1 2767.602817 log 1.23 (= log to 1.23) = 0.089905

0.0899051114

Example:	12×45=540	paration
	12×31=372	
	75÷ <u>12</u> =6.25	
Operation:	epond of north tradic sonethics as north add A = 12	EXE
9011901100.90	45 *A the cursor to the position to t	
37 Ex	Mushon of Manual Compatible At 31	
	75 2 A	
	calculation, calculations are not automome an calculation. Operations for moving n	umbers from right to left, calculating by hand ar
Example:	CON 23+9=32% are called manual calci	liations.
	53-6=47	3-3 - Manual Calculation Examples
	→ 45×2=90	
	99÷3=33	3-1. Fundamental Calculations
a Addition	, sut Totalian, 22 Hollowlow and division	are by true algebraic logic. 🐯 . 🐯 : 🗱 1901 🔞 1
Operation:	#) are used. The ® Key is used M≡23∎9	Addition, subtraction, multiplication and division
Example:	12+36-9×5-4=MEM +53=6	
	M≡M ■45¥2	EXE SAN SON SECTION OF THE PROPERTY OF THE PRO
Doctation:		
Operation:	M≡M⊞99 2 3	Deration: The section of the section
* Usina th	M	EXE 22 on results cannot be identified. To see the individu
* Using th	M is operation method, individual calculation	exe 22 on results cannot be identified. To see the individual (bettimo ad ysm)
* Using th	Mis operation method, individual calculation perform in the following manner. 23 ⊕9 M ■ MS	exe 22 on results cannot be identified. To see the individual (bettime ad vsm) [XE] (32) A X X X X X X X X X X X X X X X X X X
* Using th	Mosis operation method, individual calculation of the following manner. ■ 23 ± 9	exe 22 on results cannot be identified. To see the individue (bettime ad ysm) EXE (2) 32 14 × 22 × 202 2 3 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3
* Using th	Mis operation method, individual calculations of the following manner. 23 19 M = ANS 53 16 M = M 18 ANS	exe 22 on results cannot be identified. To see the individual (bettimo ed vsm) Exe 32 14 × 22 d × 900 5 salamas Exe 47
* Using the results, position (OC)	Messes to the following manner.	exe EXE 22 Don results cannot be identified. To see the individual (bettimo ad yem) EXE 32 14 × 22 2 × 9 62 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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* Using the results, proceedings (OC	Memeration method, individual calculation perform in the following manner. 23 ±9 M = MS 53 ■6 M = MS 45 ★ 2 M = MS 99 ☑ 3	EXE EXE 22 On results cannot be identified. To see the individual (bettimo ad yem) EXE 32 A \times 2 \ti
* Using the results, possible (OC)	Mis operation method, individual calculation perform in the following manner. 23 + 9 M = MS 53 - 6 M = M + MS 99 2 3	EXE EXE 22 On results cannot be identified. To see the individual (bettimo ad year) EXE 32 14 1 2 2 3 3 3 3 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6
* Using the results, possible (OC)	Mis operation method, individual calculation perform in the following manner. Miscolar Science	EXE EXE 22 On results cannot be identified. To see the individual (bettimo ad year) EXE 32 14 1 2 2 3 3 3 3 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6
* Using the results, possible (OC) Example (OC) Letters a constitution mands for man	Mis operation method, individual calculation perform in the following manner. 23 19 M = AS 53 6 M = M = AS 45 2 2 M = M = AS 99 Z 3 M = M = AS M = M = AS 99 Z 3 M = M = AS M = A	EXE EXE 22 On results cannot be identified. To see the individual (bettimo ad year) EXE 32 14 7 × 22 3 × 9 8 5 3 3 4 5 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
* Using the results, possible (OC) Example (OC) Letters a constitution of the consti	is operation method, individual calculation perform in the following manner. 23 99 M = MS 53 6 M = MS 45 2 M = M = MS 99 2 3 M = M = MS M = M	EXE EXE 22 On results cannot be identified. To see the individual (bettimo ad year) EXE 32 A
* Using the results, page 15 (OC) Example (is operation method, individual calculation perform in the following manner. 2000a0860089 200 × 23 199 M = MS 53 16 M = M = MS 45 12 2 M = M = MS 99 2 3 M = M = MS M = MS M = M = MS M = M	EXE 22 on results cannot be identified. To see the individual formation of the indiv
* Using the results, page 1000 Constant of the control of the cont	mis operation method, individual calculation perform in the following manner. 23 19 M	EXE EXE 22 Don results cannot be identified. To see the individual (bettime ad year) EXE (c) (c) (c) (d) (d) (d) (d) (d)
* Using the results, page 15 (OC) Example: (OC) Contraction: (OC) Example: (OC) Contraction: (OC) Contr	is operation method, individual calculation perform in the following manner. 2000a0860089 200 × 23 199 M = MS 53 16 M = M = MS 45 12 2 M = M = MS 99 2 3 M = M = MS M = MS M = M = MS M = M	EXE 22 on results cannot be identified. To see the individual formation of the indiv
* Using the results, page 15 (OC) Example: (OC) Contraction: (OC) Example: (OC) Contraction: (OC) Contr	MEMERS 9923 MEMERS	EXE 22 Don results cannot be identified. To see the individual (bestrime ad yem) EXE (a) 32 A \times 2 \ti
* Using the results, post calculated by Calc	mis operation method, individual calculation perform in the following manner. 23 19 M	EXE 22 On results cannot be identified. To see the individual to

Example: log 1.23 (= log 101.23) = 0.0899051114

Operation: LOG 1 23 1 0.0899051114

Example: $\ln 90 = \log_e 90 = 4.49980967$ 3-3-2 Function Calculations LN 90 EXE Operation: 4.49980967 Trees Committee Com Committee When using trigonometric and inverse trigonometric function Example: log456+ln456=0.4342944819 LOG 456 LN 456 E Operation: 0.4342944819 e = 2.718281828Example: Operation: | Mail | Cl -+' DF | Cl (This function is a command to call out the numerical value of the exponential table.) iphiwollot 101 9EXP 10 Operation: 2.718281828 2·sin45°xcos65.1°=0.5954345575 $10^{1.23} = 16.98243652$ Example: (To get the antilogarithm of common logarithm 1.23) 10 S 1 1 23 EXE Operation: 16,98243652 5.62.3=52.58143837 (2.0 = 3 x mis narker x rolated oT) OE=3.01 nis seigms x3 Example: Operation: 5 · 6 · 6 · 2 · 3 EXE 52.58143837 2.5×(sin-10.8-cos-10. $123^{\frac{1}{7}} = \sqrt{123} = 1.988647795$ Example: Operation: 123S1S(1/7S) 1.988647795 Example: $(78-23)^{-12}=1.3051118\times10^{-21}$ Operation: S (78 = 23 S) S 1 = 12 E 1.3051118E 21 MARKET THE THE $2^{2}+3^{3}+4^{4}=287$ Example: Operation: 2512+3513+4514E 287 ACS (BIC) SON 2002 log sin40°+ log cos 35°= -0.278567983 The antilogarithm is 0.5265407845 (logarithmic calculation of sin 40° x cos 35°) reignsex3 'ARD'' - (DRA' Cperations Operation: MODE 4 (DEG designation) -0.278567983 LOG SIN 40 LOG COS 35 EE 0.5265407845 10 S ANS EXE * The input range of power $(x \uparrow y)$ is x > 0. Logarithmic Functions (log, ln) and Exponential Functions (e, x^{p}) log1.23 (= log 101.23) = 0.0899051114 Example:

-19-

0.0899051114

LOG 1 1231

Operation:

■ Other Functions (√, SGN, RAN#, RND, ABS, INT, FR	AC)
Example: $\sqrt{2} + \sqrt{5} = 3.65028154$	
Operation: SQR 2 SQR 5 SQR	3.65028154
Example: Give "1" to a positive number, "-1" to a negative	e number, and "0" to a zero.
Operation: SGN 6 EX	1
INPUT A B SGNOX	O Steps
nguare service of Benning's All-bypost hat it is a fundamental language system which is easy to	his instrument uses BASIC as its prograph—a
Example: Random number generation (pseudo random nur	
Operation: RANS# EXE	0.904186914 a problem solving language and program
Example: The result of 12.3 x 4.56 is rounded to 10 ⁻² o 1	2.3×4.56=56.088 and a vino tol.
Operation: RND SC12 · 3 * 4 · 56 S · - 2 S D E	56. 1 and the action of the state of the sta
Example: $ -78.9 \div 5.6 = 14.08928571$	the computer and use it for making entries.
Operation: ABSS 78.925.68 DE	14.08928571 MARTRAN 1990 PORTRANT TO VIOLENT
Example: The integer portion of $\frac{7800}{96}$ is 81	
Operation: INT ST 7800 ≥ 96 SD EE	81
* This command will not exceed the original number value.	responded in the lightest of the monthly and the more say to the most say to alculation of the programs simply until the part of the contains simply until the contains simply
Example: The decimal portion of $\frac{7800}{96}$ is 0.25	Programming Fundamentals
Operation: FRAC S ☐ 7800 ≥ 96 S ☐ M	et's take a look at the program 25.0 ece
■ Effective Number of Positions Designation and Decimal Designation and Decimal Designation and decimal designation and decimal designation and designation and decimal designation designation and designation designation designation designation and designation designati	nation are performed using "SET" command. SET E n (n=0 to 9)
* For effective number of positions designation, "SET E Ø" * If designation is performed, the last designated position number value will remain in the internal calculation section."	is a 8 position designation, in will be displayed rounded off. The origin
Example: 100÷6=16.6666666	A REPORT OF BUILDING TO THE PROPERTY OF THE PARTY OF THE PARTY.
Operation: SETE4 (designates 4 effective positions)	ng several possible routes. 5 TVIERY 05
100 26 50	1.667EØ1
Example: 123÷7=17.57142857	nent, an outpublistatement and fine numbers
Example: 1+3=0.33333333333333333333333333333333333	ong and complicated. Nevertheless, they are fullso, one one line, following the line number
Operation: SETNEX (designation cancellation) Starto Isola	adequals to becommon a tl type entotage of

Chapter 4

Program Calculation

SGNOW 0 18281828 0 500008

This instrument uses BASIC as its program language, BASIC is an abbreviation for Beginner's All-purpose Symbolic Instruction Code. Also, it is said that it is a fundamental language system which is easy for beginners to use.

(1 > #MAR > 0 To reduce mothers obusing regions reduced mothers.)

BASIC Language Features 8 1 4 00 . 0

1. It is a problem solving language and programming efficiency is improved.

2. Not only is it a program language which is not limited to a particular field, but is a general use language which is applicable to many fields, such as natural science, social science and business fields.

RAN SIN DE

Example: The integer posses of the 3800 at 81

Example: The decimal portion of 7800 is 0.25

3. It is a conversation type language and the computer user can compose programs while conversing with the computer and use it for making entries.

4. It has many of the capabilities and features of FORTRAN but is free from the rules encountered when using FORTRAN.

5. Many fundamental built-in functions have been prepared and it has an expanded calculation range.

4-1 Program Outline

Program calculation 1) programs calculation contents to be executed, 2) calculator stores programs, and 3) using these programs. Simply input the data and the results can be obtained automatically.

Programming Fundamentals

Let's take a look at the programming necessary to use the computer for a given problem, and at the concept and programming procedures.

Programs and Programming

When the operator uses the computer to manage a problem, instructions must be used which are in words that the computer can understand. These instructions are called programs and the composing of these instructions is called programming, of the problem and the composing of these instructions is called programming.

What is a program?

In order to make a program, there are many grammatical rules, but these details will be explained later. First, to discuss what a program is and its form, let's take a look at an example of a fundamental program.

Command ______Operand s.al. "0 = T = 2" ... not rengises to to to to the positions of the control of the contro

* If designation is performed, the last destrementation section or in the memory, DBO. [3] [37] * number value will remain in the internal calculation section or in the memory, DBO. [3] [37] * number value will remain in the internal calculation section or in the memory, DBO. [3] [37]

20 C = A + B

—Operation statement

30 PRINT C

Output statement

-Line number

The above program is a fundamental program and consists of an input statement, an operation statement, an output statement and line numbers. That is to say, the input statement inputs data. According to that data, the operation statement performs various operations, and the output statement outputs the execution results. Also, each line has a line number preceding it. These operation statements are not limited to one but are performed several times and, by adding decision statements, the program becomes long and complicated. Nevertheless, they are fundamentally the same.

Also, on one line, following the line number, a COMMAND is written which tells the calculator what to perform next. It is composed of alphabetical characters. It is followed by OPERANDS which indicate the necessary information for the command.

The above is called a PROGRAM and is in the fundamental form.

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Program steps are counted 1) Program command 2) Functional command 3) Line number	d as follows.		1 step/1 command 1 step/1 command 2 steps/1 line number 1 step/1 character
Example:	e retters et es Comburd	and I management 2 and 1	Operation
1 INPUT A B 10 B = SIN A B 2 1 1 1 1 1	sion S=#/ hecorres Se Lycke C = = "; B E	TX 042 or 15 in a constant	
old self demon proper		the finishment following the	SEPTEMBER OF THE PROPERTY.
Programming progresses 1) Problem analysis 2) Flow chart preparatio 3) Writing of the program 4) Debugging execution	in the following sequence, in a rathe armod aclimic to a in on a coding sheet 1 916	netic operation symbols	When programming, make confusion can be avoided. Coding is the process of writh the assembling programs ing symbols are written below. The tour fundamental ariting.
Step 2: Write a flow che is composed of Step 3: Based on the fl Step 4: Check the proged The above is the procedu. Flow Chart The most widely used flow	nart to represent the flow symbols which show proclew chart, write a program for mistakes. The for composing a program of the	ermine the area of the previous to input data r. nmands but usually the 'TNR ecution. The input, wolled no but statement to make it con	the problem. The flow chart ements. So in both the solution of the flow chart ements. So in BASIC language. It is a laure to primary and the solution of the flow chart statement and the flow chart graphs are statement of the flow chart graphs are statement in the flow chart and
Symbol of their expension as	Nomenclature Nomenclature	be in the range 1 to 9999 semine later line number will	These line numbers can gnine same program. Otherwise
one of the state o		Initiate, terminate, etc.	ra mir enedorum a polite maisea
XX BOX ALBOY	Lanut/Output		numbers in program execu
USUBLES	WS TERM		Sings 972 masss 977 P

of Indiana Symbol	Nomenclature	seme program. Otherwise, the later line number will
one of the property of	Terminal 100 (not fold	nitiate, terminate, etc. Initiate, terminate, etc. In started, the statements are executed in smaller to
Examples of the sales	Input/Output	numbers in program execution sequence. 2) Next, make an assignment statement to assign the result.
C.S begonn	Process 19 vd betnese	Since Tr means Try then S = Tr X R 12 another spring representations of the street of
N.C.	Predefined process	A group of commands defined elsewhere, such as a subroutine.
th velocity the	Decision esu valgato a	Decision on the choice of a specific route from among several possible routes.

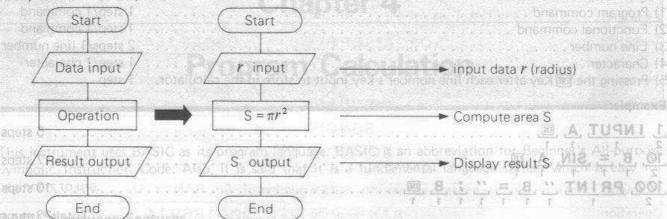
Flow Chart Example

Here, let's take a look at a simple example of a program for determining the area of a circle.

So, the complete program for determining the area of a circle is:

20 S=TXR12

For program coding, it is not necessary to use the exclusive coding paper but, if it is used, it will be more convenient for problem analysis or writing flow charts in a standard format after composing. First, following programming fundamentals, consider the data input, operation and result output separately as shown below.



The flow chart is prepared in this manner following the program flow and is composed viewing the program in its entirety, program fanguage which is not limited to a particular field, but is a general use lan-

When programming, make it a habit to compose a flow chart. If more complex programs are created, confusion can be avoided. The purple and the Confusion of the Confusion of

Programming progresses in the following sequence.

of an input statementeness transporter to

■ Coding

Coding is the process of writing programs on coding sheets or similar forms after program assembly. When assembling programs, certain operating symbols are required. The simplest fundamental operating symbols are written below.

The four fundamental arithmetic operation symbols

+ and - are expressed as " + " and " - "

x and ÷ are expressed as " * " and " / " agots herroper a

Powers, such as x^2 and x^3 , are expressed as " x^2 " and " x^3 " and the expression of the bound is explicitly as x^2 .

The "=" used in assignment statements will be explained in greater detail later but is explained briefly here. For example, the "=" in S = πr^2 means to assign the calculation result of πr^2 to S as opposed to having the meaning of equal as in mathematics. Step 41. Check the program for mistakes.

Let's write a program to determine the area of the previously specified circle. 101 on booking side a mode out

1) Write an input statement to input data r.

There are many input commands but usually the "INPUT" command is used to input data from the keyboard during program execution. The input statement used to input data r becomes INPUT R. If a line number is added to the input statement to make it complete, it becomes 10 INPUT R.

These line numbers can be in the range 1 to 9999 but identical line numbers cannot be used in the same program. Otherwise, the later line number will take priority. Usually, it is more convenient to assign line numbers in increments of ten for easy addition, correction and deletion. If the program is started, the statements are executed in smaller to larger line number sequence. So, assign the line numbers in program execution sequence.

2) Next, make an assignment statement to assign the result of the calculation from the input data to S.

Since πr^2 means $\pi \times r^2$

then $S = \pi \times R^{1}$ (X is represented by \times and R^{2} is represented by R^{1})

Therefore, with the line number attached as usual, it becomes

3) Write an output statement to output (display) the result of the operation.

Since this is just for calculation and does not cause a display, use "PRINT" command to display the

The output statement to output (display) result S becomes

And, adding a line number to this, it becomes to the property of the second sec 30 PRINT'S a, the operation statement performs various operations, and the purpose statement outputs

So, the complete program for determining the area of a circle is: adding decision statements, the global has Ames

10 INPUT R

20 S= π XR12 ated, Nevertheless, they are fundamentally the same.

30 PRINTS The following the fine number, a COMMAND is wrater which tells the

For program coding, it is not necessary to use the exclusive coding paper but, if it is used, it will be more convenient for problem analysis or writing flow charts in a standard format after composing.

4-2 Program Fundamentals

■ Constants and Variables

Characters used for BASIC are upper case letters of the alphabet (A to Z) and numbers (0 to 9) as well as some special characters (such as symbols).

Operation

Indiagond A shamiling all about their and the E+X X set (E+X X S = Y 10 3 1 telemex 3).

Variable = Numeric Expression

(1) WRT Mode Designation

19-12

Program writing is performed in the WIT mode.

Constants

A constant is a fixed value which can be written directly into a program.

Example: In the expression $S=\pi r^2$, it becomes $S=\pi \times R^2$ and 2 is the constant.

schaftenide or a separate in the result of 2XX+3 to Y. (Y =2XX+3 can be petter understood if a isstration of as Y ← 2 x x + 3 x

A variable is a value that is used in a program but is input from the keyboard during execution and is used when the result of a calculation is unknown initially because the result is assigned during execution. A variable is a single capital letter (A through Z) or a single capital letter with "\$" attached (character variable). They may be freely selected from within this range.

Example: In the expression $S=\pi r^2$, which becomes $S=\pi R^2$, R is the variable.

Example: Y = 2 * X † 2 + 3 * X + 4 V: Variable

3. If a previously written program temains, clear it.

That is, algebraics and constants used in mathematics correspond to variables and constants, respectively. Also, in addition to the above, there are character constants and character variables. Character constants are strings of characters which are written in directly, such as "ABC" and "END", and enclosed in quotation marks and spelled out. Character variables are not a numeric value but variables which accept a

C: Constant

character string. Each time a character string is given the contents will change.

