CS 102 *Spring 2020/21*

Project Group **G2C**

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Criteria	TA/Grader	Instructor
Presentation		
Overall		

~ LabConnect ~

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UI Design Report

(version 1.0)

March 24, 2021

1 Introduction to LabConnect

LabConnect is a developing project that aims to make education more productive for students, and more efficient for teaching staff, among other benefits. The feature list compiled for the sake of this goal includes items such as:

- Queueing system for live sessions to optimize wait times and student-TA communication
- Dashboard designed with a pragmatist mindset, to lessen confusion as much as viable
- Instructor panel where new assignments can be added with great flexibility
- Analysis view for students and teaching staff alike, to monitor course progress
- Announcements board where the teaching staff can reach out to students with ease
- Simple one-to-one messaging capability for the sake of light written communication
- Note-taking panel for students to take concise notes regarding individual assignments

- Detailed view of submission versions where students and the teaching staff can observe automated testing results

Though the above is not an exhaustive list of features, it does nonetheless capture the gist of the features this project proposes in order to undertake its goal of optimizing the assignment portion of a computer science course. For a more extensive summary of this project, refer to the requirements report published earlier.

2 Disclaimer Regarding the UI Design Report

The document herein contains details and illustrations from 13 application views in total, but certain disclaimers have to be made regarding the accuracy of these illustrations. LabConnect is planned to be a web application, built with established modern web design paradigms in mind. However, web pages, particularly those that strive to be designed responsively for the sake of usability on a distinct range of devices, are not easy to make *static* prototype designs of. Along with this factor, another aspect affecting the UI design process is the fact that as LabConnect is an application with a large volume of interaction between people, which may take place at severely differing times, an unavoidable need to display certain elements only in very specific instances appears. In other words, the project at hand is of such nature that it cannot be *accurately* put on display before an actual development of the interface, via the use of dynamic web technologies such as CSS and JavaScript, is in process.

As a side note, the development of the interface also depends directly on the implementation of the feature set, as the need for elements on the page will originate from the structures designed on the server application side of the project, which are highly liable to change as the back-end code undergoes development. An example of this phenomenon is the analysis view presented to the users, which is dependent highly on core features being implemented first, because only then can the data to be put on display be ascertained, and the interface thereof finalized.

The UI design of LabConnect was completed with the above considerations in mind, which is to mean that the design was developed for the sake of having a guide to refer to when the necessity arises, rather than being developed for the impractical sake of being an accurate finalized version of the interface. We believe that this approach will prove to be more advantageous in the long term.

3 Map of the Application's Views

4 User Interface Designs of Application Views

4.1 User-agnostic Views

This subsection illustrates the pages of LabConnect that are intended to remain mostly unchanged regardless of the user's account level in the system (i.e., student, TA, instructor). Having certain user-agnostic views may help to make the interface easier to maintain, similar to how reusing existing code is often advised.

4.1.1 Login

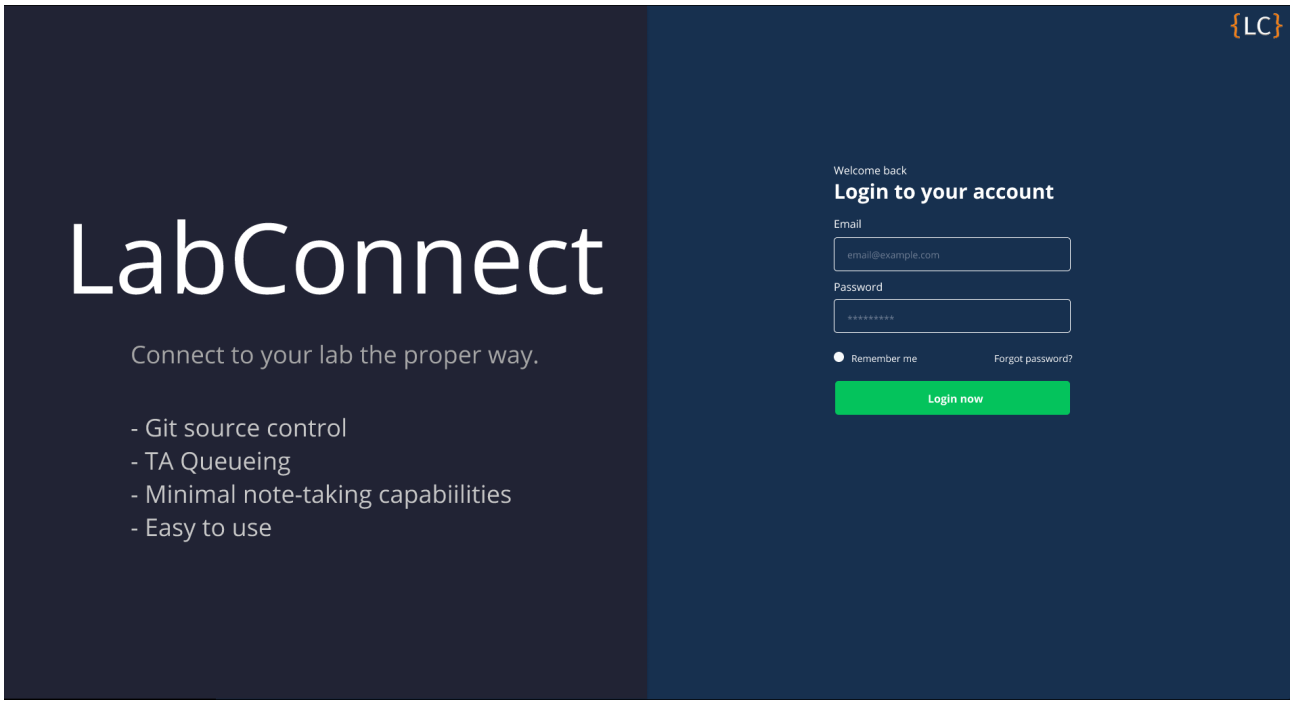

Figure 1: Complete view of the login UI

The view seen above in Figure 1 is the page every guest user will see upon visiting the website. On the left, a concise preview as to what the project is about, and is capable of, is provided. The features are also listed in order to give the user the ability to understand the inner workings of the system better, in case it may offer them a better experience utilizing the system later on. On the right, a similarly concise login panel is provided, with all of the common and basic features such as password recovery and a "Remember me" option.

It is noteworthy that the guest user is not given a choice to register a new account. The reason is that, for the time being, the user database is planned to be modified by the administrators of the system directly. The users are intended to login once they have been shared the credentials created for them.

