ASSESSMENT 2: PROBLEM SETS BRIEF	
Subject Code and Title	MFA501 Mathematical Foundations of AI
Assessment	Problem Sets
Individual/Group	Individual
Length	
Learning Outcomes	This assessment addresses the Subject Learning Outcomes outlined at the bottom of this document.
Submission	Due by 11:55pm AEST Sunday end of: • Module 6 (Week 6) (20%) • Module 10 (Week 10) (20%)
Weighting	40%
Total Marks	100 marks

Task Summary

In this assessment, you will be given a wide range of programming exercises to complete, which require using and applying mathematical concepts. These will be submitted in Module 6 (20%) and in Module 10 (20%). This assessment is to be completed individually and you are to submit a zip file including source code, debug, and release build and supporting documents for each problem set.

Context

This assessment activity assesses your skills in employing AI mathematical foundation to solve real-world problems and scenarios. The assessment is made of two parts due in modules 6 and 10 over the course of trimester.

Task Instructions

- The programs that you submit should be free of warnings and errors.
- You need to submit the source code and the executable format.
    - Name the source code folder as: MFA501_Assessment2_Week6_LastName_FirstName.zip
    - MFA501_Assessment2_Week10_LastName_FirstName.zip
- Your code should be structured and written with the best practices in the field of programming.
- There should be enough number of comments in the source files to show your understanding of the program. Any third-part code should be appropriately attributed.

After implementation and testing your programs, write a reflective report detailing the experience of the development process. The report needs to be at least 500 words in length and include the following sections:

- Overview
- Justifications and elaborations on the mathematical approaches and models used to solve the cases study
- Justifications and elaborations on the programing methods and practices used to implement the mathematical approaches and models
- What went right
- What went wrong
- What you are not sure about
- Conclusion

Your problem sets should include the following elements and should be zipped prior to submission:

- **Release Build Zip:** A release build executable must be zipped and included with the submission. Ensure that project settings are set to Release when creating this build.
- **Source Code Zip:** All relevant source code files and project files must be zipped and included with the submission
- **Reflective report:** PDF or Word
- Naming & File structure for the zip file (should be done for all problem sets) .
    - MFA501_Assessment2_Set1_Release Build_LastName_FirstName.zip
    - MFA501_Assessment2_Set1_Source_LastName_FirstName.zip
    - MFA501_Assessment2_Set1_report_LastName_Firstname.pdf or .docx
- Make sure to submit Problem Set 1 by Sunday 11:55pm Module 6
- Make sure to submit Problem Set 2 by Sunday 11:55pm Module 10

Submission Instructions

This assessment task is due in two stages throughout the trimester as outlined above. Please submit your completed assessments via the Assessment link in the main navigation menu in MFA501 Mathematical Foundations of AI. The Learning Facilitator will provide feedback via the Grade Centre on Blackboard. Feedback can be viewed in My Grades

Assessment 2 Rubric

Assessment Attributes	Fail (Yet to achieve minimum standard) 0-49%	Pass (Functional) 50-64%	Credit (Proficient) 65-74%	Distinction (Advanced) 75-84%	High Distinction (Exceptional) 85-100%
Work demonstrates the knowledge and understanding of linear algebra in AI **20%**	Little or no knowledge of linear algebra in AI. The calculations and codes are mostly incorrect.	Acceptable but further work is required to show the knowledge of linear algebra in AI. The calculations and codes are mostly correct with occasional inaccuracies and errors.	Good level of knowledge about linear algebra in AI. The calculations and codes are correct with no errors. The codes are not efficient for the case study.	Very good but not thorough knowledge about linear algebra in AI. The calculations and codes are accurate. The codes are occasionally not efficient.	Excellent and thorough understanding of linear algebra in AI. The calculations and codes are accurate and completely error-free. The most efficient implementations are given.
Work demonstrates the knowledge and understanding of calculus in AI **20%**	Little or no knowledge of calculus in AI. The calculations and codes are mostly incorrect.	Acceptable but further work is required to show the knowledge of calculus in AI. The calculations and codes are mostly correct with occasional inaccuracies and errors.	Good level of knowledge about calculus in AI. The calculations and codes are correct with no errors. The codes are not efficient for the case study.	Very good but not thorough knowledge about calculus in AI. The calculations and codes are accurate. The codes are occasionally not efficient.	Excellent and thorough understanding of calculus in AI. The calculations and codes are accurate and completely error-free. The most efficient implementations are given.
Work demonstrates the knowledge and understanding of probability in AI **20%**	Little or no knowledge of probability in AI. The calculations and codes are mostly incorrect.	Acceptable but further work is required to show the knowledge of probability in AI. The calculations and codes are mostly correct with occasional inaccuracies and errors.	Good level of knowledge about probability in AI. The calculations and codes are correct with no errors. The codes are not efficient for the case study.	Very good but not thorough knowledge about probability in AI. The calculations and codes are accurate. The codes are occasionally not efficient.	Excellent and thorough understanding of probability in AI. The calculations and codes are accurate and completely error-free. The most efficient implementations are given.
Work demonstrates the knowledge and understanding of statistics in AI	Little or no knowledge of statistics in AI. The calculations and codes are mostly incorrect.	Acceptable but further work is required to show the knowledge of statistics in AI. The calculations and codes are mostly correct with	Good level of knowledge about statistics in AI. The calculations and codes are correct with no errors. The codes are not efficient for	Very good but not thorough knowledge about statistics in AI. The calculations and codes are accurate. The codes are occasionally not	Excellent and thorough understanding of statistics in AI. The calculations and codes are accurate and completely error-free. The

20%		occasional inaccuracies and errors.	the case study.	efficient.	most efficient implementations are given
The reflective essay demonstrates the knowledge and understanding of the whole process of implementing and using the mathematical models and methods to solve the case study. **20%**	The reflective essay includes no or little sections and concepts required. There is no or little elaborations or justifications on the use of the mathematical models and methods used to solve the case study.	The reflective essay includes some of the sections and concepts required. There is little elaborations or justifications to demonstrate the knowledge and understanding of the whole process of implementing and using the mathematical models and methods to solve the case study.	The reflective essay includes all the sections and concepts required. Elaborations and justifications are not discussed well to show the knowledge and thorough understanding of the whole process of implementing and using the mathematical models and methods to solve the case study.	The reflective essay includes all the sections and concepts required. Elaborations and justifications are not thorough and in-depth to demonstrate mastery of the whole process of implementing and using the mathematical models and methods to solve the case study.	The reflective essay includes all the sections and concepts required. Elaborations and justifications are thorough and show the mastery of the whole process of implementing and using the mathematical models and methods to solve the case study.

The following Subject Learning Outcomes are addressed in this assessment	
SLO a)	Formulate key mathematical concepts used in Artificial Intelligence.
SLO b)	Apply mathematical techniques in manipulating large data sets, and in designing and analysing experimental work in AI.
SLO c)	Use standard mathematical notations and terminologies in statistics, probabilities, linear algebra, vectors, matrixes, differential calculus, and logical reasoning.
SLO d)	Compute accurately standard computations in statistics, probabilities, linear algebra, vectors, matrixes and differential calculus.