A numerical variable and a character variable which use the same letter can not be used at the same time. A character string is composed of characters enclosed in quotation marks, such as "123" and is not a numerical value. Thus, "123" is just the numbers 1 and 2 and 3 written in sequence and is considered the same as "ABC" in quotation marks.

Character variables are general variables (such as A, B, X and Y) which have a \$ sign attached. Selections can be made from within this range.

Example: A\$, B\$, C\$, X\$, Y\$

Character variables can be compared or added to one another but other operations (such as subtraction, multiplication and division) cannot be performed.

Example: If A\$ = "123" and B\$ = "456" of the medity of the stand stand stand standard and standard of Using C\$ = A\$ + R\$

Using C\$ = A\$ + B\$ C\$ becomes "123456"

VIC

(If C\$ = B\$ + A\$, C\$ becomes "456123") 39 50 60

A character string of up to 7 characters can be inserted into this character variable.

Also, besides these character variables, there is an exclusive character variable (\$) which can contain up to 30 characters.

program as above that it should be written to clarify Q 9 x 1 & Buon of a program A 4 x 1 (1) COTO

Example: \$ = "1234567890ABCDEFG"

This exclusive character variable can use character functions (MID functions) which will be explained later. This can be used more conveniently than other character variables.

The Role of the Market to write programs, input data and to obtain the result of manual calculations. For program writing, press the Market after each line number's key input to store in the calculator. Program writing or written program content change, addition and deletion are all followed by pressing the Market

Assignment Statements

BASIC assignment statements are in the form shown below.

Variable = Numeric Expression

 Constants and Variables In BASIC assignment statements, an expression having arithmetic operations (+,-,*,I) on the right side is called a numeric expression,

Example: For $Y = 2 \times X + 3$, the $2 \times X + 3$ on the right side is a numeric expression.

This " = " does not mean "equals", it means "assign".

A constant is a fixed value which can be written directly into algregram.

Example: For $Y = 2 \times X + 3$, the left side is the variable and the right side is the numeric expression. Thus, it does not mean, as in usual mathematics, that the Y on the left side and the 2 * X + 3 on the right side are equal. It means to assign the result of 2*X+3 to Y. (Y =2*X+3 can be better

understood if it is thought of as $Y \leftarrow 2*X+3$

Example Assignment Statements and allowed to the

A = B Assign the value of B to A (the former value of A is deleted).

coding is the process of whiting programs on coding sheets or similar forms after program assembly

N = 2XM... Assign double the value of M to N.

When assembling programs, certain operating symbols are required,

X = Y + Z Assign the result of the sum of Y and Z to X,

 $I = I + 1, \ldots$ Assign the value of I + 1 to I (the number value in I will be increased by 1).

A variable is a value that is used in a program but is input from the keyboard during execution and is

4-3 Program Writing and Execution

are strings of characters which are written in directly, such as "ABC" and "END" pniffin marporq

Storing a program in the calculator's memory system is called program writing, o believe by a plant house This operation is performed by keying in inputs from the keyboard. 2. Program area designation

Also, in addition to the above, there are character constants and character variables, Character constants

A character string is composed to the numbers 1 and 2 and gnifinw) string and by fugni margorial value. Thus, "123" is just the numbers 1 and 2 and gnifinw) string and by fugni margorial value.

4. The program area can be divided into 10 parts from P0 to P9. Programs are written somewhere in this program area.

(1) WRT Mode Designation

Examples of As RS CS 348 PM and Islands and DS Program writing is performed in the WRT mode. The priority. Usually, it is more convenient to

Press MODE 11, "WRT" will be displayed.

(2) Program Area Designation

To designate a program area, press the SKey then a loto I numerical key.

\$ \$\text{\text{\text{\$\ext{\$\text{\$\exiting{\$\text{\$\exitit{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\text{\$\exititin{\text{\$\texitit{\$\text{\$\text{\$\text{\$\text{\$\text{\$\tex

Using CS = AS + BS

multiplication and division) cannot be performed.

S ⊕ → P1 the tine number a

(If CS = BS + AS, CS becomes "456123") ... 69 ← 6 3

CS becomes "123450"[s18 yd batewo

Also, besides these character variables, to 30 characters.

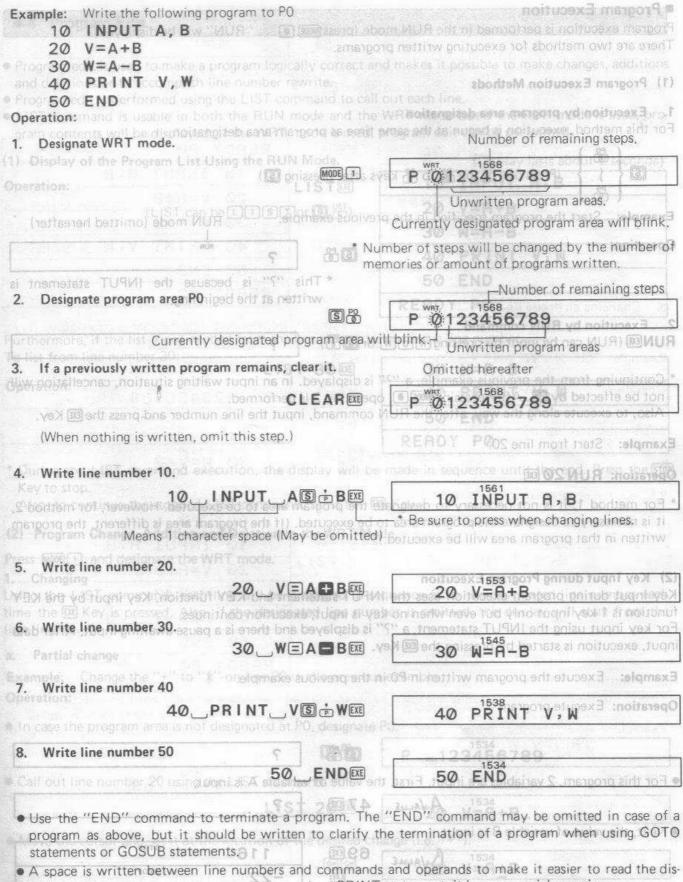
QU NSB →P3 NW

\$ \$ → P9

Example: \$ = "1234567890ABCDEFG" (3) Program Input (Writing) (unctions (MID functions) (mid tunctions) (gniting) tunnibular responses (Single Program Input) (Williams) Program writing is performed in line units. Up to 62 characters, including the line number, can be written. Finally, press the EXE Key.

* The Role of the EXE Key, n for determinand the area of a circle is:

The Key is pressed to write programs, input data and to obtain the result of manual calculations. For program writing, press the EX Key after each line number's key input to store in the calculator. Program writing or written program content change, addition and deletion are all followed by pressing the EXI Key as the final step. If the contents of the display are changed and the EM Key is not pressed, the written in contents will not be changed. It analysis or writing flow charts in a standard format after composine.



- play. In BASIC language, except messages such as PRINT statement, it has no special meaning.
- In this case, line numbers are input in units of 10. Line numbers can be freely selected from within a range of 1 to 9999. Selecting in units of 10 makes it easy to make additions and insertions later. Program execution is performed in line number sequence from small numerical value, so attach line numbers in program run sequence.
- Use the "CLEAR" command as above to clear a previously written program, while the "CLEAR A" command to clear all of previously written programs (P0 to P9).

Decrease succession in the second sec	Example: Write the following program to PO
Program execution is performed in the RUN mode (press mode)	
There are two methods for executing written programs.	20 V=A+B
	30 W=A-B
(1) Program Execution Methods	
1. Execution by program area designation	END END
For this method, execution is begun at the same time as pro-	Operation:
scare filling to secure as a constant and secure as	Designate WRT mode.
(Press one of the to to the keys after press	pd (a) ight side is the humeric express on. Thu
(Press one of the to to keys after press	sing (S) on the less side and the 21 X+3 on the
A 1998 I METEOR DESCRIPTION OF THE PROPERTY TO ASSIST THE C	SSSIT OF ZAX+3 TO Y. IY = ZAX+3 CSD be bette
Example: Start the program specified in the previous exam	nple. RUN mode (omitted hereafter)
Operation: and well beginned and How across to account to Po	RUN
LANGUA AND AND AND AND AND AND AND AND AND AN	?
and the second of the second o	is "?" is because the INPUT statement is
	itten at the beginning, to margona etangizad. \$
2. Execution by RUN command	
RUN (RUN can be input by pressing RUN or S)	Curtantly designator
* Continuing from the previous example, a "?" is displayed	If a previously written program remains, old lliw noitellance, noiteutis poitiew tuggi ne old by
not be effected by AC. After pressing MODE (a), operation 2 i	s performed
Also, to execute along the way, after the RUN command,	input the line number and press the Key.
	(When nothing is written, omit this step.)
Example: Start from line 20.	
[사용물 HPM : 1000 HPM :	
Operation: RIIN 20 EX	4. Write line number 10.
1861	4. Write line number 10. printing managed better the contract of the contract
* For method 1, it is not necessary to designate the progra	am area to be executed. However, for method 2,
* For method 1, it is not necessary to designate the progra it is necessary to designate the program area to be executed	am area to be executed. However, for method 2, ed. (If the program area is different, the program
* For method 1, it is not necessary to designate the progra	am area to be executed. However, for method 2, ed. (If the program area is different, the program
* For method 1, it is not necessary to designate the progra it is necessary to designate the program area to be execute written in that program area will be executed.)	am area to be executed. However, for method 2, ed. (If the program area is different, the program
written in that program area will be executed.) OSTITUTO SOCIO	am area to be executed. However, for method 2, d. (If the program area is different, the program with a second of crossial and an area of the control of the
* For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater	am area to be executed. However, for method 2, d. (If the program area is different, the program with a social program of constitution of the cons
* For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input.	ment and KEY function. Key input by the KEY execution continues.
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* For method 1, it is not necessary to designate the progratic it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input, of the program is displayed input, execution is started by pressing the Key. Example: Execute the program written in P0 in the previous Operation: Execute program	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data we example. Objection and some and some according to the continues.
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*For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) 2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input, for key input using the INPUT statement, a "?" is displayed input, execution is started by pressing the Key. Example: Execute the program written in PO in the previous operation: Execute program For this program, 2 variables are input. First, the value of variables are input.	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data we example. OA redmun anil arriW . 7 OB redmun anil arriW . 8
For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) 2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input, for key input using the INPUT statement, a "?" is displayed input, execution is started by pressing the Key. Example: Execute the program written in P0 in the previous program. Execute program For this program, 2 variables are input. First, the value of variables are input. First, the value of variables are input. First, the value of variables are input.	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data we example. One redmun anil arisW variable A is input. ?
* For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input, for key input using the INPUT statement, a "?" is displayed input, execution is started by pressing the Key. Example: Execute the program written in P0 in the previous operation: Execute program For this program, 2 variables are input. First, the value of the program bearing at any position. Next, the value of variable B is input.	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data we example. Our reduction and strict of the continues of the continues of the continues. Our reduction and strict of the continues of the continues of the continues. Our reduction and strict of the continues of
* For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input. For key input using the INPUT statement, a "?" is displayed nput, execution is started by pressing the Key. Example: Execute the program written in PO in the previous Operation: Execute program For this program, 2 variables are input. First, the value of the program bearing and was bearing at the program. A VALUE 47 KE Next, the value of variable B is input.	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data we example. ? Output Particle Partic
*For method 1, it is not necessary to designate the program it is necessary to designate the program area to be executed written in that program area will be executed.) (2) Key Input during Program Execution Key input during program execution uses the INPUT stater function is 1 key input only but even when no key is input, for key input using the INPUT statement, a "?" is displayed input, execution is started by pressing the Key. Example: Execute the program written in P0 in the previous of the program in P0 in the previous of the p1 in P0 in the program in P0 in the program in P0 in the p1 in P0 in the p1 in P0 in the p1 in P0	ment and KEY function. Key input by the KEY execution continues. d and there is a pause awaiting input. After data was example. 2

In this manner, for key input during execution using the INPUT statement, input data using "data [XE]."

In addition, in a waiting input situation, if MODE @ Jare pressed, program execution will stop.

The program of the input data using "data [XE]."

The program of the input data using "data [XE]."

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The program of the input data using "data [

vex hambers in program run sequence, notated one notations agreed matrice or export no true to program while the in CLEAR A" command to clear all of previously written programs (P0 to P9).

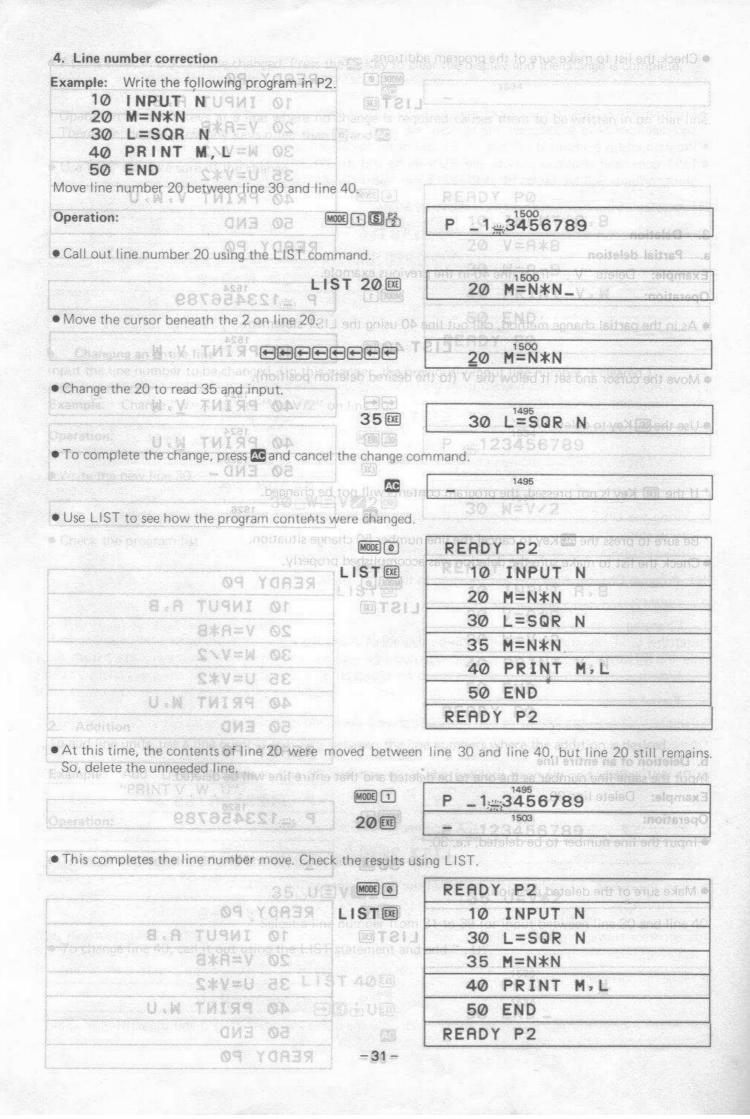
Legendra do clear all of previously written programs (P0 to P9).

		1.0	TABLETO	0.0		
 Program edit is used to make a program I and deletions or to accomplish line numb 	er rewrite.	medit teams	ave i vales		inges, addit	
 Program edit is performed using the LIST LIST command is usable in both the RI 	command to call JN mode and the	out each lir WRT mode	ne. but if the	RUN mo		
gram contents will be displayed. If the W		orogram edi	t can be pe	rtormed.		
1) Display of the Program List Using the					out 2 secon	ids)
Operation:	LISTEE	10	INPUT	A,B	en el el entre	
Partial distance (LIST can be LIT	Tor S UST)	20	V=A+B			
40 PRINT V.W crolegy	DE BEOVICES EXOCIT	30	W=A-B		il consider	1110
arian and an arian area.	(MRGCL)	40	PRINT	V,W		
	Line 40 using the	50	END			
PENDY PO	18T 40E	READY	(PØ	รที่ลูกตักเ	Changing a	,cl
Liberally all redmun entitionar wisi Furthermore, if the list is not needed from	the beginning, des	d. (Injinis n	oposido ed c	d tedmur	it the line r	igni
To list from line number 30:	er Friedrich	CONTRACTOR OF THE PARTY	00000	VVI - AND IC	rio erium	wall.
No. 140 EU voy ex de la tra " y	.IST 30 E	30	W=A-B			
Operation: 123456789	(COMBINE	40	PRINT	V,W	:norter	adri
		50	END	OF SHIP		M/ e
The train that the continuent processing free protection	Topicals will in	READ	Y PØ			
(2) Program Change, Addition and Deletic			Y PO INPUT	D D		VIII.
						X S
Press Mode 1 and designate the WRT mode 1. Changing	1 L 15 T [22]	10	1145 01	11+54		
Using the LIST command, each line will time the EE Key is pressed. Also, if the de						
first line. QM3 08		35	U=V*2			
a Partial change		40	PRINT	W.U		
Example: Change the "+" to "*" on line			END		noitibbA	
Operation: 29b at notifible and analyse and in Deletion of an entire Hips	etween the line nu	d slightly p	hquirib au	fs, use a	dd fine uni	601
 In case the program area is not designate 	d at PO; designate	POLE grande	- Land Cold Hotels Declared the Cold Cold Cold Cold Cold Cold Cold Cold	and the second second second second		Exai
Example: Delete line 30 g 2 g	56	P1	234567	89	14"	
• Call out line number 20 using the LIST of	ommand.	E E cad		89	ation:	eqO
• report the line muniforms to the letter of the	IST 20E	Juga 20	V=A+B	enil nesv	vied tugni	oT 4
 Move the cursor and set it at the location 	n of the desired ch	ange (i.e. "-	+'').			
35 U=V%2		20	V=A+B			No. The State of t
* If a cursor movement key () reachieved.	f 18 monthedmun mains pressed for bbs bns fastners	more than	1 second	fast mo	ovement ca	n be
• Make the correction. TUIRS OF	T 40 EU	ALL SE	14-14-6			
1928	* EXE	. 30	1534 W=A-B	- [a] - 1.1		1000
* Be sure to press the EXE Key. If it is not	oressed, only the c	lisplay will l	pe changed	and the v	written pro	gran
contents will not be changed.	-28-	pran	Y PØ			
	~0	15-20-318-50				

4-4 Program Edit

iere are two methods for executing written programs. AC	1534
* Operation of other keys at a line where no change is rec Therefore, do not press any keys other than 🕮 and 🕰 .	quired causes them to be written in on that liver reduction and religious of to according to the control of the
• Use LIST to make sure of the change TRW 900 bins about	LIST command is usable in both the RUN in
MODEL SUR DESCRIPTION DE DESCRIPTION DE PRESENTATION DE PRESEN	READY PØ
Mode (Display lasts about 12 seconds)	10 INPUT A, B
ISTEL BIN TO THE PERSON.	20 V=A*B
20 V=A+B contract stems	30 W=A-B multer hereafter)
30 W=R-B 常間 40 PRINT V:M	40 PRINT V, W
	50 END
b. Changing an entire line OP Y PA PRINCE OF THE STATE OF	READY PØ
Input the line number to be changed. (In this manner, the production and advantage applications) Example: Change "W=A-B" to "W=V/2" on line 30.	rthermore, if the list is not needed from the b list from line number 30. LIST
Operation: Way TMISS OF MODE 1	P = 123456789
● Write the new line 30.	put the line number and ores the 68 Key
amble Start from tine 2009 YQA39 30 WEVZ2®	1534
splay will be made in sequence until the end. Pless the ST	30 W=V/2 T21 Ladi pal v.C
TOP SHABBAR TORE IS AND ARREST VIOLENTY TO BE SARANGE PARENCES	bigsmore a 2814 become addison abusel A
The second of the program area will be executed LISTEXE	READY PØ 10 INPUT A,B
It is recessify to designate the program area to be MODE @ executed block! The work of LIST EXE	READY PO 10 INPUT A,B 20 V=A*B
It is received to the greatering program area to be a secured LISTER I Key these quing Program Execution Pose rediring and be secured and something through a long and something and beginning and b	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2
It is secretary to designate the program area (************************************	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2
It is specially a designate the program area of LIST EXE I Key Insut during Program Execution chesplading and batergises of the analysmounts probagalased and many traits the yellow of bestimo as redeming and bater for key input using the INPLIT statement, a '7' is displayed but execution is started by pressing the (2) Key	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO
Will be executed LIST EXE If Key treat during Program Execution Cose reduling and be socially off most somewhere in beyone and most state this yellocide off most somewhere in beyone and most state this yellocide of bestimo at redmun and but but execution is stated by program at the EAK as 2. Addition To add line units, use a line number that falls between the line Example: Add "U=VX2" between line 30 and line 40 in	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO Ine numbers where the addition is desired.
LIST EXECUTION Note that the program are will be executed LIST EXE I Key Institution to the program and some uper right people and some program and bat on key institution to the LIT starting and substitution to the LIT starting and substitution to add line units, use a line number that falls between the LIE Example: Add "U=VX2" between line 30 and line 40 in "PRINT V, W, U".	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO ine numbers where the addition is desired.
LIST EXE Nov next during Program Execution	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO ine numbers where the addition is desired. P #123456789
LIST EXECUTION Compared to the program of the prog	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO ine numbers where the addition is desired. 1 the previous example and change line 40 P 123456789
LIST EXE If you have do not be a private off most some uper tribeyed as a firm of some uper t	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PO ine numbers where the addition is desired. 1 the previous example and change line 40 P 123456789
LIST EXECUTED AND A STATE OF THE PROPERTY OF T	READY PO 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V, W 50 END READY PO Ine numbers where the addition is desired. 1 1534 1 23456789 1 31 to 39 for input between line 30 and line and the previous example and change line 40.
LIST ONE LIST O	READY PØ 10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY PØ International sector of the previous example and change line 40 P 123456789 135 U=V*2 131 to 39 for input between line 30 and line of add ", U".
LIST EXECUTION TO THE PROPERTY OF THE PROPERTY	10 INPUT A,B 20 V=A*B 30 W=V/2 40 PRINT V,W 50 END READY P0 In the previous example and change line 40 P 123456789 135 U=V*2 131 to 39 for input between line 30 and line and add ", U".

