

The Evolving Maze

Artificial Intelligence Project Implementation

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Maze uses random generation to generate Maze & then uses Breadth First Search algorithm to see if target is reachable or not, if reachable then controls are handed over to player, if not then a new random maze is generated:

```

✓ TERMINAL

○ PS C:\Users\IFFI\Desktop\ai_project> python .\code_evolution_maze.py

Maze generated! Use W/A/S/D to move. Reach the 'T'!
P...###.#.
##.....#.#
.#.###..#
##.....#.#
###.#.....
#.#...#.#.
.#.###..#.#
#.#...#...#
..###...
###.....#T

Move (W/A/S/D): █

```

Making Move using WASD command:

```

Move (W/A/S/D): D
You're getting close... maze evolving!
.P...###.##
##.....#.#
.#.###..#.#
##.....#.#.
###.#.....
#.#...#.#.
.#.###..#.#
#.#...#...#
..###...
###.....#T

```

Maze evolves and makes maze more complex as player moves near Target T by triggering Maze Genetic Algorithm Mutation:

```
Move (W/A/S/D): D
You're getting close... maze evolving!
..P.###.##
##.....#.
.#.##.##..#
.#.##.##..#
###.##.....
#.#...#.#.
.#.##..#.#
#.#...#..##
..#.###...
###.....#T
```

Algorithm uses Manhattan distance to calculate distance between Player and Target:

```
Move (W/A/S/D): S
You're getting close... maze evolving!
....###.##
##P...##.##
.#.##.##..#
.#.##.##..#
###.##.....
#.#...#.#.
.#.##..#.#
#.#...#..##
..#.##.##...
###.....#T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###.##
##.P...##.##
##.##.##..#
.#.##..###
###.##.....
#.#...#.#.
.#.##..#.#
#.#...#..##
....#.##...
###.....#T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###
##.P.##.
##.##.#..#
.#.#..###
###.#.....
#.#...#.#.
.#..#..#.#
#.#..#..##
....#.#...
###....##T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###
##..P.##.
##.##.#..#
.#.#..###
###.....
#.#...#.#.
.#.#...#.#
#.#..#..##
...##.#...
###....##T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###
##...P##.
##.##.#..#
.#.#..###
###.....
..#...#.#.
.#.#...#.#
#.#..#..##
...##.#...
###....##T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....###
##....##.#
##.#.P#..#
##.#..#.#
###.....
..#...#.#.
.###...#.#
#.#..#..#
...##.#...
###....##T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....###
##...###.#
##.#..#.#
##.#.P#.#
###.....#
..#...#.#.
.#.#...#.#
..##.#..#
...##.#...
###...###T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....###
##...###.#
##.#..#.#
####..#.#
###..P....
..#.#.#.#.
.#.#...#.#
..##.#....
...##.#..#
###...#..T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....###.##
##.#.###.#
##.#..#.##
#.#.#.#.##
###.....
..#.#P#.#.
.###...#.#
..##.#.#..
..###....#
###...#..T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....#####
##.#.###.#
##.#..#.#.
#.###.#.##
###....#..
..#.#.#.#.
.###.P.#.#
..##.#.#..
..###....#
##....#..T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....#####
##.#.###.#
##.#..#.#.
#.###.#.##
###....#..
.##.#.#...
.####.P#.#
..##.#.#..
..###....#
####.##..T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....####
##.#####
##.###.
#####.##
###....#..
.##.###..#
.####..#.#
#.##.P#..
..####...#
####.##..T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....##.#
##.###..#
.#.###.
#####.##
###....#..
.##.###..#
.####..#.#
#.##.###.
..##.P..#
####.#...T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....##.#
##.###..#
.#.###.
##..###
###....##..
.#..###..#
.####..#.#
#.##.###.
..###.P.#
####.#...T
```

```
Move (W/A/S/D): S
You're getting close... maze evolving!
.....###.#
##.###..#
.#.###..#
##..###.#
###...###..
.#..###..#
.####..###
#..###..#
..###...#
####.##P.T
```

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###.#
##.###..#
.#.###..#
##..###.#
###...###..
.#..###..#
.####..###
#..###..#
..###...#
####.##.PT
```

Target reached, game stopped.

```
Move (W/A/S/D): D
You're getting close... maze evolving!
.....###.#
##.###..#
.#.###..#
##..###.#
###...###..
.#..###..#
.####..###
#..###..#
..###...#
####.##..P

You reached the treasure! Game complete!
○ PS C:\Users\IFFI\Desktop\ai_project> █
```