Final-term Lab Assessment Task

Submitted By:		
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Parameters:

Consider, your ID = **AB-CDEFG-H. = 19-41289-3**

[please use any random value if assigned value comes out zero]

VAL1 = DFG*100	**VAL2** = FH*10
VAL1 = 18900	VAL2 = 830

Problem Statement:

Suppose, you want to send a message which contains your FIRST MEMBER LAST NAME. Develop a MATLAB code to show the transmission process to send the information from SENDER to RECEIVER. Available frequency ranges for the transmission: 2.2 - 2.4 GHz

Hint:

1. Encode the message.
2. Convert binary bit stream from parallel to serial transmission.
3. Convert data to signal using at least **VAL1** sample data.
4. Now, modulate the digital signal (using any Digital to Analog Conversion except ASK) to send via a transmission channel.
5. The signal to noise ratio of the channel is **VAL2**.
6. Demodulate the received signal.
7. Convert the binary data to retrieve the message.

Instructions:

1. Task can be submitted individually or in Group (not more than 4 person)
2. **For Group Submission:** You can use one of the group member ID for parameter calculation. Anyone from the group can submit the task (no need of multiple submission)
3. Plagiarism is strictly prohibited.
4. Please use MATLAB software to accomplish the project.
5. Use this file as Cover Page.
6. In your submission file, you must add three sections: Cover page, Code & Output.
7. Finally submit it in PDF format.

Code:

File Name: asc2bin.m

```
function dn = asc2bin(txt)
dec=double(txt) %Text to ASCII (decimal)
p2=2.^(0:-1:-7) % 2^0,2^-1,.......,2^-7
B=mod(floor(p2'*dec),2) %Decimal to binary conversion
 %Columns of B are bits of chars
dn=reshape(B,1,numel(B));%Bytes to serial conbversion
end
```

File Name: bin2asc.m

```
function txt = bin2asc(dn)
L=length(dn); %Length of input string
L8=8*floor(L/8); %Multiple of 8 Length
B=reshape(dn(1:L8),8,L8/8); %Cols of B are bits of chars
p2=2.^(0:7); %power of 2
dec=p2*B; %Binary to decimal conversion
txt=char(dec); %ASCII (decimal) to txt
end
```

Main Code

```
%ID: 19-41289-3
%    AB-CDEFG-H


clc;
clear all;
close all;


VAL1 = 18900;
VAL2 = 830;


%##########################################################
#################
% 1) Encode the message.
%##########################################################
#################
Transmitted_Message= 'Anik'
%Converting Information Message to bit%
```

