Computer Architecture

Assignment 11

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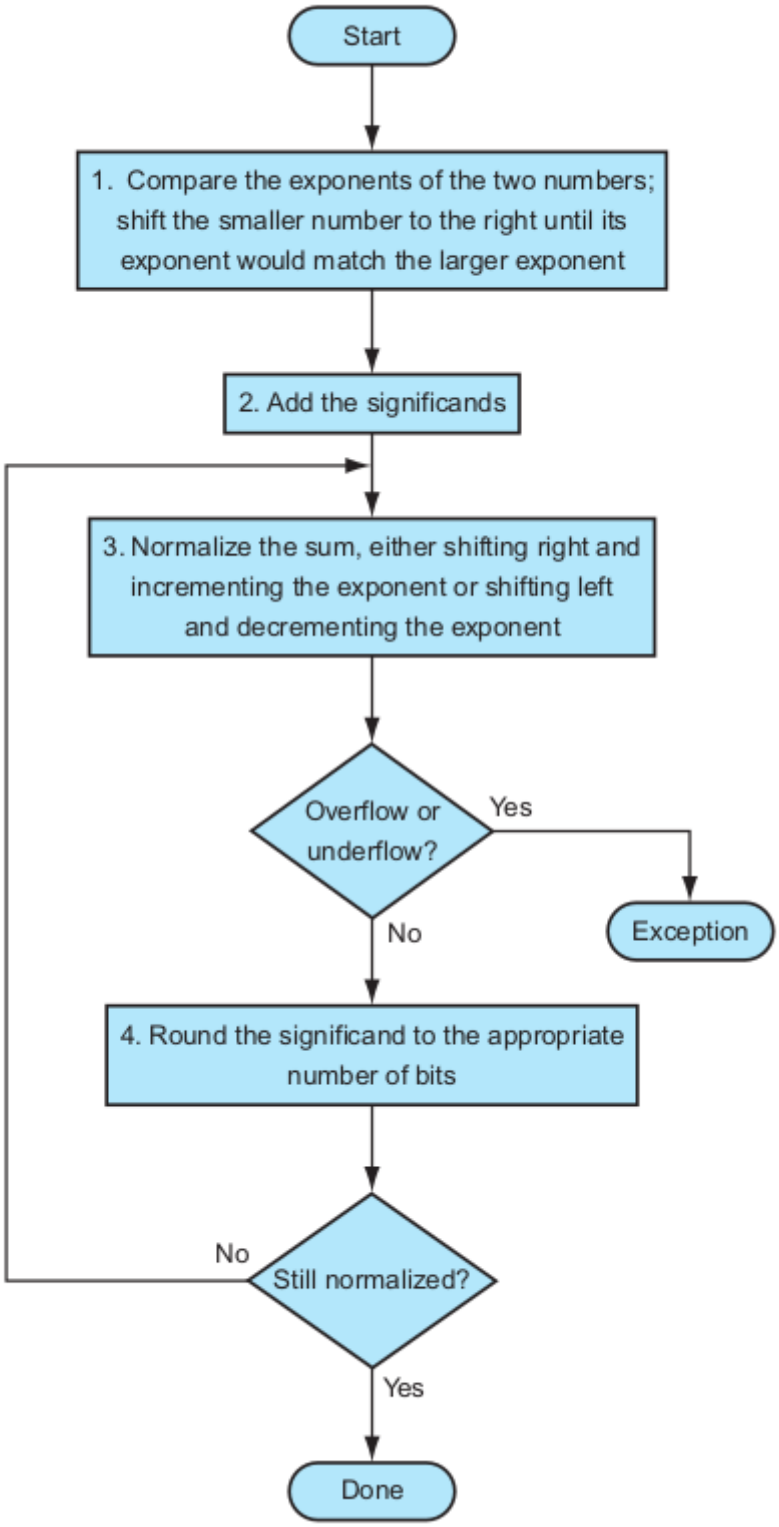
This assignment is about the flosting point arithmetic and the program implements the following algorithm in C++.



The code handles all the exceptions like underflow, overflow, zero inputs and also raises exception about the denormalised numbers.

Single precision		Double precision		Object represented
Exponent	Fraction	Exponent	Fraction	
0	0	0	0	0
0	Nonzero	0	Nonzero	± denormalized number
1–254	Anything	1–2046	Anything	± floating-point number
255	0	2047	0	± infinity
255	Nonzero	2047	Nonzero	NaN (Not a Number)

The input test file is

11111111100000000000000000000000 00000000000000000000000000000011
10000010000000000001000001000000 01111111100000000000000000000000
11111111100000000000000000000000 01111111100000000000000000000000
11111111101011000000000000000000 01011100010000000000000000000000
10100000001010100000000000000110 00001000011011100000000000000111
01111111011111111111111111111111 01111111011111111111111111111111
10000001010100000000000000000000 00000000110100000000000010000000
10000001011000000000000000000000 00000000101100000000000001000000
01000011010000000000000000000000 01000001001100000000000000000000
01001011010101010101010101010101 11000010101010101010101010101010
00000010101111111111100000000000 10000010011111111111000000000001
00000010111111111000000000000000 00000010000000010000000000000001
00011001111111111111111111111111 00011001111111111111111111111111
10000110011111111111111110000000 00000110011111111111111111000000
01100010011111111111111111111110 11100011011111111111111111111111
11100011011111111111111111111111 01100010011111111111111111111110
00100011111111100000011111100000 10100001111111100000000000000000

the output is

Infinites in input. No computations
Infinites in input. No computations
Infinites in input. No computations
NaN
10100000001010100000000000000110
number of cycles: 4
OVERFLOW
number of cycles: 3
10000000110011111111111110000000
number of cycles: 4
UNDERFLOW

number of cycles: 3
01000011011110000000000000000000
number of cycles: 4
01001011010101010101010100000000
number of cycles: 4
00000001111111111111111111111100
number of cycles: 4
00000011001000000000000000000001
number of cycles: 4
00011010011111111111111111111111
number of cycles: 3
UNDERFLOW
number of cycles: 3
11100011001111111111111111111111
number of cycles: 4
11100011001111111111111111111111
number of cycles: 4
00100011111011100010011111100000
number of cycles: 4