4.1.2 Dashboard

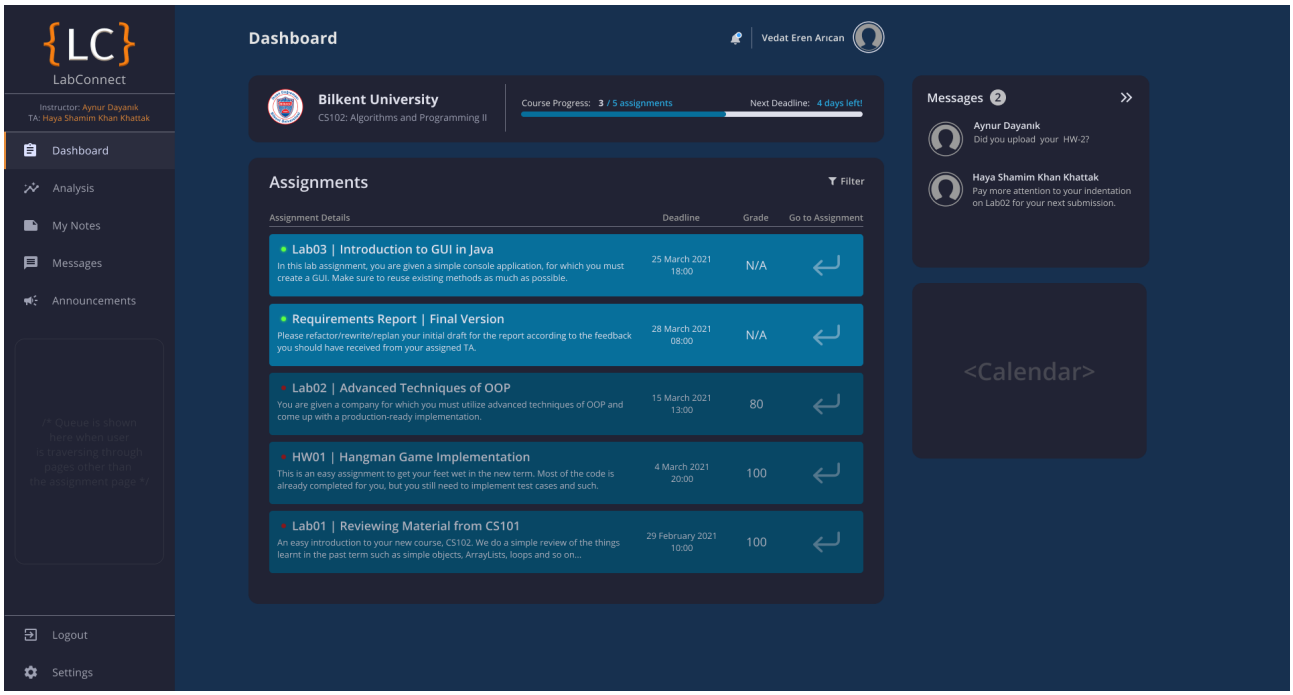

Figure 2: Complete view of the dashboard UI

The view above in Figure 2 is the page every logged in user will see as their "homepage". The goal is to provide the user with a simple and tidy overview of things requiring their attention. The main two panels, unique to the page, are located in the center column: A list of all assignments and a small status panel at the top of the screen. The assignment list panel is the main navigation method into each individual assignment. Certain details of each assignment are provided on this page, however, the user needs to click on an assignment in order to visit a page with more details and features. To make it clear that the assignment items are to be clicked on, an entrance symbol is provided on the rightmost side of the item. The rest of the elements visible on this page are recurrent throughout most, if not all, of the other pages. As such, their significance and properties will be elaborated on in the following paragraph.

The navigation bar (Figure 3) is the tool to be used to navigate anywhere on the application, as well as to show the user their current location. The bar shows brief information regarding their assigned TA and instructor, continued by a list of navigation options. Located at the very bottom of the list is two options for logging out and reaching the settings, the latter of which is not defined clearly as of yet. As such, the settings page is planned to be used should the need arise during the development process. The part on the bar highlighted in red is a reserved space to display the queue list of a live session in cases where the user is traversing pages other than the assignment page where the main queue list is located. By displaying a persistent queue list this way, the user experience is made more flexible as the user does not necessarily have to constrain themselves to staying on the

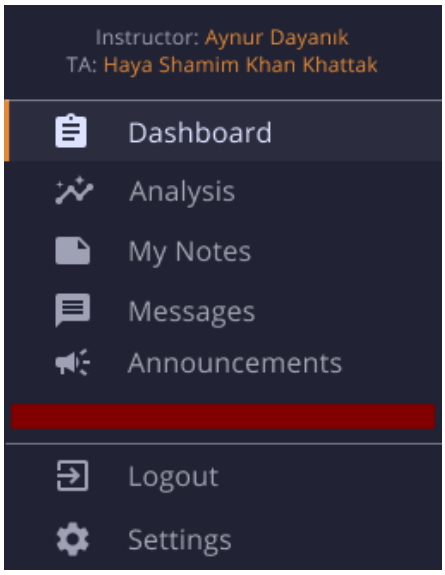

Figure 3: Navigation bar, shortened for illustration purposes

assignment page. Also, though the space in the figure is quite short, this is only for the purpose of illustration, and the true version of the persistent queue box is much more spacious.

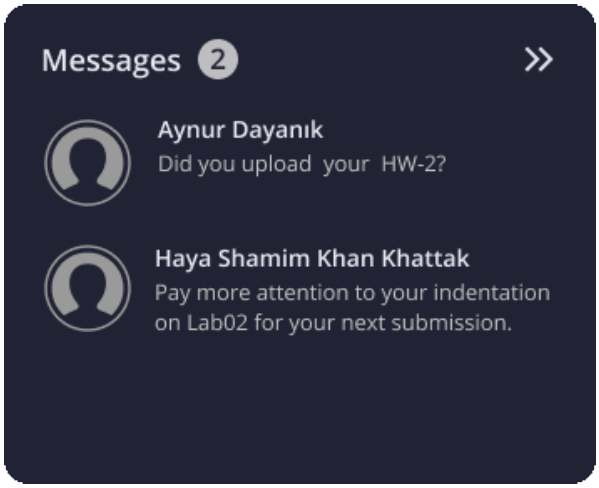

Figure 4: Messages mini-panel

The messages panel (Figure 4) serves the purpose of showing the user a brief outline of their unread messages without having to visit the full messages page. The user can click on any of the messages shown, or the right-pointing arrows on the top right, in order to visit their full messages page, where they can read and respond to messages. The calendar panel (located under the messages panel, see Figure 2) was not added in detailed manner to the design prototypes for the sake of simplicity. However, very plainly, its purpose is to show the user their assignment due dates visually by marking the days with due dates. It does not have any advanced capabilities at all, and is not exactly intended to be interacted with.

