

## Computer Science Education Game

Team GJC

<https://github.com/JakenW/Computer-Science-Education-Game>

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### WEEK OF MAR 28 - APR 4

#### A. Weekly Accomplishments

Describe what task was completed and by whom. Complete sentences, paragraphs, and explanations are required. In parenthesis, provide the number of hours the team member worked on the specific task.

- 1) The user creation form and functionality was improved through MERN. Prior to the presentation, the user creation form lacked a password and confirmed password field. Additionally, the form was lacking functionality which would prevent users from creating accounts when they had not fully filled in the form, had a password not match the confirm field, or notify them when an account with the same name already existed within the database. The code now has functionality for these issues when the form is submitted and the form has been adjusted to contain these additional fields. (Jaken Whipp, 1.5 hours)
- 2) The work done through canvas has, finally, been connected to the frontend and can be used through the webpage. Several issues and errors were encountered through this process and substantial research about correcting these errors was required. Most of the troubleshooting done to implement the canvas work was using the new MERN code, however the canvas work ended up being implemented through the original Flask work which we had swapped from weeks ago. However, the way of implementing it in Flask has solved the problem with getting the canvas hooked up which persisted across both languages and should be influential with progressing the continued development of the game. (Jaken Whipp, 4.25 hours)
- 3) Researched about map collisions/boundaries and user-to-npc interaction. Started working on the finished backgrounds and began adding collision tiles. These collision tiles were placed on areas like walls and furniture to ensure that the user will not be able to walk through objects or on walls and ceilings. (Christina Kong, 2 hours)
- 4) Created a visual novel environment that displays dialogue on canvas, as well as a background and the character's portrait. This approach showcases a potential way to display dialogue and a conversation between the user and the npc. (Christina Kong, 1 hour)
- 5) Created a question interface that contains a question, and four options for answers in one dialogue box. This is a potential way to display Computer Science questions. If a user selects the correct answer they will proceed to the next question. If the user answers incorrectly, the questions start over. (Christina Kong, 1 hour)
- 6) Research and implement techniques to prevent graphical glitches and improve user experience. (Grayson Swift, 2 hours)

#### B. Problems/Issues

Describe the problem/issue, who is working on it, what the cause is, what has been tried to solve it, expected resolution. Complete sentences, paragraphs, and explanations are required. Explain how it may affect the project schedule.

- 1) Several errors were encountered when working on the improvement of user creation. Firstly, there was an issue with figuring out why the validator library was causing errors with the `isLength` function when trying to ensure usernames and passwords were a certain length. After looking at the official documentation, I could not figure out why this was an error so I took a different approach for improving functionality of the user creation form by just using the form data and comparing its length with the built in function (which in

hindsight makes much more sense). Another issue existed with the form data not posting to the database properly, but this was because I forgot to change one of the input fields to correspond to the correct attribute. These issues were encountered by Jaken and were resolved.

- 2) Several different issues were encountered when trying to get the canvas to function properly within the application. One key issue was my lack of understanding when it came to canvas and the way in which react functions. Using canvas through react requires the canvas to be its own component/element. There is not an issue with this, until it comes to implementing specific functions which are required for the functionality of the game. Trying to set the background image caused the page to stop working every time. Firstly, the page did not know where the image was. I broke down this problem into steps. To begin solving this, I attempted to display any image on the webpage. When doing this through the HTML in the return statement it would not show the image when the explicit file path was specified. To solve this, the image needed to be imported at the top of the javascript file and then referencing it within curly braces as the source in HTML. This produced the idea of running the game script in a similar fashion by importing it and referencing it in a HTML script tag. However, this approach produced several errors and would constantly keep producing them due to the nature of how the animate function in the script was called. Secondly, I attempted to solve this issue by manually assigning the image within the draw function for the canvas. This attempt, to me, seemed like it would work however there were errors saying it was not in an acceptable image format for canvas. To attempt to solve this issue I went to the canvas documentation to look up which images were acceptable. By following the website's advice, I had included an image in a way which would have made it acceptable to canvas, however the issue still persisted. I also tried to reverse engineer an example I had seen online which produced a pulsating orb within the canvas. However, they did not show how to include images at all so this method proved troublesome and confusing. Another way I tried to implement the canvas was by putting all the code for the game script within the HTML return section within a script tag. Alas, this did not produce the desired result either. The approach of putting the entire game script in an HTML tag had not been one I had tried in Flask, and had thought was work as soon as I considered it. After going back to Flask and doing some refactoring of the game script, the original canvas work could be run through Flask. As such, the issue of not getting the canvas to function properly on the web environment has been fixed. However, it has produced the strange side effect of switching from Flask to MERN and now back to Flask. Additionally, there were some other ways I attempted to solve this issue, but I had not documented them well enough to describe. These issues with implementing the canvas environment with the webpage were encountered and solved by Jaken.

