Computer Science Education Game

Capstone Project Report

Team GJC

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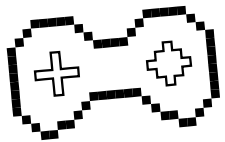
Project Description

- Open-World and Visual Novel Game
- Computer Science Instructor
- NPC interactions directing users to answer CS questions
- Solving and Creating Nonogram Logic Puzzles



Objectives

Encourage Computer Science Education

Resource for Studying Computer Science

Provides Challenging Quizzes on CS Knowledge

Provides Mentally Stimulating Logic Puzzles

Background and Project Plan

Previous MERN Projects

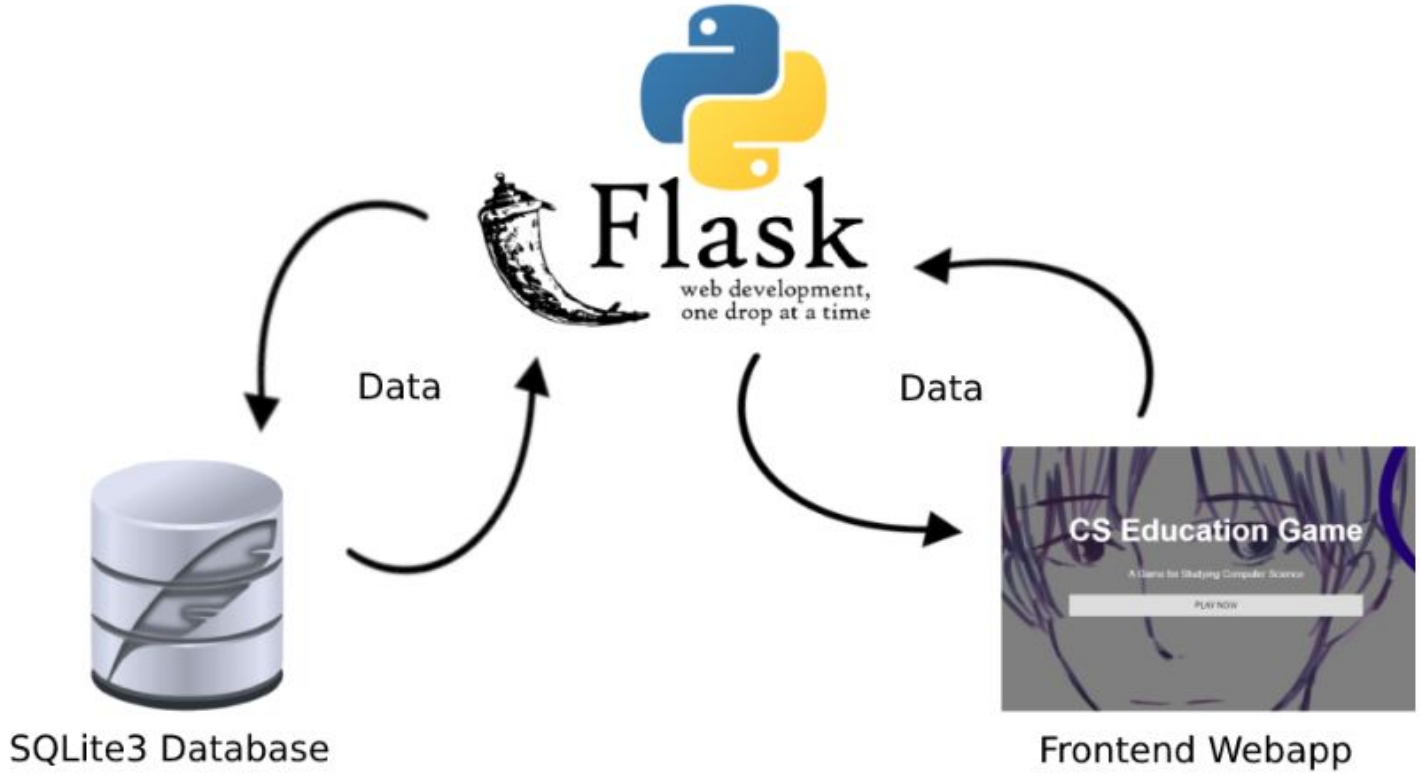
- Video Game Information App
- Todo List App

Prior Flask Project

- Photo Management App

1. Provided prior knowledge with languages
2. Construct similarly to previous Flask projects but integrate JavaScript elements