4.1.3 Messages

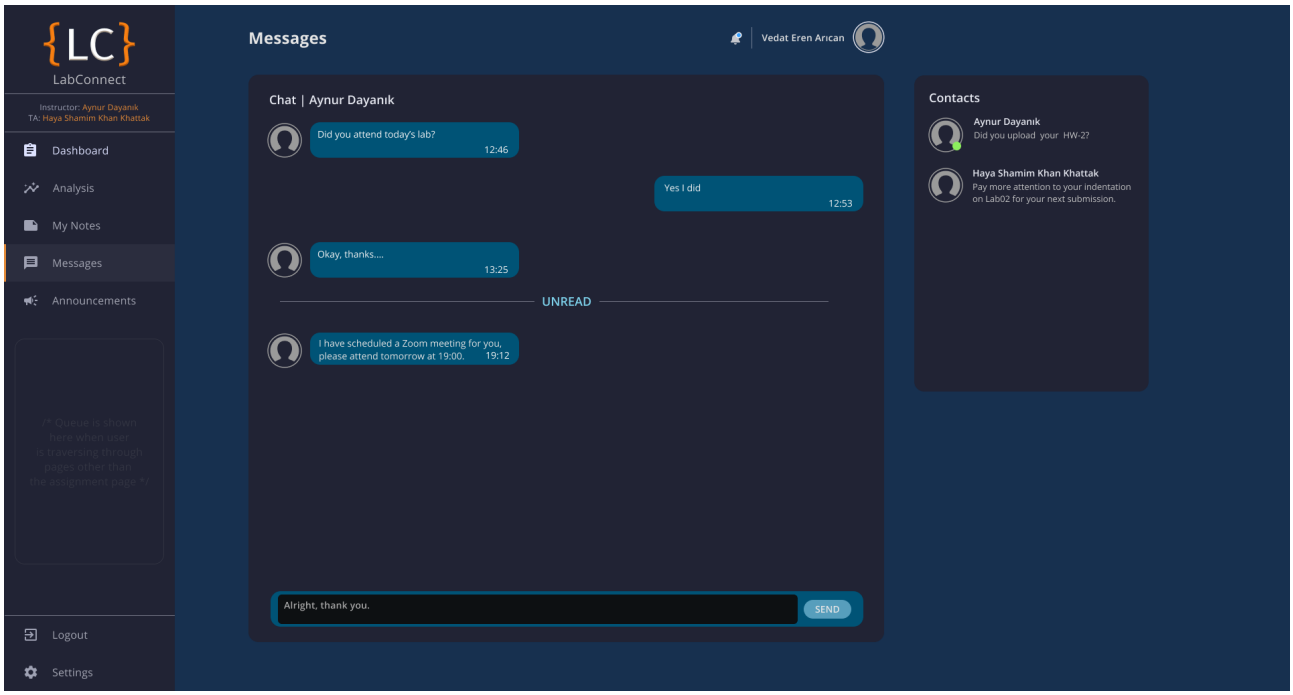

Figure 5: Complete view of the messages UI

Students, instructors and teacher assistants can send each other messages from the messages tab (Figure 5). By the overall design messages tab is fairly easy to use and self-explanatory. On the right hand side there is a contacts view which the registered contacts, contacts's online status and a small poriton of the last message is displayed. The conversation screen is displayed in the center item. Moreover, messages are displayed with the timestamp of the sending time and respondent's profile picture.

4.2 Student-specific Views

This subsection illustrates the pages involved in the user experience of a student account.

4.2.1 Assignment Details

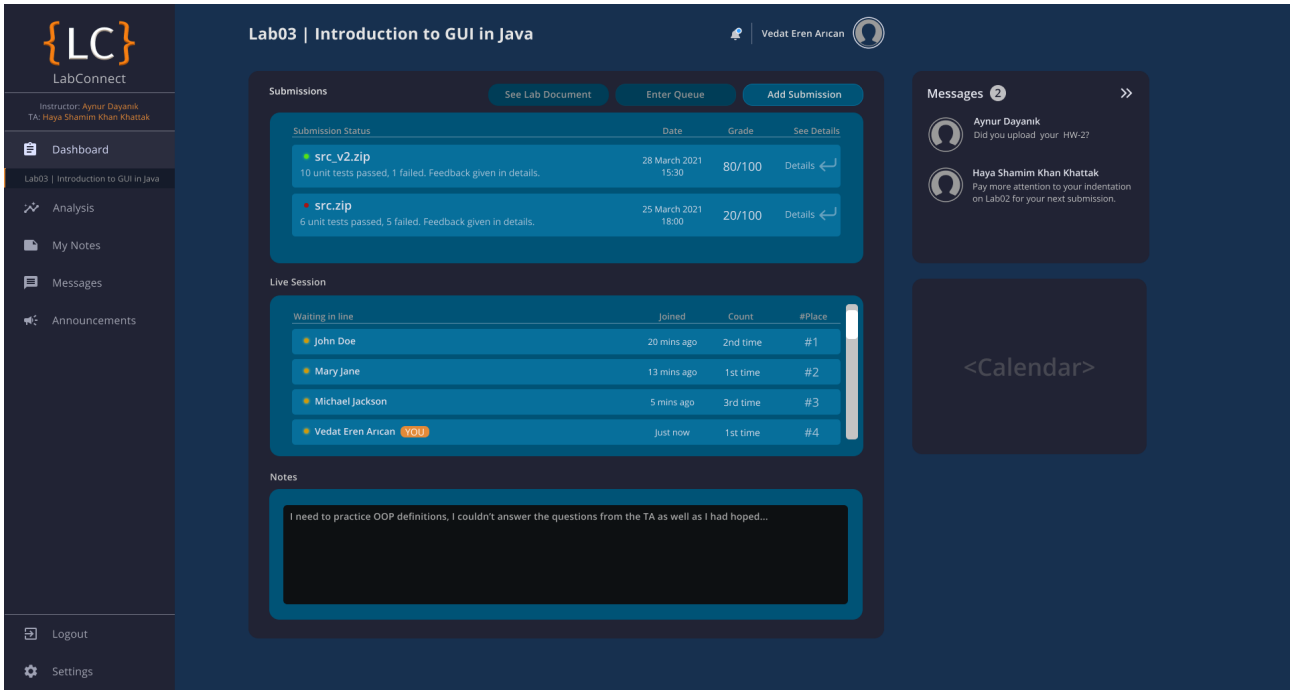

Figure 6: Complete view of the assignment details UI from a student's perspective

Once a student clicks on an assignment on the dashboard, the assignment details UI (Figure 6) is loaded. This interface contains three main sections, which are (from top to bottom):

- The "Submissions" section, where a student can check the status of their previous submissions and add new ones if necessary. The submissions are sorted based on the upload date. The student can view the upload date and grade for each submission, along with the submission's filename and a summary of the unit test results below that. Students can access detailed information about a submission by clicking the details button for that submission, which directs them to the assignment submission UI (see Section 4.2.2). To the left of the submission name is a circle colored either red or green, indicating the eligibility of the given submission for TA review. Buttons for adding a new submission, entering the review queue and viewing the assignment instructions are placed above this list.

