Artificial Intelligence in Practice
MSc Applied Computing and MSc Innovative Computing

COURSEWORK

WINTER 2024

Instructions:

1. This assignment is made up of **5** questions and worth **100** marks; to score full marks, your answers must be correct and well explained, to reflect your clear understanding of the concepts.
2. **The assignment is due on Monday, 12th February 2024, at 10 AM.**
3. You must submit your answers as a single pdf file via Moodle, using the file name **[your_student_number]_coursework.pdf**.

QUESTIONS

1) Based on Week 1

Differentiate between Mundane Tasks, Formal Tasks and Expert Tasks with 2 example of each.

In which category of tasks are humans currently outperforming computer systems? Justify your answer

(10+10 = 20 Marks)

2) Based on Week 1

Discuss in no more than 300 words, in your opinion, the three most relevant ethical concerns due to the increasing prevalence of AI. Support your answer with references to relevant literature.

(20 Marks)

3) Based on Week 2

(a) Give one-line descriptions of the different components of an agent?

(b) Would a rational or an irrational agent be more suited to solve a game of Tic Tac-Toe? Why?

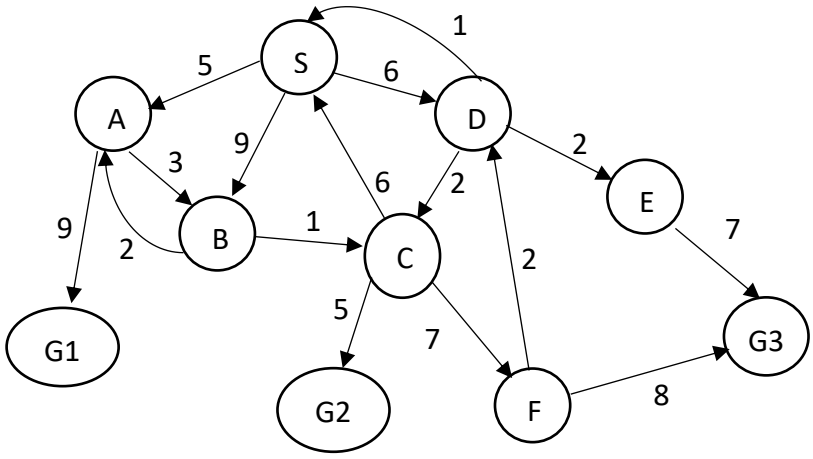
(c) For the game of Tic-Tac-Toe, what would be the Start state, Legal moves, Cost evaluation, Goal State and the Test for a Goal State ? Does the game need a performance evaluation function? If yes, suggest one.

(5+5+10 = 20 Marks)

4) Based on Week 3

Apply the Uniform Cost Search algorithm to the graph given below, where S is the start state and G1,G2 and G3 are the goal states. Show the sorted list at every step of the algorithm and also show at every step, the solution state space as it grows. Finally, clearly indicate the path cost from the start node to the goal node and the path taken within the solution tree.

Based on your working, discuss whether the algorithm exhibited any "intelligence" in searching for the goal and the solution path.



(15 + 5 = 20 Marks)

5) Based on Week 3

Write the A* algorithm based on your understanding.

Explain why should the A* heuristic always underestimate the cost from a vertex to a goal node. How will the algorithm behave if the heuristic overestimates? Does the algorithm exhibit any "intelligence" in searching for the goal and the solution path? Justify your answer.

(10 + 10 = 20 Marks)

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