



Project Title: SHE<Codes/>

Subtitle: Inspiring Girls & Young Women in STEM through Narrative Coding

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Problem

- **The Engagement Gap:** Traditional coding tutorials are often abstract, intimidating, or boring, leading to low retention among young beginners.
- **The Gender Gap:** Girls often feel excluded from STEM fields due to a lack of relatable role models. "You can't be what you can't see."

Current System

- **Market Void:** Existing tools do not serve our target demographic effectively.
 - **Scratch:** Too childish for teenagers.
 - **Solo Learn/Code academy:** Lacks the narrative depth required to keep beginners engaged.
- **Lack of Representation:** Most platforms do not highlight the contributions of women in computer science history.

Requirements

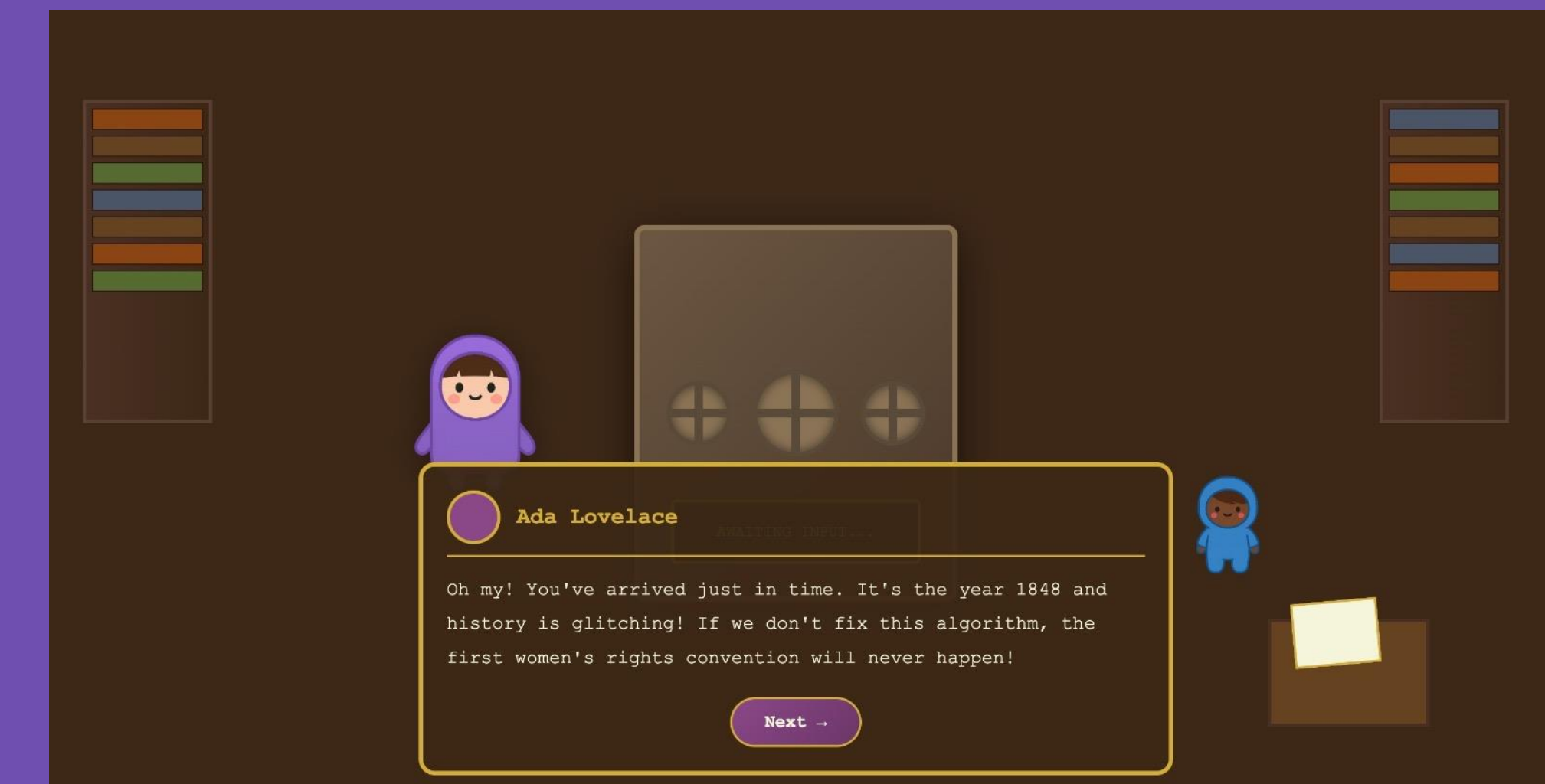
- **Narrative-Driven:** The platform must teach coding concepts through a story ("The Digital Time Machine") featuring historical female pioneers.
- **Scaffolded Learning:** Must progress from visual blocks to real Python syntax.
- **Accessibility:** Must be a web-first application optimized for Chromebooks and low-bandwidth school networks.
- **Inclusive Design:** High-contrast UI and dyslexia-friendly fonts to support diverse learners.

