

**Sprint 3 Planning Document**

Team 18: Chunao Liu, Anurag Shah, Jenna Zhang, Yierpan Abuduwaili, Michelle He, Jingyuan Yang

**Sprint Overview:**

In Sprint 3, we will check and implement any core functionalities that are still incomplete, such as group logistics and group image logistics. We will highlight the runtime error on the image ឵so that users can easily tell where the runtime error occurred. We will improve the robustness of our OCR to achieve a higher recognition accuracy while scanning actual hand-written code. We will also implement language detection and more language compilation scripts to make our app more useful. At last, we will perform unit-testing to test our app final performance and prepare for the final presentation

**Scrum Master:** Chunao Liu

**Meeting Plan:** Tuesdays/Thursdays 4:30 pm

**Sprint Challenge:**

Making our OCR more accurate on hand-written code is a big challenge since most OCR is based on recognizing typed text, not hand-written text. Highlighting runtime errors on the image would also be challenging since it requires dynamic object creation, detection, standardization, and formation; processes of great technical difficulty here. Finally, language detection and multi-language compilation would be a small challenge since we don’t have any experience implementing this before, likely leading our time estimates to change as the project progresses.

**Current Sprint Detail:**

* User Story #1

As a user, I would like to be able to update my account.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement setAvatar functionality on the backend and frontend | 5 hrs | Jenna |
| 2 | Further implement backend apis for changing account info/ | 3 hrs | Jenna |
| 3 | Test and debug the new features (Possibly using unit test). | 4 hrs | Jenna |

Acceptance Criteria:

* Given that the setAvatar functionality is correctly implemented, users will be able to choose an image from their local library as their avatar, and the new avatar will replace the old one and be stored in the database.
* Given that the APIs for account info changing are correctly implemented, users are able to change their email address and username linked to the account.
* Given that the APIs for account info changing are correctly implemented, the backend will validate the new username or new email address upon each change and send feedback to the frontend page.
* Given that the delete account button is correctly implemented, when a user clicks the button, a delete account request should be sent to the backend, and if the deletion is successful on the backend, the app should log the user out and remove anything about the account from the local storage.
* Given that the backend APIs for account removal are correctly implemented, if the user holding the account belongs to any teams, then they should be removed from those teams.
* User Story #2

As a user, I would like to be able to create/delete a team and add/remove a member if I am the team leader.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement a team page on the frontend where all the teams the user belongs to are listed. | 4 hrs | Jenna |
| 2 | Add buttons on the team page for creating or deleting a team. | 3 hrs | Jenna |
| 3 | Implement a page to display all team members in a specific group. | 2 hrs | Jenna |
| 4 | Add buttons for adding or removing team members | 2 hrs | Jenna |
| 5 | Modify the backend apis for team operations. | 4 hrs | Jenna |
| 6 | Test and debug the new features (Possibly using unit test). | 4 hrs | Jenna |

Acceptance Criteria:

* Given that the team page is correctly implemented, the user will be able to see all the teams they are in and will be directed to the team info page when clicking on a certain team.
* Given that the button for creating a new team is correctly implemented, the user will be prompted to enter a name for the new team and the new team will appear on the team page on success.
* Given that the button for deleting an existing team is correctly implemented, the user will only be allowed to delete a team where they are the team leader.
* Given that the team info page is correctly implemented, the user will be able to see all the team members in that team, and if the user is the team leader, they will be able to add a new member to the team or remove a member from the team.
* Given that the backend APIs for team operations are correctly implemented, the backend will be able to process the requests from the frontend and update the database.
* User Story #3

As a developer, I would like to prompt users to re-login when the account is inactive for a week.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Set an expiration time for the login session on the frontend | 2 hrs | Jenna |
| 2 | Set an expiration time for login token on the backend | 2 hrs | Jenna |

Acceptance Criteria:

* Given that the expiration time for login sessions on the frontend is correctly implemented, the device will automatically log the user out when the account has been inactive for a week and prompt the user to re-login.
* Given that the expiration time for login sessions on the frontend is correctly implemented, the user won’t need to enter their username and password again if they have checked the remember me box when they login last time.
* Given the expiration time for the login token on the backend is correctly set, the token will be removed when the account has been inactive for a week.
* Given the expiration time for the login token on the backend is correctly set, if someone tries to send an http request with the old token, the authentication on the backend server will fail.
* User Story #4 (Runtime Result Display)