• Check the list to make sure of the progr	MODE) (Ø)	PEAN	Chop Owollo	STREET, STREET	Line nur
Program Debug System	LISTEXE	10	INPUT		xample:
his equipment's debug system is divide			WISHELD SCHOOL	NAM-W	C (0.5) NO. 11
		20	V=A*B	1=508	30
a the feet of	. Complete Dubug	30	W=V/2	TMIMA	40
(not to pay	Program logic stru	arrie brie OC	U=V*2	is is to reminer 20.0	manitavot
i. Desk Top Debug	r. Payrial Celang	40	PRINT	V, W, U	
11 3456789 noiteled .8	9 mggrac以際以果	50	END		(peration:
n. Partial deletion	.bnsrd	READ'	Y PO	ne oilmber	Call did li
Example: Delete "V , " from line 40 in	the previous examp				
Operation:	MODE 1	P =1:	2345678	39	
As in the partial change method, call ou	ut line 40 using the	LIST staten	nent.	cursor berie	Move the
opar	LIST 40 DE		PRINT	V , W	- Gettine
• Move the cursor and set it below the V		Control Control			
Move the chizot and set it below the A	(to the desired dele		1524	e 20 to rese	di spinisto di
Use the Key to delete "V,". OE	35 (%)	40	PRINT	<u>V</u> , W	
ally error made during peogram execution	STATE OF THE OPEN COMME	40	PRINT	W,U	sage. The
rrors are displayed in line units and dig age on the display, debut is accomplished	memmoo egnado sim	feldinea one	1526	CONTRACT OF THE PARTY OF THE PA	signuo of
* If the 📧 Key is not pressed, the progra	AND THE RESERVE OF THE PARTY OF		Company of the Compan	e hist.	
THE THE TWEE INDIVIDUE DISSOCIATION DISCOUNTING		oc changes		THE WASHINGTON	100
* Be sure to press the Key to cancel the	e line number 50 ch	v zl 4 ažnos ange situati		worl use of	Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion	e line number 50 ch	v zl 4 ažnos ange situati	on.	to see how	Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion	e line number 50 ch n was accomplished	ange situation	on. Y PØ	work see of	Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion = M OC	e line number 50 ch n was accomplished MODE 0 LISTEXE	ange situation properly. READ 10	on. Y PØ		Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion = M OC Inc. 10 CHECK TO THE THE THE CASE ACKNOWLED THE THE THE CASE ACKNOWLED THE	e line number 50 ch n was accomplished MODE 0 LISTEXE	READ 10	Y PØ INPUT V=A*B		Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion = M OC - Check the list to make sure the deletion - M OC - M O	e line number 50 ch n was accomplished MODE 0 LISTEXE	ange situation properly. READ 10 20 30 35	Y PØ INPUT V=A*B W=V/2		Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion — M OC —	e line number 50 ch n was accomplished MODE 0 LISTEXE ment of the program by a	ange situation properly. READ 10 20 30 35	Y PØ INPUT V=A*B W=V/2 U=V*2	A, B When X <	Use LIST
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion = M OC - Check the list to make sure the deletion - M OC - M O	e line number 50 ch n was accomplished MODE 0 LISTEXE	READ 10 20 30 35	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT		Use LIST
* Be sure to press the AC Key to cancel the Check the list to make sure the deletion Check the list to make sure the deletion AC AC AC	e line number 50 ch n was accomplished MODE 0 LISTEXE	READ 10 20 30 35 40	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END	A,B When X	U. progra
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion Market Market	e line number 50 ch n was accomplished LISTEE THE TOTAL THE TOT	ange situation properly. READ 10 20 30 35 40 READ	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ	A,B W,W U,W	ergo (. U.
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion * Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check the list to make sure the deletion * ACKey to cancel the Check t	e tine number 50 ch was accomplished LISTEE THE PROPERTY OF	ange situation properly. READ 10 20 30 35 40 READ	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe	A,B W,W U,W	ergo (. U.
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion Market Market	e tine number 50 ch was accomplished LISTEE THE PROPERTY OF	READ 10 20 30 35 40 750 READ	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ	A, B When X <	ergo (. U.
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion • Check the list to make sure the deletion • Market and Check the list to make sure the deletion • Market and Check the list to make sure the deletion • Market and Check the list to make sure the deletion • Deletion of an entire line Input the same line number as the one to Example: Delete line 30.	e tine number 50 ch was accomplished MODE 0 LISTEXE AND THE INDUSTRIAL TO THE IND	READ 30 35 40 50 READ The results of the control of the cont	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe	A, B When X <	At this tim
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion • Check the list to make sure the deletion • Check the list to make sure the deletion • Deletion of an entire line Input the same line number as the one to Example: Delete line 30. • Input the line number to be deleted, i.e.	e tine number 50 ch was accomplished MODE 0 LISTEXE AND THE INDUSTRIAL TO THE IND	READ 10 20 30 35 40 50 READ t entire line	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be dele	A, B When X < W, U Inco edt, ed beganne edt ted. 89	At this tim
b. Deletion of an entire line Input the same line number as the one to Example: Delete line 30. Operation: Input the line number to be deleted, i.e.	e line number 50 ch was accomplished LIST EXE MODE 0 LIST EXE MODE 1 A PLANTAGE OF THE PROPERTY OF THE PR	READ 10 20 30 35 40 50 READ t entire line	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be dele	A, B When X < W, U Incompleted, and the property and the	At this tim
* Be sure to press the ACKey to cancel the Check the list to make sure the deletion • Check the list to make sure the deletion • Check the list to make sure the deletion • Deletion of an entire line Input the same line number as the one to Example: Delete line 30. • Input the line number to be deleted, i.e.	e tine number 50 ch was accomplished MODE 0 LISTER THE INDIANA MODE 10 A PUN FOR THE INDIANA Deposit of the Indiana MODE 11 E. 30.	READ 10 20 30 35 40 50 READ t entire line	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be dele 234567	A, B When X < W, U Inco ent, ent beganny entred. 89 and the propried entred. 9	At this tim
Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion M=M OC M	e tine number 50 ch was accomplished MODE 0 LISTER THE INDIANA MODE 10 A PUN FOR THE INDIANA Deposit of the Indiana MODE 11 E. 30.	READ 10 20 30 35 40 50 READ t entire line	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe 234567	A, B When X < W, U W, U The unneed the properties the properties the properties of	At this tim
Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion M=M OC M	e line number 50 ch was accomplished MODE 0 LIST EXE MODE 1 e. 30. LIST EXE MODE 1 e. 30. LIST EXE MODE 0 LIST EXE MODE 0 LIST EXE	READ To READ	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe 234567	A, B When x < W, U thought, so began and the pr miled satel 3 X ± A, B	At this tim So, delete This comp
Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the deletion ACKey to cancel the Check the deletion ACKey to cancel the deletion ACKey	e line number 50 ch n was accomplished MODE 0 LIST EXE MODE 1 e. 30. LIST EXE MODE 1 e. 30. LIST EXE MODE 0 LIST EXE MODE 1 LIST EXE MODE 0 LIST EXE	READ To REA	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe 234567	A, B When x < W, U Inco ent, ented, ented, ented, enter the properties of the prop	At this tim So, delete This comp
*Be sure to press the ACKey to cancel the Check the list to make sure the deletion *Check the list to make sure the deletion **ACKEY TO CANCEL THE ACKEY TO CANCEL T	e line number 50 ch n was accomplished MODE 0 LIST EXE MODE 1 PROPERTY OF THE PROPERTY OF	READ 30 35 40 50 READ t entire line READ READ 35 40 40 35 40 40 40 40 40 40 40 40 40 40 40 40 40	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe 234567 1534 Y PØ INPUT V=A*B U=V*2	A,B When x < W,U Incomplete the content of the content of the program of the pr	At this tim So, delete This comp
Be sure to press the ACKey to cancel the Check the list to make sure the deletion Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the list to make sure the deletion ACKey to cancel the Check the deletion ACKey to cancel the Check the deletion ACKey to cancel the deletion ACKey	e tine number 50 ch n was accomplished MODE 0 LISTEXE AND DESCRIPTION Description AND DESCRIPTION DESC	READ To REA	Y PØ INPUT V=A*B W=V/2 U=V*2 PRINT END Y PØ will be defe 234567 1534 Y PØ INPUT V=A*B U=V*2 PRINT	A,B When x < W,U Incomplete the content of the content of the program of the pr	At this times of the composition



This equipment's debug system is divided redisplay, so of about 30ART and assurbing as the first land as t	policy bemining the policy of	sk top debugotz of bns. ucture check check. on flow and mechanism	errors in	TOP COLUMN	type to the search of the sear	Conversation of the conver
This equipment's debug system is divided to display, so of about 30 ART and sear has been accounted. I. Desk Top Debug b. Part and the first that the Terror bearing the auto Using the display, check precomposition using the auto. The desk top debug is executed during program there the explanation of the conversation type. (2) Conversation Type Debug Any error made during program execution states.	pughly into despend of the public structural Debug ogram line unit must be supposed to the public structural Debug ogram line unit be supposed to the public structural Debug ogram execution matic checking lab fluest address mming.	sk top debugotz of bns. ucture check check. on flow and mechanism	g and or minos fl discrimi pro provi the O.T.	OTZ ad OT	messale and uses the Sing the	by an end and gudeb so This method by line. Debug us Example: 1.0
This equipment's debug system is divided to display, an of about 30 ART and search by a composition type debug. II. Conversation type debug. Using the display, check precomposition using the auto. The desk top debug is executed during program. Here the explanation of the conversation type. (2) Conversation Type Debug. Any error made during program execution statements.	oughly into des omplete Dubug ogram logic structial Debug ogram line unit will display ogram executio matic checking the structure.	check.	g and or minos Si dinamina propaga prop prop	TOP colored to the STO colored t	NO USES TO SEE THE SEE	aiv gudeb e This metho by line Cobug us Example: 10 20
Debug Systems I. Desk Top Debug b. Pa Pr II. Conversation type debug Using the display, check pr composition using the auto The desk top debug is executed during prograt Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	omplete Dubug ogram logic stru ogram line unit ogram line unit ogram executio matic checking ogram executio matic checking ogram executio matic checking ogram executio matic checking	check. on flow and mechanism	basaan pagajw May A May O T	OS POTA	ing the S Virte th Y = Q I NP U F OR	by line. • Debug us Example: 10 20
Debug Systems I. Desk Top Debug II. Conversation type debug Using the display, check precomposition using the auto The desk top debug is executed during program Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	ogram logic structural Debug ogram line unit PUNATION I via display ogram executio matic checking the fluest address mming.	check. on flow and mechanism	To X A., O.T.	Vol ¹ o† en V T T V X X X D BASIC	VYIGH Y=Q INPU FOR	• Debug us Example: 10 20
Debug Systems II. Conversation type debug Using the display, check pr composition using the auto The desk top debug is executed during program Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	ogram line unit HUNATI I via display Togram executio matic checking the fluest address mming.	check. on flow and mechanism	To X A., O.T.	Vol ¹ o† en V T T V X X X D BASIC	VYIGH Y=Q INPU FOR	Example: 10 20
Debug Systems II. Conversation type debug Using the display, check pr composition using the auto The desk top debug is executed during program Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	ogram line unit PUNATI via display ogram executio matic checking lo fluestadi ese mming.	on flow and mechanism	A OT	, M TI t = 1 X * X	Y=Q INPU FOR	10
Debug Systems II. Conversation type debug Using the display, check pr composition using the auto The desk top debug is executed during program Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	ogram line unit PUNATI via display ogram executio matic checking lo fluestadi ese mming.	on flow and mechanism	errors in	BASIC	YEQ INPU FOR Y=Y+	20
II. Conversation type debug Using the display, check pr composition using the auto The desk top debug is executed during prograt Here the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	PUNET via display ogram executio matic checking to fluest address mming.	on flow and mechanism	errors in	BASIC	1 NPU - FOR + Y = Y	
Using the display, check procomposition using the auto composition using the auto the desk top debug is executed during programe the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	via display ogram executio matic checking la fluented mai mming.	n flow and mechanism	errors in	BASIC	+Y=Y	
Using the display, check procomposition using the auto composition using the auto the desk top debug is executed during programe the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	ogram executio matic checking to fluest addess mming. debug via the c	n flow and mechanism	errors in	BASIC		30
composition using the auto themsels 90.12 and policy good rose. The desk top debug is executed during prograthere the explanation of the conversation type (2) Conversation Type Debug Any error made during program execution st	matic checking to fluest add eac mming. debug via the c	mechanism			NEXT	O.P.
The desk top debug is executed during program. Here the explanation of the conversation type. (2) Conversation Type Debug. Any error made during program execution st	mming.		or the c	-1- 1- a		e ₀₀
The desk top debug is executed during program. Here the explanation of the conversation type. (2) Conversation Type Debug. Any error made during program execution st	mming. debug via the c	JEXT loop,		aicuiato	END.	7.0
(2) Conversation Type Debug Any error made during program execution st	debug via the c	P.03 = 21		or Daniel Y	to sulsy	ant see of
(2) Conversation Type Debug Any error made during program execution st		tors and the second second		erousies to	AN ANT	reid leevered
Any error made during program execution st	AND ESTIMATE	s OA enit ne				remedition.
Any error made during program execution st	7 459					4-4-4
	age will be give	on on the di	enlav uei	ina an a	rror mae	eano Thoso
sage on the display, debug is accomplished by	conversation us	sing the mar	nual.			
Furthermore, for the meaning of the error me	ssages, see page	65 for the	error me	ssage lis	t, deb	e by_debing debing car
Example: The valou of Yes	YES	7569			Hald GO	10% Fridays
READY PO X TURNI OL	(0)(2009)					
20 IF X≤0; PRINT"X≤0"	GOTO 10	P0-4				
30 Y=X12+3*X+15	A DOLL					
40 PRINT Y 50 END	(8) V 81 (18)	ad hereafter				
Line 20 of the above program is a judgement			war Iv	1 12 \ \A/F	han v	0 program
execution will return to the INPUT statement						
$Y = X \uparrow 2+3X+15$ was entered on line 30 in th						
						12 01 0404 1940
Operation: If this program is executed, "?" is	s displayed using	g the INPU	Γ statem	ent on I	ine 10.	
MODE) (RUNEXE	?				
statement and request the value of Y again.	the next 510P	te gate the	ti ,nisps	871618-0	acagong.	ett osetifu)
• At this time, input 45°T8	1 50					
15138	4500	ERR2	PØ-3	0		
				-	5371=	7 19 19 19 19
• This error message indicates that a statement	and photosome	a solidas pa				

desk for debug So, if the check of variable is performed ton [1] [100] 2A on and corrected.

LIST 30EX

P 1234567893 to brist aidt priau 30 Y=X 12+3X±

• Since "X" is missing between "3" and "X" on line 30, correction is made using the program edit method.

- S ...

Y=X 12+3_X 40 PRINT Y_

* EXE

■ Program Debug (3) Program Debug during Program Execution Conversation type debug is debug that is performed using the information obtained from the calculator by an error message. However, if an error is not displayed but the calculation result is not as expected, repeat program execution and conduct debug by confirming the calculations along the way. In amount a sufficient program execution and conduct debug by confirming the calculations along the way. This method uses the STOP command to stop program progress and uses the TRACE mode to debug line by line, a PRINT M.L. a. Complete Dubug Debug using the STOP command bend enurgated in program I. Desk Top Debug Example: Write the following program, b. Partial Debug Opera10 Y=0 INPUT N, X 20 30 FOR I=1 TO N 40 Y=Y+X*X II. Conversation type debug via display: TRIJ 50 NEXT I Using the display effect program execution flow and errors in Y TRIPS composition using the automatic checking mechanism of the calculated DNA 900 - 014 To see the value of Y in the FOR NEXT loop, see the result of each loop using the STOP statement. he desk top debug is executed during programming. Operation: The best place to input the STOP statement is right after the calculation formula, so write the Change to STOP statement between line 40 and line 50. MODE 1 **123456789** 1518 eren none and model begal do no menters 45 STOPEE valge 45 neSTOP nil ni bevelgab en · By doing this, the program progress is stopped after the completion of the calculation on line 40 and debug can be performed. Use LIST to see how the congram content MODE Ø READY PO RUNEXE 4 EXE 87 EXE ine 20 of the above program: If of the input range of power $(x\uparrow y)$. When x < 0, program Cursor blinks and sent of muter life northoexe • What is the value of Y at the time of this stop? Vd me good and in QE STOP Cha aid! discipal you using the INPUT statement on line 10. 7569 • When the program starts again, it will stop at the next STOP statement and request the value of Y again. ♠ At this time, the consent of the 20 wire EXE 15138 Y EXE ERR2 PO-30 By repeating this operation, the calculation process can be seen. This example uses a simple program but when a complicated program is actually composed, it is very difficult to check the calculation process using desk top debug. So, if the check of variable is performed using this kind of STOP statement, program errors can be seen and corrected.

