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Id: 20-42195-1

Course Name: Data Communication

Section: D

Lab Assignment: Final term

Semester: 2021-2022 Fall

Submission Date: 10-12-2021

ID = AB-CDEFG-H

Here, my id is: 20-42195-1

A = 2, B = 0, C = 4, D = 2, E = 1, F = 9, G = 5, H = 1

String: 9Nl5

Code:

```
clc;

clear all;

close all;

Transmitted_Message = '9Nl5';

dec = double(Transmitted_Message);

p2 = 2.^(0:-1:-7);

B = mod(floor(p2'*dec),2);

x = reshape(B,1,numel(B));

disp('Transmitted message is:')

disp(Transmitted_Message)

disp('Binary information at transmitter:');

disp(x);

G=5;

br=(G+2)*10;

bp = 1/br;

bit = [];

a0 = 0;

a1 = (G+5);

a2= 2*(G+5);

a3= 3*(G+5);
```

```
nt = 1000;
for n =1:2:length(x)
if x(n) == 0 && x(n+1)== 0 ;
se = a0*ones(1,nt);
elseif x(n) == 0 && x(n+1)== 1;
se = a1*ones(1,nt);
elseif x(n) == 1 && x(n+1)== 0;
se = a2*ones(1,nt);
elseif x(n) == 1 && x(n+1)== 1;
se = a3*ones(1,nt);
end
bit = [bit se];
end
t = 0:2*(bp/nt):(length(x)*bp-bp/nt);
figure
plot(t,bit,'lineWidth',2.5);
ylabel('Amplitude(volt)');
xlabel('Time(sec)');
title('Unipolar digital signal');
f =(G+2)*100;
t1 =0:bp/nt:bp-bp/nt;
ss = length(t1);
m = [];
for (i = 1:2:length(x))
if (x(i) == 0 && x(i+1)== 0 )
```

```
y = a0*cos(2*pi*f*t1);
elseif (x(i) == 0 && x(i+1)== 1 )
y = a1*cos(2*pi*f*t1);
elseif (x(i) == 1 && x(i+1)== 0 )
y = a2*cos(2*pi*f*t1);
else (x(i) == 1 && x(i+1)== 1 )
y = a3*cos(2*pi*f*t1);
end
m = [m y];
end
t = 0:2*(bp/nt):(length(x)*bp-bp/nt);
figure
plot(t,m);
xlabel('Time(sec)');
ylabel('Amplitude(volt)');
title('Modulated signal at transmitter');
disp(' Message transmitted through a Transmission medium');
t = 0:2*(bp/nt):(length(x)*bp-bp/nt);
Rec=awgn(m,10);
figure
plot(t,Rec,'linewidth',2);
xlabel('Time(sec)');
ylabel('Amplitude(volt)');
title('Received signal at receiver');
nq = length(x)/2;
```

