Senior Design

FALL SEMESTER RECAP

Nathan Nguyen (CS)
Faith Rider (CS)
Elias Weitfle (CS)

Redstring

AGENDA

- The Team
- Project Abstract
- User Stories and Design Diagrams
- Major Project Constraints
- Current State of Project
- Expected Accomplishments for Term
- Division of Work
- Expected Demo at Expo

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MEET THE TEAM

Faith Rider
Narrative and AI Interaction

Responsible for designing the story arc, clue structure, and integrating AI-driven dialogue tools into the game.

Nathan Nguyen
Project Manager and Systems

Responsible for coordinating meetings, managing deadlines, and overseeing AWS backend design and integration.

Elias Weitfle
Gameplay and Frontend Dev

Responsible for implementing the 2D game environment, character interactions, and frontend logic.

Jillian Aurisano
Project Advisor

Our faculty advisor for this project.

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ABSTRACT

Redstring: A 2D, 16-bit visual style detective game that integrates AI-driven NPCs with fast inference, allowing players to interact through natural language to uncover a murder mystery.

USER STORIES

User Story #1
Role-player

As a detective role-player, I want the AI to respond quickly and naturally, so that the investigation feels immersive and engaging.

User Story #2
Gamer

As a gamer, I want smooth performance during play, so that I can stay focused on solving the mystery without distractions.

