Milestone 2 Report

Bethe OPS Project
March 8, 2019

1 Team

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2 Client

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3 Objective

The task for this project is to implement a responsive web interface for the Hans Bethe House that serves as an automated tool for house event sign-ups to replace the current mechanism of signing up for events on paper at the front desk.

The main objective of this report is to reiterate the requirements of the project from the client to ensure that the client and the team are on the same page in terms of expectations, review and receive feedback on the provisional design mockups, and document the progress made and the next steps to be made by both the user interface team and the back-end team. Finally, this report will give the breakdown of tasks and timeline in the form of a Gantt chart for the third milestone.

4 Requirements

4.1 Overview

The purpose of outlining the requirements is to document the requirements that are necessary features to include in the Bethe OPS, according to the client. These requirements have been deemed feasible to complete by the team, and after some negotiation and compromise in regards to time and technical constraints, the client has agreed these requirements are acceptable. The requirements are detailed in terms of each component of the system and project in the sections that follow.

4.2 Web Interface

A web interface is necessary for users to carry out important functions, such as signing up for events. The requirements for the web interface are as follows:

- Displays the upcoming events
- Displays a featured event on the landing page
- Allows students to sign up for events via a form that includes fields for the student's:
    - First name
    - Last name
    - Net ID
    - Place of residence (i.e., building name)
    - Contact phone
    - Comments
- Provides a profile for each event that contains important information pertaining to the event, including:
    - Event name
    - Event leader(s)
    - Event leader's email or emails if multiple event leaders
    - Event date
    - Event location
    - Event time (start and end)
        - If the event is not in Bethe, when to meet?
    - Event description
    - Number of spots remaining
    - Waitlist
    - Links or other details
- User-friendly (i.e., easy to navigate, appropriate yet concise amount of information)
- Responsive on any mobile device or desktop

4.3 Waitlist

In the common case all spots for an event are filled up, a waitlist must be available for interested students to join. The requirements for the waitlist component are as follows:

- Updates automatically to remove the person at the top of the waitlist when a spot on the event roster opens up (i.e., when someone on the event roster removes his/her name)

4.4 Email Notifications

The system should automatically send notifications to event coordinators and participants via email in various scenarios. The requirements for the email notification system are as follows:

- Sends a confirmation email when a student signs up for an event
- Sends notifications days and/or hours before an event to participating students and the event leader(s)
- Sends a notification when a student has been removed from the waitlist
- Runs actively in the background

4.5 Database

A database needs to be integrated into the system to store and archive data or information on the events posted. The requirements for a database are as follows:

- Stores all information regarding each event:
  - Event information (name, date, time, location, leader, etc.)
  - Sign-ups
  - Waitlist
- Allows administrators to download data stored within the database
- Archives the information by semester

4.6 Login System

The system needs to support various types of users and levels of authentication. The requirements for the login system are as follows:

- Integrates Cornell's login authentication system, CUWebLogin
- Supports an interface for students in which such permitted users can sign up for events, view their upcoming events, and remove themselves from any events they sign up for
- Supports an interface for event coordinators (e.g., GRFs, Active Citizens, students) in which such permitted users can add, remove, and edit events
- Supports an interface for administrators (e.g., house assistant dean) in which such permitted users have the same privileges as event coordinators in addition to downloading data from the database

4.7 System Hosting

Although system development will be local, the system will eventually need to be hosted on a proper server. The requirements for hosting the system are as follows:

- Supports the languages, technologies, and protocols used to implement the client and server side of the system
- Lives in some third-party hosting application or in a server provided by Cornell is any are available

4.8 System Maintenance

Given the team will only be developing the system within a semester, the system will need to be maintained once it is out of the team's hands. The requirements for maintaining the system are as follows:

- Be maintainable by the client as well as other developers that may continue building on the system in the future
    - Support from SSIT would be ideal for the client since the client typically resorts to CIT or SSIT for technical assistance
- Provide design documentation on the designs of the user interface, system, and programs detailing how each respective component is architected and implemented
- Comment source code with appropriately detailed specifications to clearly convey what each function does
- Provide project documentation detailing each feature of the system as well as possible extensions that can be taken into consideration in future development of the system

5 User Interface Progress

Since usability was listed as an important aspect of the web interface, for the first iteration, the user interface team was split into a design team, responsible for creating mockups for the display of the user interface, and the front-end team, responsible for writing the code for the user interface. Most of the first iteration was focused on creating a design that meets the client's expectations for the user interface.

