

**Computer Science Fundamentals**  
**CS208**

**HW 2**

**Solve each of the following problems showing all the required steps,**

1. Add the following binary numbers

a. 
$$\begin{array}{r} 00110111 \\ 00011101 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 001101 \\ 110010 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 101001 \\ + 001111 \\ \hline \end{array}$$

2. Subtract the following binary numbers

a. 
$$\begin{array}{r} 1100 \\ - 0100 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 011001 \\ - 001111 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 11010101 \\ - 01000111 \\ \hline \end{array}$$

3. Perform the specified operations on the following Octal numbers

a. 
$$\begin{array}{r} 1423 \\ + 1542 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 4200 \\ - 1425 \\ \hline \end{array}$$

4. Perform the specified operations on the following hexadecimal numbers:

a. 
$$\begin{array}{r} 2B6 \\ + 934 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 235 \\ - 1BD \\ \hline \end{array}$$

5. Convert the following decimal numbers to their 8-bit sign-magnitude and 8-bit twos-complement representations:

a. 31

b. 0

c. -49

d. -11

6. Show the results of the following binary logical operations

a. 
$$\begin{array}{r} 1111 \\ \text{AND } 1011 \\ \hline \end{array}$$

b. 
$$\begin{array}{r} 0000 \\ \text{OR } 1101 \\ \hline \end{array}$$

c. 
$$\begin{array}{r} 1101 \\ \text{XOR } 0101 \\ \hline \end{array}$$

d. SHL. 101101

e. ROL 101101

f. SHR 11011

7. Convert the following decimal floating-point numbers to their 32 bit binary representation in the IEEE floating point representation:

a. 125.75

b. -35.625

8. Convert the following 32 bit binary representation in the IEEE floating point representation to their decimal floating-point equivalent:

a. 1                    01111110

0110 ... 0

b. 0                    10000101

10110 ... 0