- The "Queue" section, where the student can view the queue for their assigned TA if a live session is taking place. This section contains a scrollable list of students in the queue. The student can view the names of the people waiting in line, along with their place in the queue, their previous review count for this lab session and time elapsed since the given person joined the queue to get an idea of the waiting times.

- The "Notes" section, where the student can take personal notes about the given assignment. These notes can be accessed after the labs by clicking "My Notes" in the side bar. This

functionality can be used as a journal of sorts, which can help the student keep track of subjects that they need to practice more.

4.2.2 Assignment Submission

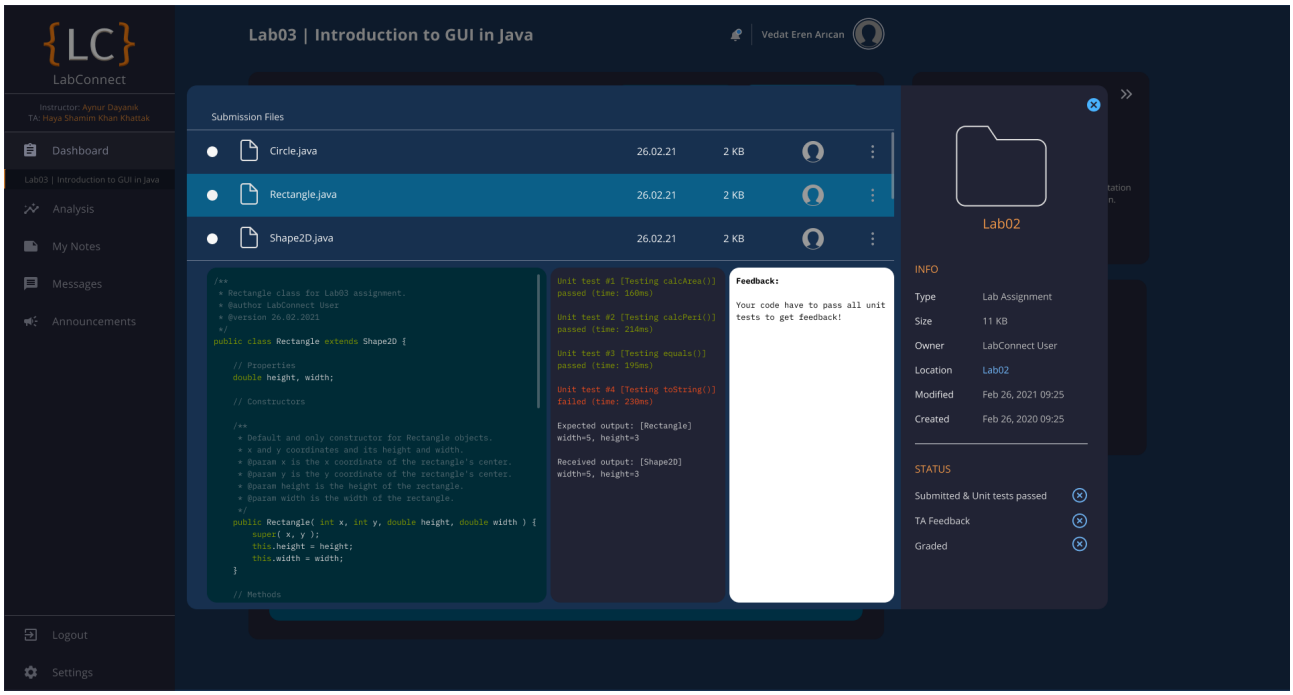

Figure 7: Complete view of the assignment submission UI from a student's perspective

On this screen (Figure 7), students can browse the files they have uploaded to the system as in a file explorer. After selecting the reladted file at the top of the window, three different sections parts will appear below: the preview of the code contained in the file itself, the outputs of the unit tests, and the TA's feedback to the file. Thanks to the code preview, students will be able to jump directly from the feedback to the part or line the TA refers to. In the area where the output of the unit tests is available, students will be able to see which part of the code does not work as desired and start to work on it immediately. Since TA feedback is clearly indicated on the same screen, students will be able to access the feedback they receive for each file in a systematic and organized way.

4.2.3 Analysis

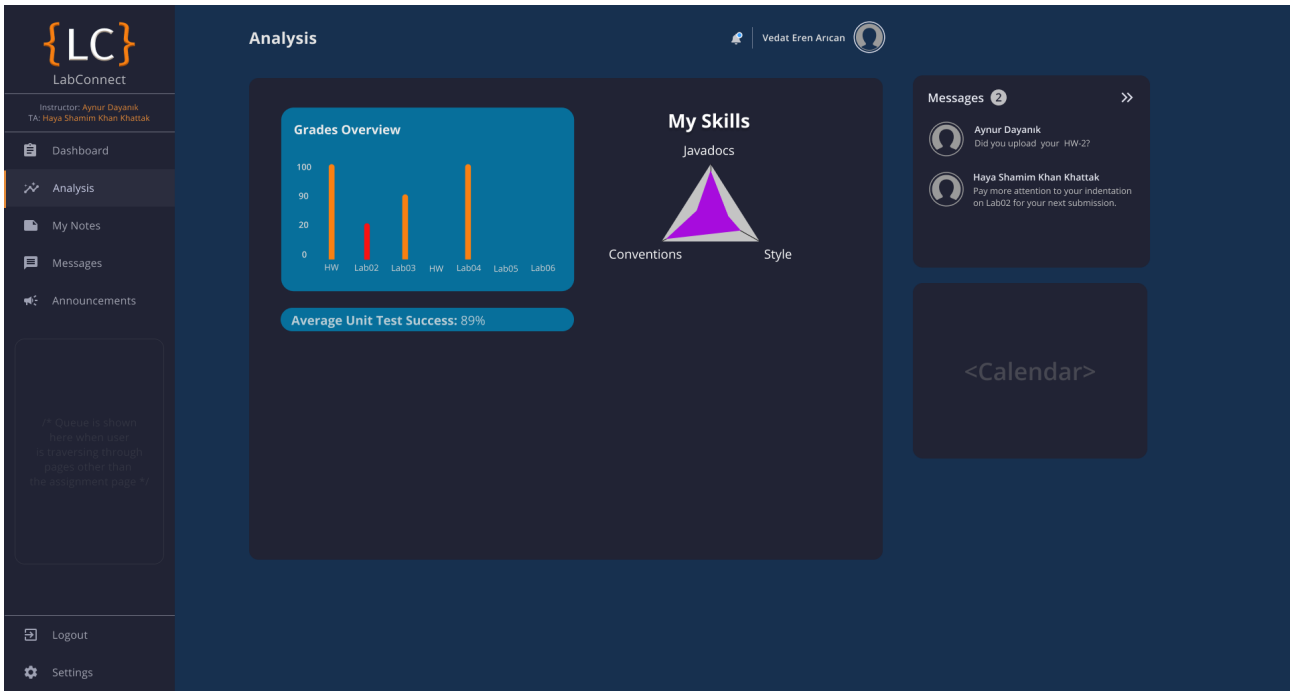

Figure 8: Complete view of the analysis UI from a student's perspective

In the analysis tab (Figure 8). Students can see their individual performance mainly about the lab, assignments and homework. The performance criteria that is displayed is overview of last assignments as graph (in the graph the averages that are lower than the pre-determined target will be indicated by another color), their documentation (Javadocs), compatibility with conventions and the style (compatibility with course or other specific guidelines) as triangle chart and finally average success at unit testing (how often they get stuck with standart and edge case testing [by percantage]).

