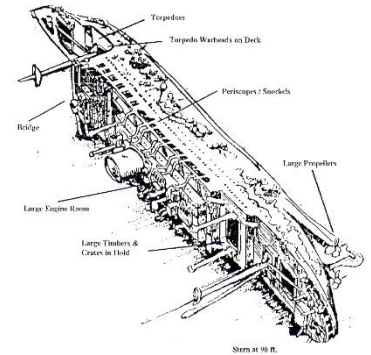


# 3D Maze

2

3D Maze

**"Two Scuba diving buddies have encountered a large, box-shaped storage facility inside the hull of the Heian Maru, a 512' submarine tender lying on the bottom of Truk Lagoon at 108'.**



**The storage facility is composed of cells, some of which can be entered and some which cannot. The only exterior walls that are missing are on the front of the storage facility in the upper left corner, and on the rear of the storage facility in the lower right corner.**

**The divers wish to determine a path through the storage facility. Use recursion to find a path through the maze or to prove that there is no path."**

# Finding a Path through a Maze

3

3D Maze

## ■ Problem

- Use backtracking to find and display the path through a maze.
- From each point in a maze you can move to the next cell in a horizontal or vertical direction if the cell is not blocked.

## ■ Analysis

- The maze will consist of an array of cells.
- The starting point is at the top left corner `maze[0][0][0]`.
- The exit point is at the bottom right corner, that is `maze[HEIGHT - 1][WIDTH - 1][LAYERS - 1]`.
- All cells on the path will have a **OPEN** value.
- All cells that represent barriers will have a **BLOCKED** value.
- Cells that we have visited will have a **TEMPORARY** value.
- If we find a path through the maze, the exit cell value will be **EXIT** and all cells on the path will have the **PATH** value.

# Sample test files

4

3D Maze

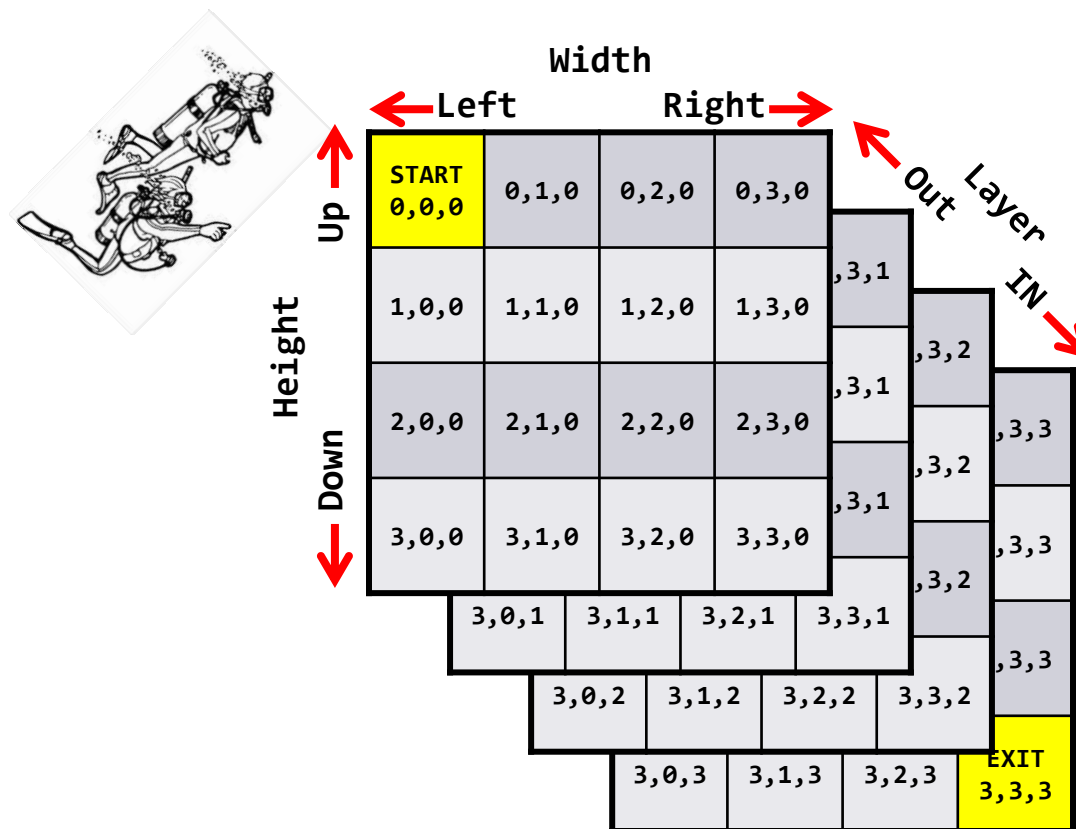
- Input File
  - in\_01.txt
  - in\_02.txt
  - in\_03.txt
- Output File
  - out\_01.txt
  - out\_02.txt
  - out\_03.txt

