AMERICAN INTERNATIONAL UNIVERSITY-BANGLADESH (AIUB)

Data Communication Laboratory

LAB REPORT

ON

Introduction to MATLAB.

Experiment No: 4

Section: G

Semester: Spring 20-21

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Performance Task for Lab Report –

ID = 18-36445-1

here, A = 1, B = 8, C = 3, D = 6, E = 4, F = 4, G = 5, H = 1

now,

**Generate a composite signal using two simple signals as,

x = A1 sin(2*pi(C*100)t) + A2 cos(2*pi(G*100)t) + s*randn(size(t))

x = A1 sin(2*pi(3*100)t) + A2 cos(2*pi(5*100)t) + s*randn(size(t))

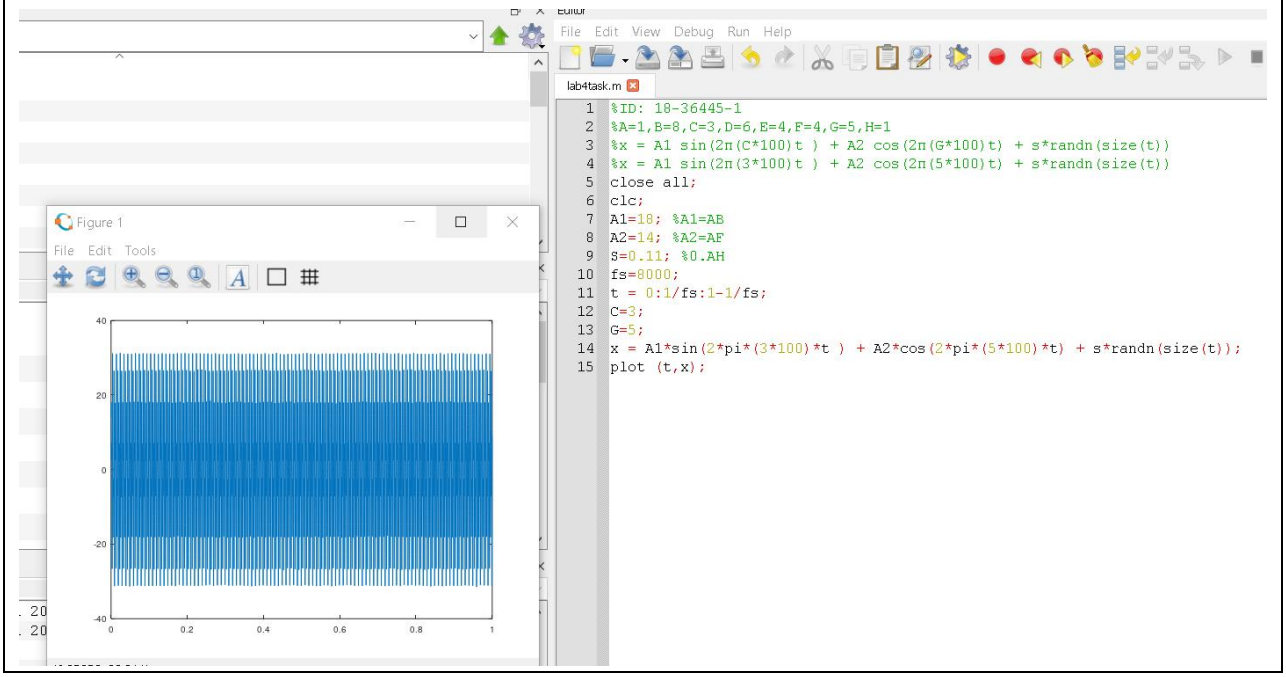
QUES: (a) Select the value of the amplitudes as follows: let A1 = AB, A2 = AF and s=AH.

