

CS150 - Computer Organization and Architecture Homework #1 - Spring 2024

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

- (a) $(00001101)_2$
- (b) $(00010001)_2$
- (c) $(01101101)_2$
- (d) $(11011101)_2$
- (e) $(11111111)_2$
- (f) $(11100.011)_2$

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

- (a) $(67)_{10}$
- (b) $(54)_{10}$
- (c) $(255)_{10}$
- (d) $(256)_{10}$
- (e) $(2416)_{10}$
- (f) $(4096)_{10}$

3. Convert the following octal numbers to equivalent decimal numbers.

- (a) $(35)_8$

- (b) $(2347)_8$

4. Convert the following decimal numbers to equivalent octal numbers.

- (a) $(91)_{10}$

- (b) $(132)_{10}$

- (c) $(521)_{10}$

5. Convert the following hexadecimal numbers to equivalent decimal numbers.

- (a) $(C4)_{16}$

- (b) $(3FF)_{16}$

- (c) $(BEEF)_{16}$

6. Convert the following decimal numbers to equivalent hexadecimal numbers.

- (a) $(30)_{10}$

- (b) $(312)_{10}$

- (c) $(513)_{10}$

7. Convert the following binary numbers to equivalent octal numbers.

- (a) $(11101)_2$
- (b) $(11101101)_2$
- (c) $(10110101)_2$

8. Convert the following binary numbers to equivalent hexadecimal numbers.

- (a) $(101010)_2$
- (b) $(111100110)_2$
- (c) $(11010101)_2$

9. Miscellaneous - Perform the following base conversions.

- (a) $(341)_5 = (?)_{10}$
- (b) $(76)_{10} = (?)_7$
- (c) $(1101001)_2 = (?)_4$
- (d) $(BFE)_{16} = (?)_{12}$
- (e) $(2112)_3 = (?)_8$
- (f) $(7AD)_{16} = (?)_{10}$
- (g) $(6101)_7 = (?)_{10}$

10. Perform the following **binary** arithmetic.

$$\begin{array}{r} \text{a. } 01010111 \\ + 00110011 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b. } 00100110 \\ + 01001111 \\ \hline \end{array}$$

$$\begin{array}{r} \text{c. } 01010011 \\ + 10111011 \\ \hline \end{array}$$

$$\begin{array}{r} \text{d. } 01011100 \\ + 00011111 \\ \hline \end{array}$$

$$\begin{array}{r} \text{e. } 10011011 \\ - 00111011 \\ \hline \end{array}$$

$$\begin{array}{r} \text{f. } 01011001 \\ - 00011111 \\ \hline \end{array}$$

11. Perform the following **octal** arithmetic.

$$\begin{array}{r} \text{a. } 424 \\ + 163 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b. } 5112 \\ + 1346 \\ \hline \end{array}$$

12. Perform the following **hexadecimal** arithmetic.

$$\begin{array}{r} \text{a. } A4 \\ + 27 \\ \hline \end{array}$$

$$\begin{array}{r} \text{b. } 7F3 \\ + 41D \\ \hline \end{array}$$

$$\begin{array}{r} \text{c. } 806 \\ - 4B \\ \hline \end{array}$$

$$\begin{array}{r} \text{d. } 56C \\ - 2FF \\ \hline \end{array}$$