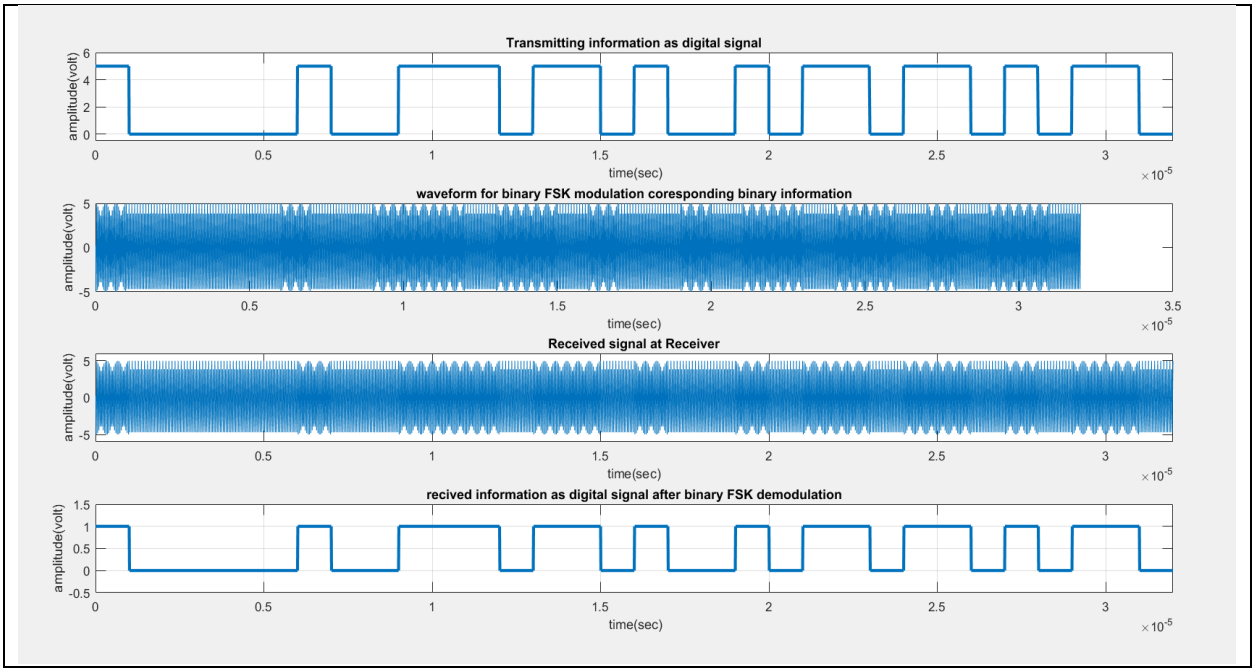
```
x=asc2bin(Transmitted_Message); % Binary Information
bp=.000001; % bit period
disp(' Binary information at Transmitter :');
disp(x);
%#########################################################
#################


%#########################################################
################
% 2) Convert binary bit stream from parallel to serial
transmission.
% 3) Convert data to signal using at least VAL1 sample
data.
%#########################################################
################
%XX representation of transmitting binary information as
digital signal XXX
bit=[];
for n=1:1:length(x)
 if x(n)==1;
 se=5*ones(1,VAL1);
 else x(n)==0;
 se=zeros(1,VAL1);
 end
 bit=[bit se];
end
t1=bp/VAL1:bp/VAL1:VAL1*length(x)*(bp/VAL1);
subplot(4,1,1);
plot(t1,bit,'lineWidth',2.5);grid on;
axis([ 0 bp*length(x) -.5 6]);
ylabel('amplitude(volt)');
xlabel(' time(sec)');
title('Transmitting information as digital signal');
%#########################################################
#################


%#########################################################
################
% 4) Now, modulate the digital signal (using any Digital
to Analog Conversion except ASK) to send via a
transmission channel.
```

```
%#########################################################
#################
%XXXXXXXXXXXXXXXXXXXXXX Binary FSK modulation
XXXXXXXXXXXXXXXXXXXXXXXXXX%
A=5; % Amplitude of carrier signal
br=1/bp;  % bit rate
f1=2.4e9;  % carrier frequency for information as 1
f2=2.2e9;  % carrier frequency for information as 0
t2=bp/99:bp/99:bp;
ss=length(t2);
m=[];
for (i=1:1:length(x))
    if (x(i)==1)
        y=A*cos(2*pi*f1*t2);
    else
        y=A*cos(2*pi*f2*t2);
    end
    m=[m y];
end
t3=bp/99:bp/99:bp*length(x);
subplot(4,1,2);
plot(t3,m);
xlabel('time(sec)');
ylabel('amplitude(volt)');
title('waveform for binary FSK modulation coresponding
binary information');
%#########################################################
#################


%#########################################################
#################
% 5) The signal to noise ratio of the channel is VAL2.
%#########################################################
#################
disp('**********')
disp(' Message transmitted through a Transmission
medium');
disp('**********')
%Channel Noise%
t4=bp/99:bp/99:bp*length(x);
Rec=awgn(m,VAL2);
subplot(4,1,3);
plot(t4,Rec);
```

```
axis([ 0 bp*length(x) -6 6]);
xlabel('time(sec)');
ylabel('amplitude(volt)');
title('Received signal at Receiver');
%#########################################################
#################


%#########################################################
#################
% 6) Demodulate the received signal.
%#########################################################
#################
%XXXXXXXXXXXXXXXXXXX Binary FSK demodulation
XXXXXXXXXXXXXXXXXXXXXXXXXXX
mn=[];
for n=ss:ss:length(m)
  t=bp/99:bp/99:bp;
  y1=cos(2*pi*f1*t); % carrier siignal for information 1
  y2=cos(2*pi*f2*t); % carrier siignal for information 0
  mm=y1.*m((n-(ss-1)):n);
  mmm=y2.*m((n-(ss-1)):n);
  t4=bp/99:bp/99:bp;
  z1=trapz(t4,mm); % intregation
  z2=trapz(t4,mmm); % intregation
  zz1=round(2*z1/bp);
  zz2= round(2*z2/bp);
  if(zz1>A/2); % logic lavel= (0+A)/2 or (A+0)/2 or 2.5 (
in this case)
    a=1;
  else(zz2>A/2);
    a=0;
  end
  mn=[mn a];
end
disp(' Binary information at Reciver :');
disp(mn);


%XXXXX Representation of binary information as digital
signal which achived
%after demodulation
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
bit=[];
```

```
for n=1:length(mn);
    if mn(n)==1;
       se=ones(1,100);
    else mn(n)==0;
        se=zeros(1,100);
    end
     bit=[bit se];

end
t4=bp/100:bp/100:100*length(mn)*(bp/100);
subplot(4,1,4)
plot(t4,bit,'LineWidth',2.5);grid on;
axis([ 0 bp*length(mn) -.5 1.5]);
ylabel('amplitude(volt)');
xlabel(' time(sec)');
title('recived information as digital signal after binary
FSK demodulation');
%##########################################################
#################


%##########################################################
#################
% 7) Convert the binary data to retrieve the message.
%##########################################################
#################
%Converting Information bit to Message%
Received_Message=bin2asc(mn)
%>>>>>>>> end of program >>>>>>>>>>>>>>>>%
%##########################################################
#################
```

Output:




```
Command Window

Transmitted_Message =

    'Anik'


dec =

    65   110   105   107


p2 =

    1.0000    0.5000    0.2500    0.1250    0.0625    0.0313    0.0156    0.0078


B =

     1     0     1     1
     0     1     0     1
     0     1     0     0
     0     1     1     1
     0     0     0     0
     0     1     1     1
     1     1     1     1
     0     0     0     0

 Binary information at Transmitter :
  Columns 1 through 20
```

```
 Binary information at Transmitter :
  Columns 1 through 20

     1     0     0     0     0     0     1     0     0     1     1     1     0     1     1     0     1     0     0     1

  Columns 21 through 32

     0     1     1     0     1     1     0     1     0     1     1     0

**********
 Message transmitted through a Transmission medium
**********
 Binary information at Reciver :
  Columns 1 through 20

     1     0     0     0     0     0     1     0     0     1     1     1     0     1     1     0     1     0     0     1

  Columns 21 through 32

     0     1     1     0     1     1     0     1     0     1     1     0


Received_Message =

    'Anik'

fx >>
```