Date: 30-03-2021 **Assignment # 01**

Subject: Artificial Intelligence (AI)

Sections: 18-A&B + Repeater Kings

Total Marks: 100

Note:

You have to make a screen recorded video of your implementation (while implementing) with your face visible, while implementing. Also test your implementation in the video. Only recorded video will be acceptable.

You have to **submit video link** (uploaded on publicly accessible platform like Youtube, Dropbox, Googledrive, etc.) of your implementation on **Slate**.

The deadline for submission is 17:00 PKT, Wednesday, 7th April, 2021.

Question # 01:

Read the following carefully:

Consider the following 5x5 rid represented as a state for the agent. Starting at the circled square in the upper-left corner, the objective is to find a path to the goal square marked "G". From each numbered square, the agent may move that exact number of squares **horizontally** or **vertically** in a straight line (no other type of move is allowed). The objective is to reach the Square with letter G (the goal, highlighted in Red).

3	4	1	3	1
3	3	3	**G**	2
3	1	2	2	3
4	2	3	3	3
4	1	4	3	2

Assume an agent that plays the above **game**. The agent perceives a random initial start state as given below:

3	4	1	3	1
3	3	3	**G**	2
3	1	2	2	3
4	2	3	3	3
4	1	4	3	2

Initial State

Given the start state of the game, agent should choose an **action** by generating **next possible states**. It should continue on until it reaches a final goal state as shown below:

3	4	1	3	1
3	3	3	G	2
3	1	2	2	3
4	2	3	3	3
4	1	4	3	2

Goal State

In this assignment your task is to:

1. **Write a program (strictly in python)** that receives initial state (use abstraction) **as input by the user**.
2. The program **should generate and display next states** and choose an action until the goal state is found.
3. The **choice of action from the queue** should be done using **Breadth First Search** algorithm.
4. The program should use tree data structure and **maintain and display a frontier (queue)** of the search tree.
5. At the end of the program when the goal state is found it should display the **total path cost** of the search process.

Good Luck!
