


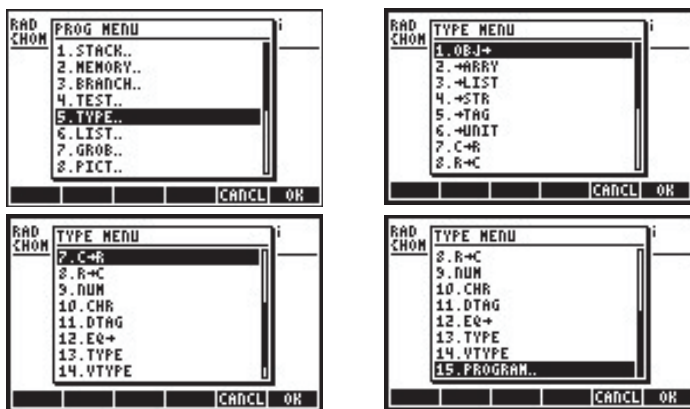
Chapter 23

Character strings

Character strings are calculator objects enclosed between double quotes. They are treated as text by the calculator. For example, the string "SINE FUNCTION", can be transformed into a GROB (Graphics Object), to label a graph, or can be used as output in a program. Sets of characters typed by the user as input to a program are treated as strings. Also, many objects in program output are also strings.

String-related functions in the TYPE sub-menu

The TYPE sub-menu is accessible through the PRG (programming) menu, i.e.,  PRG . The functions provided in the TYPE sub-menu are also shown below.



Among the functions in the TYPE menu that are useful for manipulating strings we have:

OBJ→: Converts string to the object it represents

→STR: Converts an object to its string representation

→TAG: Tags a quantity

DTAG: Removes the tag from a tagged quantity (de-tags)

CHR: Creates a one-character string corresponding to the number used as argument

NUM: Returns the code for first character in a string

Examples of application of these functions to strings are shown next:

:OBJ+("25.3")	25.3
:ANS(1):2	50.6
OBJ+ ARRAY LIST STR TAG UNIT	
:CHR(65)	"A"
:CHR(210)	"ð"
C+R R+C NUM CHR DTAG EQ+	
:TAG(5.1+3.2,"RES")	RES:8.3
:TAG("X+1","EQ2")	EQ2:(X+1)
OBJ+ ARRAY LIST STR TAG UNIT	

:STR(25.2)	"25.2"
:STR(12:6)	"72"
OBJ+ ARRAY LIST STR TAG UNIT	
:NUM("?")	63.
:NUM("4")	128.
C+R R+C NUM CHR DTAG EQ+	
:DTAG(QM:X-6)	X-6
:DTAG(N:2)	2
C+R R+C NUM CHR DTAG EQ+	

String concatenation

Strings can be concatenated (joined together) by using the plus sign +, for example:

: "My dog "+"ate it"	"My dog ate it"
C+R R+C NUM CHR DTAG EQ+	

Concatenating strings is a practical way to create output in programs. For example, concatenating "YOU ARE " AGE + " YEAR OLD" creates the string "YOU ARE 25 YEAR OLD", where 25 is stored in the variable called AGE.

The CHARS menu

The CHARS sub-menu is accessible through the PRG (programming) menu, i.e.,

 PRG .



The functions provided by the CHARS sub-menu are the following:



The operation of NUM, CHR, OBJ→, and →STR was presented earlier in this Chapter. We have also seen the functions SUB and REPL in relation to graphics earlier in this chapter. Functions SUB, REPL, POS, SIZE, HEAD, and TAIL have similar effects as in lists, namely:

SIZE: number of a sub-string in a string (including spaces)

POS: position of first occurrence of a character in a string

HEAD: extracts first character in a string

TAIL: removes first character in a string

SUB: extract sub-string given starting and ending position

REPL: replace characters in a string with a sub-string starting at given position

SREPL: replaces a sub-string by another sub-string in a string

To see those effects on action try the following exercises: Store the string "MY NAME IS CYRILLE" into variable S1. We'll use this string to show examples of the functions in the CHARS menu:

```
:"MY NAME IS CYRILLE"
:"MY NAME IS CYRILLE"
:SIZE(S1)                18.
:POS(S1,"N")              4.
SUB | REPL | POS | SIZE | NUM | CHR
```

```
:HEAD(S1)                 4.
                           "M"
:TAIL(S1)
:"Y NAME IS CYRILLE"
:SUB(S1,1,7)              "MY NAME"
SUB | REPL | POS | SIZE | NUM | CHR
```

```
:REPL(S1,12,"JOSE  ")
:"MY NAME IS JOSE  "
:SREPL(S1,"MY","HIS")
("HIS NAME IS CYRILLE"
+SKIP+SKIP+DEL+DEL+DEL+L+INS+)
```

The characters list

The entire collection of characters available in the calculator is accessible through the keystroke sequence CHARS. When you highlight any character, say they line feed character ↵, you will see at the left side of the bottom of the

screen the keystroke sequence to get such character (\rightarrow for this case) and the numerical code corresponding to the character (10 in this case).

Characters that are not defined appear as a dark square in the characters list (▪) and show (None) at the bottom of the display, even though a numerical code exists for all of them. Numerical characters show the corresponding number at the bottom of the display.

Letters show the code α (i.e., $\boxed{\text{ALPHA}}$) followed by the corresponding letter, for example, when you highlight M, you will see αM displayed at the lower left side of the screen, indicating the use of $\boxed{\text{ALPHA}}$ \boxed{M} . On the other hand, m shows the keystroke combination $\alpha \leftarrow M$, or $\boxed{\text{ALPHA}}$ $\boxed{\leftarrow}$ \boxed{M} .

Greek characters, such as σ , will show the code $\alpha \rightarrow S$, or $\boxed{\text{ALPHA}}$ $\boxed{\rightarrow}$ \boxed{S} . Some characters, like ρ , do not have a keystroke sequence associated with them. Therefore, the only way to obtain such characters is through the character list by highlighting the desired character and pressing $\boxed{\text{COPY}}$ or $\boxed{\text{PASTE}}$.

Use $\boxed{\text{COPY}}$ to copy one character to the stack and return immediately to normal calculator display. Use $\boxed{\text{PASTE}}$ to copy a series of characters to the stack. To return to normal calculator display use $\boxed{\text{ON}}$.

See Appendix D for more details on the use of special characters. Also, Appendix G shows shortcuts for producing special characters.