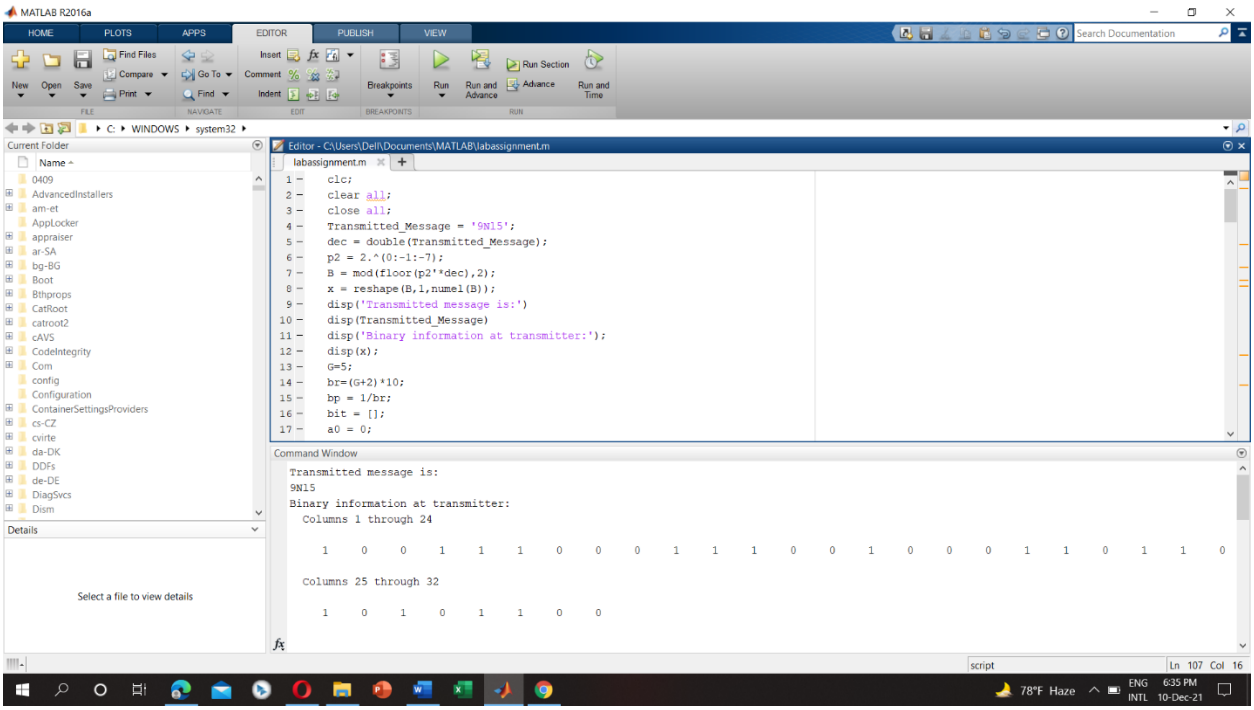
```
mn = [];
for q = 1:nq
t_in = 0:bp/nt:bp-bp/nt;
y = cos(2*pi*f*t_in);
mm = y.*Rec(((q-1)*nt+1):q*nt);
z = trapz(t_in,mm);
zz = round((2*z/bp));
if(zz > ((a0+a1)/2) && zz < ((a1+a2)/2))
a = 0;
a5 = 1;
elseif(zz >((a1+a2)/2) && zz < ((a2+a3)/2))
a = 1;
a5 =0;
elseif(zz >((a2+a3)/2))
a = 1;
a5 =1;
else
a = 0;
a5 = 0;
end
mn = [mn a a5];
end
disp(' Binary information at reciver :');
disp(mn);
bit = [];
```

```
nt = 1000;
for n =1:2:length(mn)
if x(n) == 0 && x(n+1)== 0 ;
se = a0*ones(1,nt);
elseif x(n) == 0 && x(n+1)== 1;
se = a1*ones(1,nt);
elseif x(n) == 1 && x(n+1)== 0;
se = a2*ones(1,nt);
elseif x(n) == 1 && x(n+1)== 1;
se = a3*ones(1,nt);
end
bit = [bit se];
end
t = 0:2*(bp/nt):(length(x)*bp-bp/nt);
figure
plot(t,bit,'lineWidth',2.5);
ylabel('Amplitude(volt)');
xlabel('Time(sec)');
title('Received unipolar digital signal');
L = length(mn);
L8 = 8*floor(L/8);
B = reshape(mn(1:L8),8,L8/8);
p2 = 2.^(0:7);
dec = p2*B;
txt2 = char(dec);
```