# The Maze Layout

5

3D Maze

- The maze size is defined by layer \* height \* width as specified on the first line of the test file.

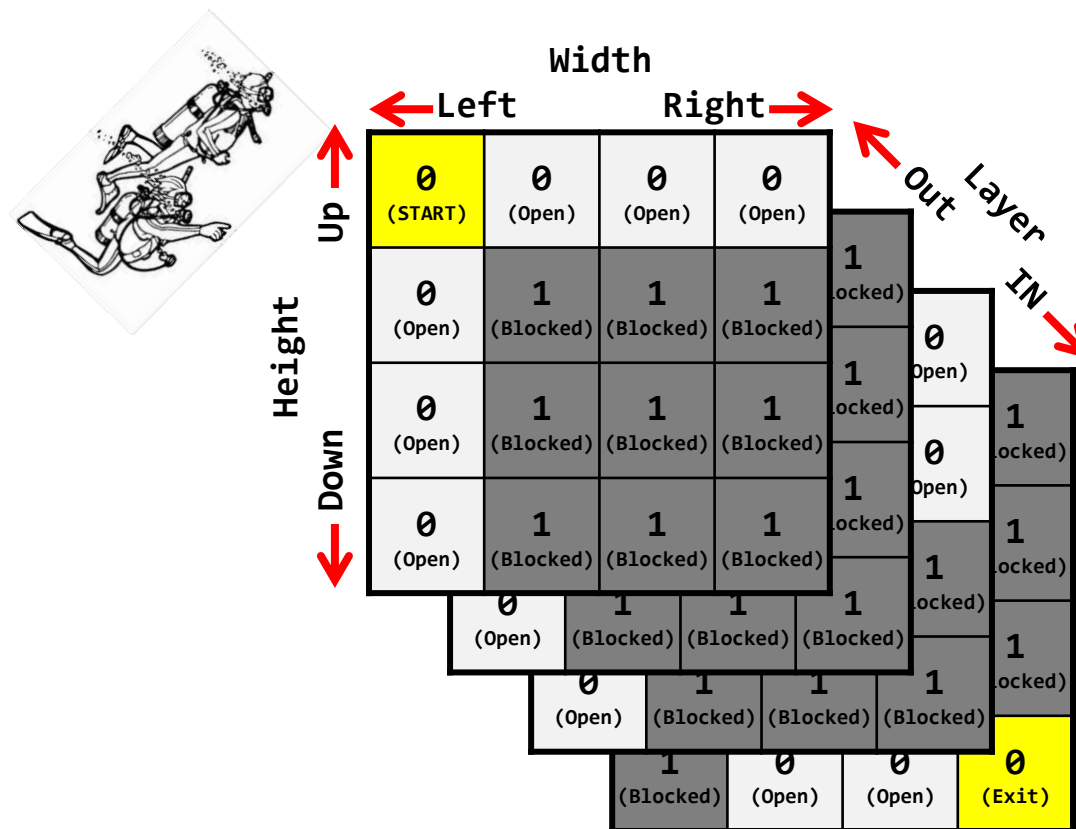


# The Maze Layout

6

3D Maze

- The maze size is defined by layer \* height \* width as specified on the first line of the test file.

