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Coursework 1, Labyrinth

Task one

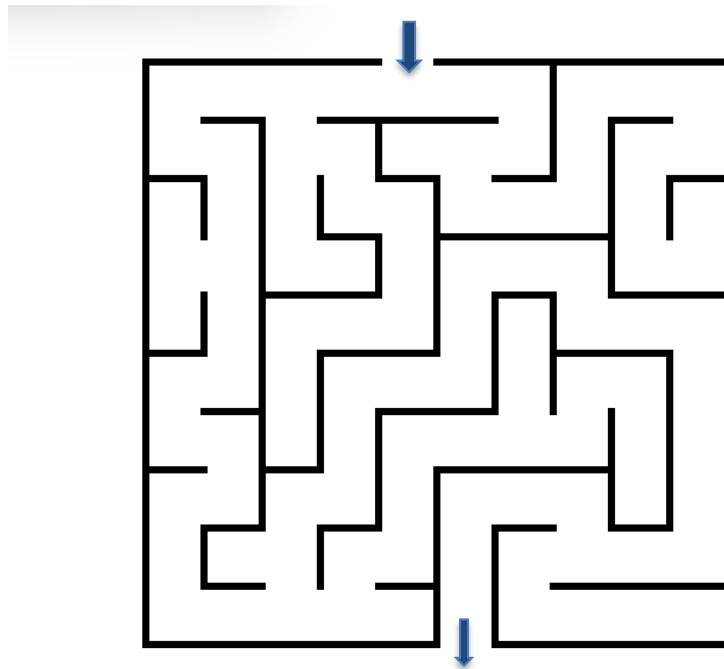


Figure 1: Maze 3 (Copyright 2021 JGB Service, <http://www.mazegenerator.net>)

Assumptions:

- **At the start**, the agent finds himself at the entrance of the maze.
- Whenever you **turn right**, turn clockwise by 90 degrees.
- Whenever you **turn left**, turn anti-clockwise by 90 degrees.
- A **neighbour** is a surrounding space that is not a wall.
- A **neighbour** can be either visited or unvisited.
- A **neighbour** is either ahead, left or right.
- **Moving toward** means facing in the direction of the unvisited neighbour and moving forward in that direction until you occupy the neighbour.
- **Dead-end** is when there are no unvisited surrounding neighbours.
- A **junction** is somewhere with 2 or more unvisited neighbours.
- **Always remember** the path taken and save any junctions encountered.

Primitives:

- Move forward
- Turn left
- Turn right
- Backtracking

Operations:

START

step inside the maze

REPEAT

 IF there is only one unvisited neighbour, move towards it

 IF there are two or more unvisited neighbours, move towards
 a random one and mark the junction before you move

 IF you encounter a dead-end backtrack to the most recent
 junction with any unvisited neighbours

UNTIL you reach an exit

END

Task 2

3D Maze

Assumptions:

- **At the start**, the agent finds himself at the entrance of the maze.
- Whenever you **turn right**, turn clockwise by 90 degrees.
- Whenever you **turn left**, turn anti-clockwise by 90 degrees.
- **The agent** knows how to use a ladder.
- A **neighbour** is a surrounding space that is not a wall.
- A **neighbour** can be either visited or unvisited.
- A **neighbour** is either ahead, left, right, up or down.
- **Moving toward** means facing in the direction of the unvisited neighbour and moving forward in that direction until you occupy the neighbour.
- **Dead-end** is when there are no unvisited surrounding neighbours.
- **A junction** is somewhere with 2 or more unvisited neighbours.
- **Always remember** the path taken and save any junctions encountered.

Primitives:

- Move forward
- Turn left
- Turn right
- Go up the ladder
- Go down the ladder
- Backtracking

Operations:

START

step inside the maze

REPEAT

IF there is only one unvisited neighbour, move towards it

IF there are two or more unvisited neighbours, move towards
a random one and mark the junction before you move

IF you encounter a dead-end backtrack to the most recent
junction with any unvisited neighbours

UNTIL you reach an exit

END