

## MMJ12503 – Computer programming Sem 1 2022/2023 Assignment 3

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**Due : 29 Jan 2023 (Sunday) by 11.59 pm**

**Marks : 15 points**

**Submission method:**

- File upload to **GOOGLE CLASSROOM** (class code : [sdoo72f](#))
- Filename must be in the following format
  - Report : **Session X – Group YY – assignment 3.pdf**.
    - X is the session number (i.e. 1, 2, 3, ...) which is based on your lab session.
    - YY is the group number (i.e. 01, 02, 03, ...) which is assigned to your group.
  - Group video : **Session X – Group YY – assignment 3.mp4**.
    - X is the session number (i.e. 1, 2, 3, ...) which is based on your lab session.
    - YY is the group number (i.e. 01, 02, 03, ...) which is assigned to your group.
  - Individual video : **Session X – Group YY – ZZZZZZZZ.mp4**.
    - X is the session number (i.e. 1, 2, 3, ...) which is based on your lab session.
    - YY is the group number (i.e. 01, 02, 03, ...) which is assigned to your group.
    - ZZZZZZZZ is the your student ID.

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### Note

This assignment 3 has the following mapping:

**PO 5** : Create, select and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.

**CO 3** : Ability to construct C programs with functions and numeric arrays.

with the knowledge profile of:

**WK 6** : Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

Also, this assignment 3 is contributes towards the engineering problems of:

**WP 1** : Cannot be resolved without in-depth engineering knowledge at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamental-based, first principles analytical approach.

**WP 3** : Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.

### Instructions / to do list

1. Form a group **between 3 to 5 members**. Note that, huge number of members in a group will required to provided more complex with more user defined functions in your developed C program.
2. Show all works/procedural analysis. You will lose marks for incomplete submission.
3. Read and signed the **student statement sheet** by all members in the group to acknowledge that you have read and understand the repercussion of plagiarism. Incomplete or without the submission of student statement sheet **will be penalized by the reduction of 50%** from the total marks obtained.
4. This assignment 3 consisting of TWO (2) components which are **report and recorded video**. All these components must address all the mentioned course outcome (CO), programme outcome (PO), knowledge profile and engineering problem listed above.
5. For the first component of report, it is consisting of **cover page, student statement sheet, table of content, problem statement, objectives, scopes, explanation of general coding** (group works) to solve or minimize the stated problem, **explanation of functions** (individual works), **conclusion, reference** (if any) and complete coding in **appendix**.
6. The **maximum pages of report** are depending on number of members in a group and counted with **excluding cover page, student statement sheet, table of content, reference and appendix**. The **maximum pages for general section** of problem statement, objectives, scopes, explanation of general coding (group works) and conclusion are **1 page per member**. On the other hand, the **maximum pages for individual sections** for the explanation of functions coding (individual works) are **2 pages**

**per member.** For example, a group of 4 students will have the maximum pages of 12, which can be detail as 4 pages for general section and 8 pages for individual section. **Any exceed page will be penalized by reduction of 10%** either as a whole group or individual depending on the exceeded contents.

7. For the individual sections, it must **clearly state the member who contributes to that section.**
8. The report must be prepared in **A4 size paper.** The font must be **12 font size** with **single line paragraph spacing** (excluded for the appendix). The report is submitted within a **single pdf file.**
9. For the second component of recorded video, it is consisting of general video and individual member videos.
10. For the general video, firstly include a short briefing on problem statements, objectives as well as scopes. Also, details explanation of the operations that are performed by the arrays used in program is needed. Lastly, show an example of input and output from the developed program. The maximum duration is 2 mins per member. For example, a group of 4 students will have the maximum duration of 8 mins. **Any exceed duration of video will be penalized by reduction of 10% per each 30 seconds exceeded.**
11. For the individual video, please include the introduction of the user defined functions and details explanation of the side effect in the developed user defined functions. The maximum duration is 5 mins per member. For example, a group of 4 students will have 4 individual videos with the maximum duration of 5 mins for each video. **Any exceed duration of video will be penalized by reduction of 10% per each 30 seconds exceeded.**
12. Each of the group member will be given a **peer evaluation form** for the group work activities of this assignment 3. Please fill up the peer evaluation form before the given due date. This peer evaluation form will be used for the **determination of multiplier** for the group work components of assignment 3. The peer evaluation is **confidential.** Therefore, you must not expose the peer evaluation to other including your group members.
13. Refer to the example of mark calculation for the determination of peer review. The multiplier will be based on the range of peer review as follow:

Range of peer review, P	Multiplier
$0.95 \leq P \leq 1.00$	1.00
$0.90 \leq P < 0.95$	0.90
$0.85 \leq P < 0.90$	0.80
$0.80 \leq P < 0.85$	0.70
$0.75 \leq P < 0.80$	0.60
$0.50 \leq P < 0.75$	0.50
$0.25 \leq P < 0.50$	0.25
$P < 0.25$	0.00

14. The due date for this assignment is on **29 Jan 2022 (Sunday) by 11.59 pm.** For each working day **late submission, 10 % per day will be deducted** from the obtained marks. Please take note that, it takes time to upload a large size document. So, don't wait until very last moment. Also, you are allowed to submit your work earlier than the due date without any penalty.

During the post pandemic COVID 19, you and your friends decide to operate a small business to support the daily expenses and reduce the financial burden of the families. Among the potential business are not limited to

- Small food stall that has on-line food ordering
- Small on-line shop
- Hourly house-keeping door-to-door service
- Development of small application with C program

As a freshman in mechanical engineering programme who already learn the course of MMJ12503 – computer programming, you and your friends are required to construct a C program with user defined functions and numeric arrays to support the business. For example, a C program that allows the staff/customer to take order and/or delivery, a C program to manage the inventory level of the business, a C program that help the scheduling and planning of operation, etc. Note that, **the developed C program must contain array(s) and user defined functions**. Each of the members in the group are responsible for at least ONE (1) user defined function within the developed C program.

Please explain the problem statement trigger your group to develop such a C program (note that it is not due to any requirement from the course of MMJ12503), the objective that your group would like to achieve with the developed program, the scope that limits the consideration during the development of the program, the basic structure or the flow chart of the whole program, the reason to choose this and not that in the program, the reason for the selected user defined function, etc. Please keep in mind that your program interface must be look user-friendly. In your conclusion, please summarize your works and how the works finally achieve the objectives and minimize or solve the problem statement at mentioned in the early stage of this project.

You can provide any reasonable assumptions to simplify the situation, and these assumptions must be well explained within the report in the scope. Any fact, diagrams, figures, tables etc that are not yours must be **properly cited**. Please use IEEE citation in your work e.g. [1][2]. Check this website for details: <https://pitt.libguides.com/citationhelp/ieee>. Also, all diagrams, figures, and/or tables that available within the report must be explained and discussed.

At the end of this assignment 3, kindly ensure that you and your group had submit the following items in Google classroom :-

1. **A single pdf format report** that consists of all components as listed in **item 4** and within the maximum pages as explained in **item 5** in the instruction given above.
2. **A group video in mp4 format** with the maximum duration as explained by **item 9** in the instruction given above.
3. **An individual video** per each member **in mp4 format** with the maximum duration as explained by **item 10** in the instruction given above.
4. **A complete developed C program (\*.c)**. Please take note that it is not the file with extension of \*.dev.
5. **A peer review** that will be distributed to each of the member by your lecturer.

Lastly, after upload all these documents, please **click on turn-in button** in Google classroom before the due date. Marks will be given based on the given rubrics and weightages.

#### **IMPORTANT NOTE**

- Marks will be given based on the **novelty (originality)** of your answer.
  - ✓ *If you choose an example that most students did not select for their work, you **will most likely** get higher marks due to your effort and complexity of the example.*
- Provide **as much details as possible, but not by copying and pasting from internet**. Give proper credit to the source that was cited.

