**Maze Game Report**

* The maze is displayed with a GUI made with the “tkinter”library , random obstacles were generated by “random” library, and the “NetworkX” library was used to model the maze as a graph and apply the A\* algorithm to it.
* Class “MazeBlocks” used for defining the walls(0) and passages(1)
* “gen” function to generate a random maze with the specified size and obstacle chance, It creates a 2D list maze\_map with all passages initially, and then randomly sets some cells to walls, ensuring that the start (0, 0) and goal (size-1, size-1) cells remain passages. It returns “maze\_map”

A screen shot of a computer code

Description automatically generated

* A computer screen with text and symbols

  Description automatically generatedThe “maze\_to\_graph” function converts the maze into a graph using “NetworkX”, each passage becomes a node in the graph, and edges are added between adjacent passage nodes. This allows us to use graph algorithms like A\* to find paths between the start and the goal.
* A\* pathfinding algorithm is used to find the shortest path

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Description automatically generated

* A black background with blue and white text

  Description automatically generatedThe ” ensure\_solvable\_maze” function is to generate mazes till finding a solvable one . I used here recursive backtracking algorithm as its easier, more flexible and faster than A\*. The function works recursively, visiting each cell in the maze and exploring possible paths. When a path is found from the start to the end of the maze, the function returns True and the modified maze. If no path is found, the function backtracks and tries alternative paths. If all possible paths are exhausted, it returns False and the maze generation process restarts.
* A screen shot of a computer code

  Description automatically generatedA screen shot of a computer code

  Description automatically generatedThe “MazeGUI” class creates a GUI to display the maze and the path. It uses tkinter to create a canvas and draw the maze, with walls, passages, and the path. It also displays a robot image at the start and a treasure image at the goal.