5.1 Focus Group Meetings

Before making any user interface design decisions, the team held two focus group meetings in order to gain different user perspectives on what functionality and design is desired for the event sign-up interface. Focus group participants included Bethe House active citizens, GRFs, and residents. The participants agreed that automation of the event sign-up system is desired, and expressed several design preferences for the interface.

In terms of the design, participants of the focus groups emphasized the importance of a clean UI and clear presentation of the event posters. The focus groups listed the details of the event that they look for when signing up for an event, such as the date, time, location, sign-up limit, and contact information. The initial design includes these specific details in an event's profile.

5.2 First Iteration Design Mockups

When creating the overall design of the system, the team wanted to focus on creating a simple and centralized system that didn't require users to navigate many menus or open new windows. After defining a general user-flow for the system, the design team created multiple iterations of the student-facing user interface for the software, following the client's requirements. The variations between iterations mostly included changes to the sidebar that students can use to browse listed events and details and posters about said events are displayed.

A few viable solutions for the sidebar were identified. The variations were based on how much information to display in each cell. Our user interface review process identified these key elements to be included:

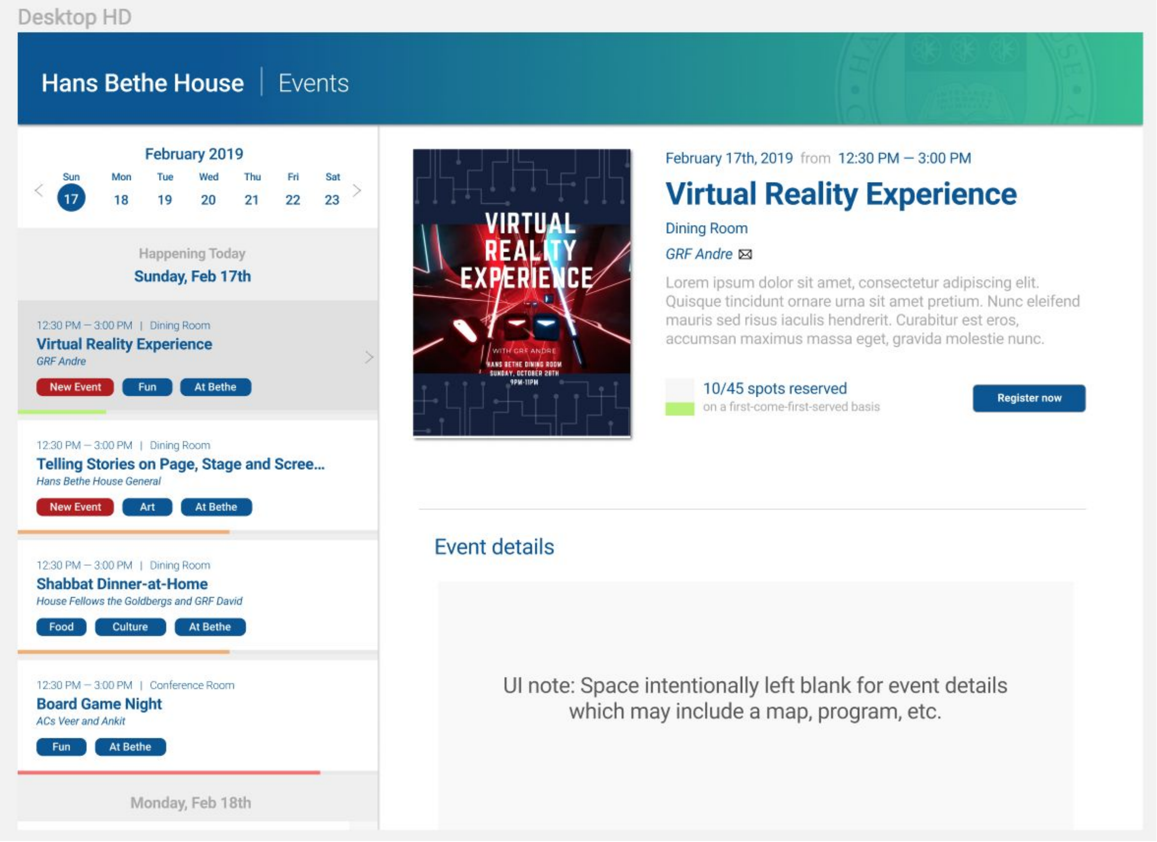
- Event poster
- Event date and time
- Event organizer
- Event location
- Event availability (the spaces remaining for each event)

Starting on the next page are the design iterations and the variations of the sidebars the design team created.

