6.111 Final Project Functionality/Correctness Checklist
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User Interface
- Display input and output floating-point numbers on logic analyzer
  ○ Separate channels for exponent (possibly biased), significand, and sign
- Select among input values using switches
  ○ Four switches/operand, so 16 different input values for each operand
  ○ 256 total combinations, implementing the tests described below (or as many as possible if 16 is insufficient to encode all the necessary inputs)
- Select operand using up/down/left/right buttons
- Implement behavior to accommodate greater number of different input values (if time permits)
- Preprogrammed series of input values and operands triggered when Enter button is pressed, cycle to next value set every couple seconds (if time permits)

Testability
- Source code will contain a Verilog test module implementing all the tests described in this checklist, for ease of testing, even if not all tests can actually be easily run on the labkit itself (due to user interface considerations) and even if the FPU does not pass all the tests

Implementational Correctness
- General considerations
  ○ Correct rounding using round-to-nearest mode
- General, special-case behavior for all supported operations with:
  ○ One or two NaN operands
  ○ One or two +Infinity or -Infinity operands
  ○ One or two +0 or -0 operands
  ○ Maximum/minimum non-infinity floating-point values
- Multiplication
  ○ Values of roughly the same magnitude
  ○ Values of substantially different magnitude (e.g. $2*10^5 * 3*10^{-15}$)
  ○ Values with different signs
  ○ Values where exponent must or must not carry (e.g. $9*10^0 * 9*10^0$ doesn't have exponent of 0 and carries, 1*1 doesn't carry)
  ○ Result rounds to +0 or -0
- Addition/Subtraction (both operations correct, operands in either order)
  ○ Values of roughly the same magnitude
  ○ Values of substantially different magnitude (e.g. $2*10^5 * 3*10^{-15}$)
  ○ Values with different signs
  ○ Values where exponent must or must not carry (e.g. $9*10^0 * 9*10^0$ doesn't have exponent of 0 and carries, 1*1 doesn't carry)
- Comparison
  ○ Pair of values with same sign/exponent but different significands
  ○ Pair of values with same sign/significands but different exponents
  ○ Same number, opposite signs
  ○ Same number, same sign
  ○ Normalized and denormalized numbers
- Exceptions

- Tests for exceptions as taken from the prose descriptions of each exception, as specified in the IEEE-754 standard

Big Features (if time permits):
- QNaN and SnaN
  - Produce QNaN and SNan as appropriate (time permitting; will not distinguish if insufficient time)
  - Propagate QNaN and SNan through calculations as appropriate (time permitting)
- Division (if time permits)
  - Infinity/+0, Infinity/-0, -Infinity/+0, -Infinity/-0
  - Big/small causing overflow