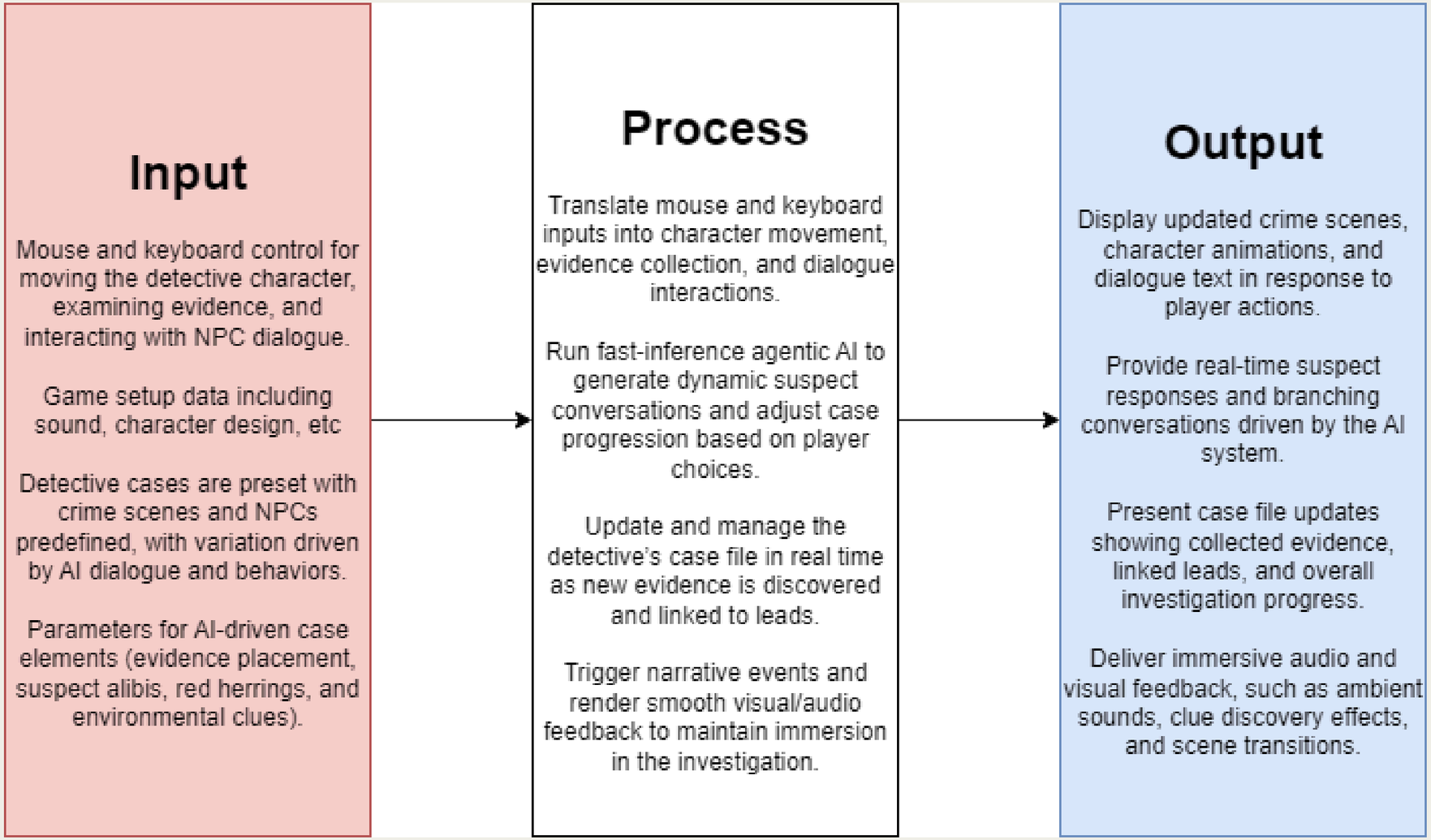
User Story #3
Story Player

As a story-driven player, I want my choices and questions to influence the clues I receive, so that the experience feels personalized.