Event Landing Page Design

The design mockups for the first iteration include the main landing page for a student, as well as the sign-up form for an event. The team focused on allowing users to peruse a week’s worth of events with ease, and thus designed a scrolling sidebar for events. The design team then asked the client for feedback on this initial design.

After clarifying privacy concerns with the client, the team decided to add a feature in the area designated “UI note: Space intentionally left blank…” that displays a list of users who have signed up for the event and a waitlist for the event. When creating events, administrators will be able to control whether to display this list for the sake of privacy.



Desktop HD

Hans Bethe House | Events

February 2019

Sun	Mon	Tue	Wed	Thu	Fri	Sat
17	18	19	20	21	22	23

Happening Today
Sunday, Feb 17th

12:30 PM — 3:00 PM | Dining Room
Virtual Reality Experience
GRF Andre
New Event Fun At Bethe

12:30 PM — 3:00 PM | Dining Room
Telling Stories on Page, Stage and Scree…
Hans Bethe House General
New Event Art At Bethe

12:30 PM — 3:00 PM | Dining Room
Shabbat Dinner-at-Home
House Fellows the Goldbergs and GRF David
Food Culture At Bethe

12:30 PM — 3:00 PM | Conference Room
Board Game Night
ACs Veer and Ankit
Fun At Bethe

Monday, Feb 18th

February 17th, 2019 from 12:30 PM — 3:00 PM

Virtual Reality Experience

Dining Room

GRF Andre ✉

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque tincidunt ornare urna sit amet pretium. Nunc eleifend mauris sed risus iaculis hendrerit. Curabitur est eros, accumsan maximus massa eget, gravida molestie nunc.

10/45 spots reserved
on a first-come-first-served basis

Register now

Event details

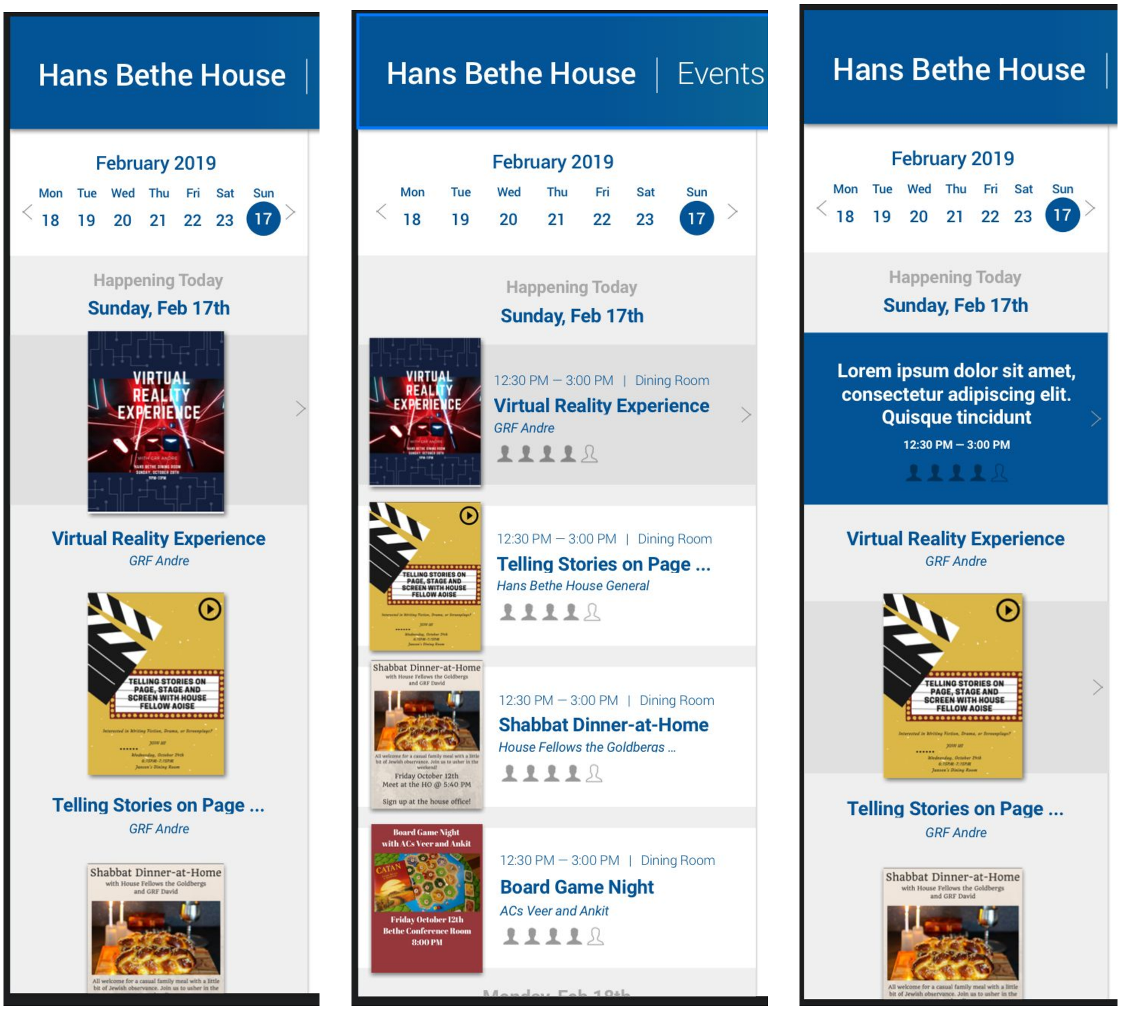
UI note: Space intentionally left blank for event details which may include a map, program, etc.

