



AMERICAN INTERNATIONAL UNIVERSITY–BANGLADESH (AIUB)

Department of Computer Science

Faculty of Science & Technology (FST)

Summer 21_22

DATA COMMUNICATION

Section: E

Supervised By

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Submitted By

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Performance Task:

Assume your ID is **AB-CDEFG-H**. Convert 'E', 'F' and 'G' to 8-bit ASCII characters and together you have a bit stream of 24 bits. Convert this bit stream to analog signal using the following:

1. 8-ASK: Different amplitudes for 000 to 111 in the modulated signal can be 0 V, 1 V, 2 V, 3 V, 4 V, 5 V, 6 V, and 7 V respectively.
2. 8-FSK: Different frequencies for 000 to 111 in the modulated signal can be 1 Hz, 2 Hz, 3 Hz, 4 Hz, 5 Hz, 6 Hz, 7 Hz, and 8 Hz respectively.
3. 8-PSK: Different phases for 000 to 111 in the modulated signal can be 0, $\pi/4$, $3\pi/4$, $\pi/2$, $-\pi/4$, $-\pi/2$, π , $-3\pi/4$ respectively.

Duration of each signal element must be 1 second.

```
close all
f=1;
f2=10;
%id=20-42715-1
%715
%x=[0 1 1 1 0 0 0 1 0 0 1 1 0 1 1 1 0 0 0 1 0 0 1 1]; %
input signal
x=[0 0 0 0 0 1 0 1 0 0 1 1 1 0 0 1 0 1 1 1 0 1 1 1]; %
input signal
%nx=size(x,2);
nx=length(x);
p=0;
fs=5000;
fc=2;
for i=1:3:nx
    t=p*1:1/fs:(p+1)*1;
    if x(i)==0 && x(i+1)==0 && x(i+2)==0
        ask=0*sin(2*pi*fc*t);
        fsk=sin(2*pi*fc*t);
        psk=sin(2*pi*f*t);
    elseif x(i)==0 && x(i+1)==0 && x(i+2)==1
        ask=1*sin(2*pi*fc*t);
        fsk=sin(2*pi*2*fc*t);
        psk=sin(2*pi*f*t+pi/4);
    end
    p=p+1;
end
```

```

elseif x(i)==0 && x(i+1)==1 && x(i+2)==0
    ask=2*sin(2*pi*fc*t);
    fsk=sin(2*pi*3*fc*t);
    psk=sin(2*pi*f*t+3*pi/4);
elseif x(i)==0 && x(i+1)==1 && x(i+2)==1
    ask=3*sin(2*pi*fc*t);
    fsk=sin(2*pi*4*fc*t);
    psk=sin(2*pi*f*t+pi/2);
elseif x(i)==1 && x(i+1)==0 && x(i+2)==0
    ask=4*sin(2*pi*fc*t);
    fsk=sin(2*pi*5*fc*t);
    psk=sin(2*pi*f*t-pi/4);
elseif x(i)==1 && x(i+1)==0 && x(i+2)==1
    ask=5*sin(2*pi*fc*t);
    fsk=sin(2*pi*6*fc*t);
    psk=sin(2*pi*f*t-pi/2);
elseif x(i)==1 && x(i+1)==1 && x(i+2)==0
    ask=6*sin(2*pi*fc*t);
    fsk=sin(2*pi*7*fc*t);
    psk=sin(2*pi*f*t+pi);
else
    ask=7*sin(2*pi*fc*t);
    fsk=sin(2*pi*8*fc*t);
    psk=sin(2*pi*f*t-3*pi/4);
end

subplot(3,1,1);
plot(t,ask);
hold on;
grid on;

title('Amplitude Shift Key')
subplot(3,1,2);
plot(t,fsk);
hold on;
grid on;

title('Frequency Shift Key')
subplot(3,1,3);
plot(t,psk);
hold on;
grid on;

title('Phase Shift Key')

```

```
p=p+1;  
end  
hold off;
```

Explanation: Here We have combined the 3 questions into a single MATLAB file. Here, ASK, FSK and PSK representing Amplitude Shift Key, Frequency Shift Key and Phase Shift Key respectively. Duration of each element is 1 second.