



TIC 3151 Artificial Intelligence GROUP PROJECT

INSTRUCTIONS TO STUDENTS:

1. This project has 3 questions. The total marks will be normalized to **30%**.
2. The project is to be completed in a group as per registered in the Google Spreadsheet in Google Classroom by 8th May 2023. Each group can consist of 1-4 members within the same tutorial section
3. If plagiarism is detected, the assignment will be granted 0% for all members of the group.
4. Deadline for submission is on **19/6/2023, 12 noon**. Submission is made via Google Classroom. Timestamp will be logged as proof of submission. Late submission will be deducted marks.
5. Report must be prepared using the template given only. For each question, the maximum number of pages is 6 exclude references. Penalty of 1 mark for every extra page after the 6th page.
6. The report must indicate the contribution of each member in the project.
7. Each member must present, and marks will be given individually.
8. The **group leader** should submit the following in a ZIP file to Google Classroom:
 - (i) .ipynb files for all 3 questions. Take note that you should use markdown or comments to provide discussion/recommendation.
 - (ii) Report in pdf. Save the file as TutSection_GrpNum_ProjLeaderStuID.pdf

Name the zip file **<Tutsection>_<GrpNum>_<ProjLeaderStudentID>.zip**

QUESTION 1: Amazing Holiday Sets [10 marks]

Year-end school holiday is coming soon. A kindergarten teacher would like to give each of the student in her class, an amazing holiday set by November 2023. There are 25 students in her class consisting of 15 girls and 10 boys. She has approached you for help and provided the following details to you:

- Budget for 25 holiday sets = RM 200.00
- Each holiday set must be wrapped using a sheet of paper i.e. blue wrapper for boy's holiday set and pink wrapper for girl's holiday set. Each wrapper cost RM1.00
- Each holiday set should have at least 2 items being stationery

The following is her list of choice of items to be packed as part of holiday set and their prices per unit.

No	Item	Price per unit (RM)
1	Chipsmore Biscuit	2.00
2	2B pencil	1.00
3	Color pencil	3.00
4	Magic pen	3.00
5	Potato chip	2.00
6	Milo packet	1.00
7	Mini sketch book	2.00
8	Milk biscuit	3.00

Solve the above scenario using Genetic Algorithm (GA). Display the total combination of items and the content of the combination of items. You should also modify and compare at least 2 methods for selection, crossover, and mutation.

[note: Make sure you comment your program properly]

Assessment Guidelines for Question 1:

Item	Marks
Description and formulation of the problem Perform the following, but not limited to, <ul style="list-style-type: none"> (i) overview of scenario and its variables. (ii) challenges in formulating the problem domain (iii) the presentation of problem domain in terms of GA. (iv) ...etc 	2
Detailed steps in GA Construction Perform the following, <i>but not limited to</i> : <ul style="list-style-type: none"> - What are the steps in GA in your program? - Detailed explanation of each step in GA with respect to the scenario - Apply 2 methods for selection, crossover, and mutation - ...etc 	3
Performance Assessment <ul style="list-style-type: none"> - Compare the findings for at least 2 methods for selection, crossover, mutation using, for example, tables and charts - Discuss the differences in terms of performance and findings for the investigated methods - ...etc 	2
Display the total combination of items and the content of the combination of items in a user-friendly manner	1.5
Individual Marks (Presentation & Individual Contributions) Marks will be given based on: <ul style="list-style-type: none"> (i) Smoothness in presentation (ii) Q&A (iii) Individual Contributions 	1.5

Continued...

QUESTION 2: Who's turn to stir the dodol? [10 marks]

The head of village ABC plans to hold a dodol feast for four consecutive days and have this feast recorded live in FB as part of promoting the village to outsiders. At the end of the dodol feast, the dodol will be shared with villagers and visitors to village ABC. The process of making the dodol, a sweet delicacy, is tedious and it requires a lot of strength to continuously stir the big pot of dodol to avoid it from being burnt.

The villagers have been divided into seven teams to stir a pot of dodol on a rotation basis for the next four days. The pot of dodol will be stirred by one team at one time. Each team will stir the pot of dodol for four hours before another team takes over the task of stirring the pot of dodol. Ideally, no team will stir the pot of dodol for more than 4 hours a day so that each team gets sufficient rest before their next turn to stir the pot of dodol. Each team will stir the pot of dodol for at least 8 hours during the entire dodol feast.

Formulate the problem as Constraint Satisfaction Problem.

[note: *Make sure you comment your program properly*]

Continued...

Assessment Guidelines for Question 2:

Item	Marks
Description and formulation of the problem Perform the following, but not limited to, <ul style="list-style-type: none"> - An overview of how the problem should be solved. - Different ways to formulate and present the problem. - ...etc 	2
Detailed steps in CSP Problem Formulation Perform the following, <i>but not limited to</i> : <ul style="list-style-type: none"> - What are the important functions in CSP? - What are the parameters to be optimized? - ...etc 	3
Assessing and Ranking the Solutions <ul style="list-style-type: none"> - Define and justify the criterion to rank/assess the solutions 	2
Display the possible duty rosters for the entire dodol feast in a user-friendly manner	1.5
Individual Marks (Presentation & Individual Contributions) Marks will be given based on: <ul style="list-style-type: none"> (i) Smoothness in presentation (ii) Q&A (iii) Individual Contributions 	1.5

Continued...

QUESTION 3: Sports Analytics [10 marks]

As an expert in data analytics, you are hired to analyse sports data. Given the NBA datasets, build TWO classification and ONE cluster analysis programs in Python. You are allowed to add ONE additional and relevant data as supplementary data to assist you to do further analysis but the given datasets will serve as main dataset for analysis.

Assessment Guidelines for Question 3:

Item	Marks
Description of the dataset Perform the following investigation, but not limited to, (i) using descriptive statistics, that is via the mean, min, max...etc. (ii) plot charts that help explain the characteristics of the dataset. (iii) Any relations between the variables (iv) ...etc	2
Model Construction and Assessment Perform the following activities, <i>but not limited to</i> : - Discuss the selection of the classifiers. - Visualize the output of different models - Accuracy comparison and discussion - Discuss the impact of parameter changes to the accuracy.	4
Recommendation/Critical Analysis and Conclusion	2.5
Individual Marks (Presentation & Individual Contributions) Marks will be given based on: (i) Smoothness in presentation (ii) Q&A (iii) Individual Contributions	1.5

End of Pages.