

**GIT Department of
Computer Engineering
CSE 232 – Spring 2020**

Homework - I

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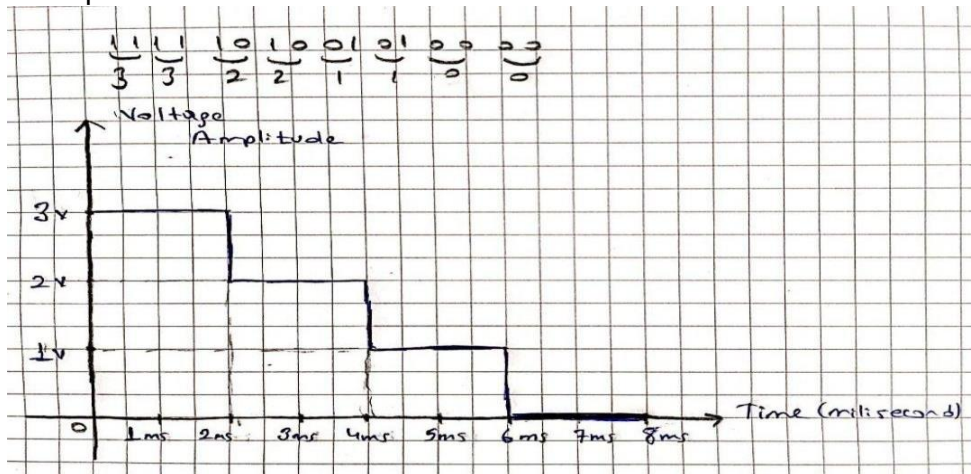
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CSE 232 SPRING 2020

HOMEWORK I

Due Date March 16, Monday

1. Assume that 0 V is encoded as 00, 1 V as 01, 2 V as 10, and 3 V as 11. You are given a digital encoding of an audio signal as follows: 1111101001010000. Plot the re-created signal with time on the x-axis and voltage on the y-axis. Assume that each encoding's corresponding voltage should be output for 1 millisecond.



2. Convert the following binary numbers to decimal numbers:

- a. 000011 $\longrightarrow (2^0) * 1 + (2^1) * 1 = 3$
- b. 1111 $\longrightarrow (2^0) * 1 + (2^1) * 1 + (2^2) * 1 + (2^3) * 1 = 15$
- c. 11110 $\longrightarrow (2^0) * 0 + (2^1) * 1 + (2^2) * 1 + (2^3) * 1 + (2^4) * 1 = 30$
- d. 111100 $\longrightarrow (2^0) * 0 + (2^1) * 0 + (2^2) * 1 + (2^3) * 1 + (2^4) * 1 + (2^5) * 1 = 60$
- e. 0011010 $\longrightarrow (2^0) * 0 + (2^1) * 1 + (2^2) * 0 + (2^3) * 1 + (2^4) * 1 + (2^5) * 0 + (2^6) * 0 = 26$

3. Convert the following binary numbers to hexadecimal:

- a. 11001101 $\longrightarrow 1100 / 1101 = CD$
- b. 10100101 $\longrightarrow 1010 / 0101 = A5$
- c. 11110001 $\longrightarrow 1111 / 0001 = F1$
- d. 110110111100 $\longrightarrow 0001 / 1011 / 0111 / 1100 = 1B7C$

4. Convert the following hexadecimal numbers to decimal:

- a. 10 $\longrightarrow 0001 / 0000 = 16$
- b. 4E3 $\longrightarrow 0100 / 1110 / 0011 = (2^10) * 1 + (2^7) * 1 + (2^6) * 1 + (2^5) * 1 + (2^1) * 1 + (2^0) * 1 = 1251$
- c. FF0 $\longrightarrow 1111 / 1111 / 0000 = (2^11) * 1 + \dots + (2^4) * 1 = 4080$
- d. 200 $\longrightarrow 0010 / 0000 / 0000 = (2^9) * 1 = 512$

5. Encode the following words into bits using the ASCII encoding table in Figure 1.9.

- a. LET $\longrightarrow 01001100 / 01000101 / 01010100$
- b. RESET! $\longrightarrow 01010010 / 01000101 / 01010011 / 01000101 / 01010100 / 00100001$
- c. HELLO \$! $\longrightarrow 1001000 / 01000101 / 01001100 / 01001100 / 01001111 / 00100000 / 00100100 / 00110001$