American International University- Bangladesh
Department of Computer Science

Lab Report Cover Sheet

Course Name	Data Communication
Lab Report No.	2
Lecturer Name	Md. Navid Bin Anwar
Semester	Fall 2020-21
Submission Date	05/11/2020
Section	B
Group No.	10

Student Name	**Student ID**	**Contribution (out of 100%)**
1. CHAITI, NUSRAT ALAM	18-37417-1	20%
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3. KABID, KAIF AL	18-38144-2	20%
4. MAHTAB, FAHIM	18-38626-2	20%
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Lecturer Remarks (Only for teacher)		

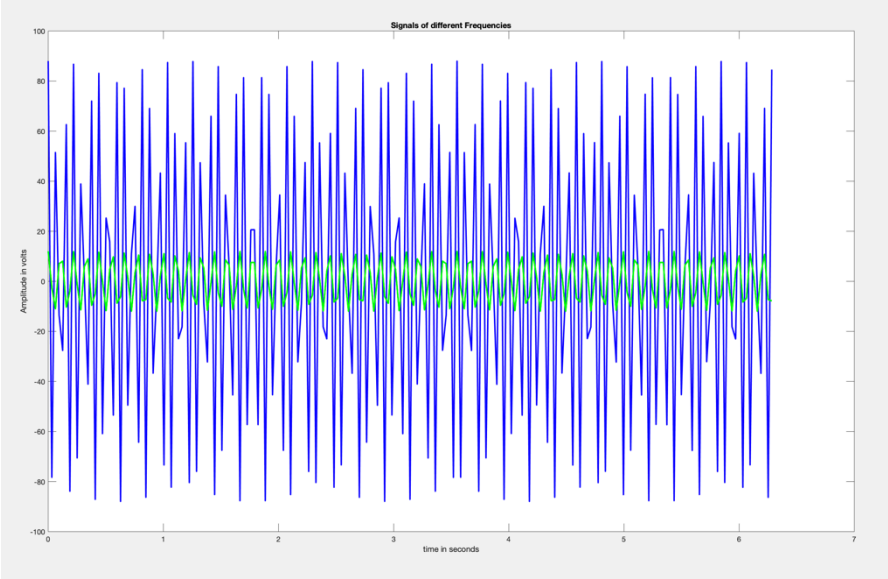
ID: 18-38828-3 A1=GD=88 and A2=AF=12

x1(t)=A1*cos(2*pi*(3*100)*t)

x2(t)=A2*cos(2*pi*(2*100)*t)

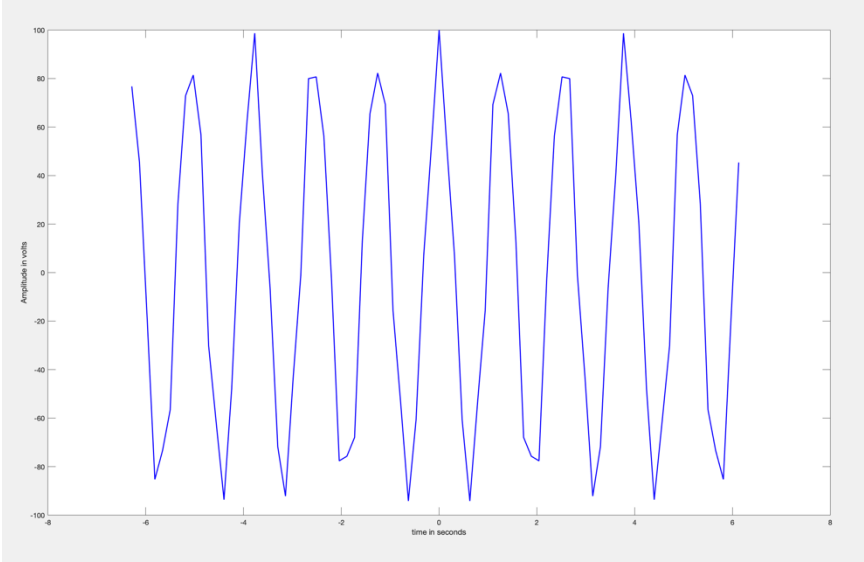
(a)

```
A1=88;
A2=12;
t=0:pi/100:2*pi;
x1=A1*cos(2*pi*(3*100)*t);
x2=A2*cos(2*pi*(2*100)*t);
plot(t,x1,'b','linewidth',2);
hold on;
plot(t,x2,'g','linewidth',2);
hold on;
xlabel('time in seconds')
ylabel('Amplitude in volts')
title('Signals of different
Frequencies')
```