4.2.4 Announcements

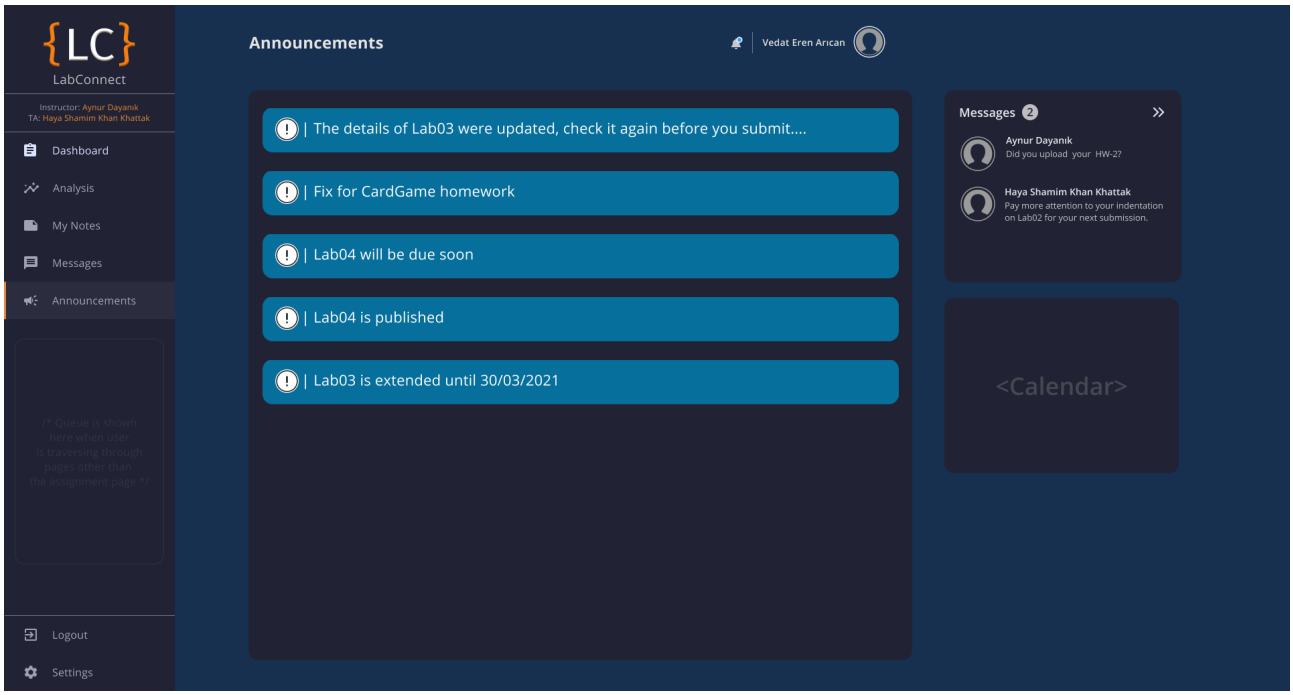

Figure 9: Complete view of the announcements UI from a student's perspective

In the announcements tab (Figure 9) students can see the course related announcements which is posted by instructor. This tab is working simultanously with the bell icon at the top of the screen. Whenever a new announcement is made the bell icon will change in order to indicate the arrival of the new announcement. When students click on the individual announcement the details of the announcement will be displayed as plain text.

