

**FACULTY OF ENGINEERING AND TECHNOLOGY**

**COMPUTER PROGRAMMING**

**COURSE UNIT: MATLAB**

**A REPORT ABOUT THE MATLAB ASSIGNMENT ONE**

**SUBMITTED BY:**

**NAME: GROUP 4**

**LECTURER: ENG. MR. BENEDICTO MASERUKA**

**DATE OF SUBMISSION:………………………………………..**

# ABSTRACT

As group 4 we met in the university library and discussed about our assignment which boosted our exposure to various cords in addition to the acquired knowledge from the previous lectures. Our discussion and research as a group helped us come up with a solution for the given assignment.

# LIST OF GROUP 4 MEMBERS

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MATLAB ASSIGNMENT | | | | |
| GROUP 4 | | | | |
| S/N | NAME | SIGNATURE | COURSE | REGISTRATION NUMBER |
| 1 | ASIMO MARTHA |  | MEB |  |
| 2 | MBABAZI BLESSING GILLIAN |  | PTI |  |
| 3 | BANGI REHEMAH FARIDAH |  | AMI |  |
| 4 | AMONGIN MARY LUCY |  | WAR |  |
| 5 | TUSIME JUNIOR YUSUF |  | AMI |  |
| 6 | OKOT SANDRAH |  | WAR |  |
| 7 | OCAA ELI |  | WAR |  |
| 8 | WAMBWA DERRICK |  | WAR |  |
| 9 | ADUPA GEORGE RICHARD |  | WAR |  |
| 10 | MWIDU PETER FREDRICK |  | WAR |  |

# DECLARATION

We hereby declare and certify that the information in this report is out of our own efforts, research as group 4 and it has never been used by any individual or submitted in any learning institution for any academic purposes

Group leader’s signature……………………………………………

Date;………………………

# ACKNOWLEDGEMENT

To begin with, we, Group 4, would like to thank The Almighty God for guiding and helping us to carry on with our assignment. We extend our heartfelt gratitude and appreciation to all member that gave a hand in the accomplishment of this assignment.

Secondly, special appreciation go to our lecturer, Dr. Maseruka Benedicto for his guidance in this course unit .Your expertise and enthusiasm have greatly enhanced our understanding.

Lastly, we also appreciate the collaborative efforts and contributions of each group member, which enabled us to complete this assignment successfully

# DEDICATION

We dedicate this report to all individuals especially group 4 members, for their teamwork, dedication, and perseverance in completing this assignment

To our lecturer Mr. Maseruka Benedicto whose guidance and expertise have been priceless, mentorship and insightful feedback have diversified our understanding.

# APPROVAL

This is to confirm that this report has been written and presented by GROUP 4, giving the details of the MATLAB assignment carried out.

LECTURER;

NAME;…………………………………..

SIGNATURE;……………………………..

DATE……………………………………

Table of Contents

[ABSTRACT 2](#_Toc209544258)

[LIST OF GROUP 4 MEMBERS 3](#_Toc209544259)

[DECLARATION 4](#_Toc209544260)

[ACKNOWLEDGEMENT 5](#_Toc209544261)

[DEDICATION 6](#_Toc209544262)

[APPROVAL 7](#_Toc209544263)

[Introduction 10](#_Toc209544264)

[Clearing the Workspace 10](#_Toc209544265)

[3. Reading the Dataset 10](#_Toc209544266)

[4. Filtering Data by Year 10](#_Toc209544267)

[5. Converting Tables to Structures 10](#_Toc209544268)

[6. Exporting Data to a New Excel File 10](#_Toc209544269)

[Code Explanation 13](#_Toc209544270)

[Code Explanation 16](#_Toc209544271)

[Observations 16](#_Toc209544272)

# 

**CHAPTER ONE**

**NUMBER 1.1**

Kaggle.com

Each group should be able to retrieve a unique data set in excel format

The group will read the data set into Matlab in one code, they will be able to copy variables of each year and put them in the following

I). Tables for each year of the term.

ii). Convert the tables in I) above into structural arrays.

iii). Output each of the variables in ii) above into a single excel sheet with each year on separate sheet having chrome headings and sheet names.

