**American International University- Bangladesh**

**Department of Computer Engineering**

COE 3201: Data Communication Laboratory

**Title: Analog Signal quantization using MATLAB**

**Performance Task for Lab Report: (ID = 18-39230-3)**

Generate an analog signal using the following equation,

x1(t) = A1 cos(2π(CDE\*100)t )

(a) Select the value of the amplitudes as follows: let *A*1 = GD and *A*2 = AF.

(b) Assuming that a 4-bit ADC channel accepts analog input ranging from 0 to 5 volts, determine

I. the number of quantization levels;

II. the step size of the quantizer or resolution;

III. the quantization level when the analog voltage is 3.2 volts;

**MATLAB code:**

%18-39230-3

A1 = 09;

A2 = 13;

fs = 40000;

lVolt = 0;

hVolt = 5;

t = 0:1/fs:0.001;

x = A1\*cos(2\*pi\*(393\*100)\*t);

n = 4;

%Quantization level

L = 2^n;

%Step size

sSize = (hVolt-lVolt)/L;

%Quantization level for 3.2 volts input

sDelta = 3.2/L;

delta = (max(x)-min(x))/L;

i = round((x-min(x))/delta);

xq = min(x) + i\*delta;

subplot(2,1,1)

stem(t,x,'b')

title('Sampled signal')

xlabel('time')

ylabel('Amplitude');

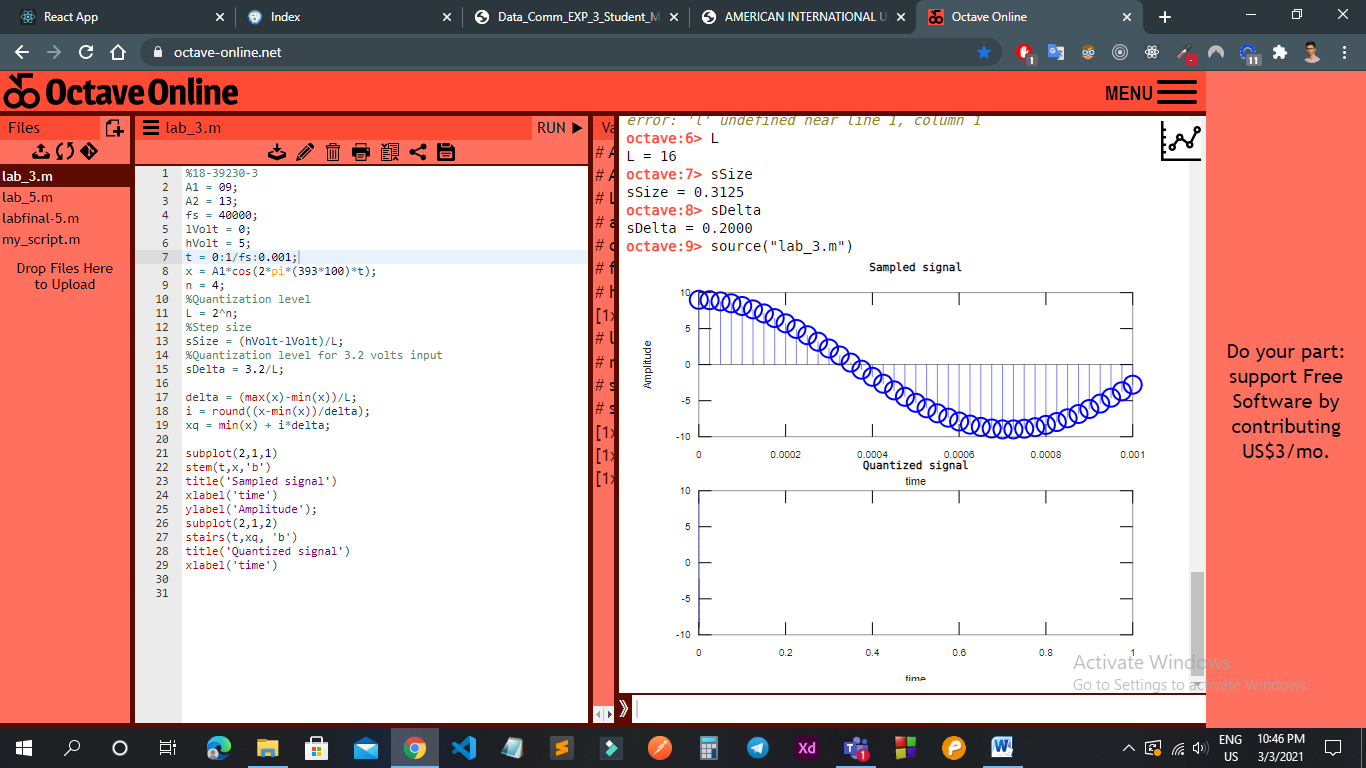
subplot(2,1,2)

stairs(t,xq, 'b')

title('Quantized signal')

xlabel('time')

**Output:**

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