4.2.5 Notes

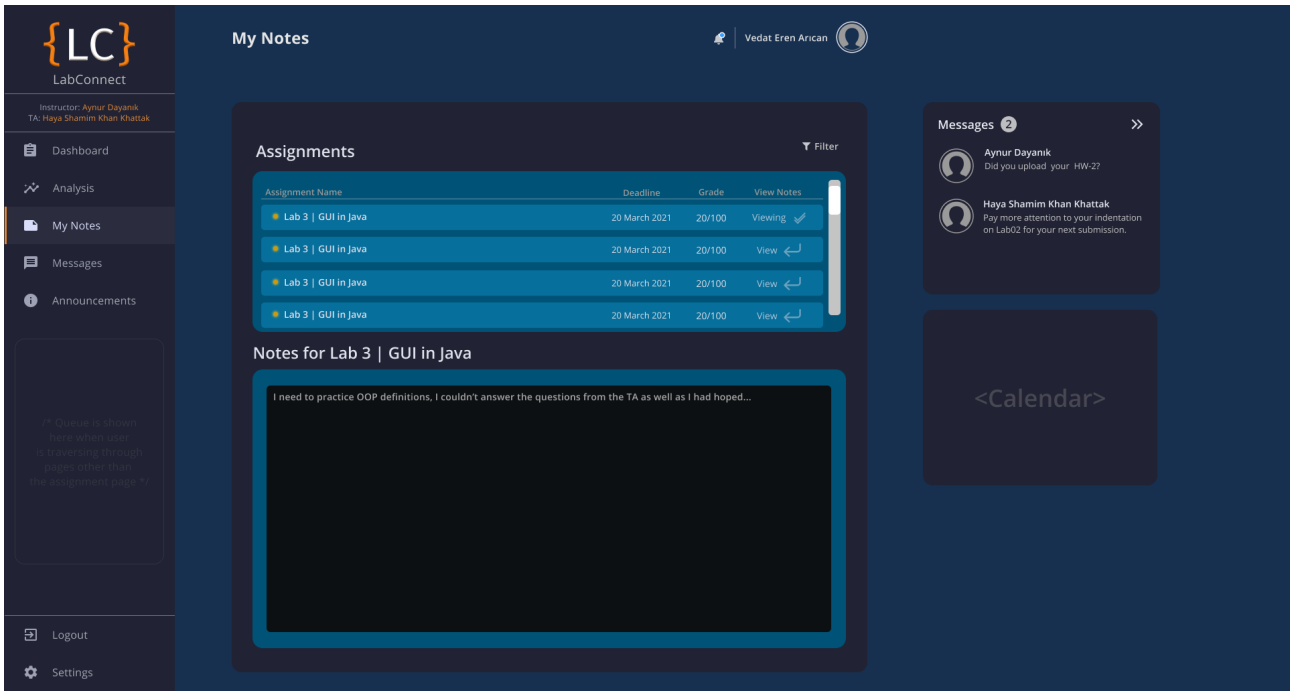

Figure 10: Complete view of the notes UI from a student's perspective

During code review taken by the TA, or a group work that is being held in the lab itself, the student would like a place for taking individual notes. These notes can be about their mistakes on the lab that is pointed out by the TA, or it can be about the project that the students are doing in groups. LabConnect supplies students with a proper place where students can take notes in an organised manner and they have the chance to save them and take a look at them afterwards if needed. This enables them to have a proper way of organising their ideas and they prevent them from missing out the things the Ta mentioned or suggested about. In the program, the notes are organised in a way that they are distributed and saved based on the assignment or the project itself. This way, their notes are well organised into subcategories based on the subject. As seen in figure 10, this interface contains two sections. The top section contains a list of assignments. The grade received for each assignment and the deadline of said assignment are visible for each list item. This allows the student to check the notes for assignments that received a grade of 80/100, for example. Once the student clicks on the "View" button for the desired assignment, the notes for that assignment are loaded to the bottom part of the screen.

4.3 TA-specific Views

This subsection illustrates the pages involved in the user experience of a TA account.

4.3.1 Assignment Submission

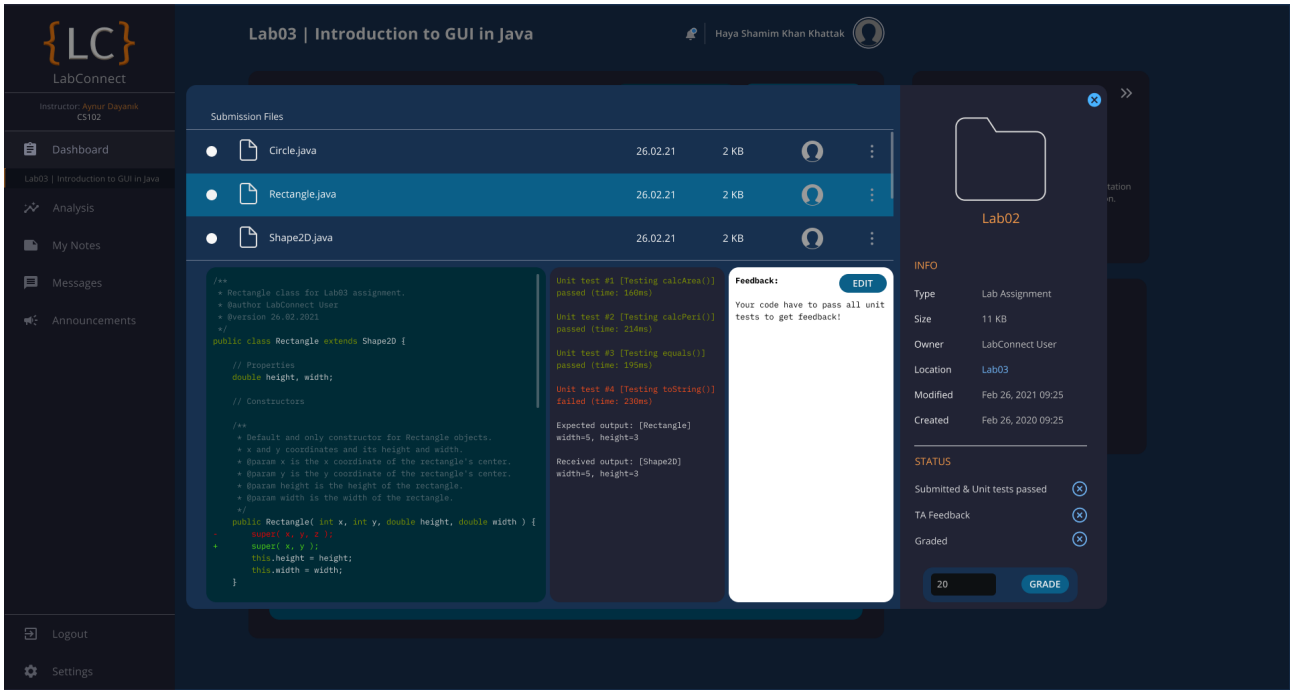

Figure 11: Complete view of the assignment submission UI from a TA's perspective

Whenever user (in this case teacher assistants) clicks on the specific assignment page, the assigned students and their submissions will be displayed (the live session page [Figure 12]) and if user click on any assignment an assignment submission details page will popup (Figure 11). Whenever user clicks on any document on this screen, user will see the code itself with solarized inspired syntax highlighting along with the results and details of the unit test. Next to that screen there is a feedback display that user can see the old (or current) feedback and edit the feedback. On the farmost panel, details about (such as creation date, last modification date, size) the whole folder (or archive file) can be seen. At the bottom of the informations part, the general status (which is grade, feedback and unit test status) about the assignment can be seen. Finally, at the end of the farmost right panel the grading screen can be seen, which user can enter the grade of this assignment.