**SOLUTION**

%reading data set into matlab

clc;

clear;

%reading of the table

W=readtable("C:\Users\Admin\Desktop\group 4 assignment\DataScience\_salaries\_2025.xlsx")

%extraction of different years from 2025-2020

W2025=W(W.Year==2025, :);

W2024=W(W.Year==2024, :);

W2023=W(W.Year==2023, :);

W2022=W(W.Year==2022, :);

W2021=W(W.Year==2021, :);

W2020=W(W.Year==2020, :);

%converting tables into struct

%S=Struct

S2025=table2struct(W2025);

S2024=table2struct(W2024);

S2023=table2struct(W2023);

S2022=table2struct(W2022);

S2021=table2struct(W2021);

S2020=table2struct(W2020);

%generation of an excel workbook

outputfile='C:\Users\Admin\Desktop\group 4 assignment\New Microsoft Excel Worksheet.xlsx'

writetable(W2025,outputfile,'sheet','W2025');

writetable(W2024,outputfile,'sheet','W2024');

writetable(W2023,outputfile,'sheet','W2023');

writetable(W2022,outputfile,'sheet','W2022');

writetable(W2021,outputfile,'sheet','W2021');

writetable(W2020,outputfile,'sheet','W2020');

## Introduction

The purpose of this MATLAB program is to process a salary dataset, organize it by year (2020–2025), and save the results into a new Excel workbook. The code performs tasks such as reading data, filtering by year, converting formats, and exporting clean outputs.

## Clearing the Workspace

- clc; clears the Command Window.  
- clear; removes all existing variables from memory.  
This ensures the program runs without interference from old data.

## 3. Reading the Dataset

- Reads the Excel file DataScience\_salaries\_2025.xlsx.  
- Stores the data in a table called W.  
Tables are convenient because they look like Excel sheets with rows and columns.

## 4. Filtering Data by Year

- Extracts rows of data for each year (2020–2025).  
- For example, W2025 contains all records where Year = 2025.  
- The colon (:) means all columns are included.

## 5. Converting Tables to Structures

- Converts each table into a structure array.  
- Structures allow easy access to fields (e.g., S2025(1).salary).  
- This format is useful for programming and analysis.

## 6. Exporting Data to a New Excel File

- Creates a new Excel workbook.  
- Each year’s data is written to a separate sheet named after the year (e.g., W2025, W2024).  
- This organizes the data neatly for reporting and further use.

**NUMBER 1.2**

clear; clc;

%Defining struct

members=struct('Name',{},'Age',{},'Course',{},'HomeDistrict',{},'Tribe',{},'Interests',{},'Facialrepresentation',{});

%member 1

members(1).Name='BANGI REHEMAH FARIDAH';

members(1).Age='22';

members(1).Course='AMI';

members(1).HomeDistrict='KALIRO';

members(1).Tribe='MUSOGA';

members(1).Interests='MUSIC';

members(1).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250608-WA0001.jpg');

%member 2

members(2).Name='OCAA ELI';

members(2).Age='21';

members(2).Course='WAR';

members(2).HomeDistrict='OYAM';

members(2).Tribe='LANGO';

members(2).Interests='SELF IMPROVEMENT';

members(2).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250608-WA0002.jpg');

%member 3

members(3).Name='WAMBWA DERRICK';

members(3).Age='22';

members(3).Course='WAR';

members(3).HomeDistrict='MANAFWA';

members(3).Tribe='GISU';

members(3).Interests='SELF MOTIVATED';

members(3).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0026.jpg');

%member 4

members(4).Name='AMONGIN MARY LUCY';

members(4).Age='24';

members(4).Course='WAR';

members(4).HomeDistrict='NGORA';

members(4).Tribe='ITESO';

members(4).Interests='VOLLEYBALL';

members(4).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0028.jpg');

