

AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH

Faculty of Engineering



Choose an item.

Assignment Title:	Analog Signal quantization using MATLAB		
Assignment No:	Lab-3	Date of Submission:	16 February 2023
Course Title:	Data Communication		
Course Code:	Click here to enter text.	Section:	J
Semester:	Spring	2022-23	Course Teacher: Sadman Shahriar Alam

Declaration and Statement of Authorship:

1. I/we hold a copy of this Assignment/Case-Study, which can be produced if the original is lost/damaged.
2. This Assignment/Case-Study is my/our original work and no part of it has been copied from any other student's work or from any other source except where due acknowledgement is made.
3. No part of this Assignment/Case-Study has been written for me/us by any other person except where such collaboration has been authorized by the concerned teacher and is clearly acknowledged in the assignment.
4. I/we have not previously submitted or currently submitting this work for any other course/unit.
5. This work may be reproduced, communicated, compared and archived for the purpose of detecting plagiarism.
6. I/we give permission for a copy of my/our marked work to be retained by the Faculty for review and comparison, including review by external examiners.
7. I/we understand that Plagiarism is the presentation of the work, idea or creation of another person as though it is your own. It is a form of cheating and is a very serious academic offence that may lead to expulsion from the University. Plagiarized material can be drawn from, and presented in, written, graphic and visual form, including electronic data, and oral presentations. Plagiarism occurs when the origin of them arterial used is not appropriately cited.
8. I/we also understand that enabling plagiarism is the act of assisting or allowing another person to plagiarize or to copy my/our work.

* Student(s) must complete all details except the faculty use part.

** Please submit all assignments to your course teacher or the office of the concerned teacher.



Group Name

Group Name/No.:

02

No	Name	ID	Program	Signature
1	Shah Azizur Rahman	19-41083-2	BSc [CSE]	
2	MD. Raiyan Khan	19-41453-3	BSc [CSE]	
3	MD. RAHAMAT ULLAH	19-40946-2	BSc [CSE]	
4	Aninda Dey	20-42557-1	BSc [CSSE]	
5	Roudro Rahman	22-46310-1	BSc [CSE]	

