VAX Floating Point

* 4 formats, all with hidden bit
  F 1, 8, 23+1
  D 1, 8, 55+1
  G 1, 11, 52+1
  H 1, 15, 112+1

* Accuracy

  * All operations are 0.5 ulp accurate, but no round to even

  * Round to nearest always used, no rounding modes

* Special operands

  * No Infinity, NaN, denorms

  * -0 is a reserved operand

* Exceptions

  * Overflow produces reserved operand and always takes a floating overflow trap

  * Divide by zero produces reserved operand and always takes a floating divide by zero trap

  * Underflow always produces zero and takes a floating underflow trap if it is enabled
    Underflow traps are disable on every procedure call

  * Reserved operand (-0) aborts instruction and always takes reserved operand trap

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VMS Exception handling -- General

* Machine faults are translated into software signals with specific condition numbers

* Programs can establish signal handlers on a per-procedure basis which are passed the condition number

* Handlers can pass the condition, unwind, or continue

* If program does not handle condition the a default handler prints something like

```
%SYSTEM-F-FLTOVF_F, arithmetic fault, floating overflow
                    at PC=00000711, PSL=03C0
%TRACE-F-TRACEBACK, symbolic stack dump follows
module name     routine name                    line
TEST            TEST                            30
```

and then stops

VMS Exception handling -- Floating point

1 / 0	-0	%SYSTEM-F-FLTDIV_F
0 / 0	-0	%SYSTEM-F-FLTDIV_F
Overflow	-0	%SYSTEM-F-FLTOVF_F
Underflow	0	%SYSTEM-F-FLTUND_F (if enabled)
Bad input	0	%FOR-F-INPCONERR
sqrt(-1)	-0	%MTH-F-SQUROONEG, square root of negative value
sqrt(-0)	none	%SYSTEM-F-ROPRAND
log(0)	-0	%MTH-F-LOGZERNEG, logarithm of zero or negative value
log(-1)	-0	%MTH-F-LOGZERNEG
log(-0)	-0	%MTH-F-LOGZERNEG
exp(89)	-0	%MTH-F-FLOOVEMAT, floating overflow in math library
exp(-89)	0	
exp(-0)	1.0	
sin(1e38)	0.989164472	
atan(0,0)	none	%MTH-F-INVARGMAT
0**0	-0	