The 8 Puzzle Problem: Overview

The 8 Puzzle is a sliding puzzle that consists of eight numbered tiles (1-8) placed randomly on a 3x3 grid along with one empty slot (represented as a blank space or zero). The player (or algorithm) can move adjacent tiles into the blank space, and the objective is to arrange the tiles in a specific goal state by sliding them one at a time.

Initial and Goal States:

Initial State: This is the random starting configuration of the 8 Puzzle, with the tiles placed in a non-goal configuration.

Example of an initial state:

```
1 2 3
4   6
7 5 8
```

Goal State: The goal is to arrange the tiles in a specific order with the blank space at the bottom right.

Goal state:

```
1 2 3
4 5 6
7 8
```

In the 8 Puzzle, only tiles adjacent to the blank space can be moved. The following moves are allowed:

- **Move the blank space up.**
- **Move the blank space down.**
- **Move the blank space left.**
- **Move the blank space right.**

The solution to the problem requires rearranging the tiles from the initial state to the goal state by making a series of these legal moves.