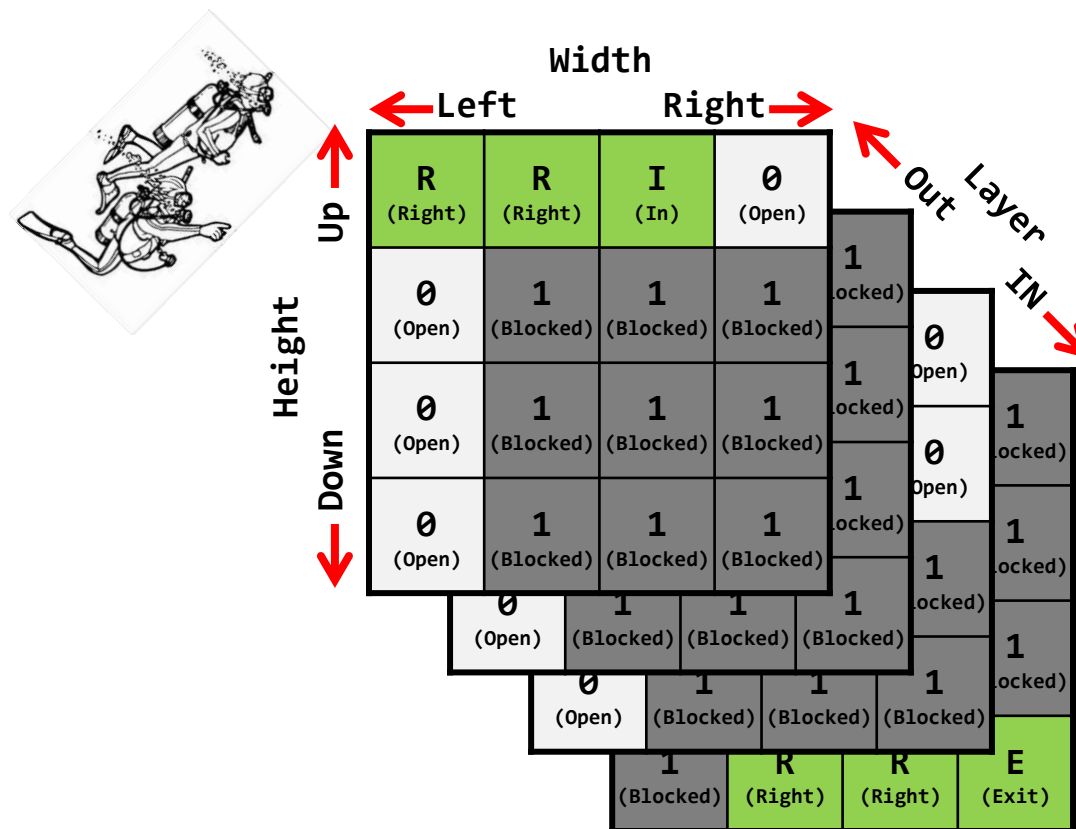


# The Maze Layout (Bonus)

7

3D Maze

- Maze values tell which way to proceed thru the maze ("L", "R", "U", "D", "O", or "I".)



# Requirements

8

Your maze program outputs the solution path using 'L' for move left ( $\text{width} - 1$ ), 'R' for move right ( $\text{width} + 1$ ), 'U' for move up on the same layer ( $\text{height} - 1$ ), 'D' for move down on the same layer ( $\text{height} + 1$ ), 'O' for move to the previous layer ( $\text{layer} - 1$ ), and 'I' for move to the next layer ( $\text{layer} + 1$ ). In addition, 'E' indicates the exit point.