No	Criteria	Weightage	Rubric					
			Excellent 5	Good 4	Fair 3	Adequate partially 2	Unsatisfactory 1	Not available 0
<b>A. REPORT – General section</b>								
1	Report writing and organisation [5 Marks]	1	<b>Excellent</b> -structured with clear and <b>logical</b> progression through and between each section.	<b>Well</b> -structured with <b>good</b> progression through and between each section.	<b>Well</b> -structured with <b>acceptable</b> progression through and between each section.	<b>Moderately</b> -structured with <b>little</b> progression through and between each section.	<b>Poorly</b> -structured with <b>no</b> clear progression through and between each section.	Not present.
2	Introduction [5 Marks]	1	The introduction is <b>highly</b> related and <b>clearly stated</b> the main topic.	The introduction <b>clearly</b> states the main topic and <b>preview</b> the structure of the report.	The introduction states the main topic and <b>moderately preview</b> the structure of the report.	The introduction states the main topic but <b>does not adequately preview</b> the structure of the report.	The introduction is <b>unclear</b> , either the main topic or the structure of the report is <b>missing</b> .	Not present.
3	Problem statements [5 Marks]	1	The problem statements are <b>clear</b> , accurate and well defined.	The problem statements are <b>mostly clear</b> and well defined.	The problem statements are <b>moderately</b> defined.	The problem statements are <b>partially</b> defined.	The problem statements are <b>unclear</b> and not well defined.	Not present.
4	Objectives and scopes [5 Marks]	1	The objectives and scopes are <b>clear, accurate and well defined</b> .	The objectives and scopes are <b>mostly</b> clear and well defined.	The objectives and scopes are <b>moderately</b> defined.	The objectives and scopes are <b>partially</b> defined.	The objective and scope are <b>unclear</b> and not well defined.	Not present.
5	General construction of a C program [5 Marks]	1	Codes are properly built <b>without any syntax error</b> . A <b>complete</b> flow chart is included.	Codes are properly built with <b>few syntax errors</b> . A <b>complete</b> flow chart is included.	Codes are properly built with <b>few syntax errors</b> . <b>Incomplete</b> flow chart is found.	Codes are properly built with <b>some syntax errors</b> . <b>Incomplete</b> flow chart is found.	Codes are properly built with <b>lots of syntax errors</b> . <b>Incomplete</b> flow chart is found.	Not present.
6	Construct C program with numeric arrays [10 Marks]	2	Numeric arrays are <b>fully declared and defined</b> . <b>No syntax error</b> is found for storing values in arrays including initialize, input and assign values to elements of arrays.	Numeric arrays are <b>fully declared and defined</b> . <b>Few syntax errors</b> are found for storing values in arrays including initialize, input and assign values to elements of arrays.	Numeric arrays are <b>moderately declared and defined</b> . <b>Some syntax errors</b> are found for storing values in arrays including initialize, input and assign values to elements of arrays.	Numeric arrays are <b>partially declared and defined</b> . <b>Some syntax errors</b> are found for storing values in arrays including initialize, input and assign values to elements of arrays.	Numeric arrays are <b>not well declared and defined</b> . <b>Lots of syntax errors</b> are found for storing values in arrays including initialize, input and assign values to elements of arrays.	Not present.
7	Explanation of numeric array [10 Marks]	2	The build numeric arrays are <b>clear and well explained</b> in report for the data type and size of arrays.	The build numeric arrays are <b>well explained</b> in report for the data type and size of arrays.	The build numeric arrays are <b>moderately explained</b> in report for the data type and size of arrays.	The build numeric arrays are <b>partially explained</b> in report for the data type and size of arrays.	The build numeric arrays are <b>not well explained</b> in report for the data type and size of arrays.	Not present.
8	Suitable aiding tables and figures [5 Marks]	1	<b>Excellent</b> used of tables and figures	<b>Good</b> used of tables and figures	<b>Adequate</b> used of tables and figures	<b>Poor</b> used of tables and figures	<b>Unacceptable</b> used of tables and figures	Not present.
9	References [5 Marks]	1	At least <b>5</b> relevant references are properly cited.	At least <b>4</b> relevant references are properly cited.	At least <b>3</b> relevant references are properly cited.	At least <b>2</b> relevant references are properly cited.	At least <b>1</b> relevant reference is properly cited.	Not present.
<b>B. REPORT – Individual section</b>								
1	Introduction of the involved user defined functions [5 Marks]	1	The introduction is <b>highly</b> related and <b>clearly stated</b> the involved user defined functions.	The introduction <b>clearly</b> states the involved user defined functions.	The introduction <b>moderately</b> states the involved user defined functions.	The introduction <b>partially</b> states the involved user defined functions.	The introduction to the involved user defined functions is <b>unclear</b> .	Not present.