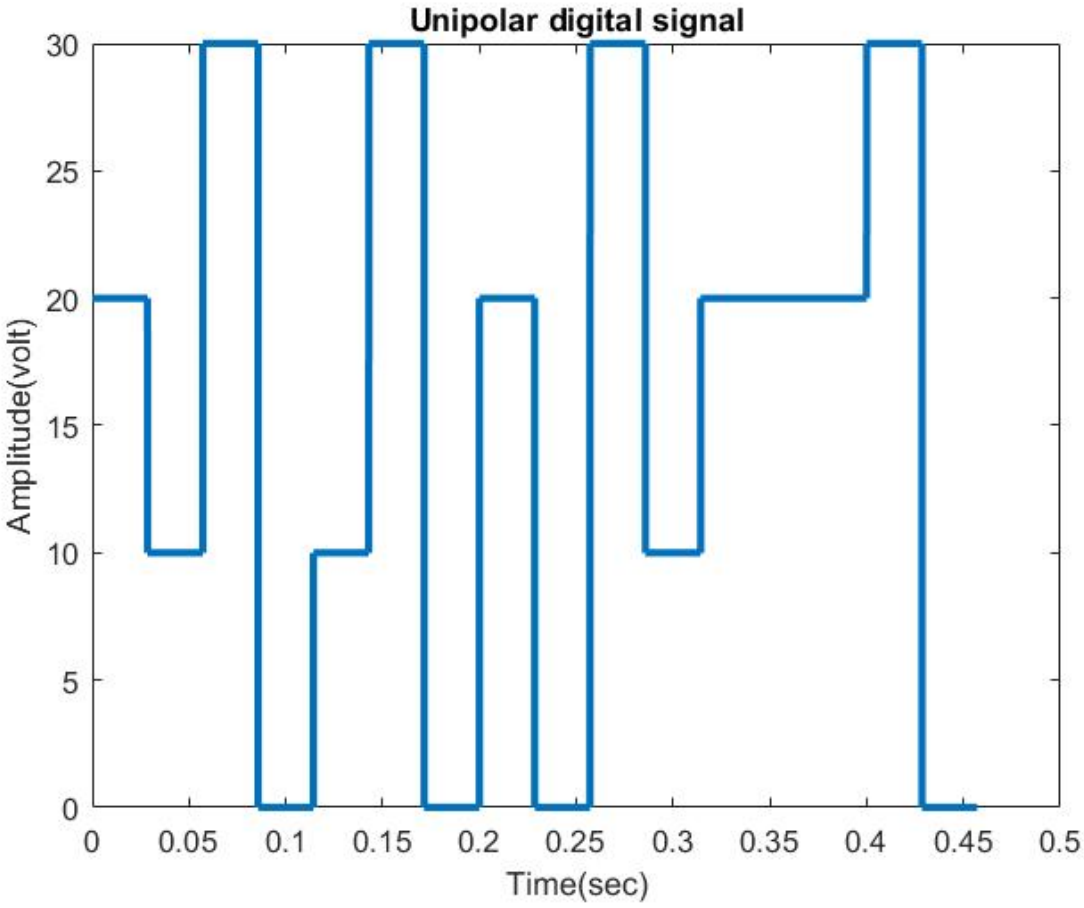
disp('Received Message is:')

disp(txt2);

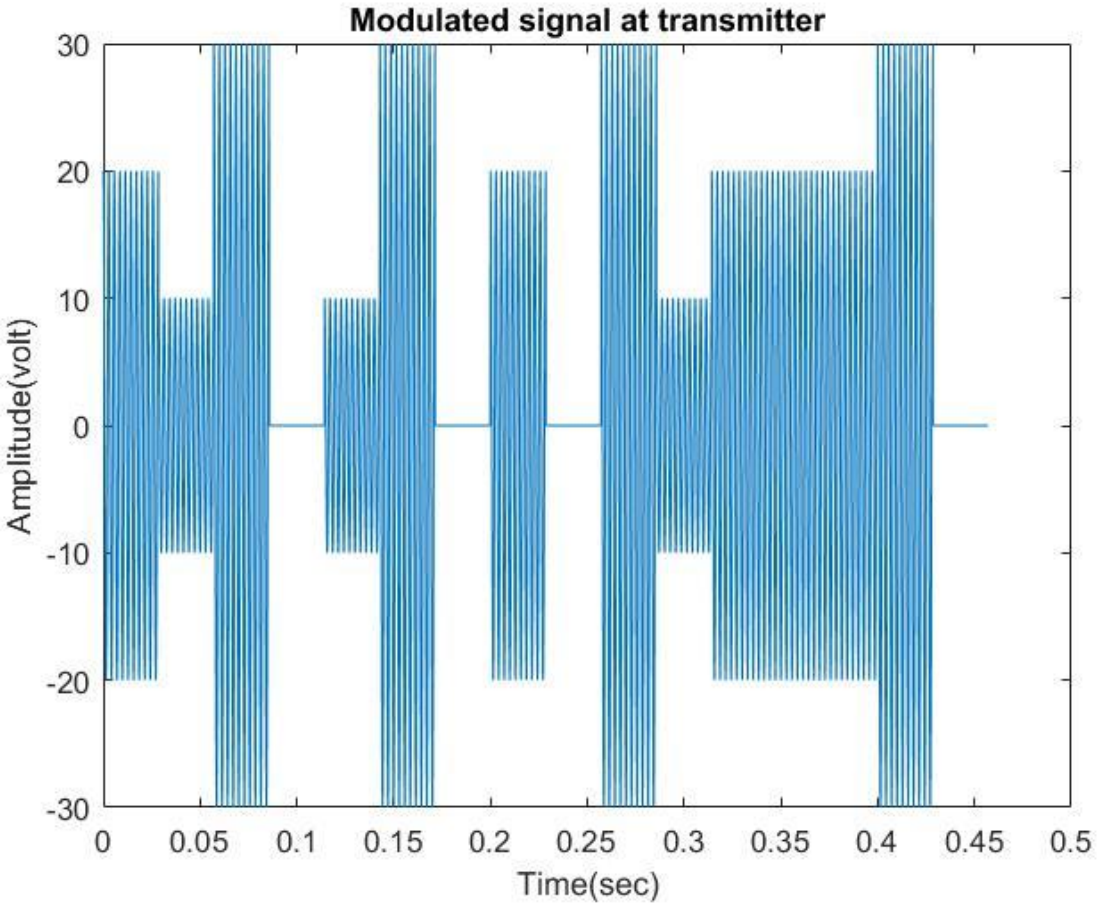
a)



