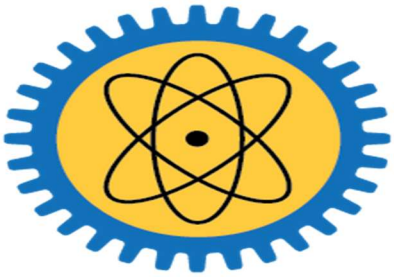

BUSITEMA UNIVERSITY

Pursuing excellence

FACULTY OF ENGINEERING AND TECHNOLOGY

COMPUTER PROGRAMMING

REPORT OF ASSIGNMENT ONE AND TWO

BY

GROUP 10

SUBMITTED BY

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2. Muganyizi James Factor
3. Arionget Shamim Egonu
4. Otim Innocent Lemo
5. Kakooza Ian Maurice
6. Bisoboka Jemimah Kairu
7. Ngobi Mark Livingstone
8. Rom Christopher Nyeko

This assignment report is submitted to the lecturer of computer programming Mr. BENEDICTO MASERUKA by Group 10.

Submitted on…/……/…….

DECLARATION

We hereby declare that the information in this report is out of our own efforts, research and it has never been submitted in any institution for any academic award

NAME	SIGNATURE
Apio Laura Oula	……...……
Muganyizi James Factor	……
Arionget Shamim Egonu	……
Otim Innocent Lemo	……
Kakooza Ian Maurice	……
Bisoboka Jemimah Kairu	……
Ngobi Mark Livingstone	……
Rom Christopher Nyeko	…….

APPROVAL

This is to confirm that this report has been written and presented by GROUP 10 giving the details for the assignment.

LECTURER'S NAME: ……
SIGNITURE: ……
DATE: ……

DEDICATION

We dedicate this report to all Group 10 members, who have been there with us in the process of researching and doing and compiling this report. To our lecturer Mr. Maseruka Benedicto whose guidance and expertise have been so needful, your mentorship and lecturing has built our understanding.

ACKNOWLEDGEMENT

First and foremost, we would like to thank the Almighty God for giving us the knowledge and guidance while doing our assignment as group 10.

We extend our gratitude to all the persons with whose help we managed to make it this far

The love of every group member to invest time and provide all they could to see the assignment a success.

Finally, we would like to express our gratitude to all the sources and references that have been cited in this report.

ABSTRACT

We started our first meeting for research on 5th, September, 2025 in the university library out of which we were exposed to various concepts on how to interact with the matlab interface, import, extract and feeding in data in to MATLAB as per the assignment which consisted of retrieving excel data from Kaggle.com website ,copying variables of each year to tables, converting tables to structural arrays, outputting each variable in to a single work book and generating a MATLAB code that can store each members' affirmation attributes, we managed to achieve this through group work and division of tasks.

APPROVAL

We are presenting this report which has been written and produced under our efforts.

Contents

CHAPTER ONE: INTRODUCTION

1.1 Historical background

MATLAB, which stands for matrix laboratory, is a high-performance programming language and environment designed primarily for technical computing. Its origins trace back to the late 1970s when Cleve Moler, a professor of computer science, developed it to provide his students with easy access to mathematical software libraries without requiring them to learn Fortran.

MATLAB is built around the concept of matrices, making it particularly effective for linear algebra and matrix manipulation.It provides a vast library of built-in functions for mathematical operations, statistics, optimization, and other specialized tasks.

MATLAB offers powerful tools for creating 2D and 3D plots, enabling users to visualize data effectively.Specialized toolboxes extend MATLAB's capabilities, providing functions tailored for specific applications like signal processing, image processing, control systems, and machine learning.

MATLAB can interface with other programming languages (like C, C++, and Python) and software tools, allowing for flexible integration into larger systems. Its interactive environment features a command window, workspace, and editor, making it accessible for both beginners and advanced users.

1.2 Historical Development

The first version of MATLAB was created in Fortran in the late 1970s as a simple interactive matrix calculator. This early iteration included basic matrix operations and was built on top of two significant mathematical libraries: LINPACK and EISPACK, which were developed for numerical linear algebra and eigenvalue problems, respectively.

Recent versions of MATLAB have introduced features like the Live Editor, which allows users to create interactive documents that combine code, output, and formatted text. This evolution reflects MATLAB's ongoing adaptation to meet the needs of its diverse user base across academia and industry.

CHAPTER TWO: STUDY METHODOLOGY

2.1 Introduction

At the start, each member was given a task of making research about the assignment before our first meeting. The research concepts were obtained through watching tutorials on U-tube and also consultations from other continuing students especially those in year three and four.

CHAPTER THREE: NUMBER ONE

3.1 Question one

There is a website on the internet called kaggle. Com each group should be able to retrieve a unique data set in excel format. The group will read this data set into Mat lab in one code, they will be able to copy variables of each year and put them in the following;

1. Tables for each year of data
2. Convert the tables in 1 above into structural arrays
3. Output each of the variables in 2 above into a single workbook with each year on separate sheets having clear column headings sheet names

3.2 Steps involved

Step1; Open Kaggle.com website from goggle chrome.

Step2; sign in Kaggle.com and download any desired excel dataset and zip it in to a desired folder.

Step 3; Open the file and copy the link path into MATLAB.

Step4; go to Home tab and click on new script to open the editor.

Step 5; save the script . And save it in the directory that is in your MATLAB path or current working directory.