Debug using TR (trace) mode			wareness and the second of the second
If program execution is performed using the T	R mode (pres	ss Mode 2), it wil	I execute each line and then
stop and execution debug can be performed	easily. Using	the previous STC	
sample debug using the TR mode.	15回	?	4-5-1 Jump and Loop
Operation:		18	# Jump Commands
ands. One is called a GOTO statement and is an	smmoofbwa bi nidoregranui	adly separated inter is a consistency	Jump commands can be brounconditional jump, The oth
Designate the RUN mode		READY PO	
Wilshollibn Designate the TR mode. 3. 11. 23.3808			The GOTO statement is or
	RUNE	P0-10	STOP HE IDO IQ SIL SECTION OF
nine the sum, difference, product and quotient	mal (b) EXE 116 TO	orogediji mishet	Example 1: Add a GOTO sta
Check the execution process ,	STOP	? TR	STOP
Flow Chart	STOP	PØ-20 TR	STOP
Continue program execution.		?	"TR" and "STOP" will be omitted hereafter.
For this program, using the GUALL statement.	4 EXE	it ? the end, it	returns 8+A=3, r0\$r, 10
"INPUT A, 6". Also, as in this example if a designated line. However, existed o's selection	87EE	an d 10 to 95 an	o writtes that que a los
designated program area.	STOP	PØ-20	50 Q=A/B
GOTO 10 (Jump to line 10 and execute	EXE 163	PØ-30	50 PRINT S.D
COTO #5 (Jamp to program aleas 6 an		P0-40	
Example 2. The value of Y	Y EXE	7569	
10 A=1	EXE : Sta	P0-45	
20 PRINT A			
30 A=A+1 \ Obs. 9.0.0	Reneate	ed hereafter	
40 GOTO 20	1100001		
Debug using the TR mode is ideal for checking mistakes have been made. at the material OTOD & oz. Vibersener stab tream. Jugni ed of a stab entremelle notation regard as	יסופט ער "HUN" נס ו	must be allowed	Whenever this is executed, it
ine 10. The program is shown below neitanalqua	er somui vile	10) uncondition	This GOTO statement (GOTC
At time 30, the result when the GOTO 20.	rements of 1, resigned to A ht. state mices	It is necessary to a state of the ties, "A = A + sary to jump to in	20 S=A+B 30 D=A-B 40 P=A×B
8-A-G			
Note: When using the GOTO statement ATS number. If the line number is omitted to			
PRINT Statement Application The PRINT statement uses; in this program the designations following the operand one of the program of the operand of the operan	outpo \		
Display stops after 5. To display the Dipress to press the care part of the press the care of the press the care of the press the care of the press the pres		hat is, if items are	ent, ammos a vd betarages of the this program, once the data be input right away.

4-5 Program Commands

4-5-1 Jump and Loop and conduct define by confirming the calculation being A Tent policy pudeb alomas

■ Jump Commands

Jump commands can be broadly separated into two commands. One is called a GOTO statement and is an unconditional jump. The other is a conditional jump combined with an IF statement.

Designate the RUN mode. (Mod) 6-1

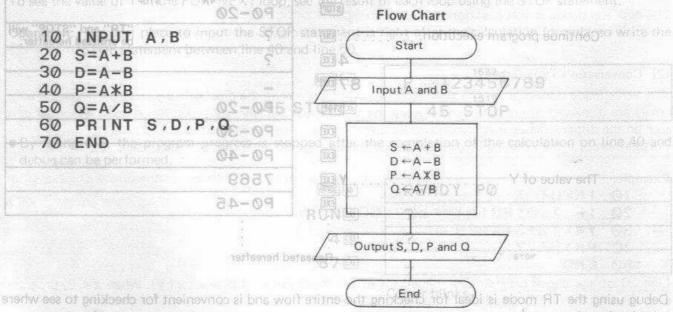
GOTO Statement

The GOTO statement is called an unconditional jump because it is a command that unconditionally advances the program to a designated location (line number).

01-09

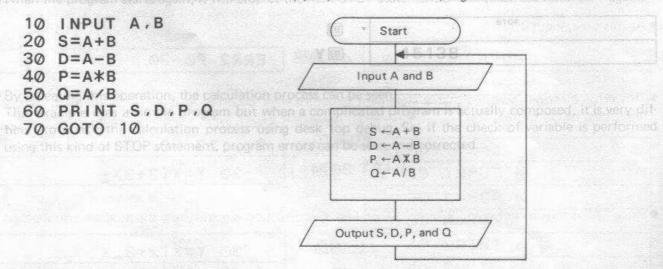
Example 1: Add a GOTO statement in the program to determine the sum, difference, product and quotient of the data A and B.

First, the fundamental program is shown below.



Whenever this is executed, it must be allowed to "RUN" to insert data repeatedly. So a GOTO statement is input at line 70 instead of END so control will return to the proper location where the data is to be input. (Line 10 in this program)

This GOTO statement (GOTO 10) unconditionally jumps to line 10. The program is shown below.



In this program, once the data is input, it goes to an await input stage (? is displayed) and the next data can be input right away.

-35-

20 PRINT A:

RUNEX Operation: ? 15 EXE In this program, William 1812 918 81 3 EXE 18 For A=1, 6010 460 mana long to the 576 12 EXE For A=3, GOTO 300 means tump to line \$80 EXE 45 946 860 388 EXE 5 860 38828 21 2 EXE 903 EX 43 EXE 946 each result. The "+" is not displayed at the slon unifications, on the depley, one soon EXE 38829 1801204505 21

For this program, using the GOTO statement, which is input at the end, it returns to line number 10 "INPUT A, B". Also, as in this example, if a line number is written after GOTO, it will jump to the designated line. However, instead of a line number, if "#" and "0 to 9" are written, it will jump to a designated program area. B, C. Dr. E: ENGBRUS

Example:

GOTO 10 (Jump to line 10 and execute from line 10)

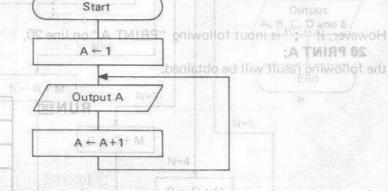
GOTO #5 (Jump to program area P5 and execute P5 program)

Example 2: Make a program to increase the value of A by increments of 1,

10 A=1 20 PRINT A 30 A=A+1 40 GOTO 20

3 4 5 6

23456



Explanation:

Since A is increased in value sequentially in increments of 1, it is necessary to assign an initial value of 1 to A. That is, "A=1" on line 10.

Next, PRINT A

At line 30, the result when 1 is added to A is assigned to A. That is, "A=A+1". Then since the program process causes a jump using the GOTO statement, it is necessary to jump to line 20 instead of returning to the beginning. So it becomes GOTO 20.

In this manner, the GOTO statement causes the program process to jump unconditionally to a designated location avoid across beauticined by the property of the control o indirect designation determines the jump destinates according to the value of the varieties varieties in the dated

Note: When using the GOTO statement, it is necessary to be sure to designate the correct destination line number. If the line number is omitted from the GOTO statement, an error will occur, about a borden

PRINT Statement Application 2 Justin 10 line 42, in this manner, earning of statement in the plant of the pla

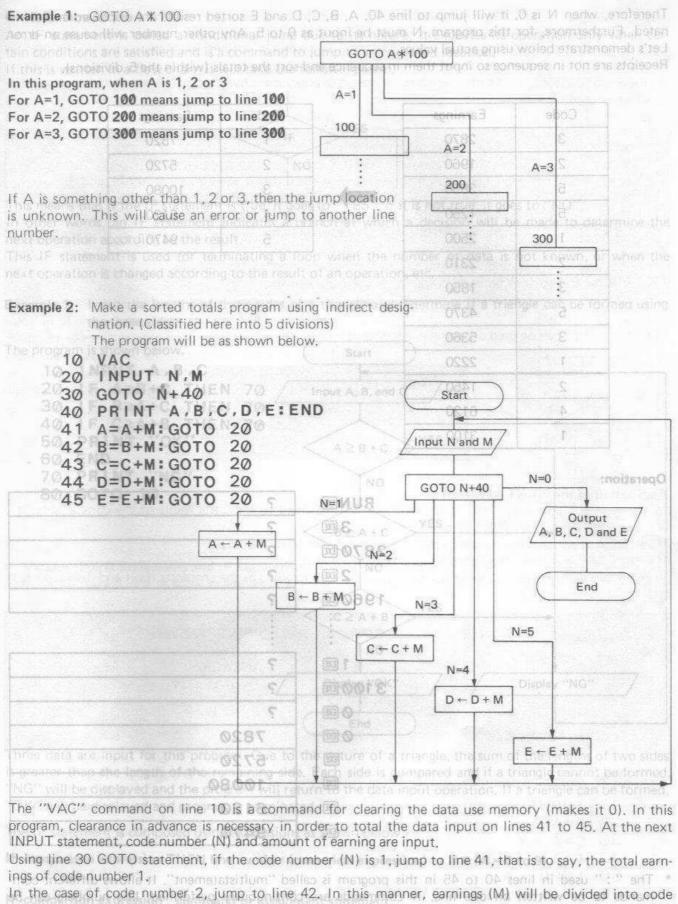
The PRINT statement used in this program changes the manner of display in accordance with the delimiter designations following the operands.

First, for example 1, S, D, P and Q are separated by a "," (comma).

Display stops after S. To display the D, press the EXE Key. That is, if items are separated by a comma, the results will be displayed one at a time. If the "," is a ";", what will the display be like? The result will be as follows The result will be as follows.

Operation:			a securior: Liquid data 15 and 2 and 203 and 40
		RUNE	?
45-1 Jump and Loop	5	15 EX	?
TO I build our coop		3 EXE	18 12 45 5 STOP
Sump Commands	81	EXE	2
tomp commends can be breadly separ		903 EXE	that he is tailed a GOTO statement and is in
r conditional jump. The other is allon	C Must	431	946 860 388
GOTO Statement	-8	4300	
the GOTO stitlement is catled about	nconditio	onal (m) sp. 5a	860 38829 21
played sequentially. Of Casallement at	erates wh	nen there are	several results and causes everything to be dis
Furthermore, on the display, one sp column but is actually present.	ace appe	ears after eac	h result. The "+" is not displayed at the sign
Column but is actuary present.	BBEIGH	(iid) -	
_{\(\psi\)} 18 _{\(\psi\)} 12 _{\(\psi\)} 45 _{\(\psi\)} 5	21	30	Flow Chart
			or this program, using the GOTO statement NPUT A, B*. Also, as in this example, it a
However, if ";" is input following "I 20 PRINT A; the following result will be obtained.	rements	oni yd AEXE) ei	GOTO #5 (Jump to program ala 20 sed sample 2: Make a program to increase \$4.50 pc 10 A=1 20 PRINT A 30 A=A+1 40 GOTO 20
the following result will be obtained.		1	End)
Ahonever this is executed it must be	1	RUNE	1 2 3 4 5 6
input at line 70 instead of END so of		resum to to	1 2 3 4 5 6 december to be input.
(Line 10 in this program)	F+A	\ → A	2 3 4 5 6 7
This GOTO statement (GOTO 10) und	andraion	1 ally humos to	2 3 4 5 6 7 maintenaire
			ng ni ni 3 li 4 n 5 p 6 s 7 v 8 b assatani al A con
20 S=A+B			· UI SHI NO 1 = A , 21 TERT .
	isplayed	A or bonole by using ";	ext, PRINT A t line 30, the result when t is added to A is a ocess causes a jump using the GOTO statemen
indirect designation determines the when the jump destination cannot	gnated the jump de be writt	ne jump design estination accion an at the be	gnation directly and caused jump. However, the cording to the value of the variable. It is use ginning of the program as when the operation of bettimo a radium and at the continuous control of the program as when the operation of the program as when the operation of bettimo a radium and at the control of the program as when the operation of the program as when the program

This uses the value of the variable (A,B,X,Y, etc.) or the numeric expression (A+B, X+10, etc.) to determine which line number to jump to or which program area to jump to.



omitted and memory can be saved. Using this multistatement, many commands cand of learned and memory can be saved.

Harington N=1 : GOTO 41 → 41 → 41 → A=A+M : GOTO 20 Execute to an interest transmitted to the left N=2 : GOTO 42 -> 42 star B=B+M : GOTO 20 Execute s to the destroyed Scrober

words, f N=3 : GOTO 43 → 43 m or C=C+M : GOTO 20 Execute agree carried be formed. So,

THEN N=4 : GOTO 44 -> 44 -- D=D+M : GOTO 20 Execute and violent DAVA : stoll

N=5 : GOTO 45 →45 E=E+M : GOTO 20 Execute

Therefore, when N is 0, it will jump to line 40. A, B, C, D and E sorted results are displayed and terminated. Furthermore, for this program, N must be input as 0 to 5. Any other number will cause an error. Let's demonstrate below using actual values.

Receipts are not in sequence so input them in sequence and sort the totals (within the 5 divisions).

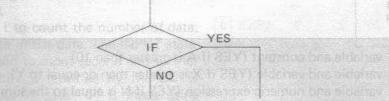
	Code	Earnings			gmui zasam 801 gm Earnings 805	
	3	2870	9/8 ⁶ / [2]		qmы 7820 00E	
	2 ε=A	1960		2946	850 ₅₇₂₀ 8	
	5	3850		3800		nintsmoa at A' t
	5	1250	ump on unit	963 6661 2 30 2 061 4 10 101	te na o6120 liw si	t was somethin s unknown. Th
he ; " laved sci	1 008	2500	s when there a	5	9470	ything thedrou
urtherm		alay 2310 page	g pears after ea	ch result. Th	e "4" is not displ	ayed at the sig
Murren lab	1 18 81 Junity 51	1850				
	105_12_	45_4370			ike a sorted totals	
	3	5360			tion. (Classified her e program will be a	
Iso, 11 e	ample ₁ c is are	2220 The res	oft wiff be as sho		AC DA	10 V
peretion	2	1450			NPUT N.M	
	4	6120	RUNGOL	19:900.	OTO_N+40_ RINT_A.B.C	
	1		(E)	200	=A+M:GOTO	
L		M 31,00 jugni		20	0100:M+8=	
Ingration	· Onla		1 650	100	=C+M:COTO	
peration	: 0=W	GOTO N+40	(CE)	204	@TOD:M+0=	44 0
	N=0 :	GOTO N+40	RUNE	200 2		44 0
70 E/	Output A, S, C, D at		RUNEXE 3EXE	2005 7 005 7	= D+M: GOTO = E+M: GOTO	44 0
Owever, 25 Phi	Output A, 8, C, D at Uden H C, T	Liefowing "PRII-	RUNŒ 3Œ 2870Œ	204 20. \$ 20. \$ 20. \$	= D+M: GOTO = E+M: GOTO	44 0
\3 to lowever, 25 Phi	Output A, B, C, D at U(8) H C h	Liefowing "PRII-	RUNE 3 EXE 2870 EXE 2 EXE	? 05 ? 05 ? ? ?	= D+M: GOTO = E+M: GOTO	44 0
Ja bri lowever 25 Phi	Output A, 8, C, D at Uden Hill T ; A TM:	Liefowing "PRII-	RUNEE 3EE 2870 EE 2EE	204 20. \$ 20. \$ 20. \$	=D+M:GOTO =E+M:GOTO	44 0
Ja bri lowever 25 Phi	Output A, 8, C, D at Uden Hill T ; A TM:	t to towing "PRIII be obtained E=M	RUNE 3 EXE 2870 EXE 2 EXE	204 ? 02 ? ? ? ?	0100:M+0= =E+M:GOTO A	44 0
Owever, 25 Phi	Outgan Outgan A, B, C, D an Outgan A; A F st.	t to towned (PRII) be obtained E=M	RUNE 3 EXE 2870 EXE 2 EXE 1960 EXE : : : : : : : : : : : : : : : : : :	2 0 S ? 0 S ? L ? M * A ? * B ? * B ?	=D+M:GOTO =E+M:GOTO	44 0
\3 br lowever, 26 PRI	Outgan Outgan A, B, C, D an Outgan A; A F st.	t to owing "PRIII be obtained E=W	RUNEE 3EE 2870EE 2EE 1960EE	7 .0% ? .0% ?	OTOD:M+G= OTOD:M+3= A	44 0
\3 to lowever, 25 Phi	Outgan Outgan A, B, C, D an Outgan A; A F st.	t to towned (PRII) be obtained E=M	RUNE 3 EXE 2870 EXE 2 EXE 1960 EXE 1 EXE 3 100 EXE 1 EXE 3 100 EXE 1 EXE 3 100 EXE 1	? 0% ? 0% ? 1 2 ? 2 3 ? 3	OTOD:M+G= OTOD:W+3= A	44 0
loweder 25 Phi	Outgan Outgan A, B, C, D an Outgan A; A F st.	t to owned "PRIII" he obtained E=M A=M	RUNEE 3 EXE 2870 EXE 2 EXE 1960 EXE 1 EXE 3 100 EXE 0 EXE	? .0% ? .0% ?	OTOD:M+G= OTOD:W+3= A	44 0
3 br 26 PRI	Outgard A, 8, C, D at Udan H (C, T) at (A W (B) (A W (B)	t to towns "PRIIIs be obtained E=W M A=W	RUNEE 3 EXE 2870 EXE 2 EXE 1960 EXE 1 EXE 3 100 EXE 0 EXE 0 EXE	7 0 S ? 0 S ? 1 2 ? 2 3 ? 3 4 7820	OTOD: M+G= OTOD: M+3= 3 4 5 6 3 4 5 6 4 5 6 7 5 6 7 8	44 0
26 PRI	M + 2 - 3	t to owns "Rills the obtained E=W M A=W M+G = Q	RUNEE 3 EXE 2870 EXE 2 EXE 1960 EXE 1 EXE 0 EXE EXE	? 0% ? 0% ? 2 ? 2 ? 2 ? 3 ? 3 ? 3 7820 5720	OTOD:M+G= OTOD:M+3= A	44 0
26 PRI	M+3-3 M+3-3 M+3-3	t to owns "PRII- the obtained E=W M+G+Q results the obspla	RUNEE 3EE 2870 EE 2EE 1960 EE 1	? 0% ? 0% ? 0% ? 2 ? 2 ? 2 ? 3 ? 3 ? 3 ? 3 7820 5720	OTOD:M+G= OTOD:W+3= A 5 6 3 4 5 6 4 5 6 7 4 5 6 7 8	44 9 45 E
13 by 26 Philips 1 Victoria	M+3-3 Control M+3-3 Control Mi+3-3	t to owns "Rills the obtained E=W M A=W M+G = Q	RUNEE 3 EXE 2870 EXE 2 EXE 1960 EXE 0 EXE EXE	? 0% ? 0% ? 2 ? 2 ? 2 ? 3 ? 3 ? 3 7820 5720	OTOD: M+G= OTOD: M+3= A	Q AA 3 65

^{*} The ":" used in lines 40 to 45 in this program is called "multistatement". It allows different commands to be written on one line. If commands are continuously performed, line numbers can be omitted and memory can be saved. Using this multistatement, many commands can be combined. However, the number of characters that can be written on one line, including the line number, is limited to 62 characters.

Note: A VAC (memory clear) command cannot be used in a multistatement, 44 CTO : 4=M : GOTO 20 Execute

If Statement in the number is written following "THEN" it will unpolled the distinguished with the members at it

An IF statement is called a conditional jump due to its nature. It executes its operation only when certain conditions are satisfied and is a command to jump to a designated location. To the property of the conditions are satisfied and is a command to jump to a designated location. If this is written in a flow chart, it will take the following form. "VBHT" to bestern best at 2, 2, amujus to In these comparisons, constants, variables, numeric expressions, characterizons, and and characterizons

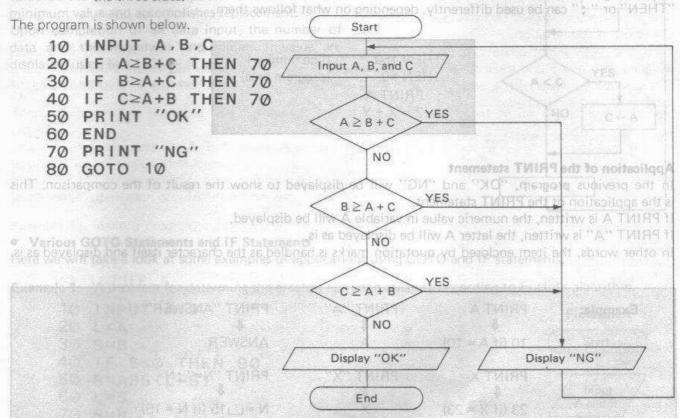


This means that if the IF statement is true, it goes to "YES", if it is not true, it goes to "NO".

In other words, an IF statement indicates a branch at which a decision will be made to determine the next operation according to the result.

This IF statement is used for terminating a loop when the number of data is not known, or when the next operation is changed according to the result of an operation, etc.

