DESK - A Desk Calculator

A versatile programmable desk calculator program has been
written directly in machine language code to operate in the
516-TSS virtual memory multi-programming environment. The
DESK calculator program may be invoked from the SYS? level
by means of:

$$\underline{DESK\downarrow}$$
or $\underline{D\downarrow}$

or from the FSNAP - level by means of:

$$\underline{DESK\downarrow}$$

Once in the DESK calculator program a "menu" may be obtained
by hitting a carriage return only, as shown below:

SYS? D

DESK CALCULATØR

```
   DESK CALCULATØR CØMMANDS
+  ADD TØ
-  SUBTRACT FRØM
*  MULTIPLY TIMES
/  DIVIDE INTØ
↑  RAISE TØ PØWER
=  LØAD WØRKING STØRE
%  FØRMAT SPECIFICATIØN
SA STØRE WORKING STØRE INTØ REG. A
PA PRINT ØUT A REG.
P  PRINT ØUT ALL REGISTERS
W  PRINT ØUT WØRKING STØRE
A  AUTØMATIC PRINTØUT ØF WØRK. STØRE
D  DELETE AUTØ. PRINTØUT ØF WURK STØRE
E  GØ TØ TEXT EDITØR
I  TAKE INPUT CØMMANDS FRØM FILE
R  RE-INITIALIZE ALL REGISTERS
X  EXIT FRØM PRØGRAM
SQR SQUARE RØØT
NEG NEGATIVE VALUE
ABS ABSØLUTE VALUE
SIN SINE
CØS CØSINE
TAN TANGENT
CØT CØTANGENT
ATN ARCTANGENT
EXP EXPØNENTIAL
LGT LØG BASE 1
LØG LØG BASE E
SGN SIGN
INT INTEGER PART
RND RANDØM NUMBER


X


SYS?
```

Any of the above commands may be given by the user, with
only the first seven in the list requiring an argument.
All operations requested by the user are performed on the
contents of a "working storage" register. Intermediate
calculation results may be stored in any one of 26 storage
registers, A to Z. Initially the contents of all storage
registers are undefined and the contents of the working
storage register is zero.

The first six commands +, -, *, /, ↑ and = take an argument
which may be either a number (free-format) or a register,
A to Z. The format specification command may be used to
specify the format of numbers to be printed out. For
instance, %9.3 would output numbers with three digits after
the decimal point and allow room for six digits before the
decimal point. The default value of the format specification
is %8.2. The store command is used to store the contents of
the working storage register in any register, A to Z. For
instance, ST would store the contents of the working storage
register in register T. The P command may be used to print
out any register selectively or to print out all registers.
The contents of the working storage register are normally
displayed after each operation on its contents. However,
this option may be deleted by means of the D command, or
reinstated at any time by means of the A command. The
contents of the working storage register may be displayed
at any time by means of the W command. The R command is
used to reinitialize all registers and proceed as if one
had just entered the DESK calculator. The X command is used
to exit from the DESK calculator.

One may also calculate functions using the contents of the
working storage register as the argument. This is performed
merely by using the name of the desired function (a three
letter code) as the command.

A command is terminated either by giving a carriage return or
a space. Upon giving a carriage return, a line feed will
automatically be outputted. Upon issuing a space another
space code will be outputted to the terminal. If the command
is illegal or cannot be performed for some reason, (e.g., LØG(0))
a double question mark will be returned.

The following sequence of commands will calculate the sine of
33 degrees (note that all angles must be converted to radians):

```
D  %8.6↵
=33↵
/180↵
*3.14159↵
SIN↵
W↵
WS = 0.544639
```

To calculate the SINE and COSINE of a number of angles, one might use the following sequence of commands:

```
D  %8.5 =3.14159 /180 SP↵
=30  *P  SA  SIN  W↵
WS = 0.50000
=A  COS  W↵
WS = 0.86603
```

To calculate the SIN and COS of other angles only the commands on the second and fourth lines of the sequence need be repeated.

To perform very frequently used calculation routines one may invoke a higher level of command by utilizing the INPUT and SPAWN subsystem programs (see document 516-51 for more detailed information). The TEXT editor can be used via the E command to write a DESK calculator routine in a file. All DESK calculator registers are saved while the EDITØR is invoked. As an example, a file, SRC, containing:

```
D  %8.5  =3.14159 /180 SP
=#1  *P  SA  SIN  W
=A  CØS  W
```

may be used to calculate the SIN and COS of any given angle passed through the argument, #1. The DESK calculator command,

```
        I, SRC, 30
    or SRC, 30
```

will print out the SIN and COS of 30 degrees. -

Up to nine arguments, #1 to #9, alphabetic, numeric or any other character string, separated by commas may be passed via the file input mechanism. In general each DESK calculator command given by the user is compared against the list found in the menu. If no match is found, an attempt is made to find a file by the given command name in the user's directory.

If such a file is found, input for the DESK calculator is
subsequently taken from the file until the file contents
are exhausted. However, a command followed by a comma and
an optional string of arguments will always be treated as
a file name, even though it may conflict with a standard
DESK calculator command.