Step 6. ; insert the required codes respectively and then run

Solution

```
%Reading table into matlab
T=readtable("C:\Users\K\Desktop\number one\dataset.xlsx")
%Extracting tables for each year from 2025-2020
T2025=T(T.Year==2025, :);
T2024=T(T.Year==2024, :);
T2023=T(T.Year==2023, :);
T2022=T(T.Year==2022, :);
T2021=T(T.Year==2021, :);
T2020=T(T.Year==2020, :);
%converting tables into structural arrays
S2025=table2struct(T2025);
S2024=table2struct(T2024);
S2023=table2struct(T2023);
S2022=table2struct(T2022);
S2021=table2struct(T2021);
S2020=table2struct(T2020);
%output of the variables into a single excel work book C
C=("C:\Users\K\Desktop\number one\workbook C.xlsx")
%writing each table into excel
writetable(T2025,C,'sheet','T2025');
writetable(T2024,C,'sheet','T2024');
writetable(T2023,C,'sheet','T2023');
writetable(T2022,C,'sheet','T2022');
```

```
writetable(T2021,C,'sheet','T2021');
writetable(T2020,C,'sheet','T2020');
```

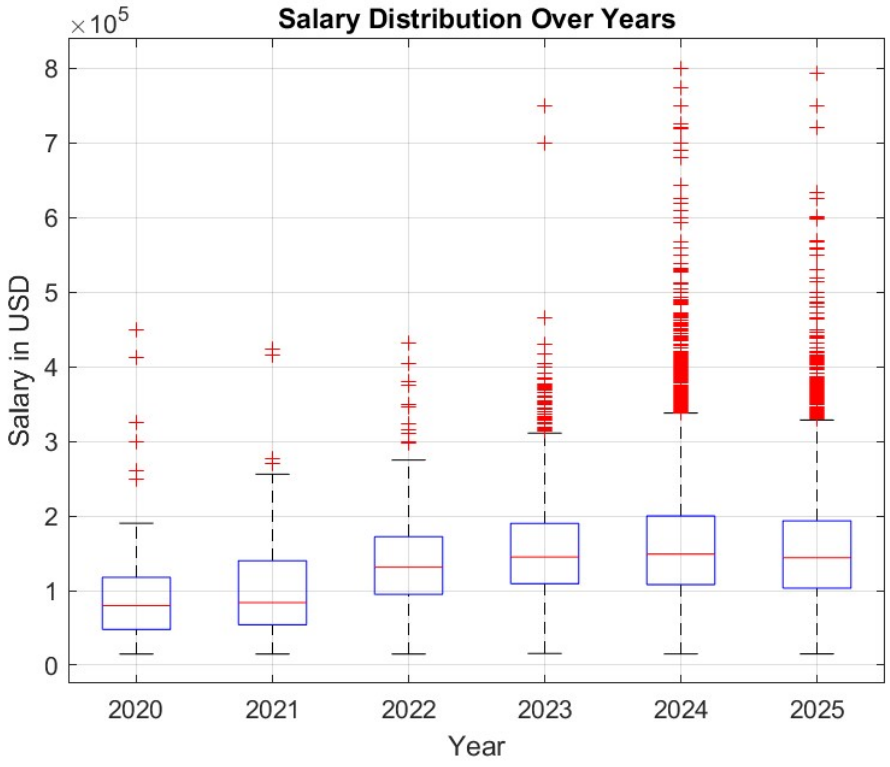
3.3 Continuation of Question one

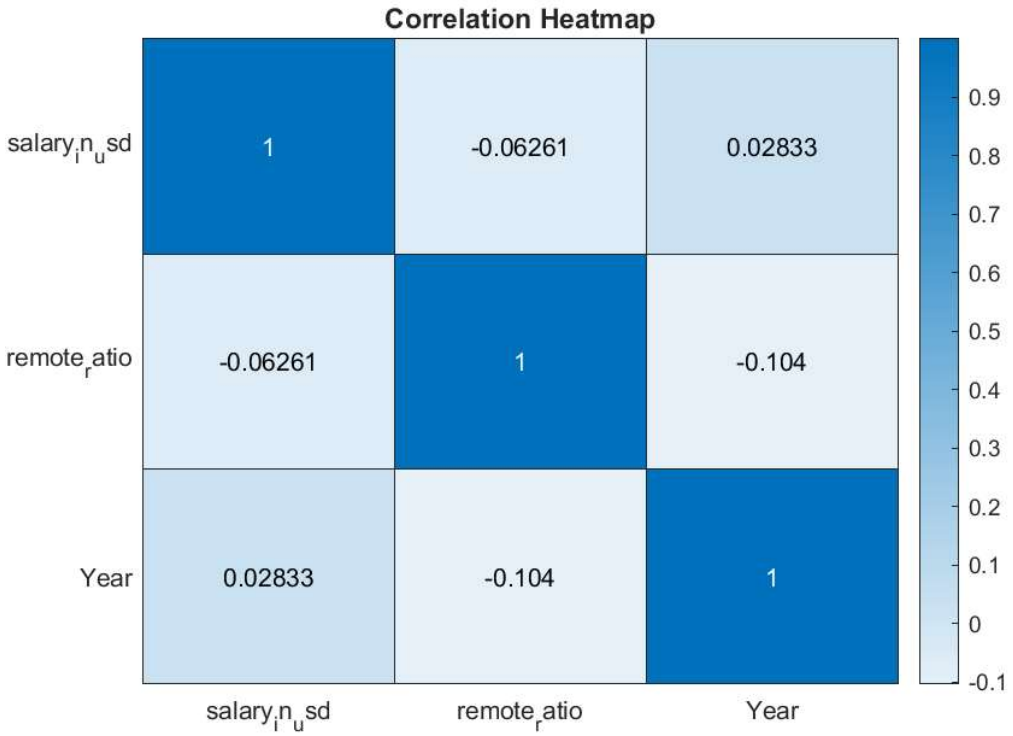
From question one in the first assignment, visualize all the knowledge obtained from module one to four to visualize the different parameters, patterns, trends and relationships. Ensure that each plot is saved as an image and it's well anotated (labeled)