Example 1: Input the lengths of three sides of a triangle and determine if a triangle can be formed using value of the the three sides, put or smaller than the



Three data are input for this program. Due to the nature of a triangle, the sum of the lengths of two sides is greater than the length of the remaining side. Each side is compared and if a triangle cannot be formed, "NG" will be displayed and the program will return to the data input operation. If a triangle can be formed, "OK" will be displayed and program is terminated. A TURNI OF

20"B=A

IF A=O THEN

A>B:BCA

The IF statement is composed using expressions as shown below.

YES ATO IF comparison expression THEN line number (numerical expression) or #n (n= 0 to 9) SOLINPUT A or

IF comparison expression; command or assignment statement

The comparison expression following "IF" compares the right side of an equality or inequality sign with the left side. If YES, it will proceed after "THEN" or ";". If NO, it proceeds to the next line. In other words, for line 20, if A is greater than or equal to the sum of B and C, a triangle cannot be formed. So, "THEN 70", in other words jump to line 70, command is performed. This "THEN" includes the GOTO statement function. 120 END

If a line number is written following "THEN", it will jump to the designated line number. If "#" and 0 to 9 are written, it will jump to a program area (P0 to P9). Oming ignorphic a believ all insmerses Troop Also, when the comparison expression is YES, if a command or assignment statement is desired instead of a jump, ";" is used instead of "THEN". Innot provoled said that it was the notation as a side if In these comparisons, constants, variables, numeric expressions, character constants and character variables can be used.

A>10	variable and constant (YES if A is greater than 10)
X≥Y	variable and variable (YES if X is greater than or equal to Y)
N = L + 3	variable and numeric expression (YES if N is equal to the sum of L and 3)
A\$ = "XYZ"	character variable and character constant (YES if the character string in AS is equal to "XYZ")
P\$ \(\frac{1}{2}\) Q\$	character variable and character variable (YES if the character string in PS is unequal to the character string in Q\$)
* Comparison	of variables with character variables cannot be performed.
	ring comparison applies to the ASCII codes.

"THEN" or "; "can be used differently, depending on what follows them.

INPUT A.B. **THEN 150** (line number) 1F A28+C THEN #9 (program area) B≥A+C THE PRINTA C≥A+B THEM 71 20 Z = X + YPRINT "OK" 00 END "DN., PRINT 703 01 0100 08

Application of the PRINT statement

In the previous program, "OK" and "NG" will be displayed to show the result of the comparison. This is the application of the PRINT statement.

If PRINT A is written, the numeric value in variable A will be displayed.

If PRINT "A" is written, the letter A will be displayed as is.

In other words, the item enclosed by quotation marks is handled as the character itself and displayed as is.

Example:	PRINT A ↓	PRINT "A"	PRINT "ANSWER"
100	10 (if A = 10)	A	ANSWER
	PRINT X	PRINT "X"	PRINT "N=";N
	23 (if X = 23)	h X	N = 15 (if N = 15)

Obtaining maximum and minimum value is shown below.

- 10 INPUT A
- 20 B=A
- 30 C=A
- The JF statement is composed using a massions as shown below

OK" will be displayed and program to terminated.

- 15 comparison expression THEN line number (numerical expression) or # n (n = 0 to 9) 1 = 1 04
- 50 INPUT ne A 40 to 45 in this program is called "multistatement". It allows different com-
- 60 LF A=0 THEN 110 memoral transplate to branched their expression of their expression of the state of the state of their expression of the expression of their expression of the expression of the expression of their expression of the expression o
- omiti70 at FncA>B; B=A saved. Using this multistatement, many commands can be combined. The comparison expression of the polyment state of the principle of the pr
- the left side. If YES, it will proceed after "THEN" or ";". If NO, it proceeds to 1+ 1=1 in 00 activer words, for line 20, if A is greater than or equal to the sum of B and C, a trian \$2.000 0000. So,
- Mote: 110 CPRINT of BC can begretores a beams of Question of the words and on "OT MEHT"
 - - 120 END

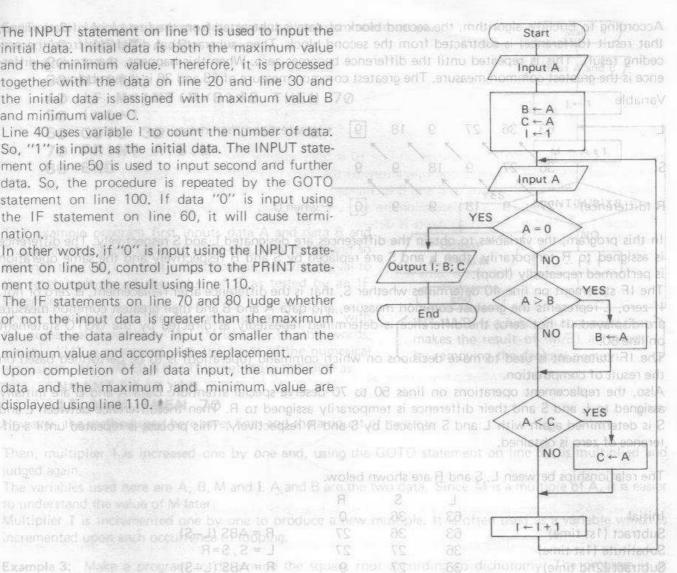
The INPUT statement on line 10 is used to input the analysis backers and the initial data. Initial data is both the maximum value noose and most become and the minimum value. Therefore, it is processed some affile and film best together with the data on line 20 and line 30 and or leatest entire. the initial data is assigned with maximum value B 70 and minimum value C.

Line 40 uses variable I to count the number of data. So, "1" is input as the initial data. The INPUT statement of line 50 is used to input second and further data. So, the procedure is repeated by the GOTO statement on line 100, If data "0" is input using the IF statement on line 60, it will cause termi-

In other words, if "O" is input using the INPUT statement on line 50, control jumps to the PRINT statement to output the result using line 110.

The IF statements on line 70 and 80 judge whether or not the input data is greater than the maximum value of the data already input or smaller than the minimum value and accomplishes replacement.

Upon completion of all data input, the number of data and the maximum and minimum value are to the maximum and minimum a displayed using line 110. And notes as bangiese virus as signed to a displayed using line 110.

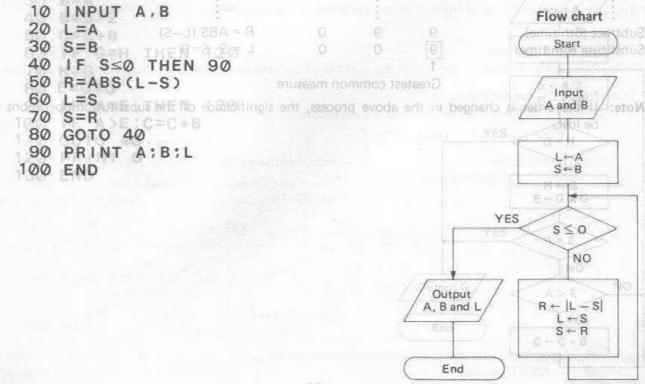


Various GOTO Statements and IF Statements

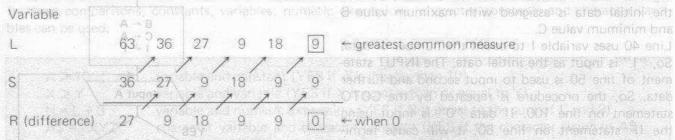
Here we will take a look at some examples of applications using GOTO and IF statements, and businesses a specific statement of the statements of applications using GOTO and IF statements.

R=8,8=1

Example 1: A program for determing the greatest common measure according to Euclid's algorithm.



According to Euclid's algorithm, the second block of data is subtracted from the first block of data. Then, that result (difference) is subtracted from the second block. Then, subtract that difference from the preceding result. This is repeated until the difference becomes zero. When this happens, the previous difference is the greatest common measure. The greatest common measure of 63 and 36 is shown below.



In this program, the variables to obtain the differences are designated L and S respectively. The difference is assigned to R temporarily, then L and S are replaced by S and R respectively and the same operation is performed repeatedly (loop).

The IF statement on line 40 determines whether S, that is the difference after replacement, is zero or not. If zero, L represents the greatest common measure, and data A and B and their greatest common measure are displayed. If not zero, the difference is determined repeatedly as directed by the GOTO statement

The IF statement is used to make decisions on which command (operation) is to be performed based on the result of computation.

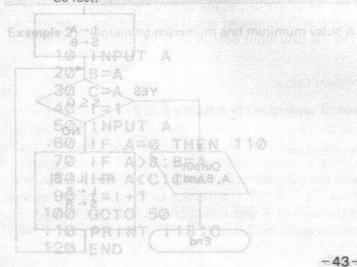
Also, the replacement operations on lines 50 to 70 deserve special attention. Data A and B are initially assigned to L and S and their difference is temporarily assigned to R. Then the difference between L and S is determined again with L and S replaced by S and R respectively. This process is repeated until a difference of zero is obtained.

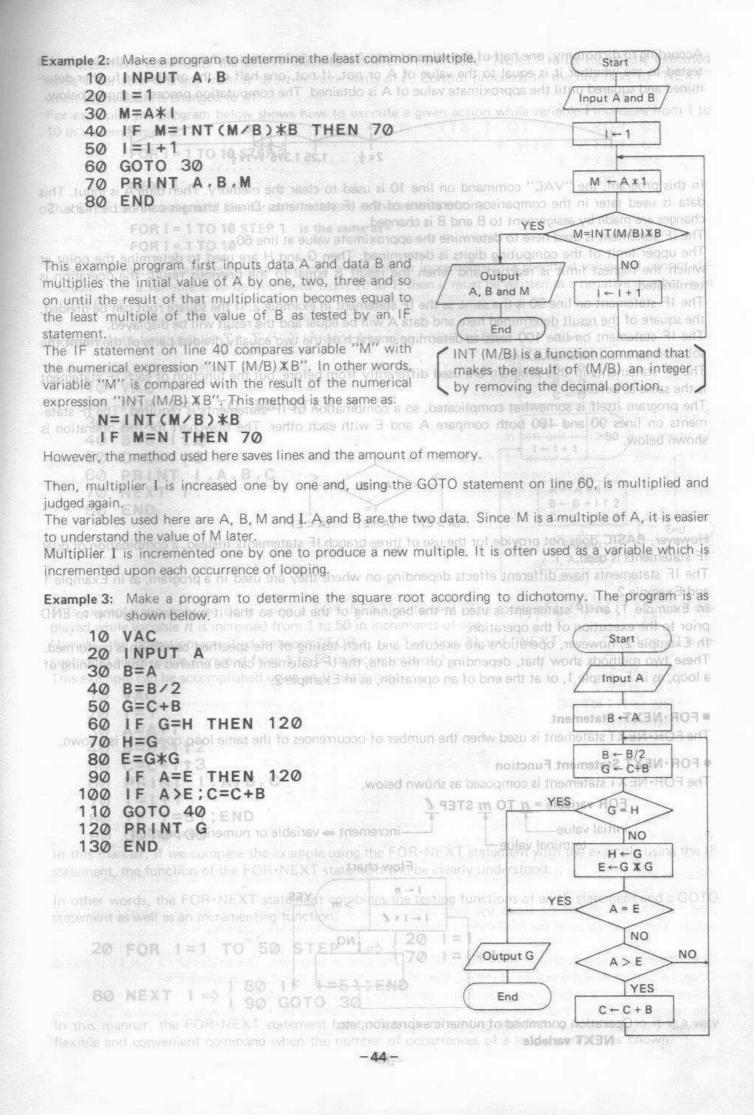
The relationships between L, S and R are shown below.

	L	S	R	
Initial	63	36	0	71
Subtract (1st time)	63	36	27	R = ABS (L-S)
Substitute (1st time)	36	27	27	L = S, S=R
Subtract (2nd time)	36	27	9	R = ABS (L-S)
Substitute (2nd time)	27	9	9	Various GOTO Statements at R ±2 \$2 ±0 gents
Subtract (3rd time) names	12 91 1 27 1 O	TO gent	zu 21 18 765	Here R = ABS (L=Spe to 4001 6 sast Time aw 316
Substitute (3rd time)	9 1 politico 200	18	18	L = S, S=R
6.546.54	100 A	179		PRINT AND MARTURAL OF
Subtract (6th time)	9	9	0	$R = ABS (L-S)$ $A = 3 \cdot DS$
Substitute (6th time)	MA [9]	0	0	L = S, S=R 8#8 05
	1			AC IF SKO THEN SO
	Great	est comn	non measi	ure (844))88A=8=08

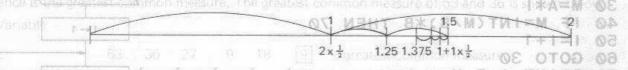
Note: If the order is changed in the above process, the significance of the substitution operations will be lost.

90 PRINT A:B:





According to dichotomy, one half of the value of data A is first determined and the square of the one half is tested to see whether it is equal to the value of A or not. If not, one half of the one half is further determined and squared until the approximate value of A is obtained. The computation process is shown below.



In this program, the "VAC" command on line 10 is used to clear the memory. Then data A is input. This data is used later in the comparison operations of the IF statements. Direct changes cannot be made. So changes are made by assignment to B and B is changed.

The IF statement is used here to determine the approximate value at line 60.

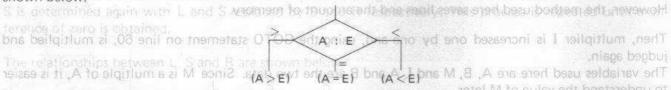
The upper limit of the computing digits is determined. Then G and H are used to determine the point at which the highest limit is reached and when the result is equal to the previous result, the operation is terminated. of 5 tempo and M see 8 A and

The IF statement on line 90 is the same as the IF statement in example 2. If the square root can be divided, the square of the result determined here and data A will be equal and the result will be displayed.

The IF statement on line 100 tests to determine in which of the two equally divided parts of the result the solution (approximate value) lies. MaTANE Your

The IF statements in this program are used differently from before, but the function of each IF statement is the same as before about privation and also or

The program itself is somewhat complicated, so a combination of IF statements is required. The IF statements on lines 90 and 100 both compare A and E with each other. The flowchart for this operation is shown below.



However, BASIC does not provide for the use of three-branch IF statements. Instead, a combination of dual IF statements is used.

The IF statements have different effects depending on where they are used in a program, as in Example 1 Example 3: Make a program? to Jd@@mnine the square root according to dichotomy. This S algmax 3 bns

In Example 1, an IF statement is used at the beginning of the loop so that it may cause a jump to END prior to the execution of the operation.

In Example 2, however, operations are executed and then testing of the specified condition is performed. These two methods show that, depending on the data, the IF statement can be entered at the beginning of a loop, as in Example 1, or at the end of an operation, as in Example 2. 40 8=8/2

50 G=C+B

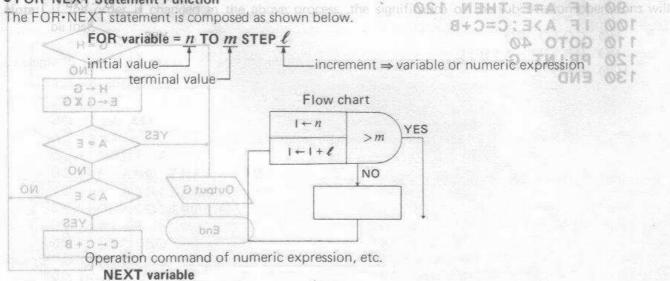
120

FOR NEXT Statement

The FOR NEXT statement is used when the number of occurrences of the same loop operation is known.

THEN 120 -

FOR·NEXT Statement Function



This statement commands the action specified between "FOR" and "NEXT" to be repeatedly executed while a variable changes from n to m in increments of ℓ . Control proceeds to the line next to "NEXT" when the variable is changed to m.

For example, the program below shows how to execute a given action while variable I increases from 1 to 10 in increments of 2.

30 PRINT SIN I I NIS TRIPS 08
40 NEXT I 000 COTO 30

This STEP can be omitted if the variable increases in increments of one.

FOR I = 1 TO 10 STEP 1 is the same as FOR I = 1 TO 10

* The FOR*NEXT statement only increases a variable in increments of a specified value and cannot decrease it. If a variable is to be decreased from 10 to 1, then it must be written as a negative number as in USTEP_1120 10.0 to streament in 1 of 0 mort shortening and seminated at the streament of the streament o

Example 1: Make a table of $\sum_{i=1}^{n} i$, $\sum_{i=1}^{n} i^2$, $\sum_{i=1}^{n} i^3$, with n ranging from 1 to 50. "MODE 4" of tine of A This program is shown below COM" lelphs to Jinu and not "earpeb" vhoach y by the company of 10 VAC A C COTENI 20 FOR I=1 TO 50 STEP 1 ■ Various Loops 30 A=A+1 1-1 40 B=B+1+2 >50 $1 \leftarrow 1 + 1$ integers in which each integer is equal to the C+1+3 = 0.05 eding integers. In other words, the sum of the first and second numbers is 2.8 A. I TNIR9 (00 un of the second and third AuthAer's is equal to the fourth number, etc. 70 B ← B + I 1 2 80 END C+C+113 End Output I, A, B, C 10 A=0: B=

This example can only be done using a FOR•NEXT statement. The totals of i, i^2 and i^3 ($\sum_{i=1}^n$) are displayed while variable n is increased from 1 to 50 in increments of one. Namely, the operation specified between "FOR...." on line 20 and "NEXT...." on line 70 is repeated 50 times as I is increased from 1 to 50 in increments of 1. This example can be accomplished using an IF statement.

NEXT

END

08

06

PRINT C

10 VAC
20 I=1
30 A=A+1
40 B=B+I † 2
50 C=C+I † 3
60 PRINT I, A, B, C
70 I=I+1
80 IF I=51; END

90 GOTO 30
In this manner, if we compare the example using the FOR·NEXT statement with the example using the IF statement, the function of the FOR·NEXT statement will be clearly understood.

In other words, the FOR•NEXT statement combines the testing functions of an IF statement and a GOTO statement as well as an incrementing function.

value). The initial value of the FOR·NEXT statement does not necessarily start from 1. approximately 1. The initial value of the FOR·NEXT statement does not necessarily start from 1. approximately 1. The substitution operations on line to the following the special attention. The sequence cannot be changed.

80 NEXT I \Rightarrow 80 OFF 1=51; END and to the property of the state of the

Example 2: Make a program to produce a table of sine functions from 0 to 1 in increments of 0.01, and the sample 2: while is variable enables from the form in the rements of A. Centrol proceeds to the fine flex to MEXT. This program is shown below, and occupant value of A When the Variable is character from Start For example, the program below

ecute a given action while vari ble ADOMs Of com 1 to 20 FOR I=0 TO 1 STEP 0.01 1 - 0 30 PRINT SIN I FOR 1 = 1 TO 10 ST 1 ← 1 + 0.01 40 NEXT 50 END VAC" command on line 10 is used to Output data is used later in the companisonnois arramation in lasse an SINsh oBristSFEE carcheronetted of the changes are made by assignment to B and B is changed omes art at FOR I = 1 TO 16 STEP The upper first of the computing digits is determined

This example determines the sine functions from 0 to 1 in increments of 0.01. The FOR·NEXT statement increments can be made using 0.01 increments. This incrementation can be accomplished because this equipment's internal computation system uses a decimal system. SIN I can be obtained and input using the statement on line 30.

End

20. FOR

played while variable M is

This example can be accomplish

End

=51:END

DAV

1=1

"MODE 4" of line 10 is to specify "degree" for the unit of angle. "MODE 5" and "MODE 6" specify "radian" and "gradient" respectively.

come what complicated, so a complicated STEP in STEP i

Start

A ← 0 B ← 1

Input N

B ← C

>N

I ← 3

Various Loops

Example: Determine the *n*th number in a Fibonacci series.