4.3.2 Ongoing Live Session

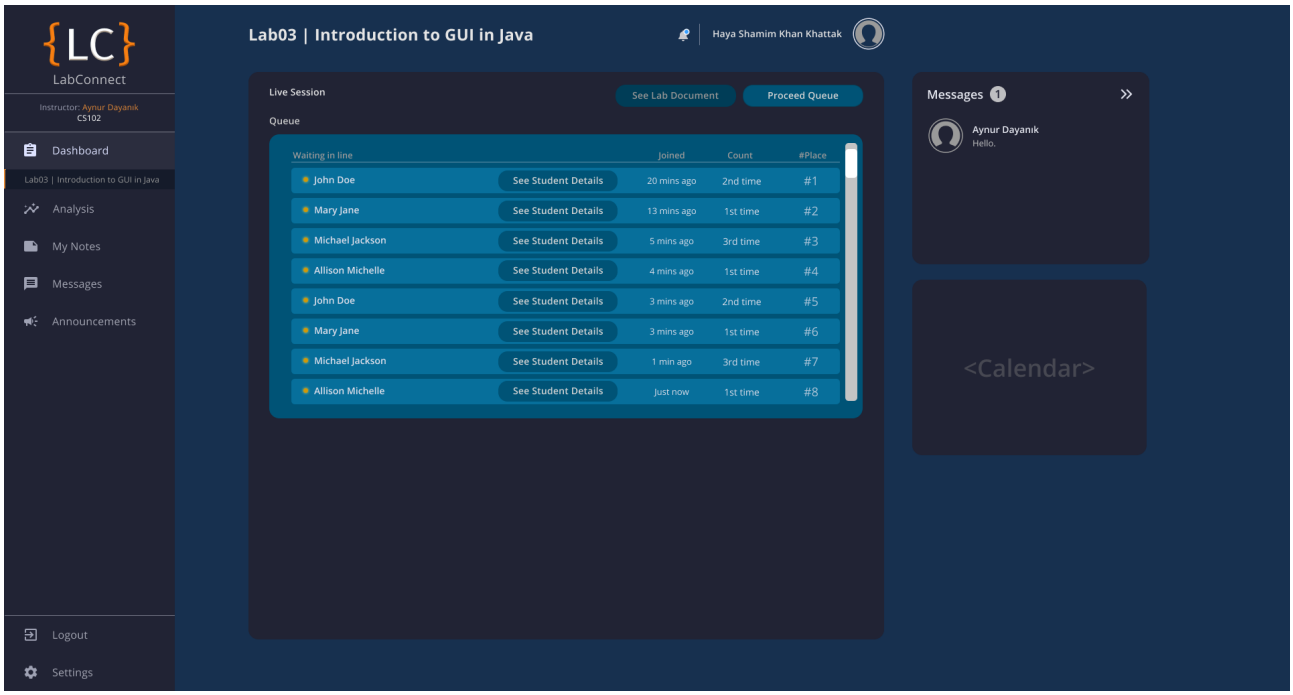

Figure 12: Complete view of the live session UI from a TA's perspective

In the Live Session page (Figure 12), teacher assistant can see the current status of the queue in the live lab session. At the top of the center item there is two buttons, the procceed queue button will procceeds the queue and pushes a notification to student (who is in the first place in queue) notifying that the TA is waiting them for feedback. Second button at the top, see lab document button, will display the lab prompt document. On the center console, TA can see every assigned student who submitted the work and waiting in the queue. Finally, whenever TA clicks the see student details button the assignment submission page will open (Figure 11).

4.4 Instructor-specific Views

This subsection illustrates the pages involved in the user experience of an instructor account.

4.4.1 Announcements

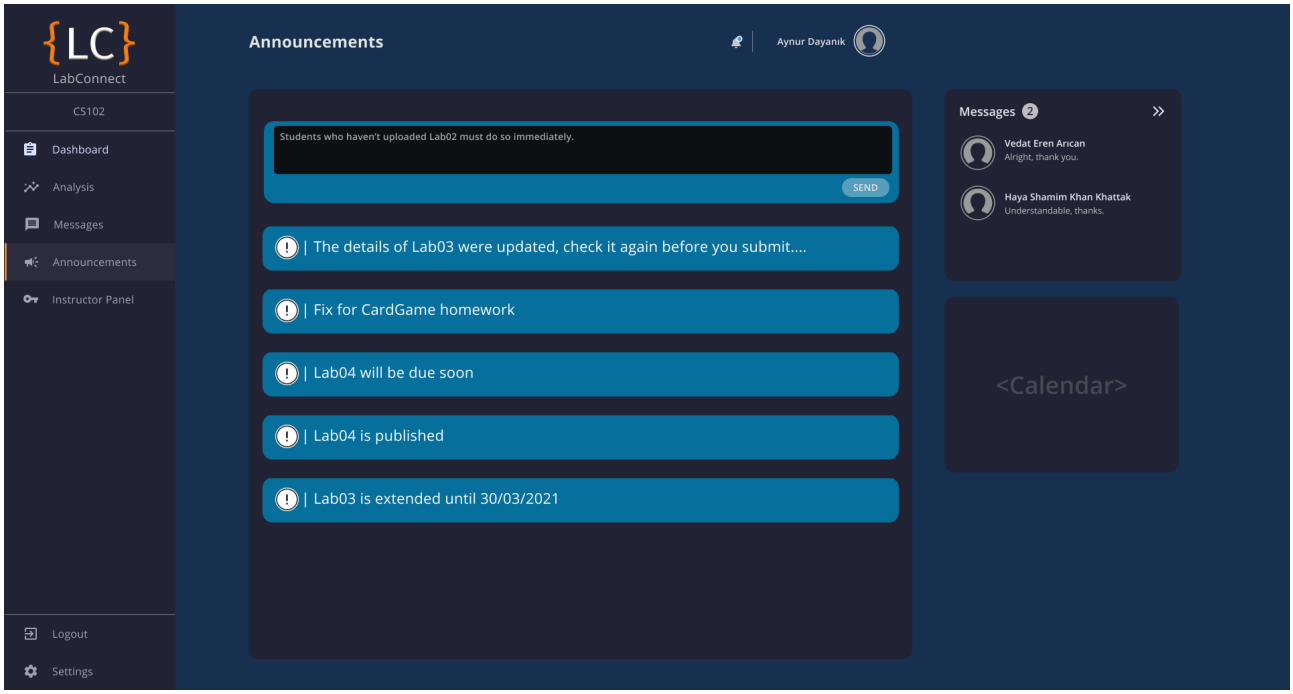

Figure 13: Complete view of the announcements UI from an instructor's perspective

In the announcement page (Figure 13), instructor can compose an announcement in the black message box. After composing instructor will click to send in order to select the sections which will receive the announcement. Also, similar to student view of announcements page, instructor can see old announcements on the center item.