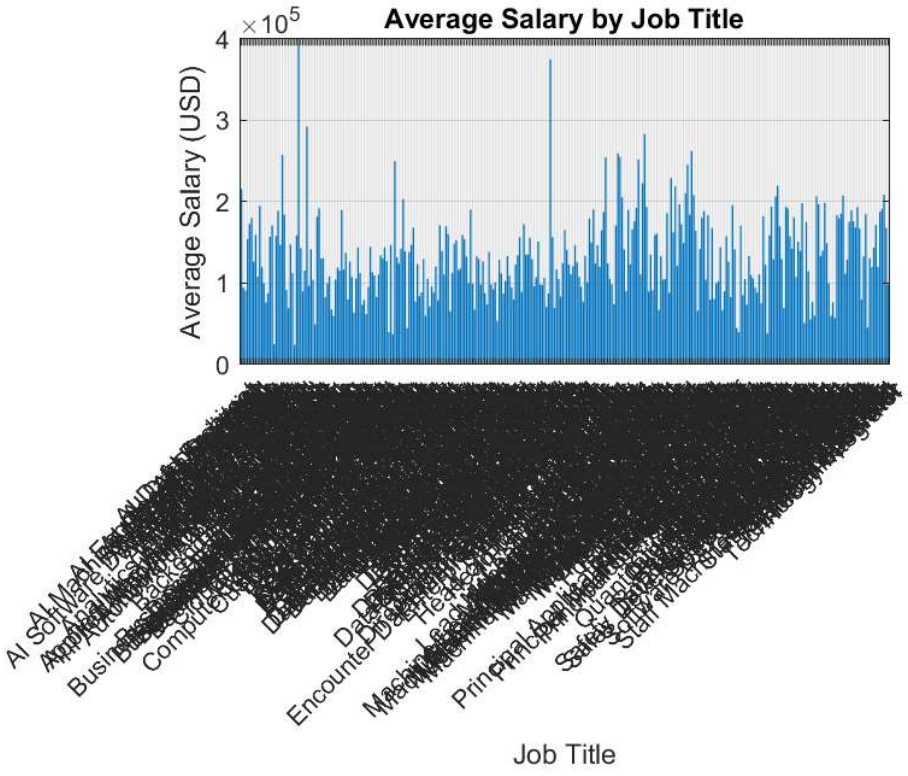
Code

```
% Load dataset
T = readtable("C:\Users\K\Desktop\PART 1\dataset.xlsx");


% Create output folder for plots
outputFolder = "Plots";
if ~exist(outputFolder, 'dir')
    mkdir(outputFolder);
end


%% 1. Salary Trends over Years
figure;
boxplot(T.salary_in_usd, T.Year);
xlabel('Year');
ylabel('Salary in USD');
title('Salary Distribution Over Years');
grid on;
saveas(gcf, fullfile(outputFolder, 'Salary_Trends.png'));


%% 2. Average Salary by Job Title
avgSalaryByJob = groupsummary(T, "job_title", "mean", "salary_in_usd");
figure;
bar(categorical(avgSalaryByJob.job_title), avgSalaryByJob.mean_salary_in_usd);
xlabel('Job Title');
ylabel('Average Salary (USD)');
title('Average Salary by Job Title');
xtickangle(45);
grid on;
saveas(gcf, fullfile(outputFolder, 'AvgSalary_JobTitle.png'));


%% 3. Salary by Experience Level
avgSalaryByExp = groupsummary(T, "experience_level", "mean", "salary_in_usd");
figure;
```

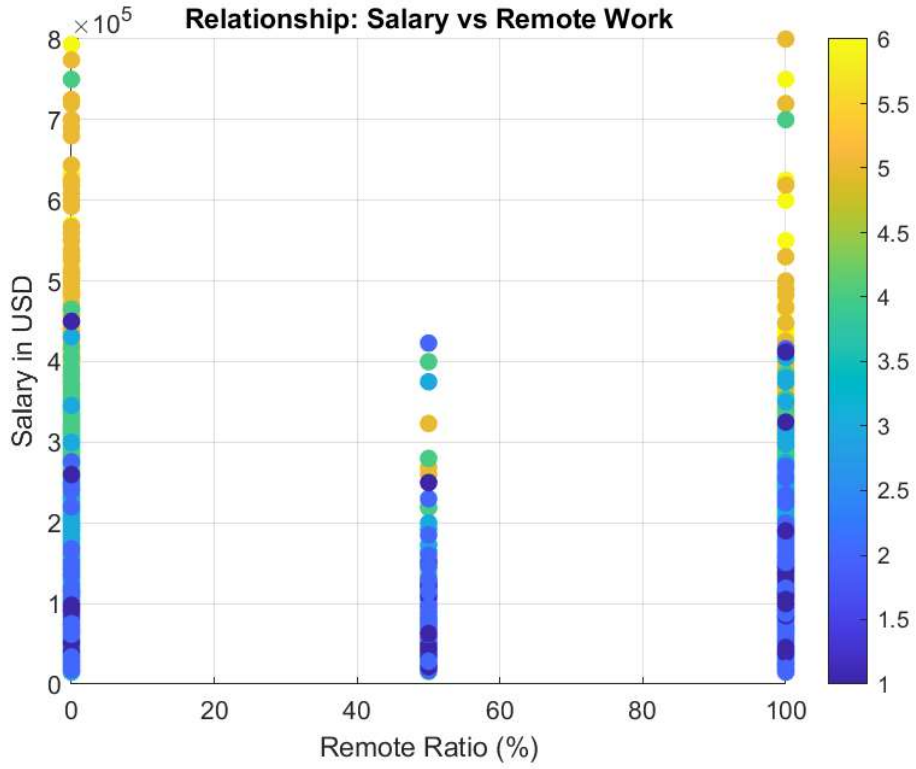
```
bar(categorical(avgSalaryByExp.experience_level),
avgSalaryByExp.mean_salary_in_usd);
xlabel('Experience Level');
ylabel('Average Salary (USD)');
title('Average Salary by Experience Level');
grid on;
saveas(gcf, fullfile(outputFolder, 'AvgSalary_Experience.png'));


%% 4. Salary vs Remote Ratio
figure;
scatter(T.remote_ratio, T.salary_in_usd, 50, categorical(T.Year), 'filled');
xlabel('Remote Ratio (%)');
ylabel('Salary in USD');
title('Relationship: Salary vs Remote Work');
colorbar;
grid on;
saveas(gcf, fullfile(outputFolder, 'Salary_vs_Remote.png'));


%% 5. Correlation Heatmap (Numeric Variables)
numericVars = {'salary_in_usd','remote_ratio','Year'};
corrMatrix = corr(table2array(T(:, numericVars)), 'Rows', 'complete');
figure;
heatmap(numericVars, numericVars, corrMatrix);
title('Correlation Heatmap');
saveas(gcf, fullfile(outputFolder, 'Correlation_Heatmap.png'));
```