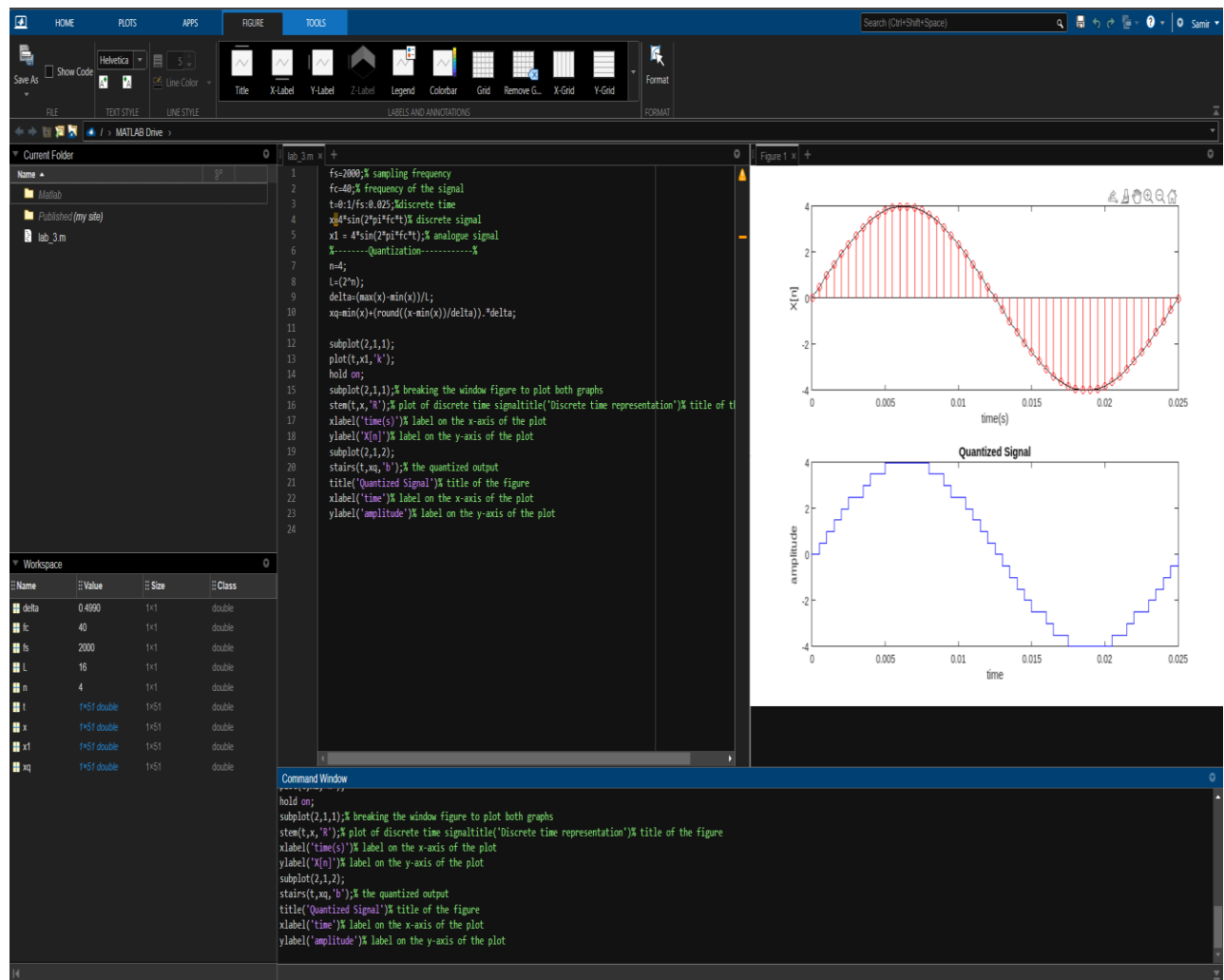


Figure 1: Lab_3 MATLAB code

Code

Id : 19-41083-2

```
fs=2000;% sampling frequency
fc=40;% frequency of the signal
t=0:1/fs:0.025;%discrete time
x=4*sin(2*pi*fc*t)% discrete signal
x1 = 4*sin(2*pi*fc*t);% analogue signal
%-----Quantization-----%
n=4;
L=(2^n);
delta=(max(x)-min(x))/L;
xq=min(x)+(round((x-min(x))/delta)).*delta;

subplot(2,1,1);
plot(t,x1,'k');
hold on;
subplot(2,1,1);% breaking the window figure to plot both graphs
```

```

stem(t,x,'r');% plot of discrete time signal
title('Discrete time representation')%
title of the figure
xlabel('time(s)')% label on the x-axis of the plot
ylabel('X[n]')% label on the y-axis of the plot
subplot(2,1,2);
stairs(t,xq,'b');% the quantized output
title('Quantized Signal')% title of the figure
xlabel('time')% label on the x-axis of the plot
ylabel('amplitude')% label on the y-axis of the plot

```

Data Communication
Lab-3

1. The number of quantization level = $2^4 = 16$ levels
2. Step size, $\Delta = \frac{4+4}{16} = 0.5$
3. $0.5 = \frac{3.2+3.2}{L}$

$$\text{Or, } L = \frac{6.4}{0.5} = 12.8 \text{ levels} \approx 13 \text{ levels} = 2^4$$
4. binary code,

LV-1 -	0	0	0	0
LV-2 -	0	0	0	1
LV-3 -	0	0	1	0
LV-4 -	0	0	1	1
LV-5 -	0	1	0	0
LV-6 -	0	1	0	1
LV-7 -	0	1	1	0
LV-8 -	0	1	1	1
LV-9 -	1	0	0	0

Figure 2: Performance Task