### **C. Next week's planned work**

What do you plan to work on next week? Complete sentences, paragraphs, and explanations are required. If you have pending issues from section B, how will they affect next week's plan?

- 1) As for next week, I would like to begin working on the puzzle functionality so that the player can actually play the puzzle aspect of the game. Additionally, if any assistance is needed with the collisions, interactions, or traversing, I am willing to look into how to do that with canvas as well. (Jaken Whipp)
- 2) Next week, I will work on combining the visual novel environment with the questionnaire dialogue box. Combining both aspects will allow the user to see the npc they are speaking to while answering the computer science questions. This will also allow the user to pick dialogue options. I also plan on finalizing the designs for the pages of the website. (Christina Kong)

- 3) During the next week I will be trying to find a way for the core gameplay loop to transition to the visual novel environment that Christina worked on. I also plan to work with Jaken to ensure a smooth connection from the front and back end. (Grayson Swift)

#### **D. Time log**

Total Number of Hours worked on the project this week per team member.

**Kong:** (4 hrs), **Swift:** (2 hrs), **Whipp:** (5.75 hrs)

**Total Weekly Team effort:** 11.75 hours

## **WEEK OF MAR 21 - MAR 28**

### **A. Weekly Accomplishments**

Describe what task was completed and by whom. Complete sentences, paragraphs, and explanations are required. In parenthesis, provide the number of hours the team member worked on the specific task.

- 7) The initial connection to the MongoDB Atlas was established and the new backend utilizing express was set up. (Jaken Whipp 1.75 hours)
- 8) The front end was set up so that pages could be displayed and a navbar was created to navigate to the different routes/pages which are included within the software. (Jaken Whipp 1.5 hours)
- 9) Create functionality implemented through the front end so that the software's users could create accounts and so that they could create questions, both of which were stored within the MongoDB backend. This task is still in progress as currently the account creation does not account for a password nor does it have logic for verifying the password and password confirmation fields match. (Jaken Whipp 2.5 hours)
- 10) Worked on interaction and further implementing a map for the game (Swift 2 hrs)
- 11) Implemented the background of the teacher's office for the game's environment. This allows the user to be able to navigate through the location. (Christina Kong, 1 hour)
- 12) Investigated implementing map boundaries/collisions. implementing object interactions alongside the dialogue associated with the interaction, and navigating to a new location on the map through interacting with an object/door. (Christina Kong, 2 hours)

### **B. Problems/Issues**

Describe the problem/issue, who is working on it, what the cause is, what has been tried to solve it, expected resolution. Complete sentences, paragraphs, and explanations are required. Explain how it may affect the project schedule.