Correlation Heatmap
salary_in_usd
remote_ratio
Year
1
-0.06261
0.02833
-0.06261
1
-0.104
0.02833
-0.104
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
salary_in_usd
remote_ratio
Year


Average Salary by Job Title
×10^5
4
3
2
1
0
Average Salary (USD)
Job Title


Average Salary by Experience Level
×10^5
2.5
2
1.5
1
0.5
0
Average Salary (USD)
EN
EX
MI
SE
Experience Level


Relationship: Salary vs Remote Work
×10^5
8
7
6
5
4
3
2
1
0
Salary in USD
0
20
40
60
80
100
Remote Ratio (%)
6
5.5
5
4.5
4
3.5
3
2.5
2
1.5
1

CHAPTER FOUR: NUMBER TWO

4.1 Question Two

Each group has different members from different backgrounds, home districts, tribes, villages, religions, courses, interests, ages, names and facial representation

Write a Matlab code that can store each members affirmation attributes into a single variable

Ensure the code saves the variables

Report and power point presentation

4.2 Solution Code

```
clear;clc;
%Defining struct
members=struct('Name',{},'Age',{},'Course',{},'Homedistrict',{},'Tribe',{},'In
terests',{},'Facialrepresentation',{});
%member1
members(1).Name='BISOBOKA JEMIMAH KAIRU'
members(1).Age='21'
members(1).Course='AMI'
members(1).Homedistrict='MAYUGE'
members(1).Tribe='MUSOGA'
members(1).Interests='WATCHING MOVIES'
members(1).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-08-12 at 14.41.06_0cd65e98.jpg")
%member2
members(2).Name='KAKOOZA IAN MAURICE'
members(2).Age='23'
members(2).Course='AMI'
members(2).Homedistrict='WANYANGE'
members(2).Tribe='MUGANDA'
members(2).Interests='GAMING'
members(2).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-22 at 20.50.22_1851d5be.jpg")
%member3
members(3).Name='OTIM INNOCENT LEMO'
members(3).Age='23'
members(3).Course='WAR'
members(3).Homedistrict='LIRA'
members(3).Tribe='LANGO'
members(3).Interests='FOOTBALL'
members(3).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-22 at 23.50.33_9b3a823e.jpg")
%member4
members(4).Name='ROM CHRISTOPHER NYEKO'
members(4).Age='23'
```

```
members(4).Course='WAR'
members(4).Homedistrict='WANYANGE'
members(4).Tribe='MUGANDA'
members(4).Interests='GAMING'
members(4).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-23 at 00.15.07_26318c39.jpg")
%member5
members(5).Name='MUGANYIZI JAMES'
members(5).Age='23'
members(5).Course='AMI'
members(5).Homedistrict='WANYANGE'
members(5).Tribe='MUNYANKOLE'
members(5).Interests='FOOD'
members(5).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-23 at 00.15.07_26318c39.jpg")
%member6
members(6).Name='APIO LAURA OULA'
members(6).Age='22'
members(6).Course='WAR'
members(6).Homedistrict='GWERI'
members(6).Tribe='ITESOT'
members(6).Interests='READING'
members(6).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-23 at 00.15.07_26318c39.jpg")
%member7
members(7).Name='ARIONGET SHAMIM EGONU'
members(7).Age='22'
members(7).Course='WAR'
members(7).Homedistrict='AMURIA'
members(7).Tribe='ITESOT'
members(7).Interests='SINGING'
members(7).Facialrepresentation=imread("C:\Users\K\Desktop\number two\WhatsApp
Image 2025-09-23 at 00.15.07_26318c39.jpg")
```

4.3 Continuation of Question Two

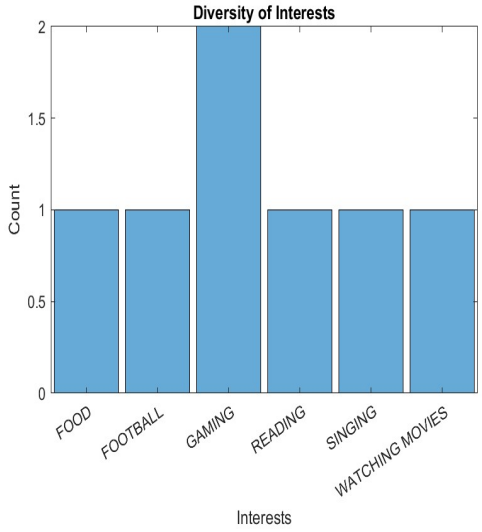
From question two in assignment one, utilize all the knowledge from module one to four to describe the different statistical characteristic in your data and ensure to visualize them. ensure that the different attributes or data collected per individual is detailed enough to describe them