No	Criteria	Weightage	Rubric					
			Excellent 5	Good 4	Fair 3	Adequate partially 2	Unsatisfactory 1	Not available 0
2	Suitable aiding tables and figures [5 Marks]	1	<b>Excellent</b> used of tables and figures	<b>Good</b> used of tables and figures	<b>Adequate</b> used of tables and figures	<b>Poor</b> used of tables and figures	<b>Unacceptable</b> used of tables and figures	Not present.
3	Construct C program with functions [15 Marks]	3	User defined functions are <b>fully declared and defined. No syntax error</b> is found for function declaration, function definition, return statement and side effect in a function.	User defined functions are <b>fully declared and defined. Few syntax errors</b> are found for function declaration, function definition, return statement and side effect in a function.	User defined functions are <b>moderately declared and defined. Some syntax errors</b> are found for function declaration, function definition, return statement and side effect in a function.	User defined functions are <b>partially declared and defined. Some syntax errors</b> are found for function declaration, function definition, return statement and side effect in a function.	User defined functions are <b>not well declared and defined. Lots of syntax errors</b> are found for function declaration, function definition, return statement and side effect in a function.	Not present.
4	Explanation of user defined functions [15 Marks]	3	The build user defined functions are <b>clear and well explained</b> in report for the return data type, data type, selection of return statement, and selection of either call by value or call by reference.	The build user defined functions are <b>well explained</b> in report for the return data type, data type, selection of return statement, and selection of either call by value or call by reference.	The build user defined functions are <b>moderately explained</b> in report for the return data type, data type, selection of return statement, and selection of either call by value or call by reference.	The build user defined functions are <b>partially explained</b> in report for the return data type, data type, selection of return statement, and selection of either call by value or call by reference.	The build user defined functions are <b>not well explained</b> in report for the return data type, data type, selection of return statement, and selection of either call by value or call by reference.	Not present.
5	References [5 Marks]	1	At least <b>5</b> relevant references are properly cited.	At least <b>4</b> relevant references are properly cited.	At least <b>3</b> relevant references are properly cited.	At least <b>2</b> relevant references are properly cited.	At least <b>1</b> relevant reference is properly cited.	Not present.
<b>C. VIDEO - General video</b>								
1	Problem statements, objectives, and scopes [5 Marks]	1	<b>Clearly and creatively summarize</b> the objectives, problem statements and scopes <b>within 1-minute</b> duration.	<b>Clearly</b> summarize the objectives, problem statements and scopes <b>within 1-minute</b> duration.	<b>Fairly</b> summarize the objectives, problem statements and scopes <b>within 1-minute</b> duration.	<b>Partially</b> summarize the objectives, problem statements and scopes with <b>more than 1-minute</b> duration.	<b>Unclearly</b> summarize the objectives, problem statements and scopes with <b>more than 1-minute</b> duration.	Not present
2	Operations that are performed on arrays [10 Marks]	2	<b>Clear explanation</b> of the numeric arrays within the developed C program for the involved operations: traversal, insertion, deletion, merging, searching, sorting, etc.	<b>Well explanation</b> of the numeric arrays within the developed C program for the involved operations: traversal, insertion, deletion, merging, searching, sorting, etc.	<b>Moderately explanation</b> of the numeric arrays within the developed C program for the involved operations: traversal, insertion, deletion, merging, searching, sorting, etc.	<b>Partially explanation</b> of the numeric arrays within the developed C program for the involved operations: traversal, insertion, deletion, merging, searching, sorting, etc.	<b>Not well explanation</b> of the numeric arrays within the developed C program for the involved operations: traversal, insertion, deletion, merging, searching, sorting, etc.	Not present
3	Input and output from the developed C program [5 Marks]	1	<b>Clear explanation</b> of the input and output of the developed C program with provided example.	<b>Well explanation</b> of the input and output of the developed C program with provided example.	<b>Moderately explanation</b> of the input and output of the developed C program with provided example.	<b>Partially explanation</b> of the input and output of the developed C program with provided example.	<b>Not well explanation</b> of the input and output of the developed C program without any example.	Not present
4	Visual aid creativity [5 Marks]	1	<b>Effectively and creatively</b> uses visual aid to enhance the presentation.	<b>Effectively</b> uses visual aid to enhance the presentation.	<b>Appropriately</b> uses visual aid to enhance the presentation.	<b>Appropriately</b> uses visual aid, but <b>does not enhance</b> the presentation.	<b>Inappropriate</b> use of visual aids.	Not present