Data Flow Diagram



Technical Description

Development Stack

- Backend
  - Python, Flask, SQLite3
- Frontend
  - HTML, CSS, JavaScript

Platforms/Tools

- Spyder (Python IDE)
- Visual Studio Code
- Tiled

Features

- Authentication
- Open-world Environment with Several Locations
- Player Movement through Environment
- NPC Interactions with Dialogue
- Visual Novel Interface for Question Functionality
- Puzzle Library, Playability, Creation
- Question Creation

Overview

HOME | REGISTER | LOGIN | CREATE QUESTION | GAME | PUZZLE

FAST TRAVEL

Office | Hallway | Classroom | Schoolyard

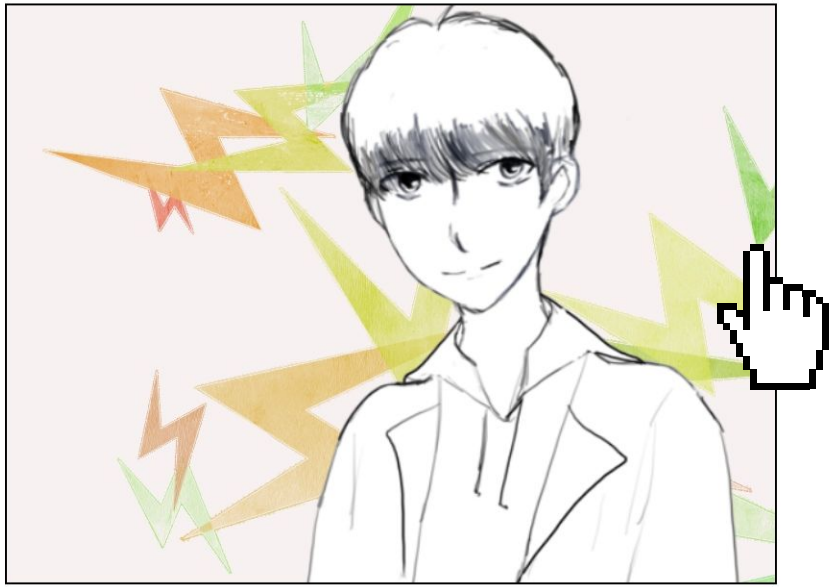
CONTROLS

W = UP
A = LEFT
S = DOWN
D = RIGHT
E = INTERACT

STUDENTS

Jimihen | Aqua | Ruby | Ai

Overview



Which deadlock condition is described by a resource which is assigned to exactly one process?

- Mutual Exclusion
- No-preemption
- Circular Wait
- Hold-and-Wait

Overview

Nonogram Puzzle

Instructions

	5 4	6 3	7 2	1 2 2	7 2	7 2	1 2 2	7 2	6 3	5 4
10										
3 2 3										
3 2 3										
3 2 3										
3 2 3										
8										
1 6 1										
2 2										
10										
10										

Restart

Congrats! You Won with No Mistakes! :D

Instructions

	5 4	6 3	7 2	1 2 2	7 2	7 2	1 2 2	7 2	6 3	5 4
10	■	■	■	■	■	■	■	■	■	■
3 2 3	■	■	■		■	■		■	■	■
3 2 3	■	■	■		■	■		■	■	■
3 2 3	■	■	■		■	■		■	■	■
3 2 3	■	■	■		■	■		■	■	■
8		■	■	■	■	■	■	■	■	
1 6 1	■		■	■	■	■	■			■
2 2	■	■						■	■	■
10	■	■	■	■	■	■	■	■	■	■
10	■	■	■	■	■	■	■	■	■	■

Restart

Lessons Learned

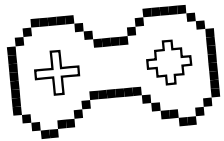
- Plan prior to Coding
  - Canvas fueled mid-development swap from Python, Flask, SQLite3 to MERN and then back again
- Comments are Key
  - Without comments, it is difficult to understand someone else’s code
- Backup Work Regularly
  - Minimizes code loss when working
  - Upload to GitHub or make local copies

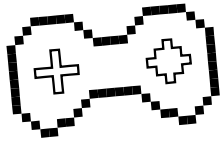
Future Work

- Uploading Questions to the Database by CSV file
- Map Traversal using doors and Map Collisions within Canvas
- Changing Sprite Image based on Directional Movement

DEMO

Demonstration of Computer Science Education Game





Thank You!

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