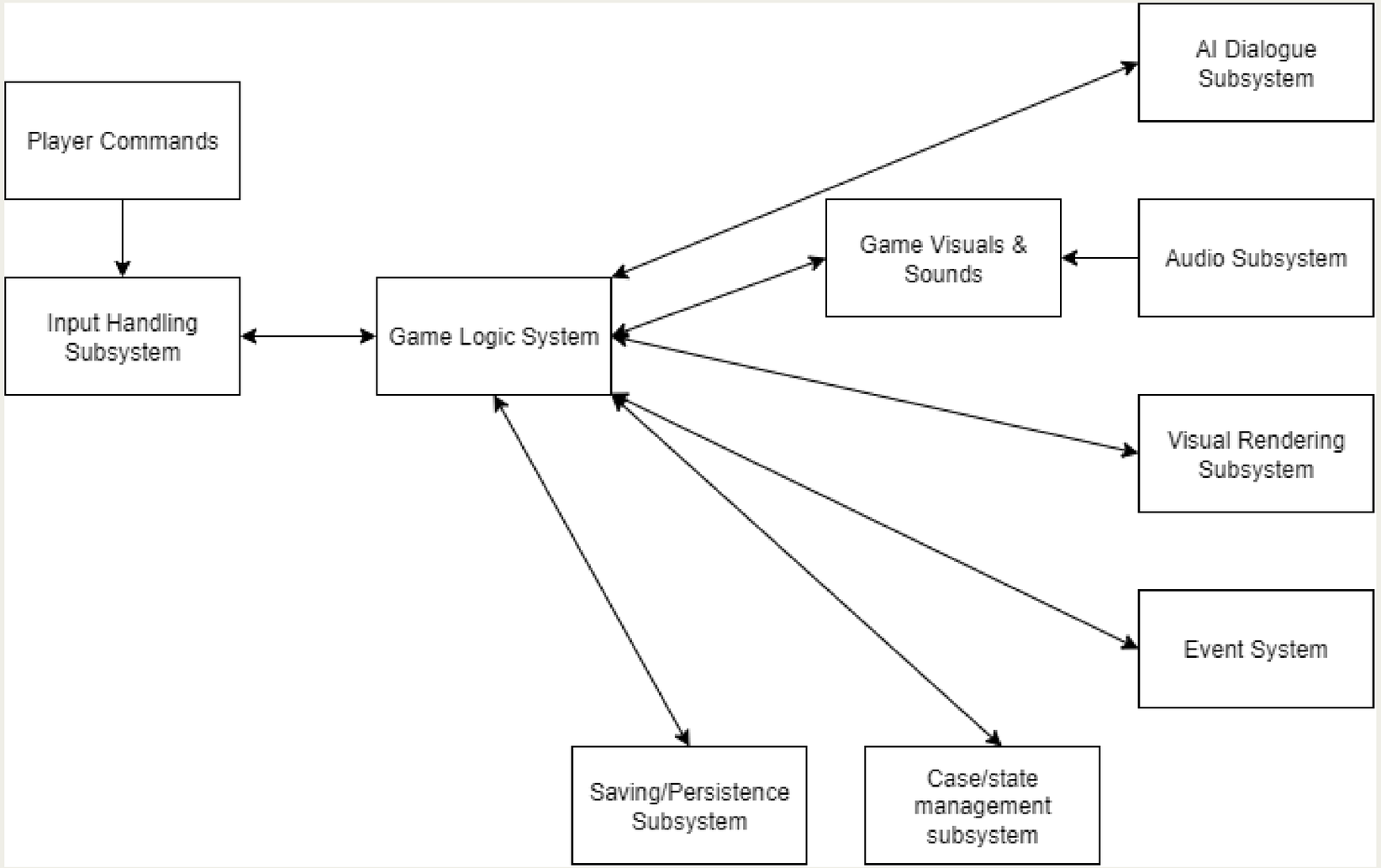
User Story #4
Game Developer

As a game developer, I want to design AI-driven NPCs that react uniquely to player choices and ensure the game runs smoothly, so that players feel immersed in a responsive and seamless world.

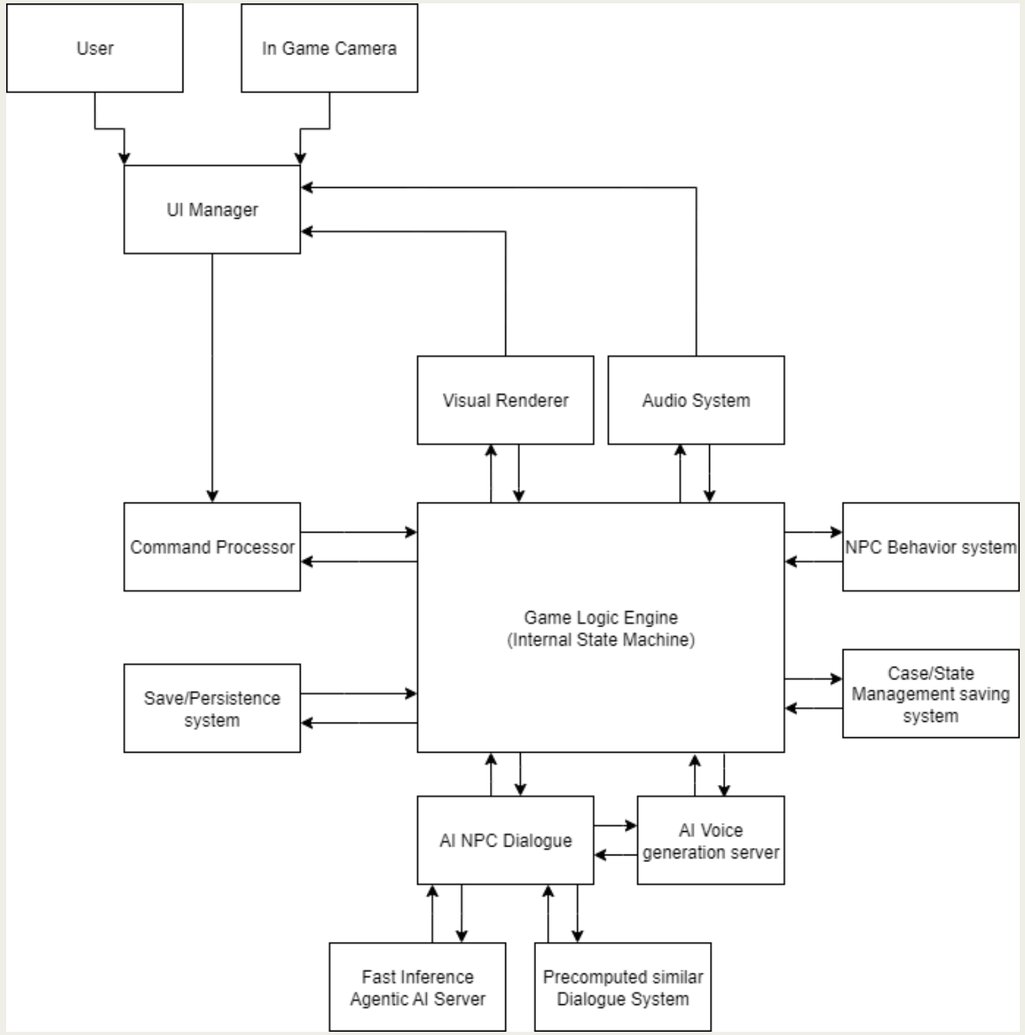
DESIGN DIAGRAM D0



DESIGN DIAGRAM D1



DESIGN DIAGRAM D2



MAJOR PROJECT CONSTRAINTS

Economical

Our team is operating with minimal funding and relying primarily on opensource tools and existing software licenses to control costs. The main financial consideration involves the use of cloud-based computing resources for running and hosting the language model components, which may limit the extent of large-scale testing and iteration.

