

MATLAB MODULES KNOWLEDGE APPLICATION ASSIGNMENT

PRESENTATION BY GROUP 10

GROUP 10 MEMBERS

NGOBI MARK LIVINGSTONE	BU/UP/2024/0985	MEB	
BISOBOKA JEMIMAH KAIRU	BU/UP/2024/0827	AMI	
ROM CHRISTOPHER NYEKO	BU/UP/2024/1069	WAR	
MUGANZI JAMES	BU/UP/2024/0831	AMI	
APIO LAURA OULA	BU/UP/2024/1015	WAR	
ARIONGET SHAMIM EGONU	BU/UP/2024/	WAR	
OTIM INNOCENT LEMO	BU/UP/2024/3257	WAR	
KAKOOZA IAN MAURICE	BU/UP/2024/4324	AMI	

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.

NUMBER 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 Matlab 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

STEPS FOLLOWED

- ▶ 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, :);
```

CONT

- ▶ %converting tables into structural arrays
- ▶ S2025=table2struct(T2025);
- ▶ S2024=table2struct(T2024);
- ▶ S2023=table2struct(T2023);
- ▶ S2022=table2struct(T2022);
- ▶ S2021=table2struct(T2021);
- ▶ S2020=table2struct(T2020);

CONT

- ▶ %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');

QUESTION ONE CONT

- ▶ .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
```

CONT

```
▶ %% 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'));

```

NUMBER 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

CODE

```
▶ clear;clc;
▶ %Defining struct
▶ members=struct('Name',{},'Age',{},'Course',{},'Homedistrict',{},'Tribe',{},'Interests',{},'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")
```

CONT

- ▶ %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")

CONT

- ▶ %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")

CONT

- ▶ %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")

CONT

- ▶ %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")

QUESTION TWO CONT

- ▶ 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

```
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');

CONT

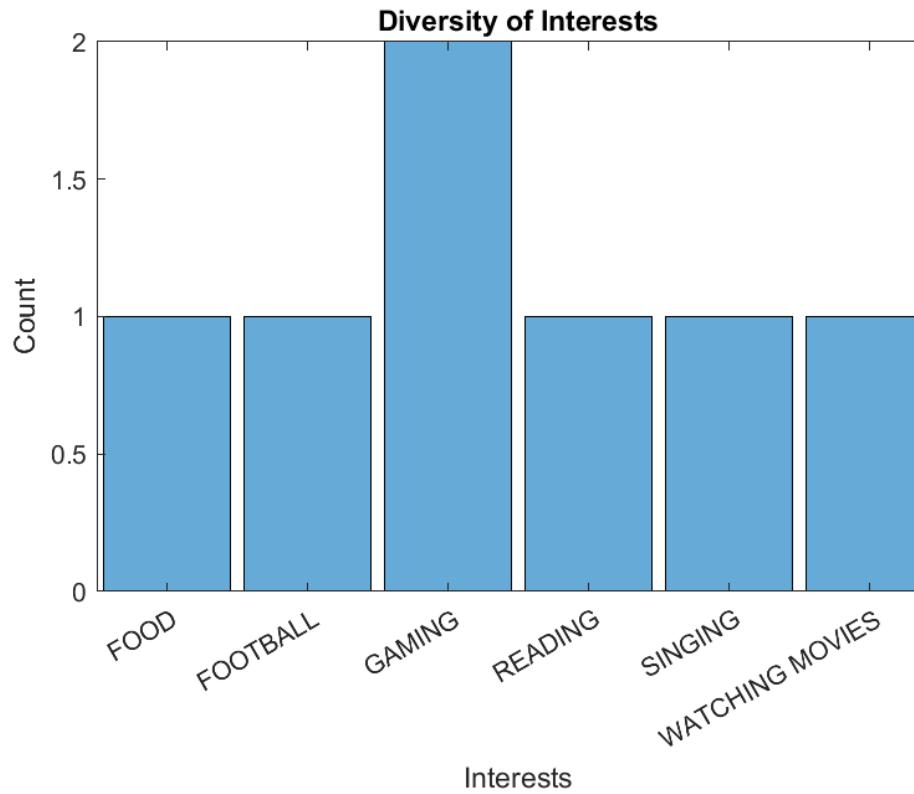
```
▶ % 4. Home District Distribution
▶ figure;
▶ districtCounts = categorical(districts);
▶ histogram(districtCounts);
▶ xlabel('District'); ylabel('Count');
▶ title('Home District Distribution');
▶ saveas(gcf, 'District_Distribution.png');

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

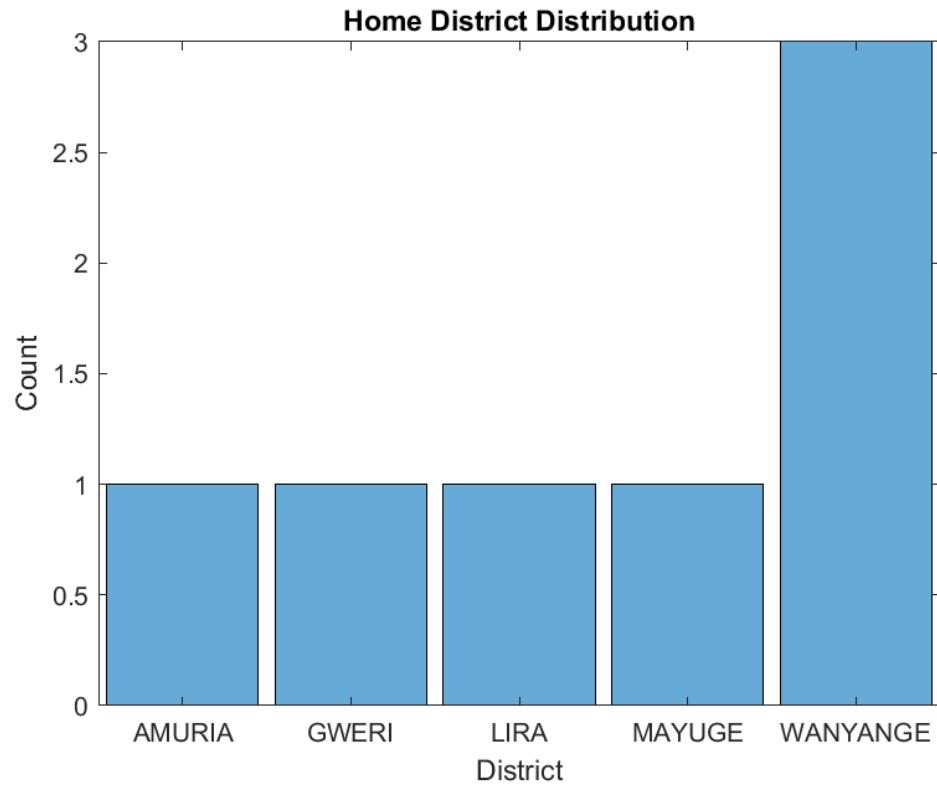
CONT

```
▶ % 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');
```

graphs



graphs



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.