Khulna University of Engineering & Technology
Department of Chemical Engineering
ChE 3230
MATLAB Sessional Test 7
[YOU MUST PLOT ALL THE FIGURES IN <u>A SINGLE FIGURE/WINDOW/PAGE/POPUP.</u> Write your calculated answers below the question. Need not to draw figures on Question paper]

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1. You will find a folder named "statistics" on your PC's "desktop / home screen" and an excel file "data.xlsx" inside it. Load that data in a MATLAB m file.

   a. Calculate the mean attendance. **5**
      Ans: 48.89

   b. There were some mistakes in collecting the DATA; the GPA must be in the range of 2.00 to 4.00. Any GPA below 2.00 should be 0.00, whereas any GPA higher than 4.00 should follow the relations: **35**
      GPA= 2.5 + (Study hour/8) for study hours < 5,
      GPA= 3 + (Study hour/10) for $5\leq$ study hour <10.
      GPA = 3.1+(study hour-2)/10, for study hour $\geq$ 10
      The teacher will provide you ID to call any random GPA.
      ANS:

   (Answer questions c through f with modified data)
   c. Calculate the median GPA and its standard deviation **10**
   Ans: 3.2246, 1.5574

   d. Calculate the mode of Age and create its boxplot. **10**

   Ans: 22
   e. Plot the histogram of study hour within the range from 2 hours to 8 hours with half hour interval. **10**

   f. Calculate the third quartile of the GPA. **10**

   Ans: 3.7038
   g. Plot the ID vs GPA before and after modification. Use legend to identify them. **10**

   h. Find how many students have a GPA in the range of 3.8 to 4 and plot their Study Hour vs. GPA graph. Use 'x' (cross) to identify the points. **10**
   Ans: 83

   Modified 83 but Real 13

CODE 1

```matlab
clc
close all
clear all
c=readtable('data.xlsx');
b=c;
%% a
mean_att=mean(b.Attendance);
%%
%% b
ind2=find(b.GPA<2);
b.GPA(ind2)=0;
%x=find(b.GPA>4);
ind_L5=find(b.StudyHour<5 & b.GPA>4);
b.GPA(ind_L5)=2.5+b.StudyHour(ind_L5)./8;
ind_G5=find(b.StudyHour >=5 & b.StudyHour<10 & b.GPA>4);
b.GPA(ind_G5)=3+b.StudyHour(ind_G5)./10;
ind_G10=find(b.StudyHour>10 & b.GPA>4);
b.GPA(ind_G10)=3.1+(b.StudyHour(ind_G10)-2)./10;
ID=input('ID:');
q2=find(b.ID==ID);
GPA=b.GPA(q2)
%%
%% c
median_gpa=median(b.GPA);
std_dev=std(b.GPA);
%%
%% d
mode_age=mode(b.Age);
subplot(221)
boxplot(b.Age)
%%
%% e
subplot(222)
histogram(b.StudyHour,[2:0.5:8])
%%
%% f
Q3=prctile(b.GPA,75);
%%
%% g
subplot(223)
plot(c.ID,c.GPA,'b',b.ID,b.GPA,'r')
legend('without modification','with modifications')
xlabel('ID')
ylabel('GPA')
%%
%% h
subplot(224)
qq=find(b.GPA<=4 & b.GPA>=3.80);
number38_4=numel(qq);
subplot(224)
plot(b.StudyHour(qq),b.GPA(qq),'x')
xlabel('Study Hour')
ylabel('GPA')
% find(b.GPA>4)
```

CODE 2 (alternative) [this one is harder, skip if you don't get it]

```matlab
clc
close all
clear all
c=readtable('data.xlsx');
b=c;

%a
mean_att=mean(b.Attendance);
ind2=find(b.GPA<2);

%b
b.GPA(ind2)=0;
x=find(b.GPA>4);
ind_L5=find(b.StudyHour(x)<5 );
b.GPA(x(ind_L5))=2.5+b.StudyHour(x(ind_L5))./8;
ind_G5=find(b.StudyHour(x)>=5 & b.StudyHour(x)<10);
b.GPA(x(ind_G5))=3+b.StudyHour(x(ind_G5))./10;
ind_G10=find(b.StudyHour(x)>=10);
b.GPA(x(ind_G10))=3.1+(b.StudyHour(x(ind_G10))-2)./10;
ID=input('ID:');
q2=find(b.ID==ID);
GPA=b.GPA(q2)

%c
median_gpa=median(b.GPA);
std_dev=std(b.GPA);

%d
mode_age=mode(b.Age);
subplot(221)
boxplot(b.Age)

%e
subplot(222)
histogram(b.StudyHour,[2:0.5:8])

%f
Q3=prctile(b.GPA,75);

%g
subplot(223)
plot(c.ID,c.GPA,'b',b.ID,b.GPA,'r')
legend('without modification','with modifications')
xlabel('ID')
ylabel('GPA')

%h
subplot(224)
qq=find(b.GPA<=4 & b.GPA>=3.80);
number38_4=numel(qq);
subplot(224)
plot(b.StudyHour(qq),b.GPA(qq),'x')
xlabel('Study Hour')
ylabel('GPA')
g4=find(b.GPA>4)
```