- 3) A problem encountered when doing the groundwork for the project in MERN was an issue related to the execution policy in the powershell. The software was running into errors until the execution policy was changed. Once changed, the software no longer encountered this error. Overall this error was not complicated to fix, but just added to the general slowdown of things. This problem was encountered and solved by Jaken.
- 4) Another issue which was encountered while working related to a new release of react-router-dom, specifically v6 compared to v5. Some advice about how to do routing, and the way in which routing was done on some older coding projects, was using information relevant to v5 of react-router-dom. However, there were some large changes between the two versions and some naming conventions of the older version were no longer used in the new version. There was a YouTube video which highlighted some key differences between the two which was helpful in resolving the issue. This issue was encountered by Jaken and required some additional research, however after enough research it was solved and the project was able to continue progressing.
- 5) Some issues were encountered throughout the CRUD process for questions and users, however all of them were solved after enough research, experimentation, or code changes. The first issue was related to requests not posting with errors saying they were bad post requests. This issue persisted regardless of how the post was made, whether by axios or by using the fetch method. This issue eventually was solved after looking through several YouTube tutorials of people doing CRUD in MERN and experimenting with their approaches. Some approaches used by people within videos would still cause the issue. Honestly, why the issue was occurring is still somewhat of a mystery, however it was able to be resolved. Another

issue involved the incorrect naming of a file path which went unnoticed for longer than I would like to admit. The name of the file had a “./” when it should have just been a “/”. This issue caused problems with CRUD functionality on questions for a substantial amount of time but was eventually resolved. Both of these issues were encountered by Jaken and were resolved.

- 6) There were compatibility issues with implementing code to our initial Javascript program. Resources that incorporated map boundaries/collisions started from scratch, so it was difficult incorporating the same code to our pre-existing lines of codes since there are slight differences in the functions. For instance the function for moving the player through the map on keydown was slightly different across tutorials, so it was hard to connect our existing function for player movement to the code for boundaries. Map boundaries/collisions are important, so that it restricts the user’s movement when it comes to traversing through an environment. For instance, creating collision blocks on ceilings, walls, or furniture will prevent the player from phasing through the object. These compatibility issues were encountered by Christina Kong and are still working on being resolved.

### C. Next week’s planned work

What do you plan to work on next week? Complete sentences, paragraphs, and explanations are required. If you have pending issues from section B, how will they affect next week’s plan?

- 4) Next week I plan to integrate the canvas work onto the webpage. I plan to start this process prior to the Midterm Presentation as it would be nice to showcase the canvas’ functionality and have it be already, at least partly, implemented on the webpage. Additionally, I plan to finish implementing the password fields on the create user page and implement the logic to only create the user’s account when the two password fields match one another. There are no outstanding issues from section B which will affect either of these plans. (Jaken Whipp)
- 5) Next week, I plan to add collision blocks to all the backgrounds for the game. This includes the already made locations; the teacher’s office, school hallway, and classrooms. Future locations will have collision blocks as well. I also plan on implementing player-to-npc interaction, where a player will be able to interact with a non-playable character and receive a response in the form of dialogue. Additionally, more research to be made on the traversing from one location to another. (Christina Kong)

### D. Time log

Total Number of Hours worked on the project this week per team member.

**Kong:** (3 hrs), **Swift:** (2 hrs), **Whipp:** (5.75 hrs)

**Total Weekly Team effort:** 10.75 hours

## **WEEK OF FEB 28 - MAR 7**

### **A. Weekly Accomplishments**

Describe what task was completed and by whom. Complete sentences, paragraphs, and explanations are required. In parenthesis, provide the number of hours the team member worked on the specific task.

- 13) Disclaimer: This task has not been fully completed. Integrating the original environment tests with the backend. This task included creating a flask route to the page where a canvas existed which allowed the user to move a character around a small area. Once completed, a user would be able to click the play button on the home page, be redirected, and then be able to maneuver a character around the screen. The route has been created and functions and once routed to the new page the canvas can be seen. However, there were complications with even getting the canvas to display in the first place as well as getting any image assets to display on it. Problems associated are described within the next section. (Jaken Whipp, 2 hours)
- 14) Disclaimer: This task has not been fully completed. Verifying that the JavaScript and HTML front end could receive information from the database and properly showcase it within the canvas. There were issues faced with this task. (Jaken Whipp, 45 minutes or .75 hours)
- 15) Finish creating the three environments within the game. This includes the location for the teacher's office, the school hallway, and classroom. This task was conducted by using the program Tiled, which allows the user to create maps for the games. Each background map for the locations were created by using free-to-use assets. Assets are any objects or tiles, like floor tiles/wallpaper and furniture to populate the environment. These locations are where the player will be able to navigate through the game. More locations will be added in the future. (Christina Kong, 2 hours)
- 16) Was able to integrate object interaction into the capabilities of the player. This involves using a specific action next to a specified area of the environment and having an interaction occur. The end result of this is a dialogue system but that has not been completely integrated yet. (Grayson Swift, 3 hours)

