American International University-Bangladesh (AIUB)

Department of Computer Science

Lab Report-03

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SECTION : **G**

COURSE NAME : DATA COMMUNICATION

SEMESTER : 2020-2021, Fall

Title: Analog Signal quantization using MATLAB

Performance Task:

My ID = **17-34465-2**

Here,

A= 1, B= 7, C= 3, D= 4, E= 4, F= 6, G= 5, H= 2.

$x_1(t) = A_1 \cos(2\pi(CDE*100)t)$
$\Rightarrow x_1(t) = A_1 \cos(2\pi(344*100)t)$

(a) Select the value of the amplitudes as follows: let *A*1 = GD and *A*2 = AF.
Ans:
(a) A_1 = GD = 54 and A_2 = AF = 16
(b) Assuming that a 4-bit ADC channel accepts analog input ranging from 0 to 5 volts, determine
Ans:

(b)

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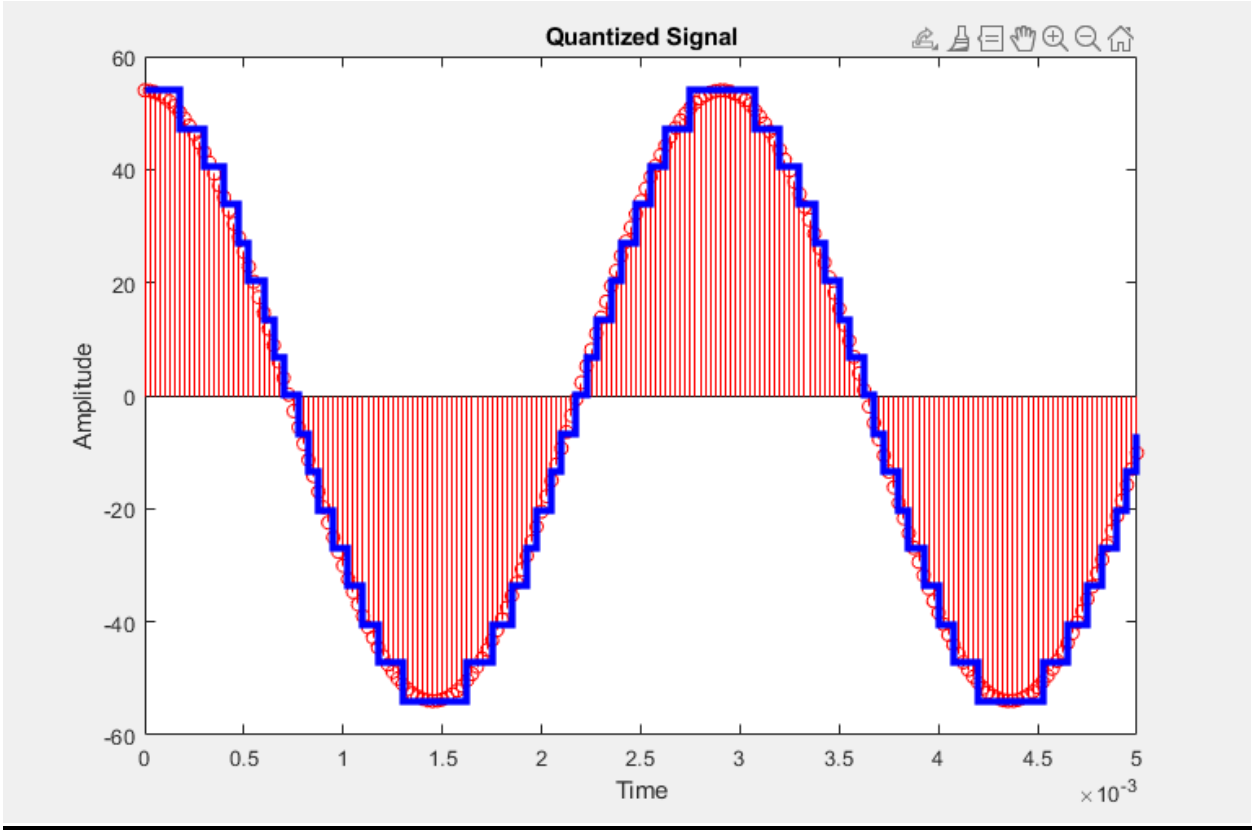
```
A1 = 54
A2 = 16
fc = 344;
fs = 40e3;
t = 0:1/fs:0.005;
x = A1*cos(2*pi*fc*t);
n = 4;
L = (2^n);
delta = (max(x)- min(x))/L;
xq = min(x) + (round((x-min(x))/delta)).*delta;
figure;
stem(t, x, 'R');
hold on;
stairs(t,xq,'b','linewidth',3.2);
hold off;
title('Quantized Signal')
xlabel('Time')
ylabel('Amplitude')
```



I. The number of quantization levels is 16.

II. The step size of the quantizer or resolution is 6.67.

III. The quantization level 8.8 when the analog voltage is 3.2 volts.

IV. The binary code produce by the ADC is

1111
1110
1101
1011
1010
1001

1000
0111
0110
0101
0100
0011
0010
0001
0000