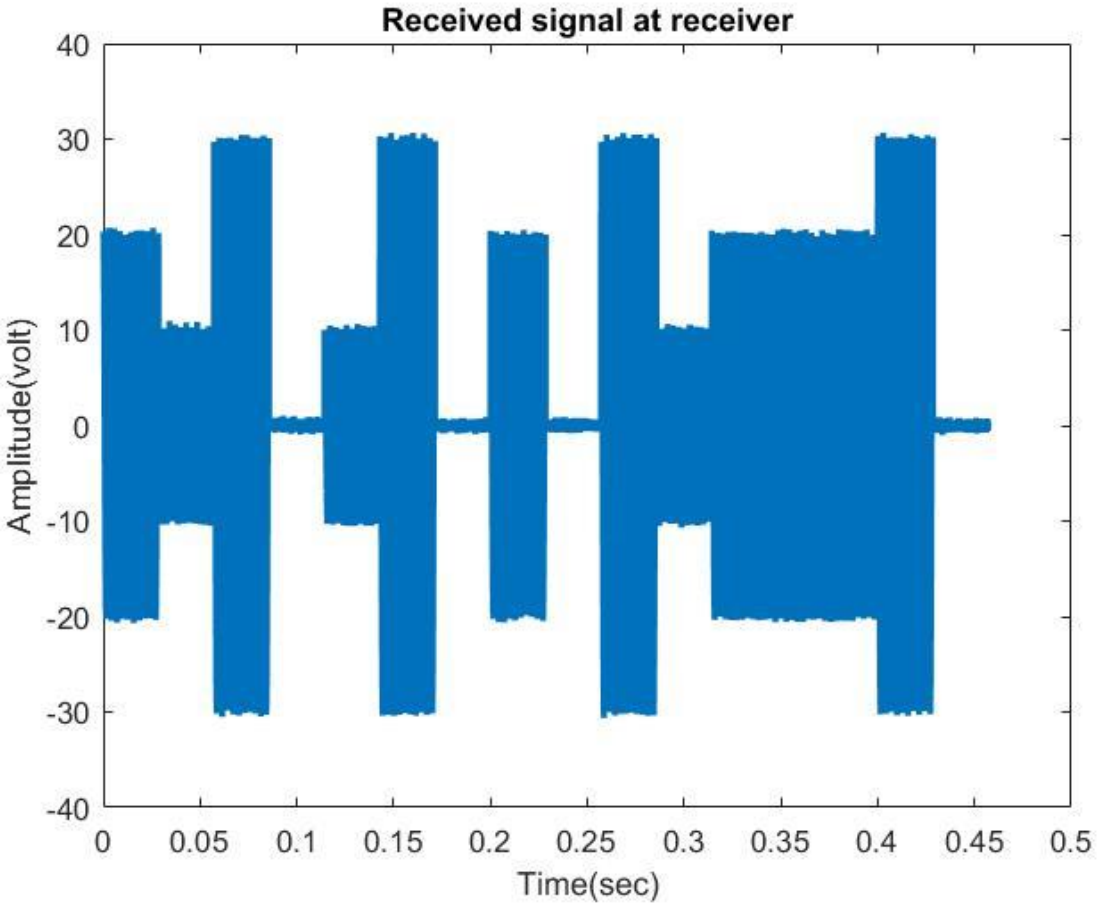
b)


