Lab Assignment 4

Floating Point Multiplier

Behavioral Simulations:

Test 1

Multiplicand: "0 11001111 10101010101010"
exponent: 11001111 (207), significant: 10101010101010 (10922)

Multiplier: "1 00000000 00000000000000"
value:- 0

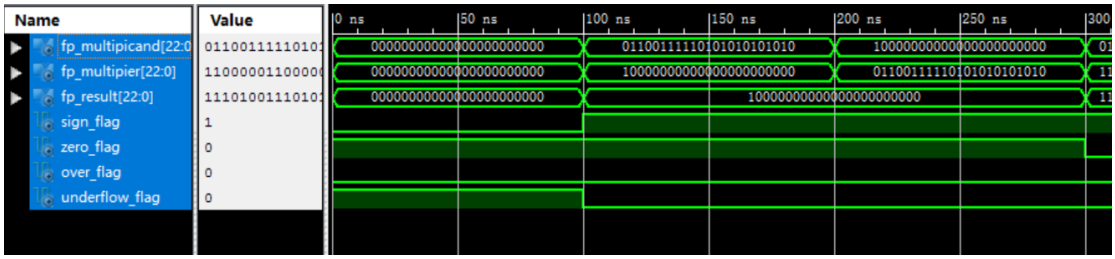
Result: -0; Sign: 1 Zero: 1 Overflow: 0 Underflow: 0

Test 2

Multiplicand: "1 00000000 00000000000000"
value:- 0

Multiplier: "0 11001111 10101010101010"
exponent: 11001111 (207), significant: 10101010101010 (10922)

Result: -0 Sign: 1 Zero: 1 Overflow: 0 Underflow: 0



Test 3

Multiplicand: "0 11001111 10101010101010"
exponent: 11001111 (207), significant: 10101010101010

Multiplier: "1 10000011 00000000000111"
exponent: 10000011 (131), significant: 00000000000111

Result: “1 11010011 10101010110101”
exponent: 11010011 (211 = 207 +131 -127) significant: 10101010110101
Sign: 1 Zero: 0 Overflow: 0 Underflow: 0

Test 4

Multiplicand: "0 11001111 10101010101010"
exponent: 11001111 (207), significant: 10101010101010

Multiplier: "1 11001111 00000000000111"
exponent: 11001111 (206), significant: 00000000000111

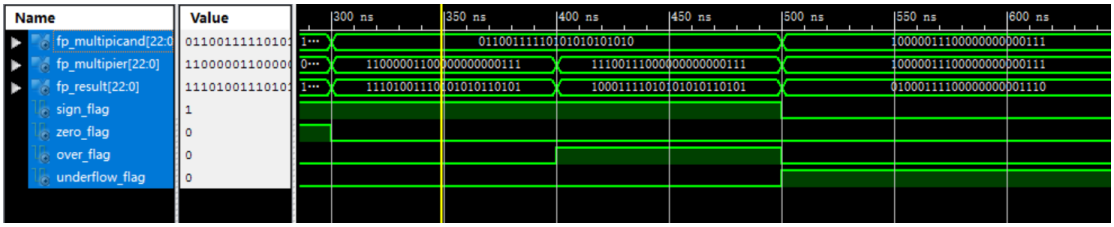
Result: “1 00011110 10101010110101”
exponent: 00011110 (30 = 207 +206 -127-256(overflow))
significant: 10101010110101
Sign: 1 Zero: 0 Overflow: 1 Underflow: 0