### **B. Problems/Issues**

Describe the problem/issue, who is working on it, what the cause is, what has been tried to solve it, expected resolution. Complete sentences, paragraphs, and explanations are required. Explain how it may affect the project schedule.

- 7) The first main issue faced by integrating the initial environment tests with the backend was centered around how flask references items. Similar to a problem faced with images within the last group project, the webpage was not recognizing where the JavaScript file being used within the HTML was stored. After a significant amount of time, I recognized the issue's similarity to last semester's and was able to solve it with the same approach. (Jaken Whipp)
- 8) The next issue with integrating the initial environment tests was flask's referencing of image assets. Within the JavaScript code, several images are referenced for the background or for character sprites. However, I experienced an incredible amount of difficulty trying to get these images to properly display within the canvas. I have tried explicitly stating they are in the static directory within the source statement, simply using just the file's name, giving the exact file path to their location on my computer, and using the roundabout way flask requires for images. However, all of these have not produced the expected result. Despite this, I am certain that the issue is with the defined path because testing it with relative file paths not through flask allows the images to display correctly. Additionally, trying to console log the image source within JavaScript was not working, which made troubleshooting what the program is expecting as

the file path incredibly difficult. This issue will affect the remaining project schedule as the assets are absolutely necessary when it comes to displaying the environment of the game. (Jaken Whipp)

- 9) When it comes to testing the functionality of canvas with the database, there were several problems associated with it. Firstly, there exists an issue with passing the information from the database to the HTML template which runs the JavaScript code. Passing the data to the HTML page is fine, however making it so the JavaScript code could utilize it became troublesome. In order to try to make the data given from the backend to the frontend, I tried using a meta HTML tag on the data given from flask and then a statement within JavaScript which should have allowed it to access the data (according to comments I was reading which had a similar issue). However, there was an error associated with this that I have yet to fully work out. I also intended to try changing the formatting of the data passed from the flask backend to a JSON format which is common for JavaScript. Moreover, the console log issue, explained in the previous item, persisted here. Being unable to console log the data within the JavaScript makes it much harder to see what the JavaScript is receiving, or if it is receiving anything. These problems will affect the project schedule because without this functionality, the game itself would not be able to run unless all the information regarding questions, and other associated parts, was explicitly hard coded in. (Jaken Whipp)
- 10) There was difficulty with using the program Titled to create the maps for the game. Issues with layering of objects, and properly setting up the base layer. After watching tutorials, and experimenting with the controls/options of the program, these issues were quick to solve. (Christina Kong)
- 11) Ensuring that the area where the player can be when the interaction occurred required an amount of fine tuning to exclude any unwanted interactions in unintended areas. (Grayson Swift)

### **C. Next week's planned work**

What do you plan to work on next week? Complete sentences, paragraphs, and explanations are required. If you have pending issues from section B, how will they affect next week's plan?

- 6) For next week we plan to integrate player-npc interaction into the game. This entails receiving a response from a non-playable character by interacting with them.
- 7) For next week, I will be going back and continuing to troubleshoot the problems experienced in section B for the work which was being done this week (Jaken Whipp).

### **D. Time log**

Total Number of Hours worked on the project this week per team member.