Ethical & Legal

We are committed to utilizing only licensed and approved software, ensuring compliance with intellectual property guidelines, and maintaining transparency in the use of AIgenerated content. Additionally, we aim to mitigate potential bias in generated dialogue and safeguard any user data that may be processed during gameplay.

Social

Our narrative draws inspiration from classic detective fiction in the style of Agatha Christie and investigative games such as Ace Attorney. While the story is entirely fictional, we are attentive to tone and presentation, ensuring that our source material is used thoughtfully and in a way that feels original within the genre. Our focus is on delivering a compelling mystery experience that rewards player reasoning and curiosity

Professional

The project provides an opportunity for each team member to apply specialized skills in software development, artificial intelligence, and visual design. We aim to produce a cohesive and innovative game that reflects both technical competence and creative design, while preparing us for future professional roles in industry

CURRENT STATE OF PROJECT

Game Code

Currently, the game engine can query a website, which will be used for interfacing with the AI backend in the future. There is also a basic character movement and interaction system, allowing the player to move around the screen and interact with level objects. Text can be displayed on the screen, allowing for character dialogue to be shown to the player. The next steps are to implement the save file system to allow the player to save their progress between sessions.

Story & Design

We have settled on a 16x16 scale pixel art style. Preliminary sprites, including some characters, buildings, and ground tiles have been created, ready to be put in a demo level. Storyline decisions are also currently being fine-tuned, with the source material inspiration coming from classic Agatha Christie novels. Next steps are to solidify level progression decisions, and increase the quantity of finished assets.

AI Backend

At the moment, the AI backend has been fully designed out and the technologies we are planning on using have been decided. Any last minute changes to the tech stack should be to improve the overall latency for the player, so they don't notice a delay in text. Over the last week, we were able to create a working local version for demoing and testing if our idea works and integrates well with the game engine.

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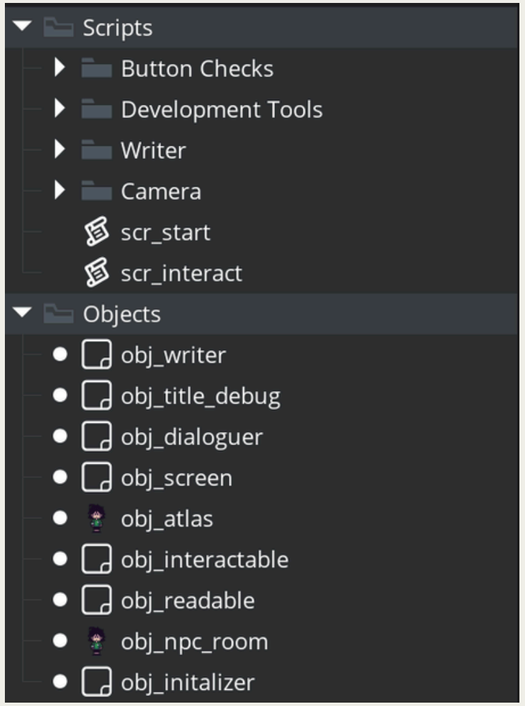
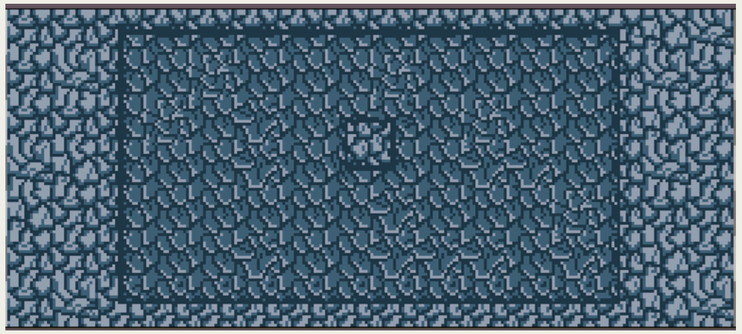
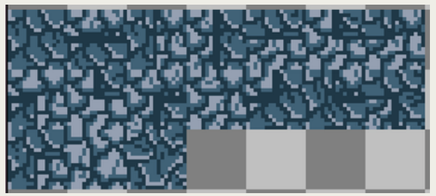
CURRENT STATE OF PROJECT- PHOTOS