As a user, I would like to see the detailed runtime error message or runtime output of the code written in the text editor.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Write a backend API that puts the typed code received from the frontend into the compiler and gets the runtime results | 3 hrs | Michelle |
| 2 | The backend sends a response including the runtime result (error or output) and the frontend will pop up a window notifying whether the code executed with or without error | 2 hrs | Michelle |
| 3 | Display the runtime error message or the runtime output in a good format, with line management and scrolling | 3 hrs | Michelle |
| 4 | Debugging and testing functionality | 5 hrs | Michelle |

Acceptance Criteria:

* Given the frontend correctly sends the code to the backend, when the backend receives the code, the API should put the code into the compiler and get the runtime result.
* Given the backend correctly sends a response with the runtime result, the response upon being received by the frontend will trigger a popup window indicating the compilation result.
* Given the UI works correctly, when the frontend receives a response, the runtime result should show at the bottom of the screen. This result can be scrolled down to reveal the full output/stack trace.
* User Story #5 (Save Typed Code)

As a user, I would like to save the typed code into a specific group and name the code.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Add the save and discard buttons on the text editor page | 2 hrs | Michelle |
| 2 | Create a popup window that asks user to choose which group to save the typed code | 4 hrs | Michelle |
| 3 | Create a popup window that asks user to name the given code | 3 hrs | Michelle |
| 4 | Include the group ID number and the name in the request to the backend and send request | 3 hrs | Michelle |
| 5 | Display a saving success message to user after receiving response from the backend | 2 hrs | Michelle |
| 6 | Debugging and testing functionality | 5 hrs | Michelle |

Acceptance Criteria:

* Given the UI for the buttons work correctly, when the save button is pressed, a popup window that asks the user to choose a group shows up.
* Given the UI for the popup window above works correctly, when a group is chosen, another popup window that asks the user to name the code shows up.
* Given the UI works correctly, when a user confirms a name of the code, the frontend sends a request to the backend with the group ID number and the name.
* Given the backend API functions correctly, when the frontend receives a response, a success message should be displayed.
* User Story #6

As a user, I would like to save the image result to a certain group library or discard the image.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | After receiving the result back from the backend, logged in users should be able to save the picture to a certain group selected by the user or simply discard. There should be a pop up window with the list of groups that the user has, so the user can select one and save. | 4 hrs | Yierpan |
| 2 | After selecting the group, there should be another window prompting the user for a name, to rename the picture that is being saved. After selecting a group and renaming the picture, if the picture is saved successfully, show a success message. | 3 hrs | Yierpan |
| 3 | If the user is not logged in, save the picture to the local gallery or discard, if the picture is saved successfully, show a success message. | 4 hrs | Yierpan |
| 4 | Test and debug | 3 hrs | Yierpan |

Acceptance Criteria:

* Given that result is received from the backend, if a logged in user presses the “save” button, they should see a list or group\_id they can save their result to that group library, and then there should be another pop up window asking the user to name the image.
* Given that the result is received from the backend, if a not logged in user presses the “save” button, they should be able to save the result to their local gallery.
* Given that the backend server has implemented the same, the user should be able to discard the result and keep using the application.
* User Story #7

As a user, I would like to see the runtime result of the image code and have a pop up window for the errors.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Have pop up windows around the red curly lines in the result image, the correct pop up window with the correct “error message” should pop whenever the red curly line is pressed, using the y-coordinates, the same error message popup should show for the same red curly line. | 10 hrs | Yierpan or TBD |
| 2 | Have a separate “terminal” window below the result image that shows the output of the program. | 4 hrs | Yierpan or TBD |
| 3 | Test and debug | 4 hrs | Yierpan or TBD |

Acceptance Criteria:

* Given that the pop up is implemented correctly and the Y-coordinates are given correctly, the pop ups should appear whenever the user clicks the red curly line under the line of code.
* Given that the result is received from the backend, the small “terminal” window should display the return value or the output of the program.
* Given that the result is received from the backend, the user should be able to see the compile time result and execution result..
  + - User Story #8 (Library page)

As a user, I would like to access all the images and code pieces shared among my teams.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | display a list of images / code pieces for each group | 2 hrs | Jingyuan |
| 2 | Add button for delete files and hook up back end | 2 hrs | Jingyuan |
| 3 | Each group has an extendable link to the group file | 4 hrs | Jingyuan |
| 4 | Implement a page for displaying a specific image and its runtime errors / output. | 3 hrs | Jingyuan |
| 5 | Implement a page for displaying a specific piece of typed code and its runtime errors / output. | 3 hrs | Jingyuan |
| 6 | testing and debug | 4 hrs | Jingyuan |

Acceptance Criteria:

* Given the library page shows every group, clicking on one of them should navigate to a new page which displays the list of shared files in the group.
* Given the user is the group leader of the current group, he can successfully add or delete any file owned by the group.
* Given the server is in realtime, the group list should be updated every time the page is loaded.
* Given the communication between the frontend and the backend is correctly implemented, the Library page should display all files shared among the user’s teams.
* User Story #9 (OCR Preprocessing)

As a developer, I would like to have an image preprocessing suite that can de-skew and remove lines/spots

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Binarize the image | 3 hrs | Anurag |
| 2 | Rotate (Deskew) the image using Projection-Profile method | 2 hrs | Anurag |
| 3 | Remove noise from the image | 4 hrs | Anurag |
| 4 | Thin and Skeletonize input (Handwritten only) | 6 hrs | Anurag |

Acceptance Criteria:

* Given an input image, that image is binarized, and its thresholds detected correctly without excess noise
* Given an input image, that image is rotated to correct orientation, so that characters are not missing in OCR portion
* Given an input image with characters, these characters are thinned for uniform stroke width with handwritten data
* User Story #10 (OCR for Handwritten data)

As a developer, I would like to have an image preprocessing suite that can de-skew and remove lines/spots

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement handwritten vs typeform detection | 10 hrs | Anurag |
| 2 | Transform input text to be work with existing OCR | 6 hrs | Anurag |

Acceptance Criteria:

* Given a page image, the page data can be correctly classified as handwritten or typeform
* Given an image with handwritten text, the pipeline functions properly
* Given an image with handwritten text, it is classified with at least 80% accuracy per character
* User Story #11 (Furthur Backend API Implementation)

As a developer, I would like to have more APIs to support temporary Image saving, Typed code compilation, etc. A MySQL trigger should be implemented so that if a group is out of user, the group should be automatically deleted.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement temporary Image upload and processing function | 3 hrs | Chunao |
| 2 | Implement the TextCode execution API | 4 hrs | Chunao |
| 3 | Implement the API for removing an Image from an group and update any correlated field change | 5 hrs | Chunao |
| 4 | Implement a trigger that if no user exist in a group, the group will be automatically deleted | 6 hrs | Chunao |

Acceptance Criteria:

* Given no user ID, a user should be able to process their images with Temp Image Upload API
* Given a request for TextCode execution, the backend API should execute the code and return the runtime result while storing this execution history into the database
* Given a request to remove an image from a group, the backend should verify if the request is valid, and then proceed to remove the image and update all related attributes
* When a group no longer have any users, the database should automatically remove the group
* User Story #12 (Language Detection)

As a developer, I would like to know what language I am supposed to compile with. We will use existing tools to help distinguish languages

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement a function that can detect whether the language is Java, C, C++, etc. | 7 hrs | Anurag |
| 2 | Upon having the correct language identified, proceed to call the compiler wrapper and return the runtime result | 6 hrs | Anurag |
| 3 | Setting up the environment for various languages, such as Java | 5 hrs | Chunao |
| 4 | If one language is not supported by our OCR, we should not proceed to call the OCR handler and return only an error message | 2 hrs | Chunao |

Acceptance Criteria:

* Given a text written in Java, the backend should be able to recognize it and call the Java handler
* Given a text written in C, the backend should be able to recognize it and call the C handler
* Given a text written in C++, the backend should be able to recognize it and call the C++ handler
* Given any other languages, we should detect them and respond to the front-end that this language is not supported
* User Story #13 (Multiple Language Support)

As a user, I would like to have my C/C++ code compiled & run.  
As a user, I would like to have my Java code compiled & run.  
As a user, I would like to have my C# code compiled & run.

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Implement language detection | 4 hrs | Anurag |
| 2 | Support Java code | 5 hrs | Anurag |
| 3 | Support C++ code | 4 hrs | Anurag |
| 4 | Support C# code | 5 hrs | Anurag |

Acceptance Criteria:

* Given a code sample, it correctly tags the language of that sample
* Given a Java code sample, it correctly compiles, executes, and detects errors in the code.
* Given a C++ code sample, it correctly compiles, executes, and detects errors in the code.
* Given a C# code sample, it correctly compiles, executes, and detects errors in the code.
* User Story #14 (Jenkins & Apache setup)

As a developer, I would like to achieve continuous delivery via Jenkin

| # | Description | Estimated Time | Owner |
| --- | --- | --- | --- |
| 1 | Setup Jenkins server on localhost | 6 hrs | Chunao |
| 2 | Setup scripts and web hook to allow Jenkins to automatically build upon git push | 7 hrs | Chunao |
| 3 | Upon failed build, Jenkin should revert the change to the previous state | 4 hrs | Chunao |
| 4 | Testing to make sure Jenkins’ workspace is working | 5 hrs | Chunao |