**Kong:** (2 hrs), **Swift:** (3 hrs), **Whipp:** (2.75 hrs)

**Total Weekly Team effort:** 7.75 hours

## **WEEK OF FEB 21 - FEB 28**

### **A. Weekly Accomplishments**

Describe what task was completed and by whom. Complete sentences, paragraphs, and explanations are required. In parenthesis, provide the number of hours the team member worked on the specific task.

- 1) CRUD, in reality just create, functionality has been implemented through the front-end so that users can create accounts. When the user has input information, and the two password fields match, their account will be created (unless there is already an account with the same name) and will be added to the database. If the password fields did not match, or the account was already in the database, then the account will not be created and they will be redirected to a page telling them the account registration was unsuccessful. (Jaken Whipp, 2 hours)
- 2) The environment for creating pixel art backgrounds was set up. The applications that were used to complete this task were Procreate and Tiled. Prepared assets to be used for making the background. Assets are objects like the teacher's desk, tiles for the floor where the player will be able to walk on, lockers, etc. (Christina Kong, 2 hours)
- 3) Object interaction within the environment of the game had its framework created and work began on properly introducing collision where it is supposed to be in the environment. I also started a basis for a dialog system that needs further work. (Grayson Swift, 3 hours)

### **B. Problems/Issues**

Describe the problem/issue, who is working on it, what the cause is, what has been tried to solve it, expected resolution. Complete sentences, paragraphs, and explanations are required. Explain how it may affect the project schedule.

- 1) There was difficulty in transferring assets from the program Procreate to Tiled, though this problem was quick to solve. (Christina Kong)
- 2) Not having all of the assets readily available makes some preparation difficult and creating context sensitive interaction caused problems within the control code. Not impossible to work around but attempting to make a dynamic system is preferable to hard coding everything. (Grayson Swift)
- 3) There were some difficulties surrounding checking the account already in the database to make sure that two accounts were not created with the same name, however this was not a difficult issue to solve it just made the task take a bit longer than I had anticipated. (Jaken Whipp)

### **C. Next week's planned work**

What do you plan to work on next week? Complete sentences, paragraphs, and explanations are required. If you have pending issues from section B, how will they affect next week's plan?

- 1) Continue working on and finish building the environment for the game. This includes the background for the teacher's office, hallway, and classroom. Sketches will be used as a guide to draw out the backgrounds. (Christina Kong)
- 2) Finalize the script for Day 1. This includes the dialogue between the player and the student (NPC, non-player character), and the Computer Science lesson. (Christina Kong, with help from Jaken Whipp and Grayson Swift)
- 3) Create a means for the dialogue system to transition into the puzzle aspect of the game. Also creating transitions between game areas. (Grayson Swift)



- 4) Begin integrating Grayson's initial environment test so that the routes will direct to the correct page and to ensure the user's experience with the canvas is what we anticipated (Jaken Whipp).
- 5) Testing the passing of data from the backend to the canvas on the front-end and vice versa (Jaken Whipp).
- 6) Create a table within the database which stores the puzzles (Jaken Whipp).
- 7) If time, begin working on the puzzle functionality on the front end, this requires #5 and #6 to be worked out as the puzzles are stored inside the database (Jaken Whipp).

#### **D. Time log**

Total Number of Hours worked on the project this week per team member.

**Kong:** (2 hrs), **Swift:** (3 hrs), **Whipp:** (2 hrs)

**Total Weekly Team effort:** 7 hours

## **WEEK OF FEB 14- FEB 21**

### **A. Weekly Accomplishments**

Describe what task was completed and by whom. Complete sentences, paragraphs, and explanations are required. In parenthesis, provide the number of hours the team member worked on the specific task.