ANS:a

A1=18; %A1=AB

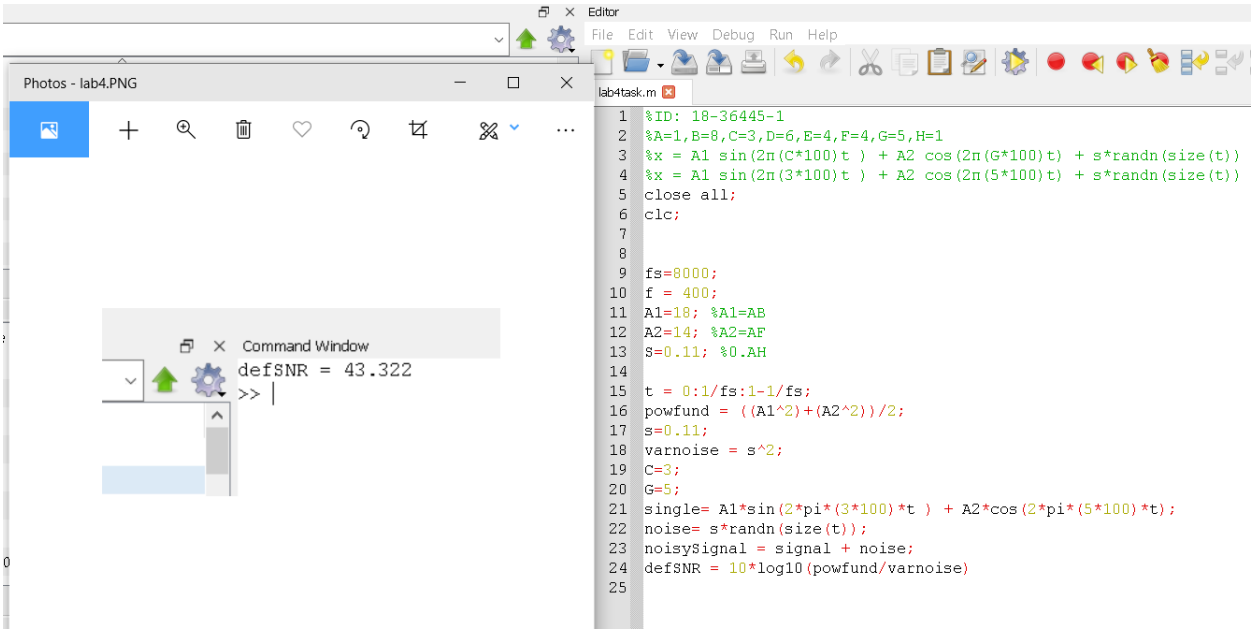
A2=14; %A2=AF

s=0.11; %0.AH



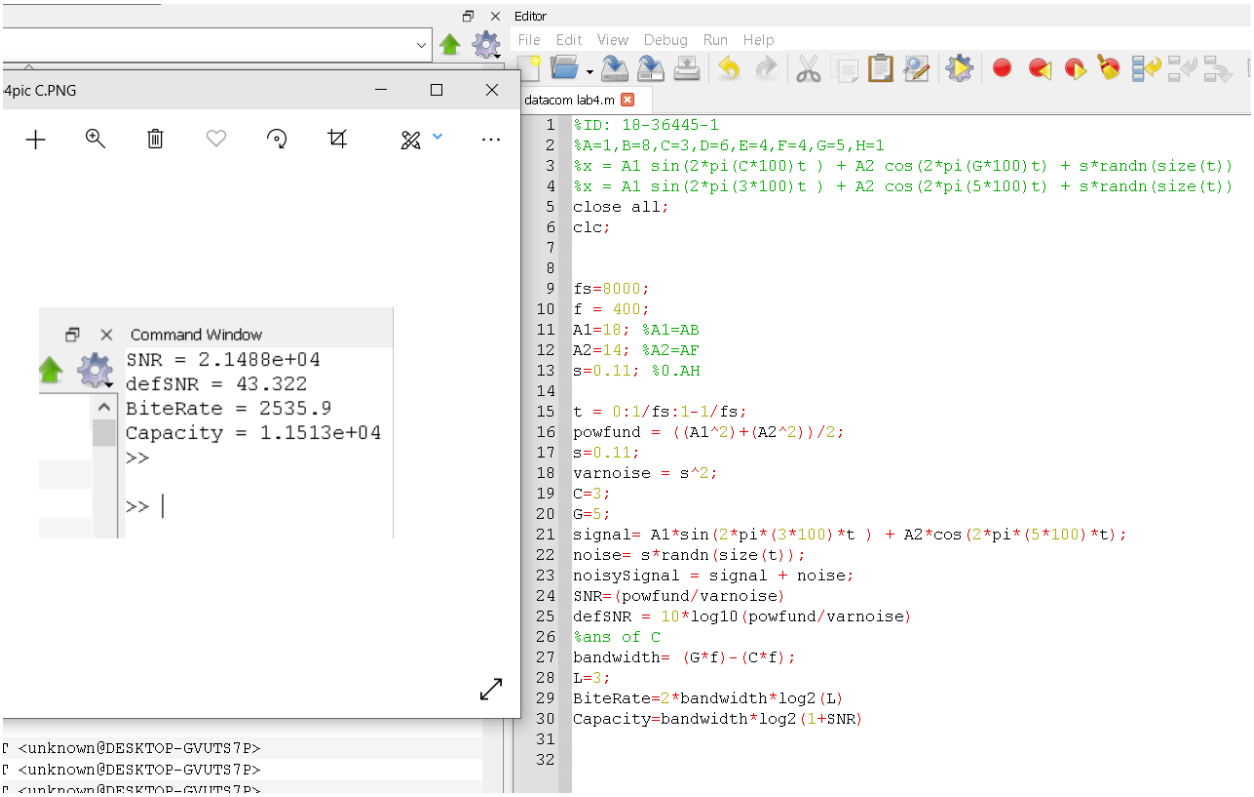
Ques: (b) Calculate the SNR value of the composite signal.

ANS:b



Ques: (c) Find the bandwidth of the signal and calculate the maximum capacity of the channel.

ANS: c



Ques: (d) What will be the signal level to achieve the data rate?