The FOR-NEXT statement is composed as shown below

FOR variable = n TO m STEP

y increases a variable, in increments of a specified value and cannot de-

A Fibonacci series is a series of integers in which each integer is equal to the sum of the two preceding integers. In other words, the sum of the first and second numbers is equal to the third number, the sum of the second and third numbers is equal to the fourth number, etc. 70 NEXT

80 END 0 , 1 , 1 , 2 , 3 , 5 , 8 , 13 , 21 , 34 , 0++1+11+22+3

This program is shown below.

10 A=0:B=1 20 INPUT N

30 FOR I = 3 TO N on a translate divide in increments of one

Per TX3Vi'doe 20 and not not the

50 A=B

B=C is show that, depending blooms and 60

70 NEXT I 80 PRINT C

90 END

 $I \leftarrow I + 1$ The FOR NEXT statement is used when the number of occurrences Output C the sam C+A+B 0=0+1113 FOR NEXT Statement Function A -B

Variable A, B and C represent the variables in the series. A is the value of the preceding number, B is the value of the next number and C is the total (the number following B).

Also, an initial value of 0 is assigned to A and an initial value of 1 is assigned to B. Then the operation is In other words, the FOR-NEXT statement combines the testing functions of anoitizing bridt and ta betrate

The FOR NEXT statement starts the loop beginning at 3 and continues it up to the desired point (Nth value). The initial value of the FOR NEXT statement does not necessarily start from 1.

20 FOR 1=1 TO 50 STEP 10 The substitution operations on lines 40 to 60 require special attention. The sequence cannot be changed. Once the sum of A and B are input into C, then B is input into A, then C is input into B.

The manner in which this FOR·NEXT statement is used differs from the previous example. Therefore, Variable N is used because the terminal value is changed based on later inputs. 30-903 and part and all flexible and convenient command when the number of occurrences of a logicaracticalitis known.

This example can be accomplished using an IF statement. A sample program using an IF statement is shown For arrays, one-dimensional arrays are used with letters attached such as E=1:1=8:0=A ti01 arrays are used both with the normal 25 memories and with expanded memories, pay N of USN 1100 lowling 30 C=A+B =0 TO 9 array arrangement. 40 A=B 50 B=C 60 IF I N; I = I + 1: GOTO 30 70 PRINT C(N) (0)8=(1)A=8 In this program, the IF statement on line 60 increments variable I while effecting the function of a GOTO 80 END statement. Initial values are set using a multistatement on line 10.1 = 0 E = A(4) = B(3) = C(2) = D(1) = C(4)We sting N is a sequence at the sequence of Nesting N is a sequence of N i FOR NEXT loops can be used to embed up to 4 levels. This embedding is called "nesting". array contents using the PRINT statement on line 50 One FOR NEXT statement is input within A(27)=B(28)=P. P. W. -NEXT D..... Expanded memories sans NEXT C When embedding a number of these, care must be used concerning the NEXT statements which correspond to their FOR statements and their variables. argument, evoid using the same memory in the same program, Also, the nesting must be done as shown above with the loops completely within one another. Overlapping FOR NEXT loops cannot be used with a portion of the loop falling outside as in the following example of an incorrect nesting. Capnot be used at the same time F. G. A(5), A(6) This type of FOR NEXT loop cannot be used, a set of pribrocal victorial research and resea --- FOR 1=1 TO 5 STEP 1 ... seed for FOR J=2 TO 20 STEP 2. lated and the and the iver NEXT IV. S. Vest July 1985 J. program when many data are input, the data can be ciput simily Furthermore, control can exit a FOR·NEXT loop but cannot enter a FOR·NEXT loop. -FOR A= FOR B= 🚁 - 65-2 Cr. residence e e e e e e e e e e e e e e IF THEN..... the class of NEXTUBY, store, the server 7111 to Z(60) are used, it is necessary to expand the memories -NEXT A

4-5-2 Arrays at 7 he gold intelligence at the markets of the gold beneath of the gold had elighteen at IT

For arrays, one-dimensional arrays are used with letters attached such as A(i), B(j), etc. Since these arrays are used both with the normal 26 memories and with expanded memories, pay attention to the following array arrangement.

A=A(0)

B=A(1)=B(0) 0€ OTO0:I+I=I;N≠I 7I

OTOD s to notion of the office of the control of the control of the control of a GOTO of a GOTO

D=A(3)=B(2)=C(1)=D(0) give sare set values are set using (1)=D=A(3)=B(2)=C(1)=D(0).

E=A(4)=B(3)=C(2)=D(1)=E(0)

antoments can plantage benedshandbades for several existent SIN I can be obtained one condition in the

40 A=B 50 B=C

A(27)=B(26)= ······=Y(3)=Z(2)

A(221)=B(220)= Y(197)=Z(196)

When arrays are used in this manner, since the same memory may be used depending on the array argument, avoid using the same memory in the same program.

Cannot be used at the same time F, G, A(5), A(6)

Perform memory expansion correctly according to the size of the array, and good TXBM-ROF to egyt and

70 NEXT I

A Fibonacci sen Expanded memories

OA FNO

Furthermore, control can exit a FOR•NEXT loop but cannot enter a FOR•NEXT loop.

Value of the present of the series of the serie

I Ambo

value of the next number and C is the total (the number tollowing B).

Also, an initial value of 0 is assigned to A and an initial value of 1 is assigned to B. Ren the poration is

started of the third position.

The FOR NEXT statement starts the loop beginning at 3 and continues it up to the desired point (Nith

The substitution operations on lines 40 to 60 require special attention. The section of 50 period to 0 once the sum of A and 8 are input into 0, then 5 is input into A, then C is input A, t ×30.

Unless this sequence is followed, substitution cannot be performed spreadly.

The manner in which this FOR*NEXT statement is used differs from the previous example. Merefore variable N is used because the terminal value is changed based on later inputs.

Example 1: Make a program to display the value of i in a one dimensional array A(i) as it changes from error is cand 0 to 9 sing the 62 Key, WPE will be distributed again and 1 Flow chart iting input condition. Start This program is shown below. Hence all 2 " will be a soleyed and an Input Commands; or time 10 FOR N=0 TO 9 is pressed, program execution N + 0 STEER TO A (N) = N moitpose a manpora instruberanti fulta i to Meidsnemansovaubnich An release 30 NEXTWIN you want to stop the program along the ment and KEY functions 40 FOR N=0 TO 9 MPUT statement includes Prioritist Statement 50 PRINT A(N) A(N)-N The INPUT Statement 60 NEXT N N+0 **70 END** > 9 N←N+1 The FOR NEXT statements on lines 10 to 30 have been explained previously. However, A(N) is used on line 20 and TURK a value of N is assigned. Also, the FOR NEXT statement on the full beattime and These of Output A (N) lines 40 to 60, in a similar manner, display the value of the other specimed day i on hews array contents using the PRINT statement on line 50, de Augor bna , (2) eldansv retoment evisual/ In this manner, the array stores data as separate variables simply by changing the elements without changing the names of the variables. So, this is a convenient function when used with the FOR·NEXT statement. Example 2: Make a program to display the difference between the average score and the individual scores TURN I NEW $\equiv A$ A by inputting the test scores of 50 students. 10 A=0 20 FOR I=1 TO 50 30 INPUT Z(I) Start water telephontity carry of The process-will proceed to the next input condition using the IMPUT state souled, so if there is no key in 40 A=A+Z(1)1 - 1 50 NEXT I 1-1+1 60 N=A/50 N + A/50 Input Z(I) 80 FOR I=1 TO 50 Output N 90 PRINT Z(I)-N $A \leftarrow A + Z(1)$ 100 NEXT I 110 END "B" THEN (+T+1 For this program, the scores are input on line 30 using array Z(I) Output Sum total is obtained using line 40. An array is used for Z(I) = Nscore input (separated). Then, the average score is calcu-S.D.P.Q TMIRE lated and the difference between the stored data (scores) and the average score is obtained and displayed. In this manner, if an array is used to make a program IF statement, world awork at no when many data are input, the data can be input simply End ient, So, by combining with the next IF state generated using a short program. RUNES If an array is not used, it will be as follows: $Z(1) \longleftrightarrow A$ Z(2) ← \rightarrow B 22 and the input statement will be

and the separation of the data will require a lot of time.

..... SE6521328 A

In the case of this program, since the arrays Z(1) to Z(50) are used, it is necessary to expand the memories

Example 1: Wake a program to display the value of t in a one dime shake a program to the training of the same of t

This chapter comprehensively explains the input/output commands used with this equipment. normal 75 medionies and with expanded memories, payveted manea respects and

■ Input Commands

10 FOR N=0 TO 9 An input command is a command used to input data during program execution and uses the INPUT state-1+14-14 ment and KEY functions.

INPUT Statement

The INPUT Statement is used to manually input data into the variables during program execution when "?" is displayed during awaiting input condition. (1)=C(3)

The INPUT statement is composed of

INPUT ["character string"], variable, ["character string"], variable (") A _ jevewoh _ visuoiverg benialexe

These character string can be omitted but once they are input, the character string is displayed before the awaiting input condition. It can be made into a message. Variables are numerical variables, character variables and exclusive character variable (\$), and input data are assigned, material TMLR9 and policy attraction value

 $Y = A(24) = B(23) = C(22) \cdots$ In this manner, the array stores data as separate variables simply by changing the elements without changing the part of the variables. So, this is a convenient Aborton-valent season with the FOR NEXT state slignment

When INPUT "A=" . A

Circles Projecting the test sco?=A50

90 PRINT Z(I)-N

100 NEXT

MEXT

FOR N=0 TO 9

Expanded memofies mere The process will proceed to the next step by inputting data and pressing the Key during the awaiting input condition using the INPUT statement. 1.) S+A+A+2 (196) (AL221)=B(220)=

60 N=A/50 **Example:** Add a message to the INPUT statement for the program for determining the sum, difference, product and quotient of 2 variables. TO 50

This program is shown below.

"A="', A,"B="', B 10 INPUT "A=",

30 D=A-B

40 P=A*B

50 Q=A/B

60 PRINT S.D.P.Q

70 END

Program execution is shown below.

Operation:

Perform

For this program, the scores are input on line 30 using Sum total is obtained using line 40. An array is used for score input (separated). Then, the average score is calcuand the average score is obtained and displayed.

In this manner, if on array is used to make a program when many data are input, the data can be input simply

RUNEXE

23 EXE

45 EXE

A=? B=?

68

EXE

22 1035

EXE EXE

...1.956521739 A TU9WI

and the separation of the data will require a lot of time.

4-1113

In this manner, the character strings which are written in the INPUT statement are displayed as messages and key input is easier.

For this INPUT statement, if character data is input for the numerical variables, an error will occur. If the error is cancelled using the Key,"?" will be displayed again and return to awaiting input condition. Also, the input for the numerical variable can be input as a numerical expression. As a result of an INPUT statement, a "?" will be displayed and an input await condition will occur. At this time, if data is input and the Key is pressed, program execution will proceed to the next process. Furthermore, when in an input await condition, even if the EC Key is pressed, the condition will not be released. Therefore, when you want to stop the program along the way, press MODE 0 . A = 0 0 5 Data which can be input using an INPUT statement includes numerical values or the results (answers) of numerical expression (for numerical variables) and character strings (for character variables). The values of WPUT A with except and the same and the beyond the same and the same Result of a numerical expression14 ★ 25 ® → A=350 In the case of INPUT B\$ valgable values and provided by a part and the case of INPUT B\$ values and on the case of INPUT B 789 B\$=789 q ." , " to seed and all visions and auditace of Furthermore, other numerical variables can also be used as input for numerical variables. The District of the control of the c In the case of INPUT A (make X = 987654) up and to notice of entrangement for the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case of INPUT A (make X = 987654) up and to notice of entrangement of the case VariableX ₩ → A=X CSR Function • KEY Functions and and enterprise = 987654 TMIA9 s ni beau si doidw notional lorinos s si sidi This function reads one character for each key which has been pressed during program execution. Velocity entities This function, unlike the INPUT statement, cannot be accomplished during the awaiting input condition. The program progresses as scheduled, so if there is no key input, nothing will happen. The KEY function is composed as shown below, notined Ismicels and notices as a second of the KEY function is composed as shown below. gree incrementa of bot Orei eulev schulegress. Character variable = KEY The character read by the KEY function is assigned to the designated character variable. The character read by the KEY function is assigned to the designated character variable. at the beginning of the program, all of the subsection that is of most and all of the subsections of the program. Furthermore, the method for gounting the united and the method for the N 10 Example: 10 A\$=KEY: IF 20 A\$="A" THEN RUN A\$="B" THEN 200 40 IF A\$="C" THEN 300 **GOTO 10** 11 01 0 8 X 180 STEP 5 This program is only for data input and separation portion, using the KEY function on line 10, it tests to see if the character data read was keyed in using the next IF statement. Even if the Key is not pressed, this KEY function is capable of reading only the first key input. However, it does not stop like the INPUT statement. So, by combining with the next IF statement, it becomes an awaiting input condition, available bos ruggi vessils such Also, lines 20 to 40 compare the contents in the read character variables and determines the jump destinations. In this manner, the KEY function can only read the character of one key, as in the state of the character of one key, as in the state of the character of the key, as in the state of the character of the key, as in the state of the character of the key, as in the state of the character of the key, as in the state of the key, as in the key, as Output Commands In the output command, there is a PRINT statement to display calculation results. Doxe notween the print of the output command, there is a PRINT statement to display calculation results. RUNES A PRINT statement is composed as shown below. Numerical expression Output control function

Character expression

26 24

2025

725904

] enclosed contents can be omitted.

either one of the enclosed contents can be used.

852

This PRINT statement displays the value of the numerical plays the character strings enclosed with "" or character value.	l expression	or the numerical variable and dis-
Example: 10 INPUT "A=", A." B=" B margor and a second an	diasa eldaday. Iliw " L" a ,1 a ,	Also, the input for the jaumerical. As a result of an INPUT statementime, if data is input and the ES factore, when chaut released. Therefore, when you wandured which can be input using a declaration of the four than a gradual expression (for thurn a gradual expression (for thurn a gradual expression). In one case of INPUT A nerv
strings is different. In the case of ";", the next data is displayed following the In the case of ",", the next data is displayed after the previous To continue the display in the case of ",", press the KE Ke	previous displ ous display is	SSUP TOWN YE SUBSEINED TO PETOTE AND ay 33 TUSKE TO SERVER INTO VALLE
 Output Control Functions must not judicize beau ed Output control functions designate the location of the output 	38 lis (163-86)(36) J t.	Perstromete, other numerical var
ELECTRON DE LA COLLEGE DE LA C	A SECULIAR DE	
CSR Function PUT "A=", A Selection PUT "A=", A		9 X sldshsv
This is a control function which is used in a PRINT statement	nent. It design	ates the location of the output on
the display (12 positions) using the PRINT statement. The format of the CSR function is shown below.	for each key was	This function reads one character
a is no key input/sorting day. Where the swamp style contained, a is no key input/sorting day. Which is possible to the contained to the conta	signments, ca lad to if then	The recurrence properties at Charles
PRINT CSR numerical expression (The decimal portion of	of the numer	cal expression is cut off and
the value is 0 to 11.)		Character variable = KEY
It uses the value of the numerical expression to determine	e at which un	it from the left of the display to
begin to output the data.d Questient of 2 variables.		
Furthermore, the method for counting the units on the displ	ay is shown b	Example: wols
TO INPUT "AB", A, "BE", 8	HEN 100	20 IF AS="A" T
RUN	HEN 200	30 IF AS="B" T
	HEN 390	40 1F A9="C" 1
0 1 2 3 4 5 6 7 8 9 10 11	The Tayle	50 COTO 10
60 PRINT S.D.P.Q		
Example: Of the NEY function or the 10: sign and 10 in the next IF statement, would X TUPN I 01 mapped tion is capab 21 X : 6 in R20 : X iTN I R9 in 02 enemt. So, by combining with 01 no TOD 108 M; 160-	ceyed in using his KEY fund	see if the character data read world. Even if the EEKey is not pressed, a
This program obtains the square of data already input an CSR function is used in the PRINT statement on line 20. The initial data "X" is displayed as is from the left side an	d displays th	e result as well as the data. The
position from the left using the CSR function.	20	Output Commands
The program, when executed, will be as shown below.		in the output command, there is a
Operation:	1035	ASSOCIATION OF THE PROPERTY OF
RUNEE	15. P. J. A. D. J.	A PRINT statement is romandate
7 EXE	7	49
In this manner, the character strings which conserve the ig-	?	Stambage displayed JAMANage
and key input is easier as a 45 x	45	2025
EXE 9312	ed 750 almetr	T either one of the enclosed cal
852 EXE	852	725904

53-

In this manner, since the two types of output are constantly displayed from a certain position, it is easier Character functions are related to character variables (AS, BS, S, etc.). The handling method for these

is different because they are used to input characters instead When there is a ";" following "CSR", it is displayed from the designated position but when ", is used, display will not be made unless the display is cleared once. So the display will not be made continuously.

Example: 1145 SET Statement in remarkable of the assistance of several drawn advertises of beautistics in no special Villa A.

The SET statement explained the number of effective positions designation and decimal designation for manual calculation but here we will explain how designation is made by writing in the program. In the SET statement example shown below, E designates the number of effective positions, F designates the decimal and N cancels the designations are character varieties and I cancels the designations are character varieties. output space for character variables or for dividing them when the size is not fixed

En) a main routine which is different from the programment (n is 0 to 9) he subroutine is called from MESIM #2 AneOld, upon Fn SET N 20 BS="456"study of the main routing 456" =28 02 many (GOSLIB) to jump from within the main 20 x 2 Am 29 st0 Butine, it the designated solutions. After the subrout (2004 3 = 0000 leted, if

Example 1:

jumps 110 SET E4 returns 20

30

SO END CARE TO A COLUMN SON THE COLU FOR X=0 TO 180 STEP 5

appropriately the main routing where the jump Q. TM I AR to OB coursed

This program displays the size (number of characters) of the characters X NIS TNIR9

60 Character variables can only perform addition. However, since the size of the TTAR.

known using that result, the LEN function is used to determine the size of that equity. QNB

This program obtains $\sin x$ in 5 degree increments of x from 0 to 180 degrees.

In order to obtain the number of effective positions up to 4 positions in this example, sin x is obtained

If the SET statement is written at the beginning of the program, all of the subsequent displays (result output) will be displayed with an effective number of positions of 4 positions.

If calculation is continued, the result can only be obtained up to 4 effective positions. So, "SET N" is used on line 60 in order to cancel the designation, deliverages the method of the characters after the characters and the characters are the characters and the characters are the

in the memory the decimal is all off for both in and it, and their values see Lto 20 Aparticular Example 2: Designate the number of decimal positions to be 4 digits for the program in Example 1.

10 SET F4

expression (the numerical expression is out off at the delivery like legisle of a evid) 20 MODE 4 FOR X=0 TO 180 STEP 30

Example: when \$ = *ABCDEPCHU alog no sell reported no + MID (3.4). To extract four characters from the third character on + MID (3.4). PRINT SIN X 40

50 NEXT X

To extract all characters from the fifth character on - MID (5) - EFGHI MID (5) TO extract all characters from the fifth characters and characters are considered. 60

END

Example:

In this manner, the number of output positions can be controlled using the SET statement similar to manual calculation. 20 N=LEN(S)/2

30 X3=MID(1,N):YS=MID(N+1)

To extract two characters from the first character on - MID (1

he line number prospections and selections and selections are selected as the selection of the selections are selected as the selection of the

40 PRINT XS.YS

This program divides the input character strings in two using the LEN function and the MID function

This determines the size of the exclusive character variable \$ on line 20. Those halves are assigned to N and the first half and the second half are divided using the MID function.

In this manner, when the size of the input character string is not fixed, the halves or thirds cannot be extracted, so the size is determined using the LEN function.

Furthermore, in this case, the character string that can be input into \$ is limited to 30 characters. However, since the number of characters in XS and YS is limited to 7 characters, the number of char-

acters input into \$ is limited to 14 characters.