- 1) Several functions for the puzzle aspect of the game were completed this week. Firstly, two functions to dynamically create the labels for the game based on the positions of correct spots within the puzzle. The functions work for all tested conditions and do not leave trailing spaces. Another function for the puzzle was completed which checks whether a position within the puzzle, represented by an adjacency matrix, is a correct spot or an incorrect spot. All puzzle functions were completed by Jaken Whipp. The time taken to complete the label functions was 1 hour. The time taken to complete the function which checked for the correct position was 10 minutes.**
- 2) The dialogue between the characters for day one is completed. This entails the beginning cutscene for the game and dialogue between the protagonist and the student. This task was completed by Christina Kong. The time taken to complete this task was 30 minutes.**
- 3) The mock pages for the website where the game will be held are completed. The index page is completed, the registration and login pages are completed, as well as the page where the game will be displayed is completed. There are also pages to show the user if registration was a success or not. If the user inputs a wrong password when logging in they will be prompted and be able to try again with logging in. These tasks were completed by Christina Kong. All tasks took one hour to complete.**
- 4) A mock layout of the game's map has been completed. This showcases where the locations will be, pathways, and how our protagonist will navigate through the environment. This task was completed by Christina Kong and took 40 minutes.**
- 5) Flask routes were created so that a user could navigate through the main page, login, and register pages. This task was implemented by Jaken Whipp. Implementation and testing that the routes directed users to the correct page took 10 minutes.**
- 6) Within the database to be used for the application, two tables were created to store information prevalent to the game. The first table stored usernames and passwords for the players of the game. The second table stored information about computer science questions which included the question, four multiple choice options, and the corresponding answer. This task was completed by Jaken Whipp and it took a time of 20 minutes.**
- 7) A canvas front-end page was created which displayed a placeholder sprite and demonstrated that a user can use the page to navigate around a set environment/background. This functions as the main way a user would play the game as they control the placeholder sprite which will eventually be replaced by our main character. This task was completed by Grayson Swift. The amount of time taken to complete this task was 1 hour.**

### **B. Problems/Issues**

Describe the problem/issue, who is working on it, what the cause is, what has been tried to solve it, expected resolution. Complete sentences, paragraphs, and explanations are required. Explain how it may affect the project schedule.

- 1) The only problem that we have currently faced is installing/using Flask on one of the laptops. Jaken Whipp is currently working on this issue. He believes the cause to be the way in which Python is currently installed on the machine. Currently, he has tried to install Flask using pip and installing it through Anaconda. The next step he plans to take is to remove Python, cleanly install it on the system, and then try downloading Flask again. If this does not work, he will look into and use a container.**

### **C. Next week's planned work**

What do you plan to work on next week? Complete sentences, paragraphs, and explanations are required. If you have pending issues from section B, how will they affect next week's plan?

**1) Add functionality to the mock pages so that a user can create account details which will be stored on the database. Add functionality to mock pages to test whether users within the database can log in. Create a table to store game data for the user and create a test page which will make sure data for a specific user can be stored within the database. If the issue within section B is not resolved, these plans will not be able to be completed on one of the machines; however, another machine with Flask working can be brought into the classroom. Additionally, research regarding how to pass information from a database/backend to a Javascript Canvas will be investigated.**

These tasks will be completed by Jaken Whipp.

**2) Draw the backgrounds for the primary locations; Teacher's Office, Hallway A, and Classroom 1A. This entails any objects in a location, entryways, and other details about the environment. The art style for the backgrounds will be pixel art, and for the time being these will be rough sketches and not the final product. These tasks will be conducted by Christina Kong. There are no issues from section B that will affect these particular tasks.**

**3) Draw the portrait art for the protagonist and student. These will be displayed on the dialogue box, near the text of dialogue. These tasks will be conducted by Christina Kong. There are no issues from section B that will affect these particular tasks.**

**4) Write the script for the Computer Science lesson for Day 1. This task will be completed by Christina Kong, Jaken Whipp, and Grayson Swift. There are no issues from section B that will affect this task.**

**5) Based on drawings, the mapping of collisions for the game environment will be done. This task will be completed by Grayson Swift. There are no issues from section B which will affect this specific task.**

### **D. Time log**

Total Number of Hours worked on the project this week per team member.

**Kong:** (2 hrs), **Swift:** (1 hrs), **Whipp:** (~2 hrs)

**Total Weekly Team effort:** 6 hours