

Project Requirements (Phase 1)

A Brief Overview of the Project Phases

Phase 1: Compare maze-solving algorithms by exit-finding speed. See Project Description for details.

*Phase 2: See how various algorithms react to changing parameters (a moving threat/block that can't be passed (intruder/enemy) or a spreading threat that can't be passed (fire))

*Phase 3: Create a visual model/simulation of the maze and solver path.

*Phase 4: Implement the maze-solver in a robot. Build/design a physical maze for it to navigate.

Project Description

The goal of this project is to implement is to compare different maze-solving algorithms and see which one works fastest. For firefighters and strike teams, finding the most efficient path in and out of a building is a matter of life and death. Oftentimes, these people must enter a building with little to no knowledge of the layout inside. These complex buildings are essentially mazes. Using the correct maze-solving algorithm could allow a firefighter to search-and-rescue more efficiently and easily. Furthermore, a robot/drone that operates based on a maze-solver can efficiently find a path to the desired location, such as a room where somebody is trapped, and the most efficient path from that location to the exit.

Target Audience

The target audience for this project is firefighters and first responders.

Formal Requirements

Top Three (3) Tasks Performed by the System

1. Navigate a maze from entrance to exit.
2. Store the path taken.
3. Autogenerate mazes.

System Inputs

1. Maze dimensions (int, int)
2. # of exits (int)
3. (Complexity?)

System Outputs

1. Maze (int array – 0 is empty, 1 is wall, 2 is start, 3 is finish)
2. Path length for each algorithm (int)

3. Best algorithm to find the exit (string)

UI

No GUI for this phase – simply input values via Eclipse IDE / command prompt, and read output there as well.

Tools and/or Technologies (All Phases)

For Phase 1, I plan to use Java as I'm already familiar with the syntax. No other tech needs are anticipated as of the present. A potential robot for Phase 4 is the iCreate, as a MATLAB-based simulator is available. However, that is still undecided.

The Team

Name	Role
Me	Managing the documentation
Myself	Generating mazes
I	Programming the Maze Solver algorithms