Date: 16-05-2022 **Assignment # 01**

Subject: Artificial Intelligence (AI)

Section 19-A&B

Total Marks: 100

Weightage: 5

Note 01: You must implement this assignment by yourself and appear in an oral discussion. Oral interview is mandatory; I will call you all for an oral interview to validate your effort. Deadline for submission is 17:00 PKT, Tuesday, 31st May, 2022. **Submit your assignment (Python Code) online on Slate.**

Question # 01:

Assume an agent that plays the following **11-Puzzle game**. The agent perceives a random initial start state as given below:

	9	8	1
4	5	6	7
2	3	10	11

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:

	1	2	3
4	5	6	7
8	9	10	11

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 **first determines if the goal state is reachable**. If not, then it should simply display an **unreachable message** and exit.
3. If goal is reachable then it should be able to **generate and display next states** and choose an action until the goal state is found.
4. The **choice of action from the queue** should be done using **Iterative Deepening Search** Algorithm.
5. The program should use tree data structure and **maintain and display a frontier (queue)** of the search tree.
6. 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!