Game Code

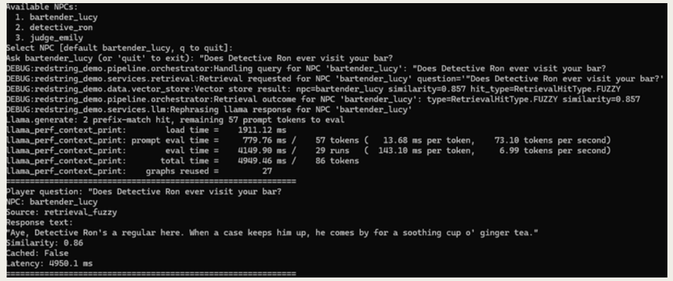


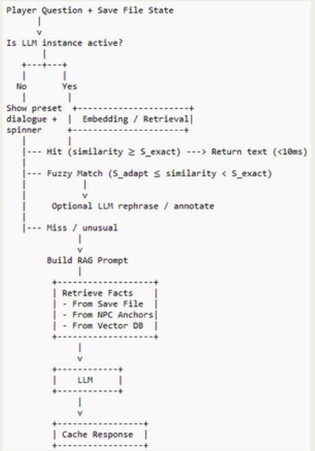
Story & Design





AI Backend





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EXPECTED ACCOMPLISHMENTS

Prototype
December 15, 2025
Implement core Hybrid Retrieval + LLM system, NPC dialogue, and initial environment; playable small demo to demonstrate functionality

Level 1
February 15, 2026
First full level completed with narrative, NPC interactions, and LLM+RAG integration

Level 2
March 31, 2026
Second level completed, full story progression, gamestate persistence, and TTS fully functional

Full Integration
April 15, 2026
Combine all levels, finalize art assets, implement all save files, polish UI, and optimize performance

Deployment
April 30, 2026
Test gameplay, fix bugs, verify NPC dialogue consistency, validate latency and TTS, prepare final submission

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DIVISION OF WORK

Nathan Nguyen

- **Design** the full Hybrid Retrieval + RAG + LLM system with warm-up fallback, ElevenLabs Turbo TTS, and per-save-file game state
- Develop the hybrid Retrieval + RAG backend API to handle player queries, embedding search, and LLM fallback
- **Implement** preset dialogue and warm-up fallback layer for NPCs to ensure smooth interaction during LLM cold starts
- **Integrate** ElevenLabs Turbo TTS for asynchronous NPC voice generation and streaming to the client
- **Test** end-to-end latency for Retrieval hits, LLM generation, and TTS streaming under concurrent player load

Faith Rider

- **Design** the complete narrative framework, including the murder mystery plotline, investigation structure, and branching story paths
- **Develop** character profiles for all suspects, witnesses, and secondary NPCs, specifying their backstories, motivations, and narrative roles
- **Create** 2D visual assets for environments, characters, items, and user interface elements consistent with the detective game's artistic direction
- **Specify** and document the game's art style guide, including visual tone, color palette, and atmosphere to ensure consistency across assets
- **Implement** narrative constraints and dialogue guidelines for NPCs to ensure LLM-generated responses remain consistent with character backstories and story canon

Elias Weitfle

- **Develop** the save data system that allows the player to save the current state of the game (items collected, dialogue options explored) and allow that data to be read and loaded later
- **Develop** a client-server request system that retrieves text responses from the backend and renders them in an interactive in-game textbox.
- **Create** a developer-facing debug system that streamlines testing through variable inspection, event triggers, and gameplay simulation tools.
- **Implement** the foundational NPC interaction system to enable core player-character dialogue and engagement mechanics.
- **Prototype** initial room environments to establish gameplay flow and functional structure before final asset integration and layout design.

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EXPECTED DEMO AT EXPO

We aim to have a fully playable prototype to showcase of our game, readily playable by anyone. This will consist of a tutorial level and at least one other level.

Thank you!

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