Unipolar digital signal
Amplitude(volt)
Time(sec)
30
25
20
15
10
5
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

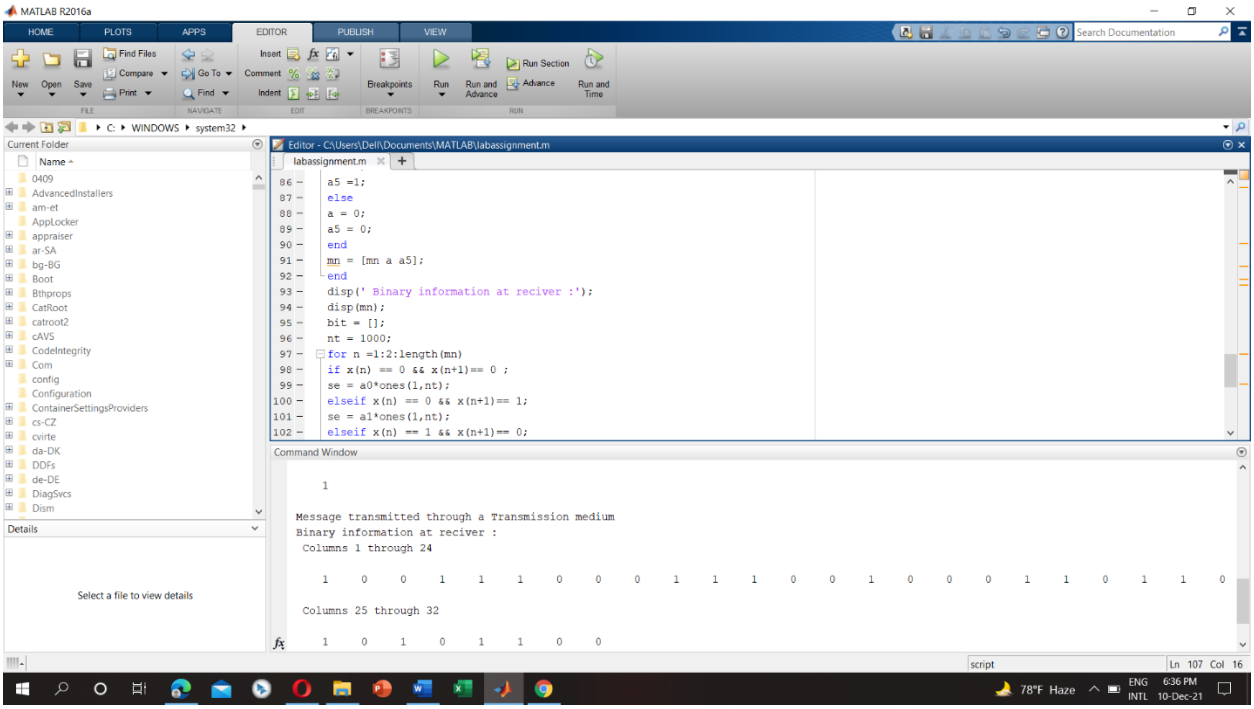
c)


Modulated signal at transmitter
Amplitude(volt)
Time(sec)
30
20
10
0
-10
-20
-30
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