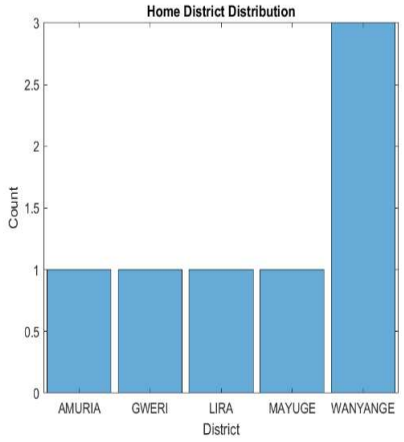
Code

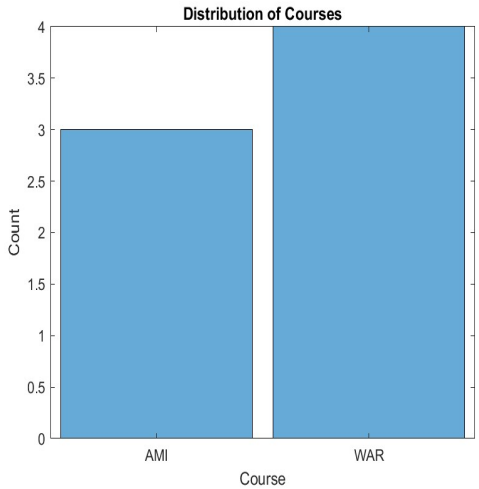
```
clear;clc;



% Load members struct
load('members.mat');


% Extract fields
```

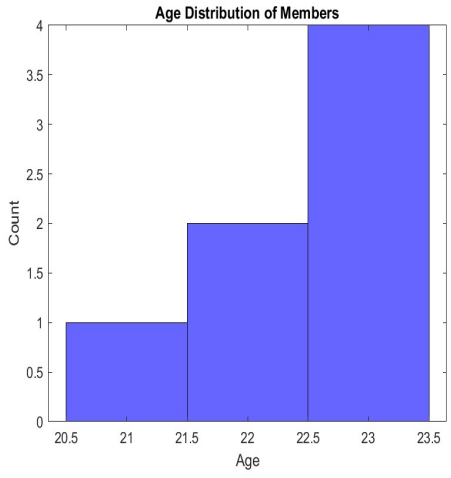
```
names = {members.Name};
ages = str2double({members.Age});
courses = {members.Course};
districts = {members.Homedistrict};
tribes = {members.Tribe};
interests = {members.Interests};


% 1. Age Statistics
meanAge = mean(ages);
medianAge = median(ages);
minAge = min(ages);
maxAge = max(ages);


fprintf('Age Statistics:\n Mean: %.2f\n Median: %.2f\n Range: %d - %d\n', ...
    meanAge, medianAge, minAge, maxAge);


figure;
histogram(ages, 'FaceColor','b');
xlabel('Age'); ylabel('Count');
title('Age Distribution of Members');
saveas(gcf, 'Age_Distribution.png');


% 2. Course Distribution
figure;
tabulateCourses = categorical(courses);
histogram(tabulateCourses);
xlabel('Course'); ylabel('Count');
title('Distribution of Courses');
saveas(gcf, 'Course_Distribution.png');


% 3. Tribe Distribution
figure;
tribeCounts = categorical(tribes);
histogram(tribeCounts);
xlabel('Tribe'); ylabel('Count');
title('Tribal Background Distribution');
saveas(gcf, 'Tribe_Distribution.png');


% 4. Home District Distribution
figure;
districtCounts = categorical(districts);
histogram(districtCounts);
xlabel('District'); ylabel('Count');
title('Home District Distribution');
saveas(gcf, 'District_Distribution.png');
```

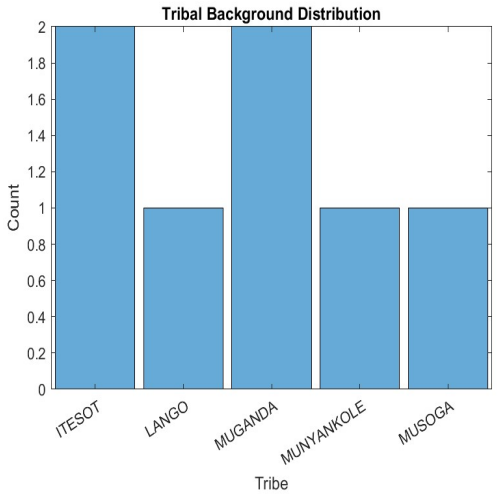
```
% 5. Interests
figure;
interestCounts = categorical(interests);
histogram(interestCounts);
xlabel('Interests'); ylabel('Count');
title('Diversity of Interests');
saveas(gcf, 'Interest_Distribution.png');


% 6. Display Members with Face Representations
figure;
for i = 1:length(members)
    subplot(2,4,i); % arrange in grid
    imshow(members(i).Facialrepresentation);
    title(members(i).Name, 'FontSize', 6);
end
sgtitle('Facial Representations of Group Members');
saveas(gcf, 'Facial_Representations.png');
```







