The MAZE Project: A Personal Voyage

ALX Africa's Maze project involves creating a game in C using the SDL2 library and Ray-caster, in which a player must find the exit while playing. The overall goal of this project was to learn about creating a game without using an advanced game engine like modern games, to learn about the physics and math behind the design of games, implement a simple game using a computer graphics rendering technique called ray casting, and most importantly to submit the game as the final project for the foundation sprint of the ALX Africa program.

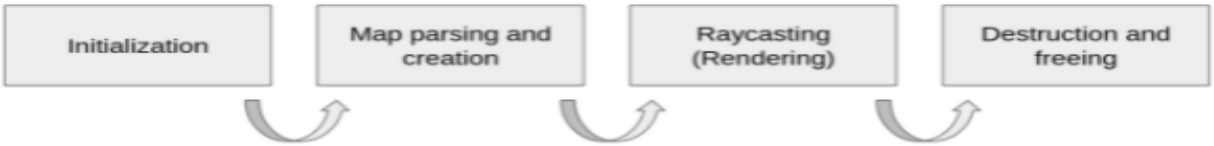
Why the maze project?

We are living in the most game-conscious time of human civilization, where the gaming industry amasses billions of dollars every year from sales and other game-related activities.

Currently, many people across the world are playing realistic games on their phones and computers every single day. On a personal note, I have been playing computer and mobile games since I was in my early teens. This familiarity with games have created in me a sense of fascination with what goes on behind some of my favorite games. When the opportunity to learn and build a game presented itself, I took it.

Features and Functionalities

To make this maze, I used ray-casting to draw the walls and textures to design the game by using the C programming language and the SDL2 library to render and add the textures. The maps are defined in 2D arrays in text files, which are parsed when passed as an argument to the maze executable. 0 represents open space, all other integers are drawn as walls.



The SDL2 or the Simple DirectMedia Layer 2 is a cross-platform development library designed to provide low-level access to I/O devices (audio, keyboard, mouse, joystick), and graphics hardware via OpenGL and Direct3D or simply the SDL2 library allows us to interact with various devices like graphics hardware, audio, keyboard, mouse, etc. Thus, by using SDL2 library, I was able to map keyboard keys to different movements inside the game. To navigate through the maze, the player can use either the arrow keys or “WASD” keys.

Challenges

During the development of the program, I faced a number of technical and non-technical challenges. The most insidious ones were non-technical issues such as time constraints and schedule recovery. On the technical side, the most difficult challenge I faced was with regard to implementing a detection of wall collision which was a feature that would block camera rays from passing through the walls. Additionally, installing SDL2 was a major challenge because the majority of the materials were written in C++. After more research, I was able to install it. I chose to work on a real machine in order to run and test the game.

Understanding User Stories and Writing Tips:

Before delving into the specific user stories for your MVP, let's first establish an understanding of user stories and some best practices in writing them.

User Stories:

User stories are concise, informal descriptions of a software feature from an end-user perspective. They follow a specific template: "As a [type of user], I want [an action] so that [benefit/value]." This format helps capture the who, what, and why of a feature in a simple and understandable way.

Tips for Writing User Stories:

- User-Centric Approach: Focus on the user's needs and goals. Start with identifying the user type, their desired action, and the benefit they expect.
- INVEST Criteria: Ensure your user stories are Independent, Negotiable, Valuable, Estimable, Small, and Testable. This helps in creating manageable and well-defined stories.
- Acceptance Criteria: Clearly outline the conditions that must be met for the user story to be considered complete. This adds detail and helps in evaluation.
- Avoid Ambiguity: Be specific and avoid vague terms. The user story should be clear enough for both the development team and stakeholders to understand.
- Prioritization: Arrange user stories based on priority to ensure that the most critical features are addressed first.

Pitfalls of Creating General User Stories:

- Lack of Detail: Overly general user stories can lead to misunderstandings and misinterpretations by the development team.
- Incomplete Understanding: If user stories are too vague, it might result in incomplete or incorrect implementations.
- Difficulty in Estimation: General user stories make it challenging to estimate the effort required for development accurately.

Now, let's define three to five detailed user stories for your MVP:

User Stories for MVP:

- **User Registration:**
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    - As a new user, I want to be able to register on the platform using my email and password, so that I can access personalized features and content.
    - Acceptance Criteria:
        - The user should receive a confirmation email.
        - Password should meet security requirements.
        - User data should be stored securely.
- **Profile Creation:**
    - As a registered user, I want to create and edit my profile, so that I can provide and update my personal information.
    - Acceptance Criteria:
        - The user should be able to add a profile picture.
        - The user should be able to update contact details.
        - Changes to the profile should be reflected instantly.
- **Search and Filter Functionality:**
    - As a user, I want to search for products and apply filters based on categories and prices, so that I can quickly find and purchase items of interest.
    - Acceptance Criteria:
        - Search results should update dynamically as the user types.
        - Filters should be easy to apply and remove.
        - Product details should be accessible from the search results.
- **Shopping Cart Management:**
    - As a shopper, I want to add items to my cart, review the contents, and proceed to checkout, so that I can complete my purchase efficiently.
    - Acceptance Criteria:

        - User should see an updated cart summary after adding/removing items.
        - Clear indications of available stock and total cost.
        - Seamless transition from cart to checkout process.
- **Order Tracking:**
    - As a customer, I want to track the status of my order in real-time, so that I can anticipate the delivery and plan accordingly.
    - Acceptance Criteria:
        - Order status updates (processing, shipped, delivered).
        - Estimated delivery time displayed.
        - Option to receive notifications on order status changes.

These user stories provide a foundation for developing an MVP with key features that cater to user needs while avoiding the pitfalls of being too general.

Conclusion

The best way to learn programming (including game development) is by doing it. The utmost lesson I learned from this project was that I was able to fully develop a game from scratch. For the first time, I came across computer graphics algorithms like ray-casting as well as employing different libraries like SDL2 to develop a game, although challenging I was able to understand and work with them successfully. I wouldn't say I am a pro yet, but this was surely a steppingstone to becoming better as a game developer or a better programmer.

If there's anything this project taught me about myself, it's that I am willing to explore and venture into unknown territories. To reiterate, I never imagined I would bother to know anything in regard to game development, but I took on this project head-on without hesitation and put my best foot forward. It definitely paid off. I am more open to working on more games and learning deeper concepts after this. I think I can say this without batting an eyelid, game development is very fun, despite what I believed prior to working on this project.

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