%member 5

members(5).Name='TUSIIME JUNIOR YUSUF';

members(5).Age='24';

members(5).Course='AMI';

members(5).HomeDistrict='HOIMA';

members(5).Tribe='MUNYORO';

members(5).Interests='FOOTBALL';

members(5).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0058.jpg');

%member 6

members(6).Name='OKOT SANDRA';

members(6).Age='24';

members(6).Course='WAR';

members(6).HomeDistrict='LIRA';

members(6).Tribe='LANGO';

members(6).Interests='WATCHING';

members(6).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0102.jpg');

%member 7

members(7).Name='MWIDU PETER FREDRICK';

members(7).Age='39';

members(7).Course='WAR';

members(7).HomeDistrict='KAMULI';

members(7).Tribe='MUGWERE';

members(7).Interests='SCRABBLE';

members(7).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0122.jpg');

%member 8

members(8).Name='ADUPA GEORGE RICHARD';

members(8).Age='22';

members(8).Course='WAR';

members(8).HomeDistrict='KUMI';

members(8).Tribe='ITESOT';

members(8).Interests='WELLWISHER';

members(8).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0142.jpg');

%member 9

members(9).Age='25';

members(9).Name='ASIMO MARTHA';

members(9).Course='MEB';

members(9).HomeDistrict='SOROTI';

members(9).Tribe='ITESOT';

members(9).Interests='ATHLETICS'

members(9).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0159.jpg');

%member 10

members(10).Name='MBABAZI BLESSING GILLIAN';

members(10).Age='21';

members(10).Course='PTI';

members(10).HomeDistrict='NTUNGAMO';

members(10).Tribe='MUNYANKOLE';

members(10).Interests='DANCING';

members(10).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0175.jpg');

This explains a MATLAB script that defines and stores information about different group members using a structured array. Each member's details such as Name, Age, Course, Home District, Tribe, Interests, and Facial Representation are stored in a struct.

## Code Explanation

1. The script begins by clearing the workspace and command window using 'clear' and 'clc'.  
2. A structure array called 'members' is defined with fields: Name, Age, Course, HomeDistrict, Tribe, Interests, and Facialrepresentation.  
3. For each member (1 to 10), details are manually entered. The fields include personal information and an image loaded using the 'imread' function.  
4. The 'imread' function reads an image from the specified file path and stores it in the 'Facialrepresentation' field of the struct.  
5. By the end of the script, the struct 'members' contains data for 10 individuals, making it easier to organize and access their details programmatically.

**CHAPTER 2**

**NUMBER 2.1**

%Reading the table ito Matlab

clc;

clear;

%reading of the table

W=readtable("C:\Users\Admin\Desktop\group 4 assignment\DataScience\_salaries\_2025.xlsx")

%extraction of different years from 2025-2020

W2025=W(W.Year==2025, :);

W2024=W(W.Year==2024, :);

W2023=W(W.Year==2023, :);

W2022=W(W.Year==2022, :);

W2021=W(W.Year==2021, :);

W2020=W(W.Year==2020, :);

%converting tables into struct

%S=Struct

S2025=table2struct(W2025);

S2024=table2struct(W2024);

S2023=table2struct(W2023);

S2022=table2struct(W2022);

S2021=table2struct(W2021);

S2020=table2struct(W2020);

%generation of an excel workbook

outputfile='C:\Users\Admin\Desktop\group 4 assignment\New Microsoft Excel Worksheet.xlsx'

writetable(W2025,outputfile,'sheet','W2025');

writetable(W2024,outputfile,'sheet','W2024');

writetable(W2023,outputfile,'sheet','W2023');

writetable(W2022,outputfile,'sheet','W2022');

writetable(W2021,outputfile,'sheet','W2021');

writetable(W2020,outputfile,'sheet','W2020');

%2D plots

figure("Name","scatterplot,lineplot,bar graph,horizontal bar graph")