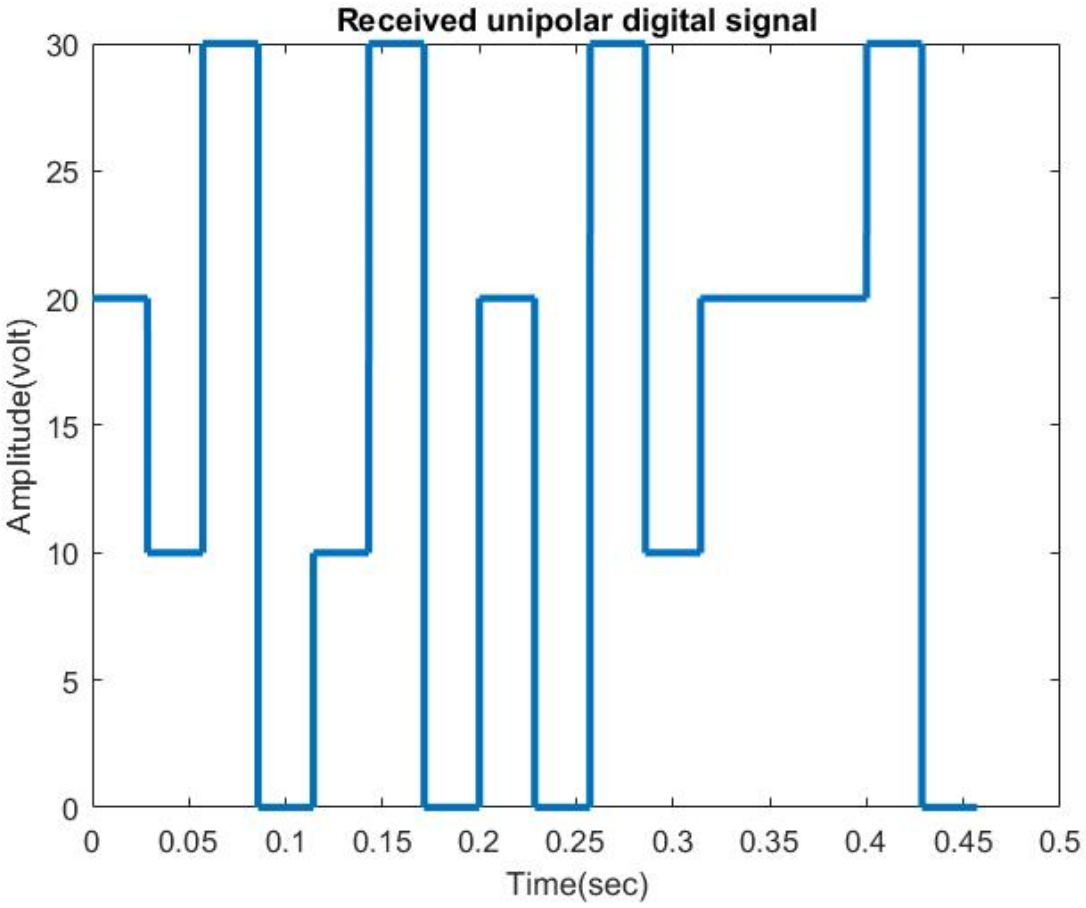
d)


Received signal at receiver
Amplitude(volt)
Time(sec)
40
30
20
10
0
-10
-20
-30
-40
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

