National University of Computer and Emerging Sciences, Lahore Campus

Course:	Artificial Intelligence	Course Code:	AI-2002
Program:	BS(Computer Science)	Semester:	Spring 2024
Duration:	-	Total Marks:	10
Submission:	14-Feb-24	Weight	3.33 %
Section:	D/E/F	Page(s):	1
Exam:	Assignment 1	Roll No.	

Instruction/Notes:

- Your submission must have two files. A .ipynb file having the required code.
- A word document having a comparison chart of all implemented algorithms.

Problem

Implement Depth-First Search (DFS), Breadth-First Search (BFS), Iterative Deepening Search (IDS) and Uniform Cost Search (UCS) algorithms to solve the **8-puzzle problem**. The 8-puzzle consists of a 3x3 grid with 8 numbered tiles and one blank space. The goal is to rearrange the tiles to form a particular configuration. Your program should accept the initial configuration of the puzzle as input and output the steps required to reach the goal state. In addition, compare the efficiency of the four algorithms in terms of **number of nodes visited, path cost, memory consumed, and time taken** to find the solution. Report this comparison in a form of a table in a separate word file.

Sample Output

```
Enter start State: 120345678
Enter goal State: 012345678
-----------------
DFS Algorithm
-----------------
Time taken:  0.0010004043579101562 seconds
Path Cost: 2
No of Node Visited: 3
-----------------
1 2 0

3 4 5

6 7 8
-----

1 0 2

3 4 5

6 7 8
-----

0 1 2

3 4 5

6 7 8
-----
```