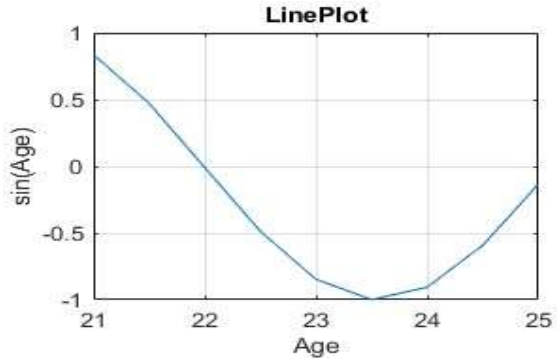




Assignment 2D Plots

1.Line Plot

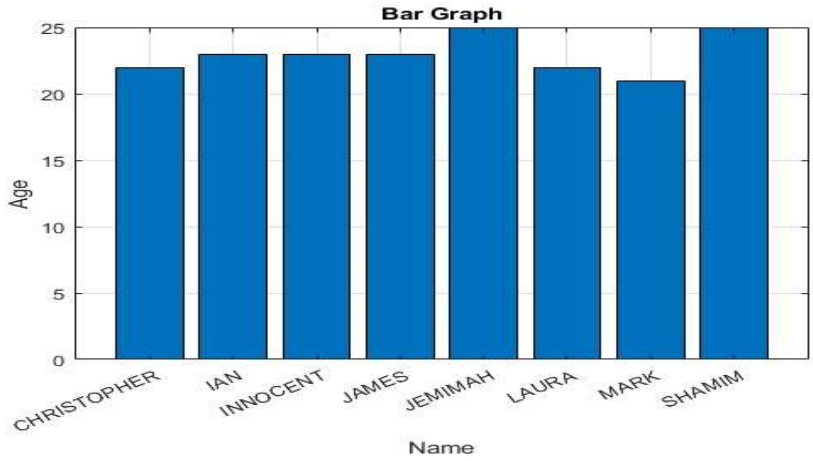
```
x = 21:0.5:25;
y = sin(x);
plot(x,y);
xlabel('Age');
ylabel('sin(Age)');
title('LinePlot');
grid on;
```



2.Bar Graph

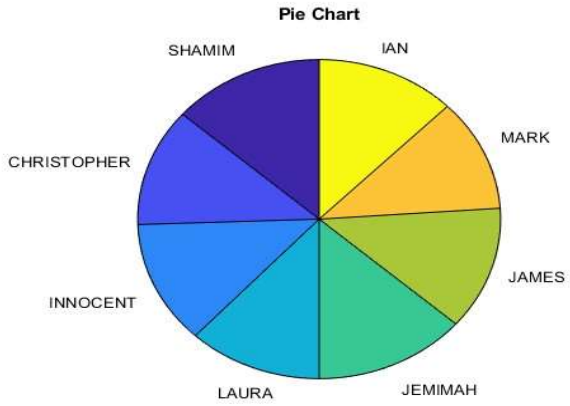
```
x =
categorical({'SHAMIM','CHRISTOPHER','INNOCENT','LAURA','JEMIMAH','JAMES','MARK
','IAN'});
y = [25,22,23,22,25,23,21,23];
bar(x,y);
ylabel('Age');
```

```
xlabel('Name');
title('Bar Graph');
grid on;
```



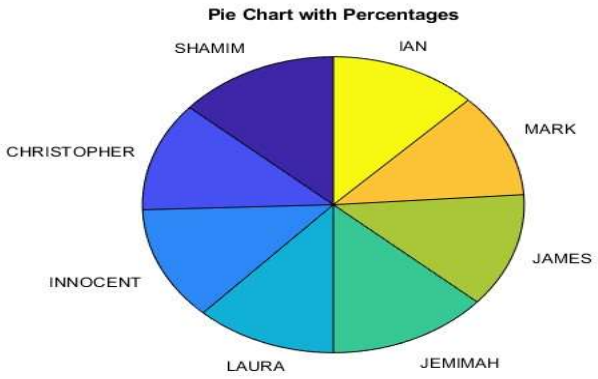
3.Pie chart

```
data = [25,22,23,22,25,23,21,23];
labels =
{'SHAMIM','CHRISTOPHER','INNOCENT','LAURA','JEMIMAH','JAMES','MARK','IAN'};
pie(data,labels);
title('Pie Chart');
```



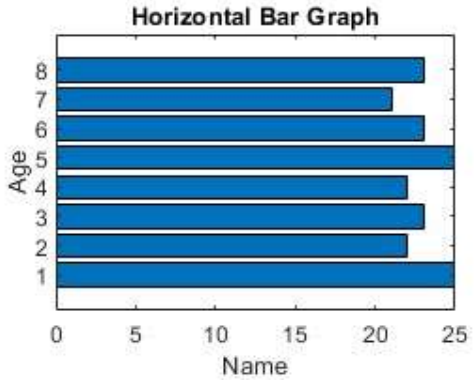
4.Pie Chart with percentages

```
data = [25,22,23,22,25,23,21,23];
labels =
{'SHAMIM','CHRISTOPHER','INNOCENT','LAURA','JEMIMAH','JAMES','MARK','IAN'};
pie(data,labels);
title('Pie Chart with Percentages');
```



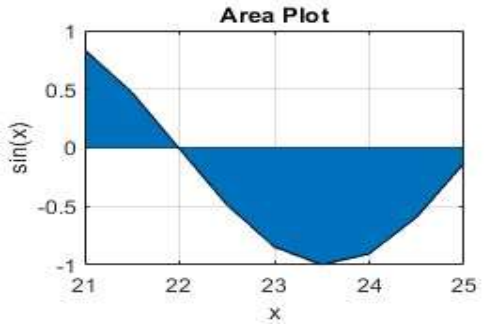
5.Horizontal Bar graph

```
figure('Name','horizontalbargraph');
y = [25,22,23,22,25,23,21,23];
barh(y);
ylabel('Age');
xlabel('Name')
title('Horizontal Bar Graph');
```