4-5-4 Character Functions of Bayelland Villes models (Lighton) Security Switzers Sale (16) Helphone and the

Character functions are related to character variables (A\$, B\$, \$, etc.). The handling method for these is different because they are used to input characters instead of numeric values. Therefore, these character functions determine the size of the character variables, extract some characters from character strings in character variables and transform number in character variables to numerical values.

■ LEN and MID NT

A LEN function is a command to count the number of characters in a character variable. The size of the The SET statement explained the number of effective positions designed ad authors aldered and an arrangement of the statement A MID function is a command to extract some characters from the exclusive character variable (\$). It is used for rearranging the character variables, and setsonical at woled inwork alignment from the character variables. Since the LEN function can tell the size of the character variable, it is a convenient means of reserving output space for character variables or for dividing them when the size is not fixed.

Example:

A\$="123" data is displayed after the bray (expresses is cleared once.

B\$="456" 20

30 C\$=A\$+B\$

40 D=LEN(C\$) nate the location of the output.

50 PRINT D

60 END

Example 1:

20 MODE 4

30 FOR X=0 TO 180 STEP

In this manner, the number of buildur, positions gan

This program displays the size (number of characters) of the character variable by adding character vari-

Character variables can only perform addition. However, since the size of the character variable is not known using that result, the LEN function is used to determine the size of that addition. Only character variables can be used for the LEN function.

The format of the MID function is shown below au analized evidents for redmun ent histor or rebro ni all expression to determine at which both from the left of party of \$1.50

If the SET statement is written at the beginning expression) inniped out to national interests T32 and it

C:"...":D

It extracts the n character portion from the mth character of the character string stored in the exclusive CALCULATION IS CONTINUED, THE ROSAIT CON DOLLY DE DOLLANDE UD TOcharacter variable (\$). MOLITROG 69

If n is omitted, all the characters after the mth character will be extracted. and isomeo of rebio of 00 and no

Furthermore, the decimal is cut off for both m and n, and their values are 1 to 30. And m must be smaller than the stored number of characters. If the sum of m and n is greater than the stored number of characters TO SET FAL plus 1, an error will occur.

Example: when \$ = "ABCDEFGHIJ"

30 FOR X=0 TO 180 STEP 5 To extract four characters from the third character on → MID (3,4) . . . CDEF(1.2 TM 1999 OF To extract two characters from the first character on → MID (1,2) . . . AB X TXEM 08 To extract all characters from the fifth character on → MID (5) . . . EFGHIJ

Example:

10 INPUT \$

20 N=LEN(\$)/2

X\$=MID(1,N):Y\$=MID(N+1)

40 PRINT X\$,Y\$

The pr 50 mEND: executed, will be as shown below.

This program divides the input character strings in two using the LEN function and the MID function and displays.

This determines the size of the exclusive character variable \$ on line 20. Those halves are assigned to N and the first half and the second half are divided using the MID function.

In this manner, when the size of the input character string is not fixed, the halves or thirds cannot be extracted, so the size is determined using the LEN function.

Furthermore, in this case, the character string that can be input into \$ is limited to 30 characters.

However, since the number of characters in X\$ and Y\$ is limited to 7 characters, the number of characters input into \$ is limited to 14 characters.

-55-

VALouring a last or part of the main solutile, so it is not amorphish define mobile or distributed as

The VAL function changes the numbers in a character variable into a numerical value.

Surface area display

Format: VAL (character variable)

Example 1: Make a program to determine the sociace at Since this function changes the numbers in the character variable into a numerical value, when there are no numbers in the character variable (for example, "ABC"), an error will occur, dank may do pany command Example: of If Z\$ = "78963", VAL (Z\$) = 78963

Note: When this function is used in a program and an error occurs as a result of the data in the variable being other than numbers, "ERR 2" will be displayed and the program area and line number will not be displayed. the arc) the subsoutine for Betalto they At well and volume

ambibion of nating subroutine is incorporate As \$15401 Of

4-5-5 Subroutines

YX ONS THE X

A subroutine (also called a subprogram) has a main routine which is different from the programs (also called main routines) considered previously. The subroutine is called from the main routine and, upon completion of the operation, returns to the original position in the main routine.

In other words, using the command (GOSUB) to jump from within the main routine to the subroutine, it jumps from that position to the designated subroutine. After the subroutine operation is completed, it returns to the position (GOSUB command) in the main routine where the jump to the subroutine occurred SHATE OF OUR and the main routine process is continued. 1020-X=1NT_Z21013XY

The main routine for computing the surface area and votume of the regular deflared on the MCEssilv

≥100 GOSUB 1000

subroutine callout (jump) command

1006

100 RETURN

The difference is the rounding program included in the main routine as a subrouting B=A 0001 to on This subrouting has an animor by subrouting the stream and voluntable beam and subroutine area. and 50, down to three decimal places entired and not make the command to return to main routine.

1030 RETURN

AXAXE GOS=X O

OWNT -

understood, as it is similar to the programs considered previously.

The commands required for this subroutine are "GOSUB" and "RETURN" statements. The command to jump (callout) to the subroutine is the GOSUB statement and the command to return from the subroutine to the main routine is the RETURN statement.

This GOSUB statement is used in the following formats.

- (1) GOSUB numerical expression (the numerical expression is cut off at the decimal and uses line numbers 1 to 9999) TUPMI OF
- (2) GOSUB # numerical expression (the numerical expression is cut off at the decimal and uses $0 \le n < 10$) The first method uses direct designation to write the line number directly following "GOSUB" and can indirectly designate the subroutine location using the value contained in the variable, SEA=\(\) The second method uses a subroutine in another program area (P0 to P9) to designate directly and indi-

rectly. GO PRINT Furthermore, neither will return unless the RETURN statement is written at the end of the subroutine.

BO AARON the set of the method, sometimes of the set reserve the execution just by changing the values of history M. In the Falast M. Scott M. T.X. 199 Les inconstrained into subcontines, memory can be saved and contents and computar Xn XM1492 not Under-

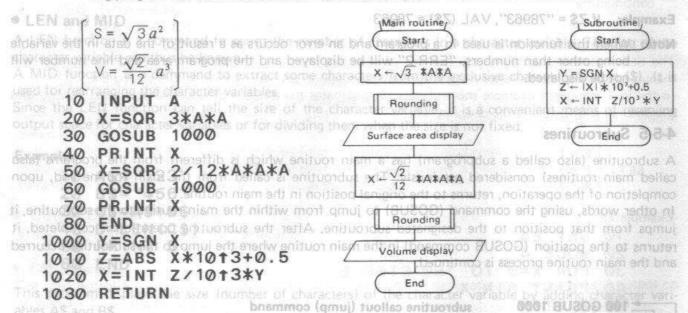
First program and the programment of the subtouring described above perform. The same processing the same programment method is called "nesting." It calls out iPIgrois bns ashook a spikupidus siti ggisu maporg siti tud isnos In other words, the subroutine is used to simplify the program by eliminating repetitive operations and * In this example, since the rounding program is incorporated into a subroutine, "PRINT X" is not in-In other words, it goes from the main routine to the first and the suprogram of the suprogr as the main routine and the next (second level) subroutine is unless only berevoquosi, a noting and this case, PT). This method is convenient because it can be used as a subroutine in common with another program (a program written in another program area)

Subroutine Fundamental Programs

JAV-

Here we will explain how to arrange the subroutines using actual program examples nano notional JAV and

Example 1: Make a program to determine the surface area and volume of a regular tetrahedron, in which the length of the sides is A, computed down to three decimal places. Provided that a rounding program has been incorporated into a subroutine.



The main routine for computing the surface area and volume of the regular tetrahedron can be easily understood, as it is similar to the programs considered previously.

The difference is the rounding program included in the main routine as a subroutine from line 1000 on. This subroutine has the function of computing the surface area and volume, as determined on lines 20 and 50, down to three decimal places by rounding.

The subroutine can be used as many times as desired.

It is used twice in this program, first for rounding the value of the surface area and second for rounding the value of the volume.

If a subroutine is not used and only a main routine is used as in the past, the program will be longer, as shown below.

```
than the TNPUT A characters of the sum of what it is public than the store of an action of the sum of the sum
```

This program and the program using the subroutine described above perform the same processing (operations) but the program using the subroutine is shorter and simpler.

In other words, the subroutine is used to simplify the program by eliminating repetitive operations.

* In this example, since the rounding program is incorporated into a subroutine, "PRINT X" is not included in the subroutine. Actually, in this program, lines 30 to 60 and lines 80 to 110 are the same and this portion is incorporated into a subroutine.

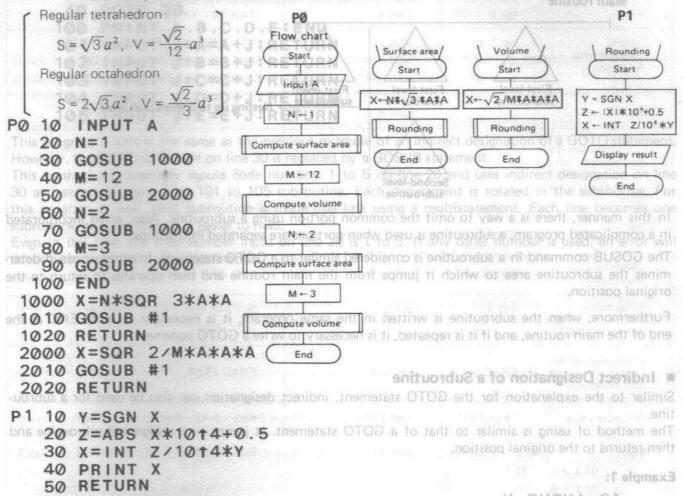
Furthermore, in this case, the character string that can be input into \$ is limited to 30 characters

However, since the number of characters in X\$ and Y\$ is limited to 7 characters, the number of characters input into 5 is limited to 14 characters.

This subroutine is also a part of the main routine, so it is not incorporated within the main routine but is incorporated after the end ("END") and must be ended with a RETURN statement. If it is incorporated along the way in the main routine, it will be read as the main routine and processed repeatedly, thereby causing an error upon execution of the RETURN statement.

Therefore, as in this example, the subroutine area must be separated by starting it at line 1000 or 5000. The subroutine is similar to the GOTO command (GOTO statement), and is considered a jump command but differs in that a RETURN statement is always attached so that it returns to the GOSUB statement after completion.

Example 2: Make a program to determine the surface area and volume of a regular tetrahedron and a regular octahedron in which the length of sides is A, computed down to four decimal places. Provided that the main routine and the subroutine for determining the area and volume are incorporated into P0 and the rounding subroutine is incorporated into P1.



Three subroutines are used in this program: two common portions for computing surface areas and volumes, and a rounding program.

Using this method, commonly used computational operations can be incorporated into a subroutine for repetitive execution just by changing the values of N and M. In this manner, if common portions are incorporated into subroutines, memory can be saved and contents and computation method can be understood more easily.

Therefore, on lines 1010 and 2010 of this program, a subroutine is called out from a subroutine. This method is called "nesting." It calls out a subroutine from a subroutine similar to calling out a subroutine from a main routine.

This nesting can be performed up to 8 levels (8 times), so any nesting beyond that causes an error. In other words, it goes from the main routine to the first level subroutine. Then that subroutine acts as the main routine and the next (second level) subroutine is called out. Even at this time, the RETURN statement on which the subroutine is based must be written at the end of each subroutine without fail. Similar to the rounding subroutine, this subroutine can be incorporated into another program area (in this case, P1). This method is convenient because it can be used as a subroutine in common with another program (a program written in another program area).

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In this manner, many subroutines can be used in one program of plant and to mad a pale at anti-police sixtle In the case of "nesting", however, up to 8 levels can be accomplished. The soft tests between all all the case of "nesting", however, up to 8 levels can be accomplished. rated along the way in the main routine, Example Main routine thereby causing an emorphonic execution of the RETURN starement there of 10002 ng 0000 frent Visita OTO DIPON ANTINO OTO BISIN The subroutine is similar to al inametel but differs in that a RETL Example 21 Make a prenifuorduz determinational sides as A, computed down, to the decimal places.

x regular octanedron in which the legoth of sides is A, computed down, to the decimal places.

x regular octanedron in which the legoth of sides is A, computed down, to the decimal places. 1 1/15 We incorporated into Pg and the subroutine is incorporated in DIP 1/16 1/16 Main routine 3×A×A First-level First-level subroutine subroutine subroutine → Nesting up to 8 levels is allowed 16 20- 国际10 10 S A TURNI OF OR Routende THE MEDICAL PROPERTY. Mary Willia X = ARS N + 1Q1 COSUB 1000 HOLD Y INT Y'S 10 + 40 M=12 Second-level SO GOSUB 2000 subroutine In this manner, there is a way to omit the common portion using a subroutine. Also, when incorporated in a complicated program, a subroutine is used when portions are separated into groups. The GOSUB command in a subroutine is considered similar to a GOTO statement. In other words, it determines the subroutine area to which it jumps from the main routine and then operates to return to the original position. AXAXE Furthermore, when the subroutine is written in the same program, it is necessary to write END at the end of the main routine, and if it is repeated, it is necessary to write a GOTO statement, and if it is repeated, it is necessary to write a GOTO statement. 2000 X=SQR 2/M*A*A*A bell Indirect Designation of a Subroutine Similar to the explanation for the GOTO statement, indirect designation can also be used for a subrou-PI 10 YESON X The method of using is similar to that of a GOTO statement. It jumps to a designated subroutine and then returns to the original position. 30 K=INT Z/10 FARY AO PRINT Example 1: XPINI ZZ10+3*Y SO RETURN 10 Three subroutines are used in this program, two common portions is GOSUB N+100 20 PRINT Using this method, commonly used computational operations car be 101 and 40 END below repetitive execution just by changing the values of N and M. In this mANUTAR: 6= X 01 01 are incomporated into subroutines, memory can be saved and contents and NAUTAR: 01 = X 2 01 Under-103 X=15: RETURN THE THE TOTAL X = 20: RETURN & PRINCIPLE OF THE PRINCIPLE 105 X=25:RETURN method is called "nesting." It calls out a soliton from a shorou in other 106 X=30: RETURN to simplify the program by eliminating repetiting of mind a most enit 107 X=35: RETURN 108 X=40: RETURN This nation can be performed up to 8 levels (8 times), so any in other words, it goes from the main routine to the first 109 X=45: RETURN as the main routine and the next (second level) subroutine is called charge and on each subroutine is based must be written at the end or each subroutine is based must be written at the end or each subroutine with the subrouti In this program, the subroutine is designated indirectly using the value of input N. When N is 1 to 10, it

goes to a subroutine between 101 and 110 and determines the value of variable X and displays the com-

program (a program written in another program area)

putation result of X X 6.

In this manner, since the indirect designation of the GOSUB statement determines the jump destination (subroutine) using the value of the variable, when the variable is one, it jumps to the first subroutine (line 101).

When the variable is two, it jumps to the second subroutine (line 102), and so on. It designates indirectly depending on the variable.

Example 2: Use the indirect designation of the GOSUB statement to make the sorted totals program which was given in a previous example and which used indirect designation of the GOTO

	statement (5 divisions).			
10	VAC			
20	INPUT I WIS DE MIS	2 M18	1 g nig	oltiminenegit T
30	GOSUB 1+100	# C 0 8 x 8 0 0 ×	7, 800	motional
40	GOTO 20 ON MAT	TANK	X 087	
100	PRINT A,B,C,D,E:END			
101	INPUT J: A=A+J: RETURN		X. This could	Inverse
Since 102	INPUT J:B=B+J:RETURN	V	1. Mightens appear	n at 14 designation of the control o
103	INPUT J:C=C+J:RETURN	anciosy wrate are	Tank Langt	
104	INPUT J:D=D+J:RETURN	nd cosine CDS are	witten in the aut	nerie empressione
105	INPUT J:E=E+J:RETURN	SOR X FOR	ut voltage X and c	Square root

This program is almost the same as the previous example of an indirect designation of a GOTO statement. However, the GOTO statement on line 30 is replaced by a GOSUB statement.

This method also basically inputs code numbers 1 to 5 on line 20 and uses indirect designation on line 30 and separates using lines 101 to 105 subroutine. Each department is totaled in the subroutine. For this program as well, each subroutine is made one line using a multistatement. Each line becomes one subroutine, thereby making it easier to read.

Even in this case, the code number input on line 20 is 1 to 5. If any other number is used, an error will occur when there is no jump destination

occur when there is no jump destination. Vo	Trage is Your or normal ca	Common logarithm and logarithm
Example April 10 The Table 18 Charles 19 Cha	specification function.	ers using meters represent the light of the
FRAC 73.54 FRAC M SHACLEHBL	FRACX	part removed)
taken as #NALCOA (U.23An Che+ Raad by	s 10 digit mentuse in the 1000 to extrac x asa e dig	
Example 4: (8-9) (032 - 2 M32 : 086MD2m) a	calculation usin a weeks	Sign noith and lairning (if $x > 0$, 1) (if $x > 0$, 0) (if $x = 0$, 0) (if $x < 0$, -1)
(э Ду обл Е К Вак (зт) оия 30 С = (2 + 2 + 3 + 19 г дия / В	RND (X, Y)	Significant digit specification (X is determined down to the 10.1 th significant digit place by rounding)
The base (2) of natural logarithm is imput		Random number generation Ultraform random number generation in the range 10, and e ^x is calculated taken of your
ut shift to not south reward bha (3 etdehav). One right angle = 90 degrees.	MODE 4	Unit of Degree angular measure
One right engle = 7 rediens	MODE 5	nathaR
One right angle = 100 gradients	MODE 6	Gradient

^{*} x and y are constants, variables or numerical expressions.

4-5-6 General Functions represent a 80200 entrancisagises to be bounded and annual representation of the solution of the solut

General functions may be used manually or incorporated within programs of the GOTO which was given in a previous example and which used Indirect designation of the GOTO

Function r	name	Format	DAY OF
Trigonometric function Main foutine	sin X cos X tan X	SIN X COS X TAN X	SIN 30 SIN A SIN (N+5) 0 COS 3.14 COS (COS (L-3) COS (L-3) COS (TAN 70 TAN F TAN (F X 2)
Inverse trigonometric function	sin ⁻¹ X cos ⁻¹ X tan ⁻¹ X	ASN X ASUT ACS X ASUT ATN X ATN	ASN 0.07 ASN P (ASN (Z+Y) () ACS π/5 ACS D T ACS (C-X) () ATN 6.5 ATN V (ATN (Q+0.5))
Square root	routing 7	SOR X MAU	SOR 69 SOR A - SOR (R X S)
command to call ou the numerical value	tement. y produses indire lent is totaled	placed by a GOSUB strong of the Strong of th	his program is almost the same as the previous program, as the GOTO statement on line 30 is refined also basically input! 9X3e number of and separates using lines 101 to 105 subject program as well, each subrouting is man
Natural logarithm	rs a view to or rs. loge X brown to V other numbe	it the common portion	LN 43 LN P LN (U+T)
		te is considered signal if $LOG x$ from the ma	LOG 24.6 LOG R LOG (G+15)
Integration (Maximum integer not exceeding X)	he soproutine	s written in the same	INT 347.457 INT V INT (Q+U)
Fractionalization (X with its integer part removed)	tio FRAC X _{Subs}	OUTERAC <i>x</i>	FRAC 73.54 FRAC N FRAC (H+B)
Absolute value	(X)	ABS X	ABS -9.43 ABS L ABS (K/P)
Sign (If $x > 0$, (If $x = 0$, (If $x < 0$,	1) 0) -1)	SGN X	SGN 79 SGN E SGN (P-0)
Significant digit spe (X is determined do 10. http://doi.org/10. http://doi.org/10. by rounding)	own to the	RND(X, Y)	RND (123.456, 2) RND (A, C) RND (F+E, G-5)
Random number ge (Uniform random n generation in the ra $0 < x < 1$)	eneration () and ()	RAN#	RAN#
Unit of angular measure	Degree Radian	MODE 4 MODE 5	One right angle = 90 degrees One right angle = $\frac{\pi}{2}$ radians
109 X=45	Gradient	MODE 6	One right angle = 100 gradients

^{*} x and y are constants, variables or numerical expressions. In the wards of input N. When N. is 1 to 10, is

Since these functions are built in they can be used in a program at once.