No	Criteria	Weightage	Rubric					Not available 0
			Excellent 5	Good 4	Fair 3	Adequate partially 2	Unsatisfactory 1	
<b>D. VIDEO – Individual video</b>								
1	Introduction of user defined functions [5 Marks]	1	<b>Clearly and creatively introduce</b> the developed user defined functions <b>within 1-minute</b> duration.	<b>Clearly</b> introduce the developed user defined function <b>within 1-minute</b> duration.	<b>Fairly</b> introduce the developed user defined function <b>within 1-minute</b> duration.	<b>Partially</b> introduce the developed user defined function <b>more than 1-minute</b> duration.	<b>Unclearly</b> introduce the developed user defined function with <b>more than 1-minute</b> duration.	Not present
2	Side effect in a function [15 Marks]	3	<b>Clear explanation</b> of the developed user defined function for the side effects.	<b>Well explanation</b> of the developed user defined function for the side effects.	<b>Moderately explanation</b> of the developed user defined function for the side effects.	<b>Partially explanation</b> of the developed user defined function for the side effects.	<b>Not well explanation</b> of the developed user defined function for the side effects.	Not present
3	Visual aid creativity [5 Marks]	1	<b>Effectively and creatively</b> uses visual aid to enhance the presentation.	<b>Effectively</b> uses visual aid to enhance the presentation.	<b>Appropriately</b> uses visual aid to enhance the presentation.	<b>Appropriately</b> uses visual aid, but <b>does not enhance</b> the presentation.	<b>Inappropriate</b> use of visual aids.	Not present

### Distribution of marks for assignment 3

- A. Report – General section : / 55 Marks (each member will have an individual multiplier to multiply with this mark)
- B. Report – Individual section : / 45 Marks (each member will have his/her own mark for this section)
- C. Video – General video : / 25 Marks (each member will have an individual multiplier to multiply with this mark)
- D. Video – Individual video : / 25 Marks (each member will have his/her own mark for this section)

Example of calculation of mark for a group of 3 students with assumption that the multiplier for each member are as follow:

	Reviewed by M1	Reviewed by M2	Reviewed by M3	total	Peer review, P	multiplier
M1	-	20 / 30	18 / 30	<b>19</b>	$\min(1, 19/24) = 0.79$	0.60
M2	28 / 30	-	26 / 30	<b>27</b>	$\min(1, 27/24) = 1.00$	1.00
M3	26 / 30	26 / 30	-	<b>26</b>	$\min(1, 27/24) = 1.00$	1.00
			Average	24		

The counted pages for the report and duration of videos based on the guidelines in instruction are as follow:

Component of assessment	Maximum limit	Penalty on over maximum limit	Submitted	Obtained marks based on given rubric	Marks after penalties
Report – General section	1 page per member × 3 members = 3 pages	-10% per page exceed of obtained marks	2 pages	<b>40 / 55</b>	$40 \times 100 \% = 40$
Report – Individual section (M1)	2 pages	-10% per page exceed of obtained marks	2 pages	<b>41 / 45</b>	$41 \times 100 \% = 41$
Report – Individual section (M2)	2 pages	-10% per page exceed of obtained marks	3 pages	<b>30 / 45</b>	$30 \times (100\% - 10\%) = 27$
Report – Individual section (M3)	2 pages	-10% per page exceed of obtained marks	4 pages	<b>40 / 45</b>	$40 \times (100\% - 20\%) = 32$
Video – General video	2 mins per member × 3 members = 6 mins	-10% per each 30 seconds exceed of obtained marks	6 minutes 20 seconds	<b>20 / 25</b>	$20 \times (100\% - 10\%) = 18$
Video – Individual video (M1)	5 mins	-10% per each 30 seconds exceed of obtained marks	6 minutes	<b>18 / 25</b>	$18 \times (100\% - 20\%) = 14.4$
Video – Individual video (M2)	5 mins	-10% per each 30 seconds exceed of obtained marks	4 minutes	<b>22 / 25</b>	$22 \times 100\% = 22$
Video – Individual video (M3)	5 mins	-10% per each 30 seconds exceed of obtained marks	5 minutes 1 second	<b>23 / 25</b>	$23 \times (100\% - 10\%) = 20.7$

Total marks for each member are as follow:

	Multiplier	A	B	C	D	Total	Assignment 3*
M1	0.60	$0.60 \times 40 = 24.0$	<b>41.0</b>	$0.60 \times 18 = 10.8$	<b>14.4</b>	<b>90.2</b>	$90.2 / 150 \times 15 = 9.0$
M2	1.00	$1.00 \times 40 = 40.0$	<b>27.0</b>	$1.00 \times 18 = 18.0$	<b>22.0</b>	<b>107</b>	$107 / 150 \times 15 = 10.7$
M3	1.00	$1.00 \times 40 = 40.0$	<b>32.0</b>	$1.00 \times 18 = 18.0$	<b>20.7</b>	<b>110.7</b>	$110.7 / 150 \times 15 = 11.1$

\*note : If there is any late submission of assignment 3 or incomplete student statement sheet, reduction of mark will be counted from this point.