Test 5

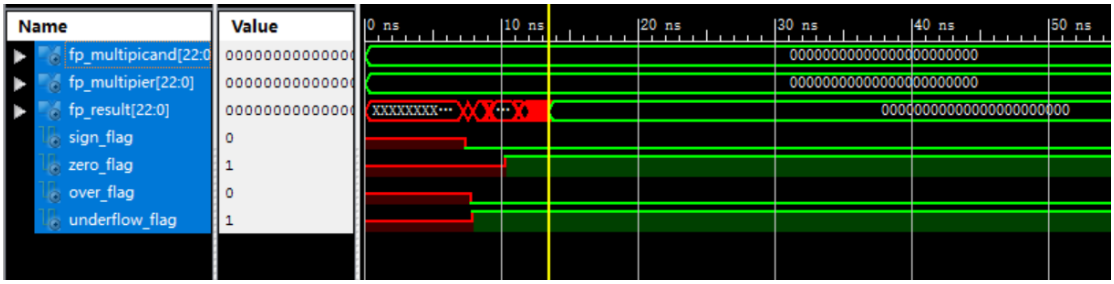
Multiplicand: "1 00000111 00000000000111"
exponent: 00000111 (7), significant: 00000000000111

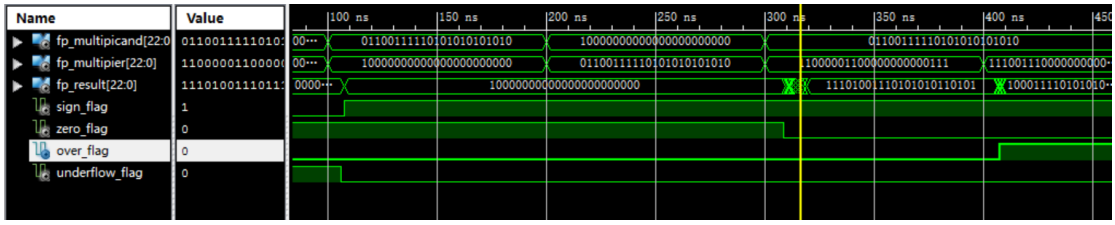
Multiplier: "1 00000111 00000000000111"
exponent: 00000111 (7), significant: 00000000000111

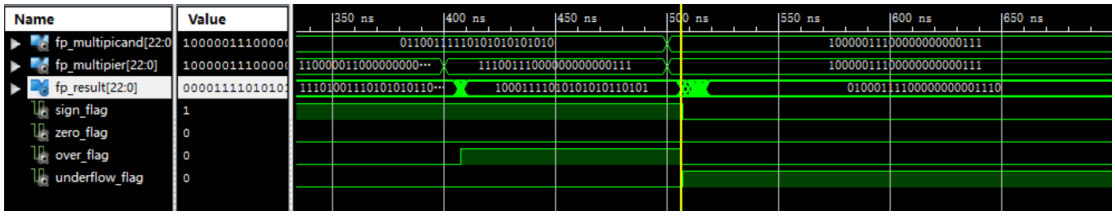
Result: “0 10001111 00000000001110”
exponent: 10001111 (143 = 7 + 7 -127 + 256(underflow))
significant: 00000000001110
Sign: 0 Zero: 0 Overflow: 0 Underflow: 1



Timing Simulations:





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Device utilization summary:
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Selected Device : 3s500efg320-5

 Number of Slices:                      284  out of   4656      6%
 Number of 4 input LUTs:                516  out of   9312      5%
 Number of IOs:                          73
 Number of bonded IOBs:                  73  out of    232     31%
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Number of 4 input LUTs: 516

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Timing Summary:
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Speed Grade: -5

   Minimum period: No path found
   Minimum input arrival time before clock: No path found
   Maximum output required time after clock: No path found
   Maximum combinational path delay: 20.355ns

Timing Detail:
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All values displayed in nanoseconds (ns)

=========================================================================
Timing constraint: Default path analysis
  Total number of paths / destination ports: 996949 / 27
-------------------------------------------------------------------------
Delay:               20.355ns (Levels of Logic = 29)
  Source:            fp_multipier<3> (PAD)
  Destination:       fp_result<21> (PAD)
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Critical path delay: 20.355ns

Maximum Frequency: 49.13 MHz