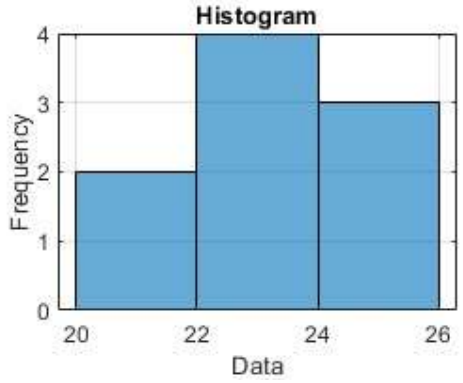
6.Area Plot

```
figure('Name','areaplot');
x = 21:0.5:25;
y = sin(x);
area(x,y);
xlabel('x');
ylabel('sin(x)');
title('Area Plot');
grid on;
```



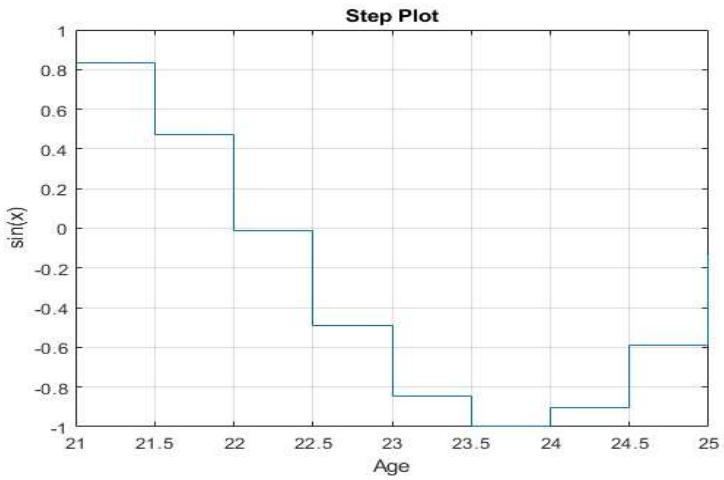
7.Histogram

```
figure('Name','histogram');
data = 21:0.5:25;
histogram(data);
xlabel('Data');
ylabel('Frequency');
title('Histogram');
grid on;
```



8.Step plot

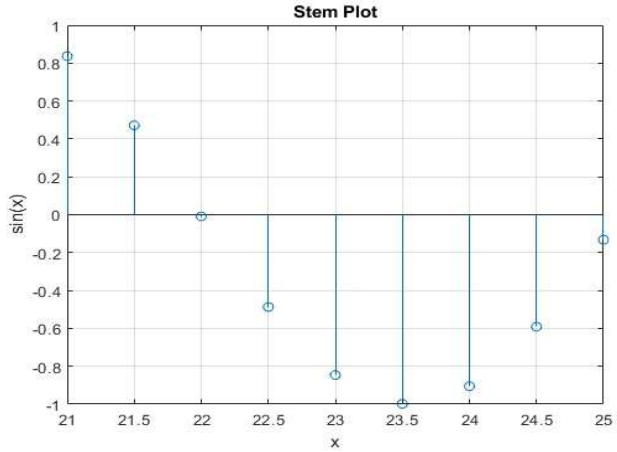
```
figure('Name','stepplot');
x = 21:0.5:25;
y = sin(x);
stairs(x,y);
xlabel('Age');
ylabel('sin(x)');
title('Step Plot');
grid on;
```



9.Stem Plot

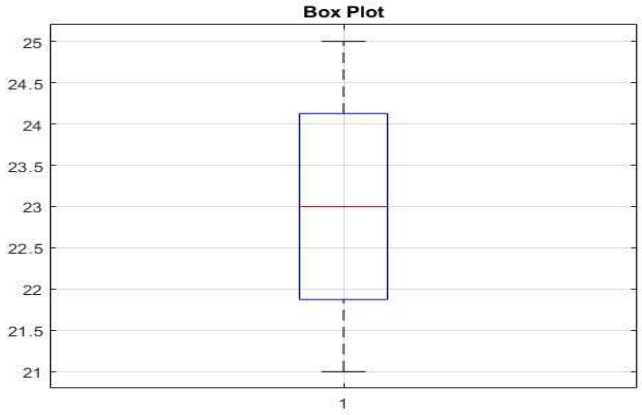
```
figure('Name','stemplot');
x = 21:0.5:25;
y = sin(x);
stem(x,y);
```

```
xlabel('x');
ylabel('sin(x)');
title('Stem Plot');
grid on;
```



10.Box Plot

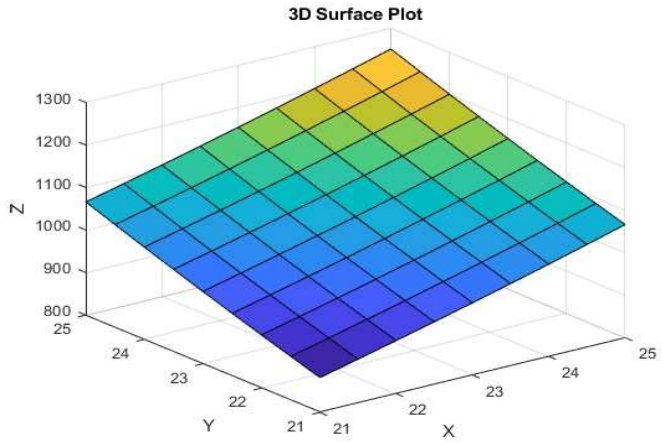
```
figure('Name','boxplot');
data = 21:0.5:25;
boxplot(data);
title('Box Plot');
grid on;
```



