CSE 232 SPRING 2020

HOMEWORK 1

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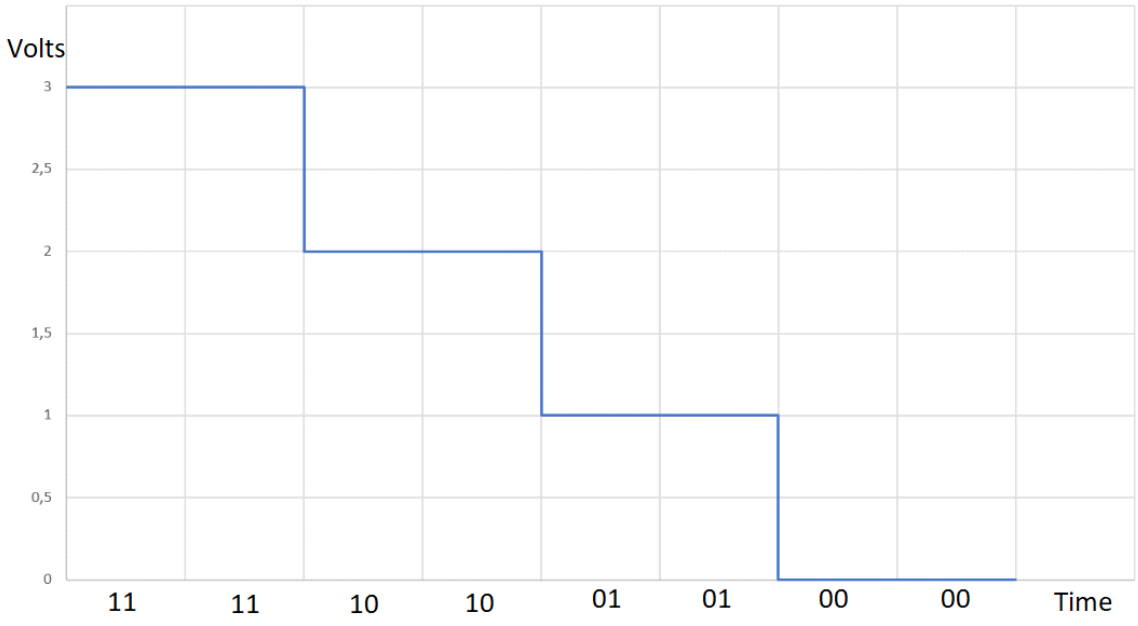
1) Assume that 0 V is encoded as 00, 1 V as 01, 2 V as 10, and 3 V as 11. You are given a digital encoding of an audio signal as follows: 1111101001010000. Plot the re-created signal with time on the x-axis and voltage on the y-axis. Assume that each encoding's corresponding voltage should be output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



2) 2. Convert the following binary numbers to decimal numbers:

a. 000011

$2^0 + 2^1 = 3$

b. 1111

$2^0 + 2^1 + 2^2 + 2^3 = 15$

c. 11110

$2^1 + 2^2 + 2^3 + 2^4 = 30$

d. 111100

$2^2 + 2^3 + 2^4 + 2^5 = 60$

e. 0011010

$2^1 + 2^3 + 2^4 = 26$

3. Convert the following binary numbers to hexadecimal:

a. 11001101

1100 ----> 12 = C

1101 ----> 13 = D

Hexadecimal = CD

b. 10100101

1010 ----> 10 = A

0101 ----> 5

Hexadecimal = A5

c. 11110001

1111 ----> 15 = F

0001 ----> 1

Hexadecimal = F1

d. 1101101111100

0001 ----> 1 = 1

1011 ----> 11 = B

0111 ----> 7 = 7

1100 ----> 12 = C

Hexadecimal = 1B7C

4. Convert the following hexadecimal numbers to decimal:

a. 10

$16^1=16$

b. 4E3

$3x16^0 + 14x16^1 + 4x16^2 = 1251$

c. FF0

$15x16^1 + 15x16^2 = 4080$

d. 200

$2x16^2 = 512$

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

a. LET

L ----> 01001100

E ----> 01000101

T ----> 01010100

01001100 01000101 01010100

b. RESET!

R ----> 01010010

E ----> 01000101

S ----> 01010011

E ----> 01000101

T ----> 01010100

! ----> 00100001

01010010 01000101 01010011 01000101 01010100 00100001

c. HELLO $

H ----> 01001000

E ----> 01000101

L ----> 01001100

L ----> 01001100

O ----> 01001111

[space] ----> 00100000

$ ----> 00100100

01001000 01000101 01001100 01001100 01001111 00100000 00100100