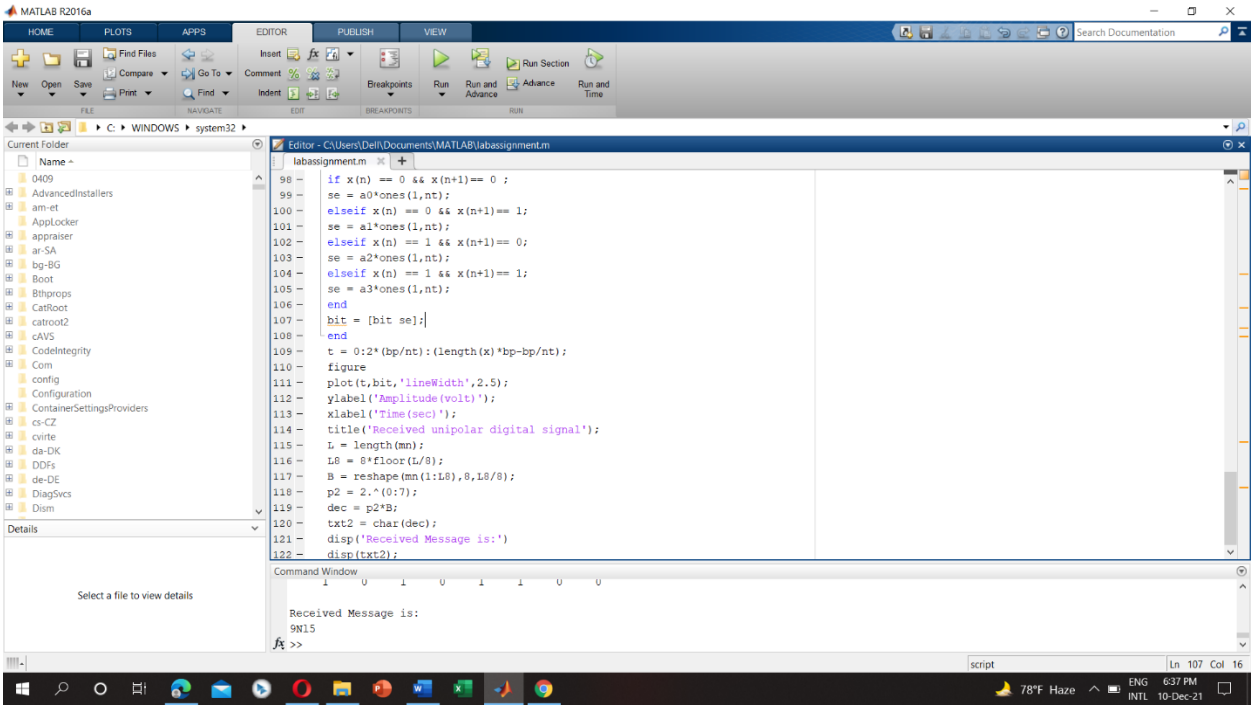
e)


MATLAB R2016a
HOME
PLOTS
APPS
EDITOR
PUBLISH
VIEW
Search Documentation
New
Open
Save
Find Files
Compare
Print
Go To
Find
Insert
Comment
Indent
Breakpoints
Run
Run and Advance
Run Section
Advance
Run and Time
C: ▸ WINDOWS ▸ system32 ▸
Current Folder
Name
0409
AdvancedInstallers
am-et
AppLocker
appraiser
ar-SA
bg-BG
Boot
Bthprops
CatRoot
catroot2
cAVS
CodeIntegrity
Com
config
Configuration
ContainerSettingsProviders
cs-CZ
cvirte
da-DK
DDFs
de-DE
DiagSvcs
Dism
Details
Select a file to view details
Editor - C:\Users\Dell\Documents\MATLAB\labassignment.m
labassignment.m
86 a5 =1;
87 else
88 a = 0;
89 a5 = 0;
90 end
91 mn = [mn a a5];
92 end
93 disp(' Binary information at reciver :');
94 disp(mn);
95 bit = [];
96 nt = 1000;
97 for n =1:2:length(mn)
98 if x(n) == 0 && x(n+1)== 0 ;
99 se = a0*ones(1,nt);
100 elseif x(n) == 0 && x(n+1)== 1;
101 se = a1*ones(1,nt);
102 elseif x(n) == 1 && x(n+1)== 0;
Command Window
1
Message transmitted through a Transmission medium
Binary information at reciver :
Columns 1 through 24
1 0 0 1 1 1 0 0 0 1 1 1 0 0 1 0 0 0 1 1 0 1 1 0
Columns 25 through 32
1 0 1 0 1 1 0 0
script
Ln 107 Col 16
78°F Haze
ENG
INTL
6:36 PM
10-Dec-21

f)


Received unipolar digital signal
Amplitude(volt)
Time(sec)
30
25
20
15
10
5
0
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5

g)



h) Noise is an unwanted signal which interferes with the original message signal and corrupts the parameters of the message signal. This alteration in the communication process, leads to the message getting altered. If we increase noise power in modulated signal, it'll take more energy for transmission. As a result, it'll increase cost and there will be a chance for data loss. But if we decrease noise power, it'll take less energy for transmission as well as it reduces cost and there'll less chance for data loss.

Discussion:

There is some of the bugs concluded with the definite organizational complementation with the functions of the MATLAB. The regression of the functions originated from the libraries inclines the comprehensive objective of this complementation. I face some problems while creating the plot and also face problems while calculation using my student id number. MATLAB takes some time while I try to run because my laptop configuration is low.