System Design

- **Frontend:** React/TypeScript User Interface communicates with the Game Engine.
- **Game Engine:** Blockly & Skulpt execute code in the browser.
- **Backend:** Node.js/Express API handles data requests.
- **Database:** PostgreSQL stores user progress.

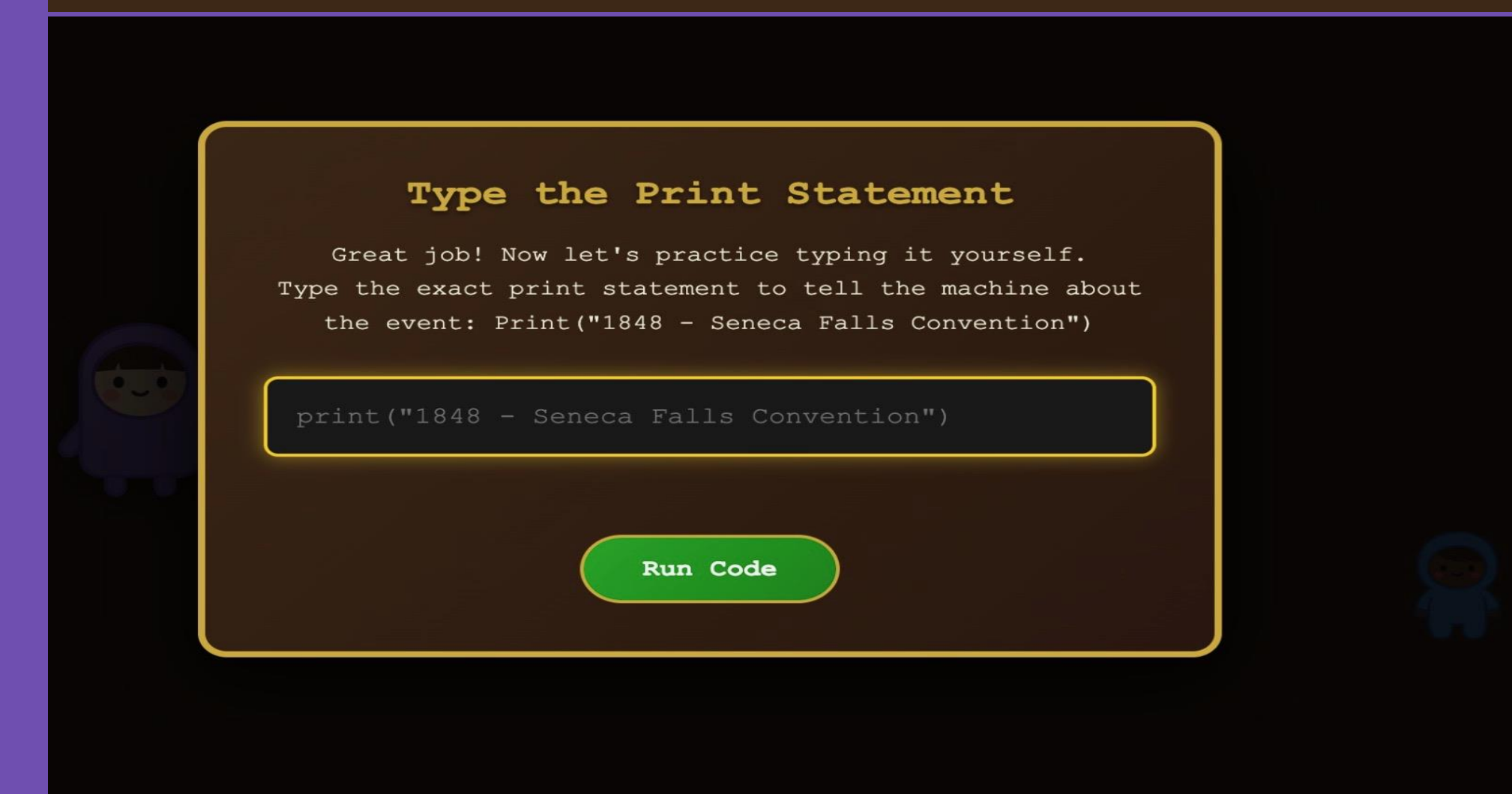
Narrative & Dialogue

- **Pioneer characters** levels with short history lesson and coding challenge; for example:
- **Description:** Shows Ada Lovelace interacting with the player character.
- **Caption:** Interactive Storytelling: Players interact with historical pioneers to uncover the "glitch" in history.



