

# CS150 - Computer Organization and Architecture

## Homework #3 - Spring 2024

1. Convert the following binary numbers to equivalent decimal numbers.

- (a)  $(11010.1)_2$  26.5
- (b)  $(101011.101)_2$  43.625
- (c)  $(10100.01)_2$  20.25
- (d)  $(1001101.111)_2$  77.875
- (e)  $(10110.010)_2$  22.25

2. Perform the following hexadecimal arithmetic.

$$\begin{array}{r} \text{a. } A2 \\ \times 3 \\ \hline 1E6 \end{array}$$

$$\begin{array}{r} \text{b. } 8FF \\ + 301 \\ \hline C00 \end{array}$$

$$\begin{array}{r} \text{c. } E06 \\ - 4F \\ \hline DB7 \end{array}$$

$$\begin{array}{r} \text{d. } 5CA \\ - 1FF \\ \hline 3CB \end{array}$$

$$\begin{array}{r} \text{e. } 62 \\ \times 12 \\ \hline 6E4 \end{array}$$

$$\begin{array}{r} \text{f. } C8A \\ + 3F3 \\ \hline 107D \end{array}$$

3. Convert the following decimal numbers into equivalent 16-bit two's complement binary numbers.

•  $(211)_{10}$  0000 0000 1101 0011

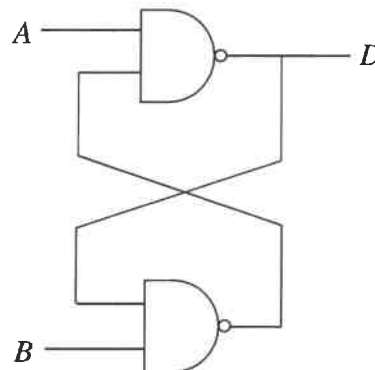
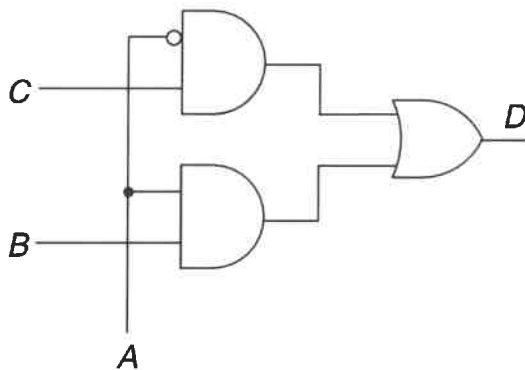
•  $(-211)_{10}$  1111 1111 0010 1101

•  $(32765)_{10}$  0111 1111 1111 1101

•  $(-9)_{10}$  1111 1111 1111 0111

•  $(-2)_{10}$  1111 1111 1111 1110

4. One of the circuits below is combinational, whereas the other is sequential. Please label the circuits as such, and justify your answer.



Answer Here:

combinational

sequential

5. Generate a gate-level logic circuit diagram which satisfies the truth table shown below. Please use only AND, OR, and NOT gates and be sure to clearly denote wire junctions.

A	B	C	Z
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