Acceptance Criteria:

* Upon a git push on the main branch, Jenkins should automatically attempt to build and run basic tests for the django server
* Upon a failed build, Jenkin should leave a report and revert back to the previous working state
* Upon a successful build, Jenkin should update server’s content

**Remaining Backlog:**

* ~~As a user, I would like to have a welcome page when I open the app.~~
* ~~As a user, I would like to have a “remember me” feature at login.~~
* ~~As a user, I do not need to log in again if I’ve logged in before and did not log out.~~
* ~~As a developer, I would like to send a password resetting link to users via their email addresses when they forget their passwords.~~
* ~~As a user, I would like to be able to create my own account.~~
* ~~As a developer, I would like to link users’ accounts with their emails/phone numbers.~~
* ~~As a user, I would like to have a profile page where I can edit/update my info.~~
* ~~As a developer, I would like to have a navigation bar that directs users to different pages.~~
* ~~As a developer, I would like to prompt users to re-login when the account is inactive for a week.~~
* ~~As a user, I would like to be able to deactivate/reactivate my account.~~
* ~~As a user, I would like to use the Apps feature without creating an account.~~
* ~~As a user, I would like to have a way to reset my password.~~
* ~~As a developer, I would like to load pictures and snapshots faster using multi-thread.~~
* ~~As a user, I would like to have a profile picture and a banner.~~
* As a user, I would like to see if there is any syntax error in my code, have the lines physically underlined with a marker on my code image, and have a popup after clicking on that inform me about the full error details encountered at that line.
* ~~As a user, I would like to access an archive of the scanned documents in digitized text form that can be saved in an editor app (such as the Note app in iOS).~~
* ~~As a user, I would like to retake a photo of the code if the image taken is not satisfying.~~
* ~~As a user, I would like to join/create/leave multiple teams.~~
* ~~As a team member, I would like to see who is the coordinator/creator of the team.~~
* ~~As a team manager/member, I would like to see the team members.~~
* ~~As a team manager/member, I would like to be able to access all shared code between the team.~~
* ~~As a team manager, I would like to remove a user from the team.~~
* ~~As a user, I don’t need to see the login page as I re-enter the app starting from the second time.~~
* ~~As a team manager, I would like to have access to view and change the team members’ code.~~
* ~~As a user, I would like to be able to upload a photo from my phone’s library in place of taking a new photo.~~
* ~~As a user, I would like to save the OCR-generated code on my device storage.~~
* ~~As a user, I would like the backend to be able to figure out what language my code is in, and use the correct compiler.~~
* ~~As a user, I would like to delete the archive of a scanned document if it is no longer needed.~~
* ~~As a user, I would like to have my C/C++ code compiled & run.~~
* ~~As a user, I would like to have my Java code compiled & run.~~
* ~~As a user, I would like to have my C# code compiled & run.~~
* ~~As a developer, I would like to design various user roles so that users with different roles can access different features.~~
* ~~As a developer, I would like to allow users to have multiple roles.~~
* As a developer, I would like to use cacheManager to load data so that the backend does not need to retrieve data from the database every time there’s a request so that data access latency is decreased (if possible).
* ~~As a developer, I would like to store each user’s authentication information in a SQL query.~~
* ~~As a developer, I would like to be able to retrieve entries of a specific user’s authentication information during the user’s login session~~
* ~~As a developer. I would like to keep track of each user’s current status, either logged in or not logged in~~
* ~~As a developer, I would like to be able to store each user’s uploaded pictures in a relational database~~
* ~~As a developer, I would like to be able to retrieve the picture after the OCR detection and send it back to the front-end~~
* ~~As a developer, I would like to keep track of each user’s team information in a relational SQL query~~
* ~~As a user, I would like to be able to access photos I have taken previously~~
* ~~As a developer, I would like the database to be able to store the image filename, detected code, and compilation results/error messages~~
* ~~As a product manager, I would like to see continuous delivery on the backend.~~
* ~~As a product manager, I would like to have unit tests for both the front-end and back-end.~~
* ~~As a user, I would like to be able to take photos from slight angles or at a slight tilt, and not have that affect the app~~
* As a developer, I would like to have an image preprocessing suite that can de-skew and remove lines/spots
* ~~As a developer, I would like to have a separate segmentation algorithm for typeform code images~~
* ~~As a developer, I would like to ensure that each model can correctly place spaces in the program where necessary for the compiler~~
* As a user, I would like the application to process my image of handwritten code, be able to distinguish it from typeform code, and convert it to the relevant textual representation.