Initial event landing page design

Sidebar Designs

The following are the various sidebar designs created based on client feedback from the original event landing page design. The client emphasized the importance of displaying the posters in the sidebar, so the design team explored a few options with this in mind.

While the client emphasized the importance of a visual-based sidebar, the team still felt that including text describing crucial details such as the event title, time and location could serve as a quick and simple way of conveying such information to users without requiring them to open the event. After receiving some user feedback from the client's team of GRFs and undergrads, the client and the team agreed to search for a compromise between including both posters and basic text information (reduced from the information included in the original design). A few potential ideas that the team considered are shown below.



Hans Bethe House

February 2019

Mon Tue Wed Thu Fri Sat Sun

18 19 20 21 22 23 17

Happening Today

Sunday, Feb 17th

Virtual Reality Experience

GRF Andre

Telling Stories on Page ...

GRF Andre

Shabbat Dinner-at-Home

Hans Bethe House | Events

February 2019

Mon Tue Wed Thu Fri Sat Sun

18 19 20 21 22 23 17

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Sunday, Feb 17th

12:30 PM – 3:00 PM | Dining Room

Virtual Reality Experience

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House Fellows the Goldbergs ...

12:30 PM – 3:00 PM | Dining Room

Board Game Night

ACs Veer and Ankit

Monday, Feb 18th

Hans Bethe House

February 2019

Mon Tue Wed Thu Fri Sat Sun

18 19 20 21 22 23 17

Happening Today

Sunday, Feb 17th

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Quisque tincidunt

12:30 PM – 3:00 PM

Virtual Reality Experience

GRF Andre

Telling Stories on Page ...

GRF Andre

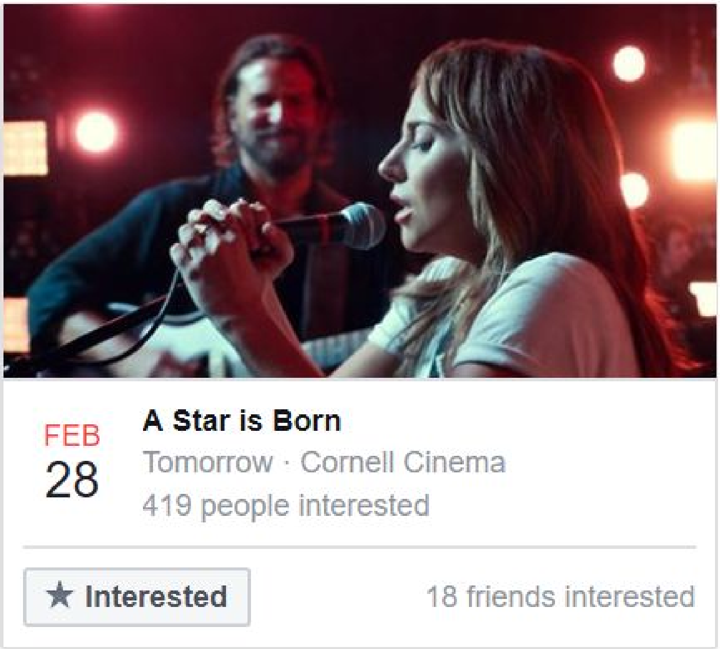
Shabbat Dinner-at-Home

From left to right: (a) Poster with basic text, (b) Poster with more detail, (c) Poster with hover info