%Subplot, scatter plot showing salaries vs remote ratio

subplot(2,2,1)

scatter(W2020.salary,W2020.remote\_ratio,"b\*");

hold on

scatter(W2021.salary,W2021.remote\_ratio,"bo");

scatter(W2022.salary,W2022.remote\_ratio,"rs");

scatter(W2023.salary,W2023.remote\_ratio,"g\*");

scatter(W2024.salary,W2024.remote\_ratio,"co");

scatter(W2025.salary,W2025.remote\_ratio,"yo");

legend("W2020","W2021","W2022","W2023","W2024","W2025");

hold off;

xlabel('salary');

ylabel('remote ratio');

title('Salaries vs remote ratio');

grid on;

%subplot, lineplot showing salaries in different years

subplot(2,2,2)

plot(W2020.salary,W2020.remote\_ratio,"b:o");

hold on

plot(W2021.salary,W2021.remote\_ratio,"b-\*");

plot(W2022.salary,W2022.remote\_ratio,"c:s");

plot(W2023.salary,W2023.remote\_ratio,"y--\*");

plot(W2024.salary,W2024.remote\_ratio,"r:");

plot(W2025.salary,W2025.remote\_ratio,"b:o");

legend("W2020","W2021","W2022","W2023","W2024","W2025");

hold off;

xlabel('Year');

ylabel('salary');

title('salaries in different years');

%Subplot, scatter plot showing salaries vs remote ratio

subplot(2,2,1)

scatter3(W2020.salary,W2020.remote\_ratio,W2020.salary\_in\_usd,"b\*");

hold on

scatter3(W2021.salary,W2021.remote\_ratio,W2020.salary\_in\_usd,"bo");

scatter3(W2022.salary,W2022.remote\_ratio,W2020.salary\_in\_usd,"rs");

scatter3(W2023.salary,W2023.remote\_ratio,W2020.salary\_in\_usd,"g\*");

scatter3(W2024.salary,W2024.remote\_ratio,W2020.salary\_in\_usd,"co");

scatter3(W2025.salary,W2025.remote\_ratio,W2020.salary\_in\_usd,"yo");

hold off

## Code Explanation

1. Data Import: The script clears the workspace and command window using 'clc' and 'clear'. It then reads an Excel dataset (`DataScience\_salaries\_2025.xlsx`) into a table `W`.  
  
2. Filtering by Year: The dataset is filtered into subsets for each year from 2020 to 2025 using conditional indexing. Each subset is stored in a separate table (e.g., W2020, W2021, ...).  
  
3. Struct Conversion: Each yearly table is converted into a struct array using 'table2struct', making it easier to handle in MATLAB programs.  
  
4. Export to Excel: The yearly tables are exported into a new Excel file (`New Microsoft Excel Worksheet.xlsx`) with six different worksheets (W2020–W2025).  
  
5. 2D Scatter Plot: A scatter plot is drawn to show the relationship between 'salary' and 'remote\_ratio' for each year, using different markers and colors.  
  
6. Line Plot: A line plot is created to compare salary trends against remote ratio across the years.  
  
7. 3D Scatter Plot: A 3D scatter plot is attempted, with axes showing salary, remote ratio, and salary in USD. However, the subplot index is reused, and the 'salary\_in\_usd' field mistakenly references only the 2020 dataset instead of each corresponding year.

## Observations

- The script demonstrates data handling, struct creation, and visualization in MATLAB.  
- Exporting filtered data to a new Excel file provides organized yearly analysis.  
- The scatter and line plots help visualize salary distribution and trends with remote ratio.  
- The 3D scatter plot needs corrections (subplot index and dataset references) for accurate visualization.

NUMBER 2.2

clear; clc;

%Defining struct

members=struct('Name',{},'Age',{},'Course',{},'HomeDistrict',{},'Tribe',{},'Interests',{},'Facialrepresentation',{});

%member 1

members(1).Name='BANGI REHEMAH FARIDAH';

members(1).Age='22';

members(1).Course='AMI';

members(1).HomeDistrict='KALIRO';

members(1).Tribe='MUSOGA';

members(1).Interests='MUSIC';

members(1).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250608-WA0001.jpg');