 $\mathsf{EXP}\left(e\right)$ cannot be used in a continuous calculation. Also, it cannot be used in a multistatement.

Example 1: Make a program to obtain the length of one side of a triangle using the angle enclosed by the other two sides.

$$[C = \sqrt{a^2 + b^2 - 2ab \cos \theta}]$$

10

Format: SAVE ["filenames"] if A (Mem.in. brackets may be omit 5, 8, 8 TUPN I

nistro 30 D=SQR (A*A+B*B-2*A*B*COS C) 8 prize desogned ad vern entertall adT

When 140 PRINT Date exclusive character variable \$, write \$ taledatys/anedmun/anerter isotradarigle

This co 50 GOTO 20 either martially of by writing it in a program

Since the angular unit "degree" is used in the trigonometric function, MODE 4 appears on line 10 in this program. Then, the lengths of the two sides and the enclosed angle are input.

In accordance with the formula, square root SQR, and cosine COS are written in the numeric expression.

Example 2: Make a program to obtain the amplifier gain dB with input voltage X and output voltage Y.

[dB =
$$20 \cdot \log_{10} \frac{Y}{X}$$
]

10 INPUT X,Y

20 Z=20*LOG (Y/X) able 1 F. variable 21 . Yllaunam bezu ad vino nep boommoo 3VAS A

30 PRINT Z

This cold GOTO 10 bith manually and by writing it in a program

If the input voltage is X and the output voltage is Y, the formula can be written as shown on line 20 to ob-This command starts the tape recorder in the PLAYBACK position. tain the gain (Z).

Example 3: Make a program to generate three-digit random numbers using a random number generating function and a significant digit specification function. The programmed manpond shinds value of

10 N=RND(RAN#,-4)*1000 20 PRINT N

Even if a program has entered been written in the designated program area or common QUA OR Rother

Since random numbers can be generated as 10-digit mantissa in the range 0 < x < 1, three digits must be taken as significant digits and multiplied by 1000 to extract three-digit numbers.

Example 4: Make a program to perform a calculation using the exponential function.

[Calculate
$$\frac{A + e^{1,5}}{B}$$
]

10 E=EXP 1

20 INPUT A, B

30 C=(A+E 11.5)/B

40 PRINT C

50 GOTO 20

· Recording of all programs

SAVE ["filename"] III

Program callout

Operation:

["emenalit"] SAVE A

Callout of all programs

The base (e) of natural logarithm is input into a variable (E) on line 10, and e^x is calculated using the value (variable E) and power function on line 30.

This command simultaneously calls out the programs of all the program areas which were recorded using the SAVE A command. The operation is similar to the LOAD command and the tape recorden is started in the PLAYBACK position.

110 PRINT

Operation: LOAD A ["filename"] [X]

Display during program load one "MODE 8" prior to program termination and

All files filename

BE: FX-700P

Cassette magnetic tape

In order to record programs or data stored in this unit on a cassette tape, use the FA-3 cassette interface and an ordinary tape recorder. If the tape recorder has a remote terminal, remote control can be conveniently performed from the FX-700P through the FA-3.

For tape recorder connection procedures and detailed operating procedures, refer to the FA-3 operation manual.

Program recording

Format: SAVE ["filename"] (Item in brackets may be omitted.)

The filename may be composed using 8 characters or less enclosed by quotation marks and may contain TAN 70 TA'UT TWY 99 404 alphabetical letters/numbers/symbols.

Example:

Since the angular coast (chapter his used in the togonometric function, MODE₃A appears of Time World In this program, when the tends and the enclosed angle are input. In accordance with the formula, aguing root SQR, and cosine COS are written in the number QMression.

This command starts the tape recorder in the RECORD position.

Operation:

SAVE ["filename"] EXE

A SAVE command can only be used manually.

Program callout

Format: LOAD ["filename"] (Item in brackets may be omitted.)

This command starts the tape recorder in the PLAYBACK position.

Operation: LOAD ["filename"] EXE

Display during program load

nerste three-digit random pumbl re PF : ABCapis e bae notionut

Program file filename

program, Elean, the langther of the two sides and the enclosed angle are input. - ner

Even if a program has already been written in the designated program area prior to callout, the former program will be erased starting with the initial line number of the program to be loaded and the new load will be made correctly. taken as smithleast diais and analysissed by 1000 to extract these digit numbers.

Recording of all programs

Format: SAVE A ["filename"] (Item in brackets may be omitted.)

This command simultaneously records all of the programs which are written in all program areas from P0

The operation method is similar to the SAVE command and the tape recorder is started in the RECORD position, if can't digit specification.

Operation:

SAVE A ["filename"] EXE

RND 412 A S P T T S L 30 C=(A+E 1 40 PRINT C

50 GOTO 20

2=20*LOG

of the mout voltage is X and the

INPOIN OTOD

Callout of all programs

eulay eds orial betalunia ai *5 bns 01 enil no (3) elderay a otni tugni si multirapol la utan to (3) esad enil Format: LOAD A ["filename"] (Item in brackets may be omitted.) nut seway bns (3 elderay)

BAN #

This command simultaneously calls out the programs of all the program areas which were recorded using the SAVE A command. The operation is similar to the LOAD command and the tape recorder is started in the PLAYBACK position. Gradient

Operation: LOAD A ["filename"] [XE | real expressions

Display during program load

AF: FX-700P

All files filename Even if programs are already written in program areas prior to callout, the former programs will be cleared and then the new programs will be called out.

Furthermore, both the SAVE A command and the LOAD A command can only be used manually.

Data recording

Format: PUT ["filename"] variable 1 [, variable 2] (Items in brackets may be omitted.)

The data which is recorded on the tape is the data in the variables from variable 1 through variable 2.

Example: PUT "PB" Adata of variable A

PUT "1-2" A, Z data of variables A through Z

PUT "DT" \$, A, Z(10) data of character variable \$ and variables A through Z(10)

When recording the data in the exclusive character variable \$, write \$ first.

This command can be used either manually or by writing it in a program.

For manual operation, start the tape recorder in the RECORD position.

Operation:

PUT ["filename"] variable 1 [variable 2] (XI) bour i fluxe 9 •

S Verify the date

When performing by writing it in the program, write the PUT command along with the line number and in GOTO statement by GOSU8 start the written program.

ardument input range"

Outside the numeric function

Data callout

* For a command function that e Cons Format: GET ["filename"] variable 1 [, variable 2] (Items in brackets may be omitted.)

This command can be used both manually and by writing it in a program.

For manual use, start the tape recorder in the PLAYBACK position and operate as follows. , bebnedxe ,

Operation:

Attempt was made to use the GET ["filename"] variable 1 [, variable 2] Exported among

For use in a program, write it with a line number attached and start the program.

● Checking of the file which has been recorded on the tape UTBR • de command following

A VER command is used to check whether the programs or data have been recorded properly.

Format: VER ["filename"] (Item in brackets may be omitted.)

The operation sequence is similar to program load, level entropic

Printer

Sex not reduction and religion FOR NEXT loops exceed 4 An exclusive mini printer can be connected to the FX-700P. By connecting this printer, program lists or data can be extracted. Also, the output of calculation results during execution can be printed out. For printer connection procedures and operating procedures, refer to the mini printer operation manual.

gool RO ni ton nertwoer son is tais

betwoexe at BVAS Signifies the end of a sold

To print a program list, press MODE 7 and designate the PRT mode.

Program list 199 Isons 0

MODE Ø MODE 7

LIST EXE OF LIST A EXE

[MODE] 8 (PRT mode release)

After printout is complete, be sure to press MODE 8 and release the PRT mode.

Also, to print calculation results or operation contents, printout can be performed automatically by writing "MODE 7" and "MODE 8" in the program.

Example:

100 MODE 7 110 PRINT A

120 MODE 8

When "MODE 7" is written in the program, be sure to write "MODE 8" prior to program termination and release the PRT mode.

-64-

Even if programs are already written in program areas prior to callout, the former blocking agreement of the second second in programs are already written in program areas prior to callout, the former blocking areas are already written in program areas prior to callout, the former blocking areas are already written in program areas prior to callout, the former blocking areas are already written in program areas prior to callout, the former blocking areas are already written in program areas prior to callout, the former blocking areas are already written in program areas prior to callout, the former blocking areas are already written in program areas are already are already areas are already are already areas are already are already are already are already are already areas are already ar

Error code	Meaning	SHERRING A CL Cause to Both Lines with	Corrective measure
1 bu	Memory overflow or system stack as lost deal overflow.	Number of steps insufficient. Program cannot be written in. Stack overflow moul selds levent his stabled at east e	 Clear unneeded programs or reduce the number of memories. Divide the formulas and make them simpler.
2	Syntax error les delle ondi A seldsinsy bos 8, e	 Format error in program, etc. Left-hand and right-hand formats differ in an assignment statement, etc. 	Correct error in input program, etc.
3	Mathematical error	The result of a numeric expression calculation exceeds 10 1000 Outside the numeric function argument input range Result is indefinite or impossible	e on hi are the distribution of the electric section of the calculation of the calculatio
4	Undefined line bos number error	No designated line number for GOTO statement or GOSUB statement	Correct the designated line number 19010 nestrice and 19111 west to be a second nestrino and the number 19010 nestrice an
5	Argument error	• For a command function that requires an argument, the argument is outside the input range.	• Correct the argument error
6	Variable error OAO [Interaction of the program loading to the prog	 Attempt was made to use a memory which has not been expanded. Attempt was made to use the same memory for a numerical variable and a character variable at the same time. 	Expand the memory properly Do not use the same memory for a numerical variable and a character variable at the same time. The same is a same time.
Tourne	Wisage of belong of the erased starting with Nesting error amage of the erase of t	executed NEXT statement comes out when not in FOR loop Subroutine levels exceed: 8 org of levels FOR*NEXT loops exceed 4 org levels of levels and of betreennones	within required levels ted.) testing inim sylvation of
9	Ditarego retning inim en Timetrod is similar to Option error	No printer or tape recorder is connected and execution is attempted in the PRT mode or optional command such as SAVE is executed	Connect printer or tape recorder Cancel PRT mode

(exerter about TB9) (e (away) Callout of all programs After printout is complete, be sure to press [608] and release the PRT mode. Also, to print calculation results or operation contents, printent can be performed autometrically by writing "MODE 7" and "MODE 8" in the program.

This command simultaneously calls out the programs of all the program areas which were recorded using the SAVE A command. The operation is similar to the LOAD command and the tape recorder is started in 100 MODE

Operation: LOAD A

Display during program load be sure to write "MODE 8" prior to program termination and

110 PRINT

When "MODE 7" is writte

release the PRT mode.

Program Command List

Classification	Command name	Format	Function
	$\frac{e_2 - e_1}{e_0}$ + 1" ti	INPUT variable string and one of the color o	Causes data to be entered from the keyboard during execution of a program. The program execution is stopped until after the end of input. P. 51
Input statement	ts. It the increments regarded as "1."	Character variable = KEY	Reads a character entered during execution of a program and assigns it to a character variable. Since the program is not stopped by this command, nothing is assigned to the character variable if no key-in entry is made. P. 52
Output	eeds to the line I statement TAIR9	PRINT output control function {;} output element { }}	Outputs a specified output element in a specified format. P. 52
o vo beunitnos ed CSR CSR CSR		CSR $n \ \{;\}$ in the same ') $(0 \le n \le 11)$	Displays from the designated <i>n</i> th position. P. 53
	GOTO neo bobne	GOTO {line number }	Causes control to jump to the speci- fied line number. P. 35
THE STATE OF THE S	IF{THEN}	4.GAD.A. [Stilenames]	Causes control to jump to the line number following THEN, or executes the command following ";", if the result of the comparison is true. Causes control to proceed to the next line number if the result of the comparison is false. P. 40
Branching	GOSUB	TISMER Pringrame GOSUB {line number } Variable Page Page Page Page Page Page	Calls the subroutine with the specified line number for execution. After the subroutine is executed, control returns to the GOSUB statement by the RETURN statement to proceed to the command following that statement. P. 56
mayora but	of a program. NAUTAR 's all the programs.	RETURN HA	Signifies the end of a subroutine; returns control to a line number next to the GOSUB statement. P. 56

Classification	Command name	Format	Function
	oard during assess tThe program	$^{\prime\prime}$ $^{\prime\prime}$ denotes a numerical variable, and e_1 , e_2 and e_3 represent a numerical expression respectively.	Declares the beginning of a loop in which numerical value ν changes from initial value e_1 to terminal value e_2 in increments of e_3 . The loop is repeated $ \frac{e_2 - e_1}{e_3} + 1 \text{ times} $ between the FOR and NEXT statements. If the increment e_3 is omitted, e_3 is regarded as "1". P. 45
	is not stopped by the	tion to ression carmation exce	proceeds to the line next to the NEXT statement. P. 45
Execution stop	specified format. Toris secing POTZ Toris transpr leys from the de	statement in GOSU statement in	Stops the execution of a program temporarily to bring the system into a key-in wait state. The execution can be continued by pressing the key. P. 33
Execution end	es controlato QN3 line number.	Attempt was not 2 to 20 hemory which has not be END panded judgmungend Land	Signifies the end of a program, the system returning to its pre-execution state. The execution of a program, once ended, cannot be continued even if the EXE key is pressed. P. 26
Data clearing	ber following to jumi command following	VAC	Clears all variable data for a program. P. 38
Program listing	es control to proced	LIST [line number] Compared to the property of	Displays a listing of all the statements
Program/data listing	the subreutine while him the humb A TSIL. Subtouting is exer		Displays a listing of the statements in all programs and the data in all memories, P. 64
Program execution	RETURN STAURS OF AN ORDER	RUN [fine number]	Causes a program to start from the specified line number. P. 27
Program	CLEAR Read of a street of a street		area of a program. P. 26
erasing	e GOSABANDA		Clears all the programs. P. 26

Classification	Command name	Format	Function
Angular unit designation	MODE 10 Others	MODE $\left\{ \begin{array}{c} 4 \\ 5 \\ 6 \end{array} \right\}$	Designates trigonometric angular units as degree (4), radian (5) or gradient (6). P. 47
Format designation	SET R2032) ption Notice indication of	SET $\left\{ \begin{array}{l} E n \\ F n \\ N \end{array} \right\}$	Designates the number of effective positions or number of decimal positions for the displayed numerical value. P. 54
Character function	LEN	LEN (character variable)	Calculates the size of the character variable. P. 55
	egree/radian/gradie leletion, of interes designation OIM generalization		Extracts <i>n</i> characters from the <i>m</i> th character in the exclusive character variable (\$).
	VAL	VAL (character variable) gnl	Converts the numbers in a character variable to a numerical value. P. 56
	SAVE patteries	SAVE ["filename"]	Records only the program in the currently designated program area on tape. P. 63
	LOAD	f = x LOAD ["filename"] 0 < x	Calls out the program from the tape and loads it to the currently designated program area. P. 63
	SAVE A HOTE	SAVE A ["filename"]	Records the programs in all program areas on tape at the same time. P. 63
		LOAD AR ("filename") US	Calls out all programs from the tape and loads them to the respective program areas. P. 63
	PUT on seeithern	PUT ["filename"] variable	Records the data in the variable on tape. P. 64
	*GET edifications	GET ["filename"] variable	Calls out the data from the tape and loads it in the variable. P. 64
	VERPION Which	particular installation. If the	Checks to confirm that the programs or data have been recorded on the tape properly. P. 64

^{*} Items enclosed in [] may be omitted. Either one of the items enclosed in { } may be used.

**Maximum J O regressions (P.A. Inserting P.A.) agrees that set reflue therein a continuous entress structure of maximum 2.2 The maximum 2.2 T

Display system and contents

10 mantissa positions (including minus sign) or 8 mantissa positions (7 positions for negative number, and 2 exponential positions, Also, display of respective conditions such as EXT, (3), (7), RUN, WRT, 1946, RAD, GRA, TR, PRT, STOP

Specifications ■ Type K9 Designates the number FX-700P positions or number 331 ()/8 ■ Fundamental calculation functions Negative numbers, exponentials, parenthetical addition, subtraction, multiplication and division (with priority sequence judgement function (true algebraic logic)) Built-in functions ments. If the incremen Trigonometric/inverse trigonometric functions (angular units - degree/radian/gradient), logarithmic/ exponential functions, square root, powers, conversion to integer, deletion of integer portion, absolute value, symbolization, designation of number of effective positions, designation of number of decimal positions, random numbers, π where it it is unawall (character ■ Function digit capacity of strevero Result accuracy Input range variable to a numerical value. P. $\sin x$, $\cos x$, $\tan x$ $|x| < 1440^{\circ} (8 \pi \text{rad}, 1600 \text{gra})$ 10th digit ±1 $\sin^{-1}x, \cos^{-1}x$ and who showed ["emane]currently designated plotte x rate log x, ln xx > 0 e^x x = 1Calls out the program from ["anx≥0"1 dAod and loads it to the designated program area (x ↑ x) vx (x ↑ y) uses margoria betangiseb x > 0Records the programs as shammod INPUT, PRINT, GOTO, FOR NEXT, IF-THEN, GOSUB, RETURN, STOP, END, RUN, LIST, LIST A MODE, SET, VAC, CLEAR, CLEAR A, DEFM, SAVE, SAVE A, LOAD, LOAD A, PUT, GET, VER Calls out all prog Program functions mont about bus LOAD A ["filename"] KEY, CSR, LEN, MID, VALMERDORG ■ Calculation range $\pm 1 \times 10^{-99}$ to $\pm 9.9999999999 \times 10^{99}$ and 0 (internal calculation uses 12 mantissa positions) ■ Program system Stored system out stab and two ellas ['filename'] variable ■ Program language Checks to certifirm that the colored or data have been ■ Number of steps Maximum 1,568 steps Either one of the items enclosed in berfilmo ad Varir [1194] becolone amen ■ Program capacity Maximum 10 programs (P0 through P9) Number of memories 26 to maximum 222 memories and exclusive character variable (\$) lears all the programs ■ Number of stacks

Subroutine — 8 levels FOR•NEXT loop — 4 levels Numerical value — 6 levels Calculation elements — 12 levels

■ Display system and contents

10 mantissa positions (including minus sign) or 8 mantissa positions (7 positions for negative number) and 2 exponential positions. Also, display of respective conditions such as EXT, S, F, RUN, WRT, DEG, RAD, GRA, TR, PRT, STOP

■ Display elements

12-position dot matrix display (liquid crystal)

■ Main components

C-MOS VLSI and others

■ Power supply

2 lithium batteries (CR2032)

■ Power consumption

Maximum 0.02 W

■ Battery life

Mainframe only - approximately 300 hours (Continuous use)

Auto power-off

Power is turned off automatically approximately 7 minutes after last operation.

■ Ambient temperature range

0°C to 40°C (32°F to 104°F)

■ Dimensions

9.8H x 165W x 71mmD (3/8"H x 6-1/2"W x 2-3/4"D)

■ Weight

118 g (4.2 oz) including batteries

GUIDELINES LAID DOWN BY FCC RULES FOR USE OF THE UNIT IN THE U.S.A. (not applicable to other areas).

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- ... reorient the receiving antenna
- ... relocate the computer with respect to the receiver
- ... move the computer away from the receiver
- ... plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4.

CASIO CURRELLARS LAID DOWN BY FCC RULES FOR USE OF THE UNIT IN THE U.S.A chain from remark and sound to comply with the limits for a Class B consumers toward the solvents of the specific articles in Support Josephan 15 of FCC finder, which are designed to provide a Paris au par a event, merchana de la la la designa de la composition della composi annothis provided the

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AC number contains foldulating minus son for dimension positions (7 tentions for regarder). The A contains minus son for dimensions such as £ 2.7, [5]. [F]. FIGU.

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