In example (a), the team mainly displayed the posters with very basic information listed underneath the event. In example (b), the poster is smaller and displayed to the side of the event like an event icon, with the main focus on the text details. This design allowed the team to display more text information in consistent locations between events, but sacrificed the size of the posters, which the client valued. Finally, in example (c), posters are displayed with basic information listed underneath, and additional details are shown using a solid overlay when the user hovers over the event.

The design team considered alternative ideas, such as a format similar to Facebook events (see image below), in which the posters could be cropped and used like a "cover photo" or "profile picture" for the event. The team also considered the possibility of using horizontal instead of vertical posters, however, the client informed us that this would not be possible.

With that, the design team proposed the sidebar designs to the client and her team. The majority of her team, mainly undergrad students, preferred (b) whereas some of the GRFs and the client herself preferred (c). The design team will decide on a final design for the sidebar and incorporate it into the second iteration landing page design in the second iteration.



FEB
28

A Star is Born

Tomorrow · Cornell Cinema

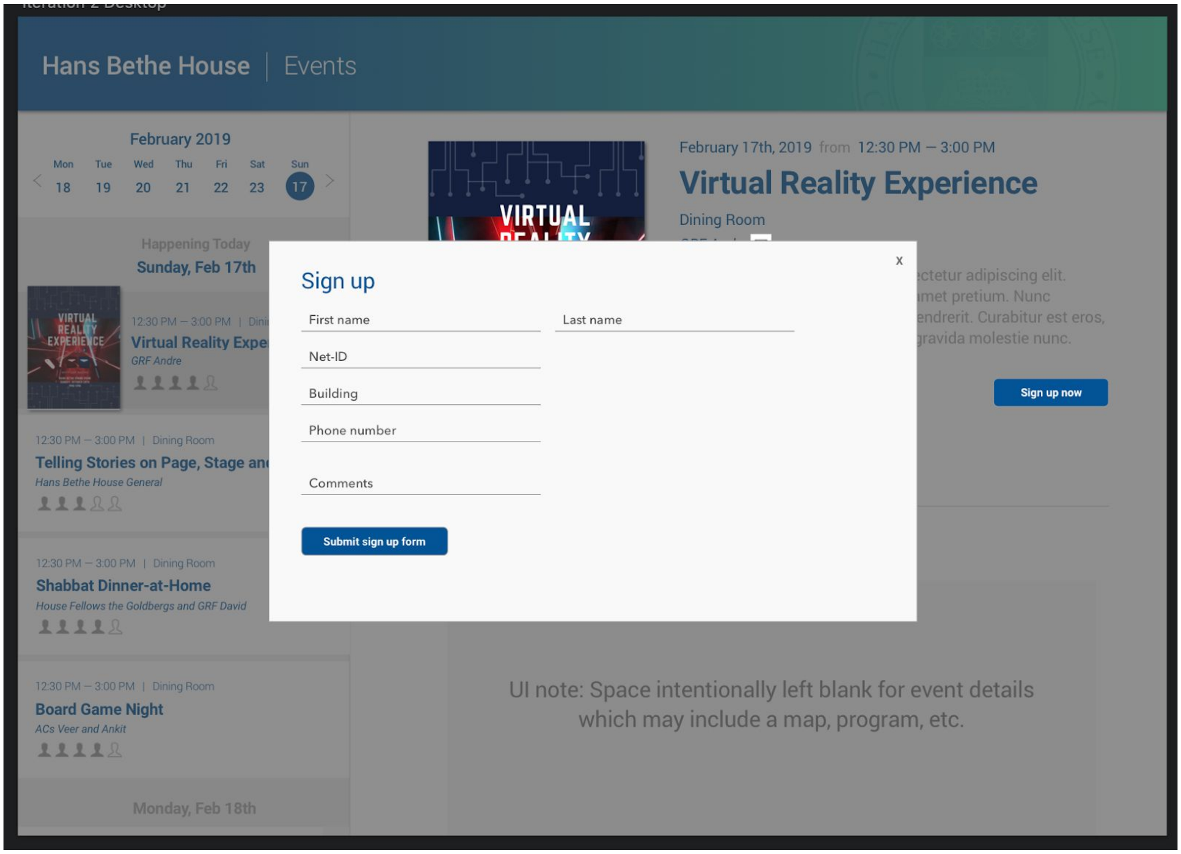
419 people interested

18 friends interested

Sample Facebook event used for reference

Sign-Up Form Design

The sign-up screen contains fields for the collection of information that was identified by the client to be necessary.