%member 2

members(2).Name='OCAA ELI';

members(2).Age='21';

members(2).Course='WAR';

members(2).HomeDistrict='OYAM';

members(2).Tribe='LANGO';

members(2).Interests='SELF IMPROVEMENT';

members(2).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250608-WA0002.jpg');

%member 3

members(3).Name='WAMBWA DERRICK';

members(3).Age='22';

members(3).Course='WAR';

members(3).HomeDistrict='MANAFWA';

members(3).Tribe='GISU';

members(3).Interests='SELF MOTIVATED';

members(3).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0026.jpg');

%member 4

members(4).Name='AMONGIN MARY LUCY';

members(4).Age='24';

members(4).Course='WAR';

members(4).HomeDistrict='NGORA';

members(4).Tribe='ITESO';

members(4).Interests='VOLLEYBALL';

members(4).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0028.jpg');

%member 5

members(5).Name='TUSIIME JUNIOR YUSUF';

members(5).Age='24';

members(5).Course='AMI';

members(5).HomeDistrict='HOIMA';

members(5).Tribe='MUNYORO';

members(5).Interests='FOOTBALL';

members(5).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0058.jpg');

%member 6

members(6).Name='OKOT SANDRA';

members(6).Age='24';

members(6).Course='WAR';

members(6).HomeDistrict='LIRA';

members(6).Tribe='LANGO';

members(6).Interests='WATCHING';

members(6).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0102.jpg');

%member 7

members(7).Name='MWIDU PETER FREDRICK';

members(7).Age='39';

members(7).Course='WAR';

members(7).HomeDistrict='KAMULI';

members(7).Tribe='MUGWERE';

members(7).Interests='SCRABBLE';

members(7).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0122.jpg');

%member 8

members(8).Name='ADUPA GEORGE RICHARD';

members(8).Age='22';

members(8).Course='WAR';

members(8).HomeDistrict='KUMI';

members(8).Tribe='ITESOT';

members(8).Interests='WELLWISHER';

members(8).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0142.jpg');

%member 9

members(9).Name='ASIMO MARTHA';

members(9).Age='25';

members(9).Course='MEB';

members(9).HomeDistrict='SOROTI';

members(9).Tribe='ITESOT';

members(9).Interests='ATHLETICS'

members(9).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0159.jpg');

%member 10

members(10).Name='MBABAZI BLESSING GILLIAN';

members(10).Age='21';

members(10).Course='PTI';

members(10).HomeDistrict='NTUNGAMO';

members(10).Tribe='MUNYANKOLE';

members(10).Interests='DANCING';

members(10).Facialrepresentation=imread('C:\Users\Admin\Pictures\Saved Pictures\BHANGI\IMG-20250610-WA0175.jpg');

%2D plots

%plotting sine(x) against Age

subplot(2,2,1)

x=21:1:39;

y=sin(x);

plot(x,y);

xlabel('Age');

ylabel('sin(x)');

title('Line plot showing sine(x) against Age');

grid on;

%scatter plot showing interests against Age

subplot(2,2,2)

y=21:1:39;

x=categorical({'MUSIC','SELF IMPROVEMENT','SELF MOTIVATED','VOLLEYBALL','FOOTBALL','WATCHING','SCRABBLE','WELLWISHER','ATHLETICS','DANCING'})

scatter(x,y);

xlabel('INTERESTS');

ylabel('Age');

title('Scatter plot showing variations of Age and interests');

grid on;

Code Explanation

1. The code creates a subplot in a 2 by 2 grid (position 1)

2. Defines x as a range from 21 to 39 with a step of 1

3. Calculates y as a sine of x

4. Plots y against x

5. Labels the x axis as “Age”, y axis as “sin(x)”, and sets the title.

6. Turns on the grid for the plot and creates another subplot in the 2 by 2 grid (position 2)

7. Defines y as a range from 21 to 39

8. Defines x as categorical array of interests

9. Creates a scatter plot of y against x

10. Labels the x axis as “INTERESTS”

CONCLUSION

In conclusion coding is a fundamental skill that has changed the way we live, work, and interact with technology. Through this report we have explored the basics of coding, its applications, and its impact on various industries.