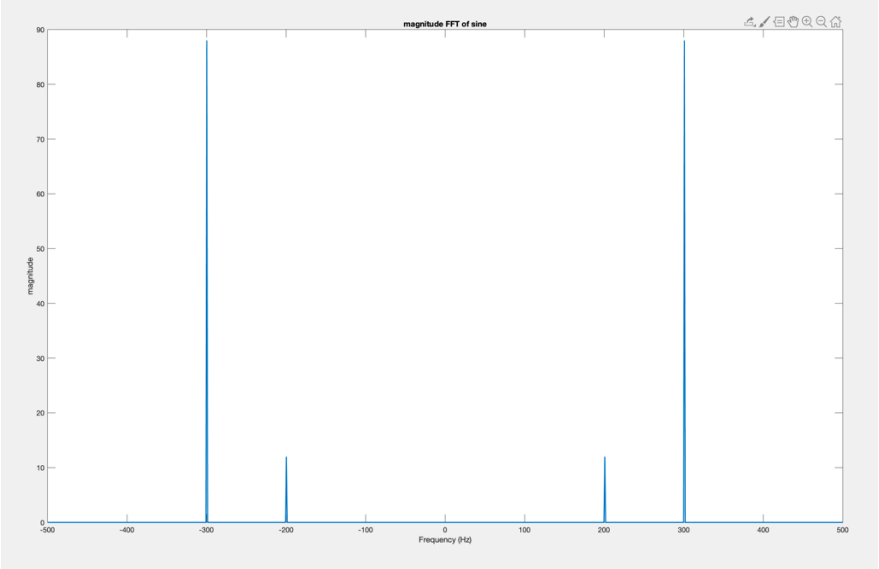
(b)

```
A1=88;
A2=12;
t=-2*pi:pi/20:2*pi-pi/20;
x1=A1*cos(2*pi*(3*100)*t);
x2=A2*cos(2*pi*(2*100)*t);
x3=x1+x2;
plot(t,x3,'b','linewidth',1.5);
hold on;
xlabel('time in seconds')
ylabel('Amplitude in volts')
```



(c)

```
fs = 1000;
t = 0:1/fs:1-1/fs;
f1 = 300;
f2 = 200;
A1 = 88;
A2 = 12;
x1 = A1*sin(2*pi*f1*t);
x2 = A2*sin(2*pi*f2*t);
x3= x1+x2;
fx3 = fft(x3);
fx3 = fftshift(fx3)/(fs/2);
f = fs/2*linspace(-1,1,fs);
figure;
plot(f,
abs(fx3),'LineWidth',1.5);
title('magnitude FFT of sine');
axis([-500 500 0 90])
xlabel('Frequency (Hz)');
ylabel('magnitude');
bandwidth = obw(x3,fs)
```



(d)

```
fs = 1000;
t = 0:1/fs:1-1/fs;
f1 = 300;
f2 = 200;
A1 = 88;
A2 = 12;
x1 = A1*sin(2*pi*f1*t);
x2 = A2*sin(2*pi*f2*t);
x3= x1+x2;
fftSignal = fft(x3);
fftSignal =
fftshift(fftSignal)/(fs/2);
f = fs/2*linspace(-1,1,fs);
noise = 2*randn(size(x3));
figure
plot(t,noise)
xlabel('Time (s)');
ylabel('Amplitude');
title('Time-Domain Noise');
fftNoise = fft(noise);
fftNoise =
fftshift(fftNoise)/(fs/2);
figure
plot(f,abs(fftNoise))
title('Magnitude FFT of noise');
xlabel('Frequency (Hz)');
ylabel('magnitude');
noisySignal = x3 + noise;
figure
plot(t,noisySignal)
xlabel('Time (s)');
ylabel('Amplitude');
title('Time-Domain Noisy
Signal');
fftNoisySignal =
fft(noisySignal);
fftNoisySignal =
fftshift(fftNoisySignal)/(fs/2);
figure
plot(f,abs(fftNoisySignal))
title('Magnitude FFT of noisy
signal');
xlabel('Frequency (Hz)');
ylabel('magnitude');
band=obw(noisySignal,fs)
```

Before the noise the bandwith was 100.7210 and
after the noise has been added the bandwith is 100.7492

Difference (100.7492-100.7210)
=0.0282