User Manual

Project Title: Walk3D
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1. Introduction

This program is a **console-based 3D maze explorer**. It displays a simple 3D environment in text mode using ASCII symbols and allows you to walk around using the keyboard.

You can:

- Load different map files (`.csv`) that describe the environment.
- Move around the map in first-person view.
- Save your current position to a file.
- Pause and resume the game.
- Quit anytime from the in-game menu.

No graphics card or GUI is required — the program runs entirely in the command line window.

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2. System Requirements

Operating Systems:

- Windows 10 or later

Minimum Hardware:

- Single-core CPU
- 1 GB RAM
- Console terminal with at least 80x24 character display

Files Required:

- The executable file (compiled program)
- One or more `.csv` map files located in the same folder

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3. Starting the Program

1. Open a **terminal** or **command prompt**.
2. Navigate to the folder containing the program.
3. Run the executable:

- On **Windows**:

```
raycaster.exe
```

The main menu will appear automatically when the program starts.

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4. Main Menu

When you start the program, you'll see a centered text-based menu. You can navigate using the **arrow keys** or **W/S** and confirm with **ENTER**.

Available options:

Menu Item	Description
Resume	Continue exploring the map (only available if a map is loaded).
Load Map	Open the list of available `.csv` map files to load.
Save Map	Save your current map and position to a file (`map_saved.csv` or the current map name).
Quit	Exit the program safely.

To open or close the menu during gameplay, press **ESC**.

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5. Loading Maps

When you select **Load Map**, a new menu appears listing all `.csv` files in the current folder.

- Each file represents a map.
- To go back to the main menu, select **< Back>** at the top of the list.

Map Format (.csv)

Each line in the file contains map characters separated by commas:

- `#` = wall
- `.` = empty space (walkable floor)
- `X` = player starting position

Example:

```
#,#,#,#
#,.,.,#
#,X,.,#
#,#,#,#
```

After selecting a map, the game will start in first-person view from the `X` position.

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6. Controls During Gameplay

Key	Action
W	Move forward
S	Move backward
A	Turn left
D	Turn right
ESC	Toggle the main menu
Q	Quit the game immediately

The player's movement speed and rotation are smooth and time-based, so they adapt to your computer's performance.

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7. Saving Progress

At any time (via the menu), you can choose **Save Map** to store your current map. The map will be written to a CSV file with your current position marked as `X`. If you have loaded a map file, it overwrites that map; otherwise, it creates `map_saved.csv`.

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8. Understanding the Display

The display uses **ASCII characters** to simulate a 3D environment:

Symbol	Meaning
`#`, `@`, `M`, etc.	Wall surfaces at different distances (darker = closer)
`.`, `'`, `,`, `~`, etc.	Floor texture gradient
(space)	Empty air above the horizon

The closer a wall is, the darker its shading character will appear.

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9. Exiting the Program

You can exit in two ways:

1. From the menu → **Quit**
2. In-game → press **Q**

All memory is automatically freed, and the console will return to normal state.

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10. Troubleshooting

Problem	Possible Cause	Solution
No maps appear when selecting “Load Map”	No `.csv` files found in the current directory	Add map files next to the executable
Player spawns inside a wall	Invalid map layout	Edit your `.csv` to ensure `X` is in open space (`.`)
Menu not visible or distorted	Terminal too small	Resize your console window to at least 80x24
Program closes immediately	Missing or invalid map file	Check file permissions and contents

11. Tips for Creating Custom Maps

You can design your own maps using any text editor (like Notepad or VS Code):

1. Use `#` for walls, `.` for floor, and `X` for start.
2. Make sure each row has the same number of columns.
3. Save it as `yourmap.csv` in the same folder as the program.

Then select it from the **Load Map** menu.