

COM 2128 Artificial Intelligence Fundamentals

Assignment 1

Due Date: 4 March 2024

Answer all questions.

1. In Figure 1, a map is given. The map's grid reference is made up of rectangular cells. The edges of a cell form the paths through which you can move. You are supposed to navigate from the starting point marked with **S** to the destination point marked with **D**. The only permissible moves are to move to the right or up. Any other move is illegal. A move is counted as 1 if you change from moving right to moving up or from moving up to moving right, irrespective of the number of cell edges you cover or when moving straight to **D**.
 - i. Find the total possible routes from **S** to **D**. [8]
 - ii. Explain how you got your answer in item (i). [2]

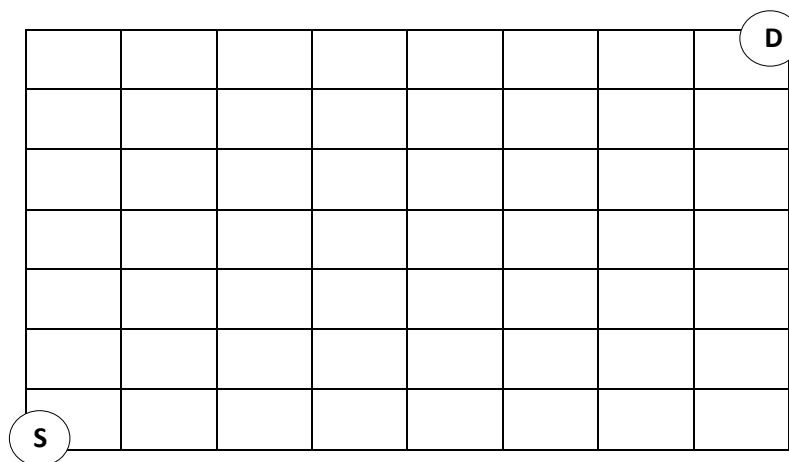


Figure 1: Finding the way from start (S) to destination (D)

2. You have a choice of 3 doors. Behind one is a car. Behind two are goats. You get to pick one and you'll win the prize that is behind it. After you make your first selection but before that door is opened, the host (Monty) opens one of the doors you didn't pick to reveal a goat. So now two doors have not been opened - yours and the one you didn't pick. Monty gives you the option of staying with your original door or swapping for the other door.

Will you swap or not? Justify your answer.

[1,4]

3. Three missionaries and three cannibals wish to cross the river. They have a small boat that will carry up to two people. Everyone can navigate the boat. If, at any time, the cannibals outnumber the missionaries on either bank of the river, they will eat the missionaries.

Find a way to get everyone to the other side, without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place. [5]