

DC(I)

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NAME

dc — desk calculator

SYNOPSIS

dc [ file ]

DESCRIPTION

*Dc* is an arbitrary precision arithmetic package. Ordinarily it operates on decimal integers, but one may specify an input base, output base, and a number of fractional digits to be maintained. The overall structure of *dc* is a stacking (reverse Polish) calculator. If an argument is given, input is taken from that file until its end, then from the standard input. The following constructions are recognized:

number

The value of the number is pushed on the stack. A number is an unbroken string of the digits 0-9. It may be preceded by an underscore `_` to input a negative number. Numbers may contain decimal points.

+ - \* % ^

The top two values on the stack are added (+), subtracted (-), multiplied (\*), divided (/), remaindered (%), or exponentiated (^). The two entries are popped off the stack; the result is pushed on the stack in their place. Any fractional part of an exponent is ignored.

sx The top of the stack is popped and stored into a register named *x*, where *x* may be any character. If the *s* is capitalized, *x* is treated as a stack and the value is pushed on it.

lx The value in register *x* is pushed on the stack. The register *x* is not altered. All registers start with zero value. If the *l* is capitalized, register *x* is treated as a stack and its top value is popped onto the main stack.

d The top value on the stack is duplicated.

p The top value on the stack is printed. The top value remains unchanged.

f All values on the stack and in registers are printed.

q exits the program. If executing a string, the recursion level is popped by two. If *q* is capitalized, the top value on the stack is popped and the string execution level is popped by that value.

x treats the top element of the stack as a character string and executes it as a string of *dc* commands.

[ ... ] puts the bracketed ascii string onto the top of the stack.

<x >x =x

The top two elements of the stack are popped and compared. Register *x* is executed if they obey the stated relation.

v replaces the top element on the stack by its square root. Any existing fractional part of the argument is taken into account, but otherwise the scale factor is ignored.

! interprets the rest of the line as a UNIX command.

c All values on the stack are popped.

i The top value on the stack is popped and used as the number radix for further input.

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- o** The top value on the stack is popped and used as the number radix for further output.
- k** the top of the stack is popped, and that value is used as a non-negative scale factor: the appropriate number of places are printed on output, and maintained during multiplication, division, and exponentiation. The interaction of scale factor, input base, and output base will be reasonable if all are changed together.
- z** The stack level is pushed onto the stack.
- ?** A line of input is taken from the input source (usually the console) and executed.

An example which prints the first ten values of  $n!$  is

```
[[a1+dsa*pla10>y]sy  
0sa1  
lyx
```

**SEE ALSO**

bc (I), which is a preprocessor for *dc* providing infix notation and a C-like syntax which implements functions and reasonable control structures for programs.

**DIAGNOSTICS**

- (x) ? for unrecognized character x.
- (x) ? for not enough elements on the stack to do what was asked by command x.
- 'Out of space' when the free list is exhausted (too many digits).
- 'Out of headers' for too many numbers being kept around.
- 'Out of pushdown' for too many items on the stack.
- 'Nesting Depth' for too many levels of nested execution.

**BUGS**