3D PLOTS

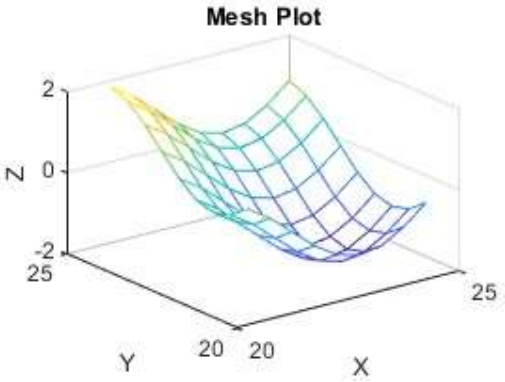
1.3D Surface Plot

```
x = 21:0.5:25;
[X,Y] = meshgrid(x);
Z = X.^2 + Y.^2;
surf(X,Y,Z);
xlabel('X');
ylabel('Y');
zlabel('Z');
title('3D Surface Plot');
```



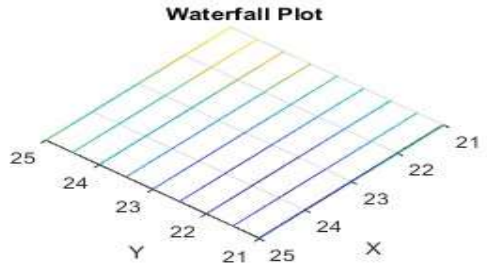
2.Mesh Plot

```
x = 21:0.5:25;
[X,Y] = meshgrid(x);
Z = sin(X) + cos(Y);
mesh(X,Y,Z);
xlabel('X');
ylabel('Y');
zlabel('Z');
title('Mesh Plot');
```



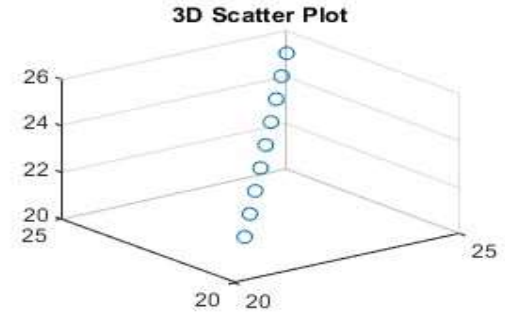
3.Waterfall Plot

```
x = 21:0.5:25;
[X,Y] = meshgrid(x);
Z = sin(X) + cos(Y);
waterfall(X,Y,Z);
xlabel('X');
ylabel('Y');
zlabel('Z');
title('Waterfall Plot');
```



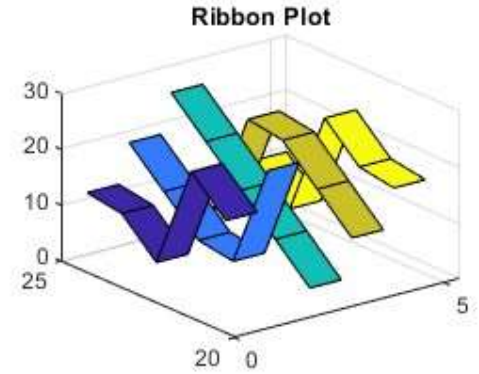
4.3D Scatter Plot

```
x = 21:0.5:25;
y = 21:0.5:25;
z = 21:0.5:25;
scatter3(x,y,z);
title('3D Scatter Plot');
```



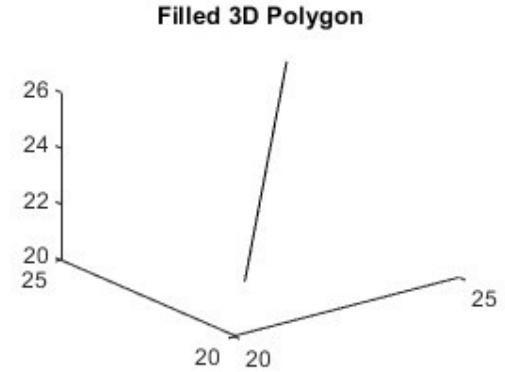
5.Ribbon Plot

```
y = 21:25;
z = magic(5);
ribbon(y,z);
title('Ribbon Plot');
```



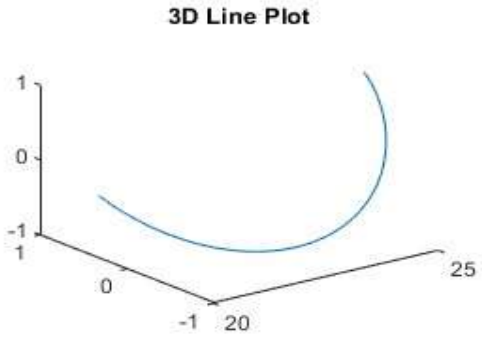
6.Fill 3Plot

```
x = 21:0.5:25;
y = 21:0.5:25;
z = 21:0.5:25;
fill3(x,y,z,'r');
title('Filled 3D Polygon');
```



7.Plot3

```
x = 21:0.1:25;
y = sin(x);
z = cos(x);
plot3(x,y,z);
title('3D Line Plot');
```



CONCLUSION

The assignment was successful since there was maximum cooperation among group 10 members. It exposed us to the different computation skills on how to import, retrieve and to compile large sums of data using MATLAB. It also exposed us to use different websites like Kaggle.com where we obtained our excel dataset for number one.