ANS: d

Output:

apprxDataRate1 = 11513

apprxDataRate2 = 4375

compareDatarate =

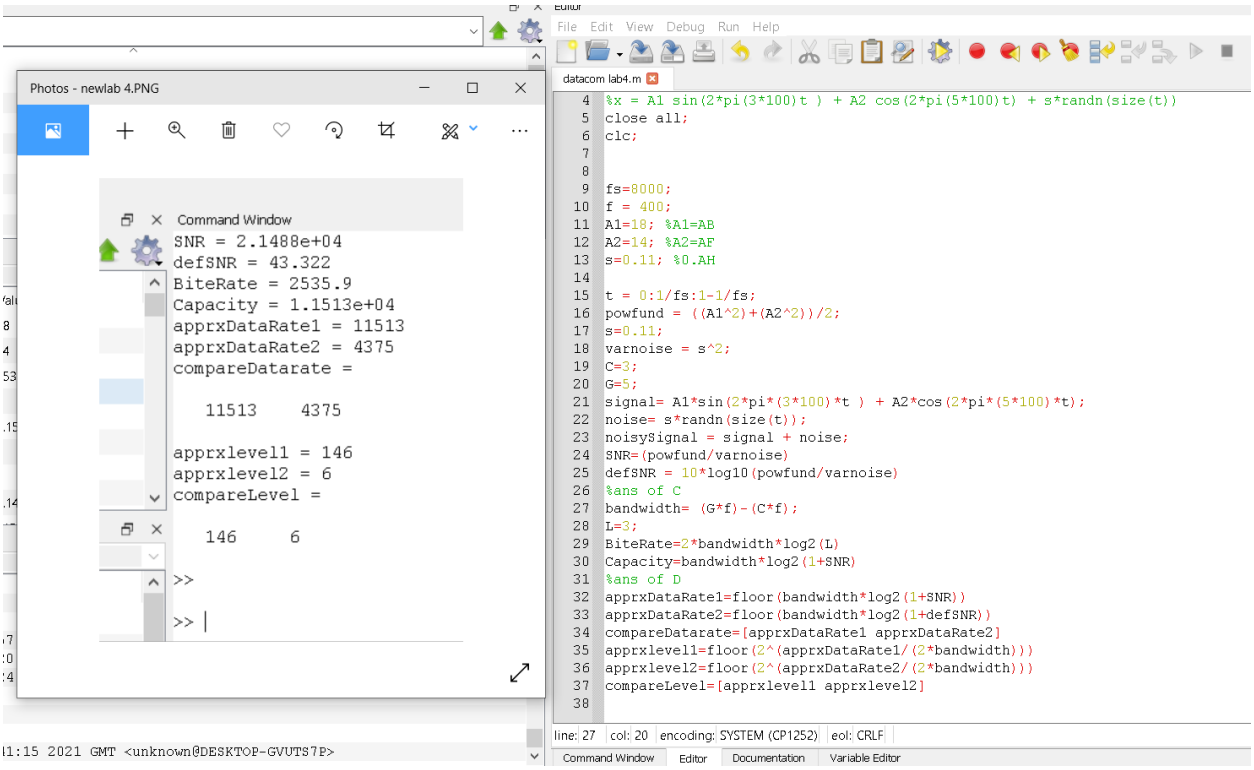
11513 4375

apprxlevel1 = 146

apprxlevel2 = 6

compareLevel =

146 6



%ID: 18-36445-1

%A=1,B=8,C=3,D=6,E=4,F=4,G=5,H=1

%x = A1 sin(2*pi(C*100)t) + A2 cos(2*pi(G*100)t) + s*randn(size(t))

%x = A1 sin(2*pi(3*100)t) + A2 cos(2*pi(5*100)t) + s*randn(size(t))

close all;

clc;

```
fs=8000;
f = 400;
A1=18; %A1=AB
A2=14; %A2=AF
s=0.11; %0.AH

t = 0:1/fs:1-1/fs;
powfund = ((A1^2)+(A2^2))/2;
s=0.11;
varnoise = s^2;
C=3;
G=5;
signal= A1*sin(2*pi*(3*100)*t ) + A2*cos(2*pi*(5*100)*t);
noise= s*randn(size(t));
noisySignal = signal + noise;
SNR=(powfund/varnoise)
defSNR = 10*log10(powfund/varnoise)
%ans of C
bandwidth= (G*f)-(C*f);
L=3;
BiteRate=2*bandwidth*log2(L)
Capacity=bandwidth*log2(1+SNR)
%ans of D
```

```
apprxDataRate1=floor(bandwidth*log2(1+SNR))
apprxDataRate2=floor(bandwidth*log2(1+defSNR))
compareDatarate=[apprxDataRate1 apprxDataRate2]
apprxlevel1=floor(2^(apprxDataRate1/(2*bandwidth)))
apprxlevel2=floor(2^(apprxDataRate2/(2*bandwidth)))
compareLevel=[apprxlevel1 apprxlevel2]
```