Exam # 1 - CSc 137, Fall 2020

(Please show all work)

Name: _____

1. What is the 16-bit FP number representation of -7.375 in hex with 1-bit sign, 4-bit biased exponent, and 11-bit fraction, where bias = 7. Please identify the key components of FP number representation (25 pts)

2. Please circle the best answer about Von Neumann architecture below (25 pts)

A. Only data is stored in primary memory

B. Only instructions are stored in primary memory

C. Data and instructions are both stored in primary memory

D. None of Above

3. Using Boolean Algebra, simplify the following logical expression? (25 pts)

$$F = AB + A\,(B+ C) + B(B+C)$$

4. Design a Single cell 1 bit Carry propagate (or Ripple Carry Adder) full adder. (25 pts)

a. Generate the truth table

b. Using K-map or Boolean algebra, determine the logical expression for Carry out (C-out) and Sum (S) Outputs

C. Draw the circuit diagram of the outputs in step b

Conversion Table:

Decimal (Base 10)	Binary (Base 2)	Hexadecimal (Base 16)
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F