Coding Challenge

- **As the levels advance, challenges increase in difficulty;** for instance, the first level challenge:
- **Description:** Shows the "Type the Print Statement" challenge with neon border.
- **Caption:** Active Coding Challenges: Users transition from reading to writing real Python syntax.



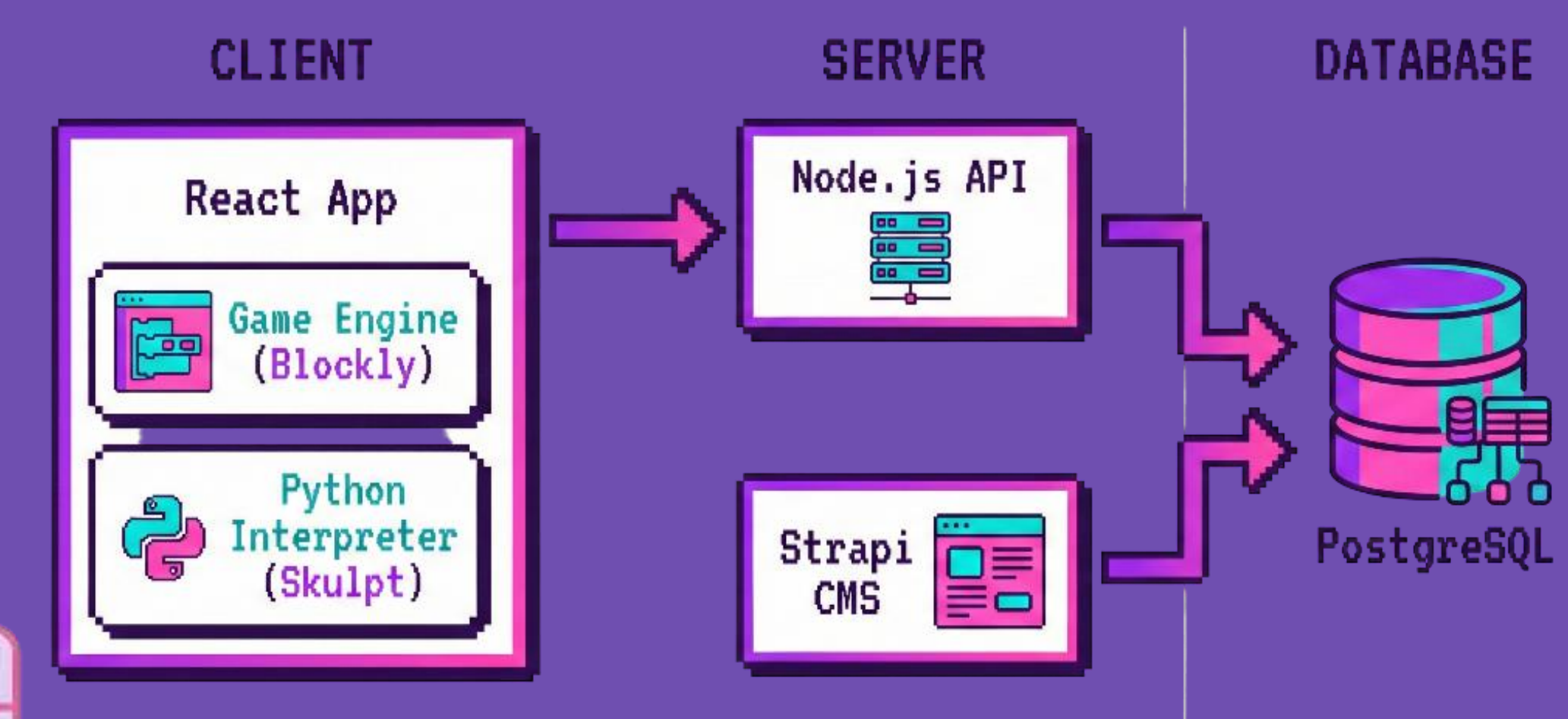
Investigation Scene:



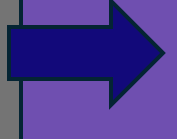
Verification

- **Unit Testing:** Validated individual game components (e.g., orbit calculation logic) to ensure accurate feedback on user code.
- **End-to-End Testing:** Used Playwright to verify critical user flows: *Login -> Start Challenge -> Submit Code -> Save Progress.*
- **CI/CD Pipeline:** Implemented GitHub Actions for automated linting and type-safety checks before every merge.

SHE<Codes/> - WEB-BASED EDUCATIONAL GAME ARCHITECTURE



Title Screen:



Acknowledgement

We would like to thank the FIU SCIS Senior Design faculty, our Product Owner, and our mentors for their guidance and support throughout this project.

Summary

SHE<Codes/> successfully bridges the gap between gaming and education. We created a scalable, empowering platform designed to teach girls Python fundamentals while exploring the rich contributions of women in STEM history.

