**Final-term Lab Assessment Task**

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| **Submitted By:** | | |
| **Name** | **ID** | **Task Completed** |
| Saha, Anik Kumar | 19-41289-3 | 1,2 |
| Ahmed, Nafiz | 19-41283-3 | 3,4 |
| Ahmed, Raiyan | 19-41322-3 | 5 |
| Akhter, Zubaida | 19-41541-3 | 6 |
| Malik, Md. Sakibur Rahman | 18-38856-6 | 7 |

**Parameters:**

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

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

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| **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:**

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| **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 |

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| **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 |

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| **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.  %##########################################################################  %XXXXXXXXXXXXXXXXXXXXXXX Binary FSK modulation XXXXXXXXXXXXXXXXXXXXXXXXXXX%  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.  %##########################################################################  %XXXXXXXXXXXXXXXXXXXX Binary FSK demodulation XXXXXXXXXXXXXXXXXXXXXXXXXXXXX  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:**

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