4.4.2 Instructor Panel

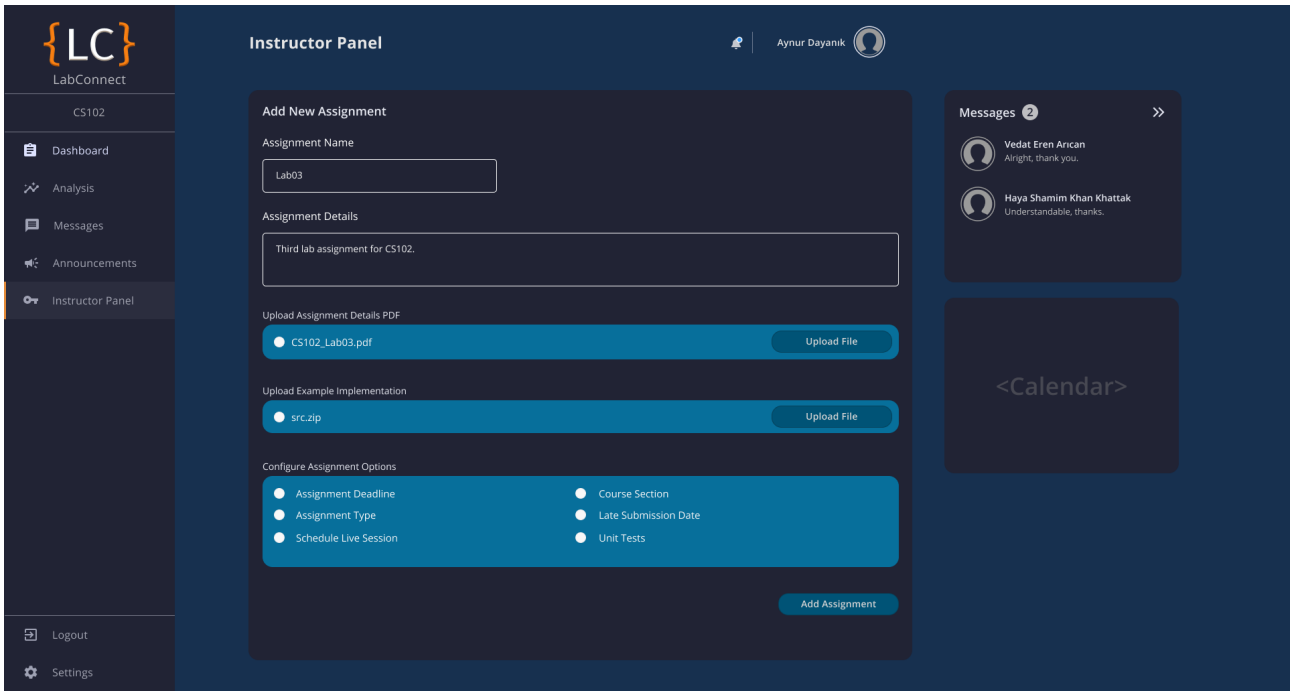

Figure 14: Complete view of the instructor panel UI from an instructor's perspective

In the instructor panel (Figure 14), instructor can upload various assignments. In the center item instructor can edit the assignments name, description, assignment prompt (details) document, test classes (which will be used in unit tests) and other various assignment options. On the last section of center item, instructor can specify the course section (which is going to receive the assignment), can determine the assignment deadline, late submission date and the live session. Finally, instructor can also set the assignment type and the unit tests that are going to be applied.

4.4.3 Analysis

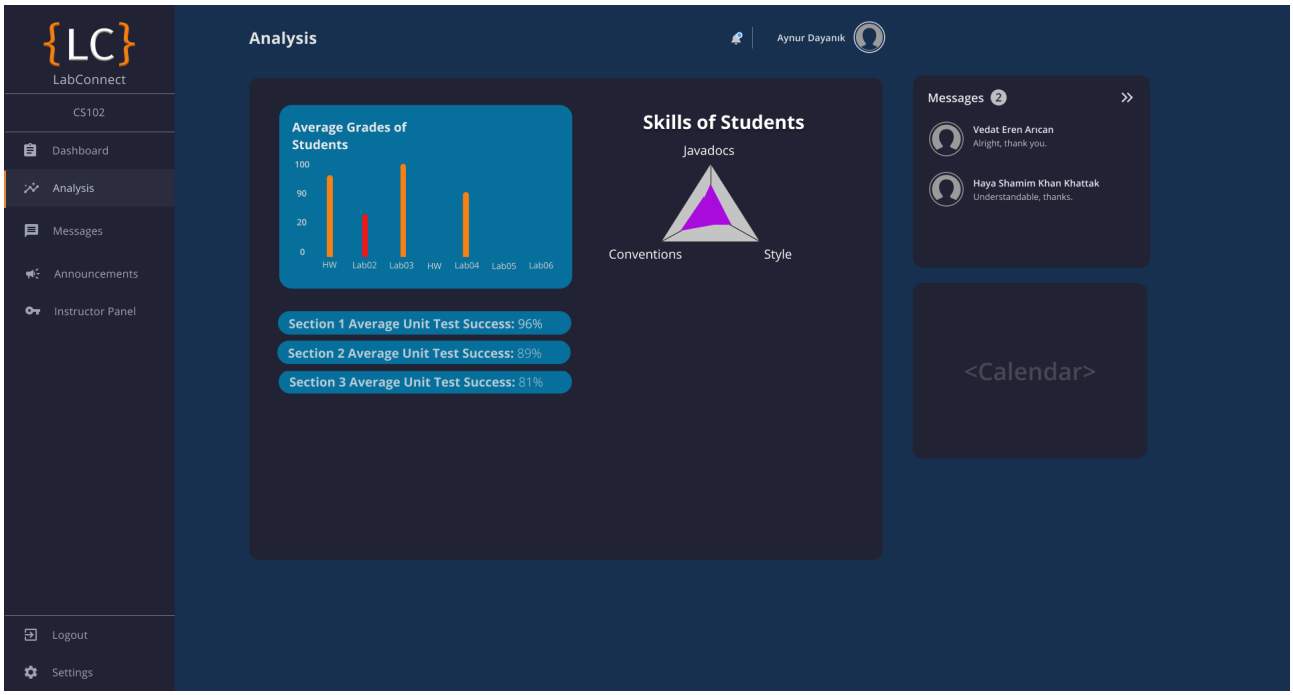

Figure 15: Complete view of the analysis UI from an instructor's perspective

In the analysis tab (Figure 15) instructors can view the performance average of all sections. The performance criterias are similar with the ones that displayed in the student view. On the left corner of the center item, the average grades (average of all sections) of assignments are displayed as graph. In the graph the averages that are lower than the pre-determined target will be indicated by another color. On the right corner the average skills of students which is based on documentation (Javadocs), compatibility with conventions and the style (compatibility with course or other specific guidelines) as a triangle chart. Finally, on the left end corner of the center item, the average success at unit tests of every section is displayed solely.

5 Final Remarks

The user interface of LabConnect was designed while being conscious of the experiences we have been undergoing for the past two semesters of CS courses. The same care that we had put into compiling a list of features that we thought would alleviate many of the issues we had observed, was put into designing an interface such that users would not be facing the interface as an obstacle at any point during their usage. Striving to remain as simple and to-the-point as possible, as the UI design matures throughout the development timeline, the plan is to continue to have a focus on being UX-oriented. The design we have formulated is by no means unique, as countless web applications adopt quite similar interfaces. However, rather than being seen as detrimental to the creativity of this design, we consider this wide usage to be a testimony of the design being a viable option for user satisfaction. Additionally, many users may be content with the advantage of being familiar with the interface from the very start.

Also, for the sake of coverage, another point to address is our decision of basing our design on a dark color scheme. Though we are concerned that the psychological association of lighter colors with professional-looking reputable websites may surprise some users upon their initial visit, we also firmly recognize that the programmers of our day have a strong preference towards interfaces with colors that do not stress the eye. Considering the fact that our project caters quite specifically to a user base consisting of programmers, we think that picking a lighter color scheme would have been frustrating to the overwhelming proportion of users who will be using this website among their otherwise dark-themed workspace. Alas, we have determined it most sensible to put our efforts into developing a dark-mode interface, though we may choose to add the option of switching to a light-mode theme in the later stages of the project's development.