UI note: Space intentionally left blank for event details which may include a map, program, etc.

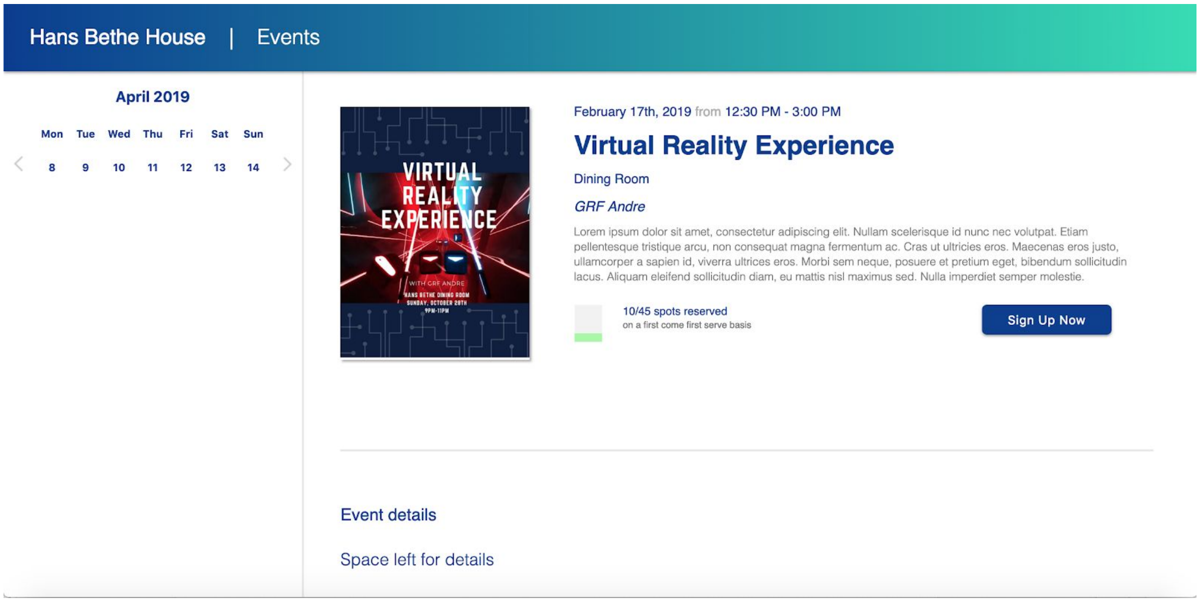
Sign-up form design

5.3 First Iteration User Interface Front-End Implementation

The front-end subteam worked on implementing the user interface for the event landing page as well as the sign up form as shown in the design mockups. To do this, the subteam utilized the framework Materialize CSS and built the basic functionality using HTML/CSS/JavaScript. With linking the user interface to backend in mind, the front-end team also created the necessary file structure for integrating Express templating. After receiving feedback from the client about the initial design mockups, the user interface team concluded that the design of the events that show up on the sidebar needs further discussion and should be adjusted, so the front-end team is holding off on fully implementing the sidebar until the next iteration.

Currently, the implementation of the user interface includes the general layout of the event landing page, the event details which displays the event poster and main details, the horizontal weekly calendar on the sidebar, and the sign-up form. The user can click on the left and right arrows on the weekly calendar to view previous and future weeks, respectively. The basic functionality of the sign-up form has been implemented, and the developers are able to extract information submitted from the sign-up form. As of now, a sample event has been hard coded to the user interface.

Front-End Implementation Event Landing Page



February 17th, 2019 from 12:30 PM - 3:00 PM

Virtual Reality Experience

Dining Room

GRF Andre

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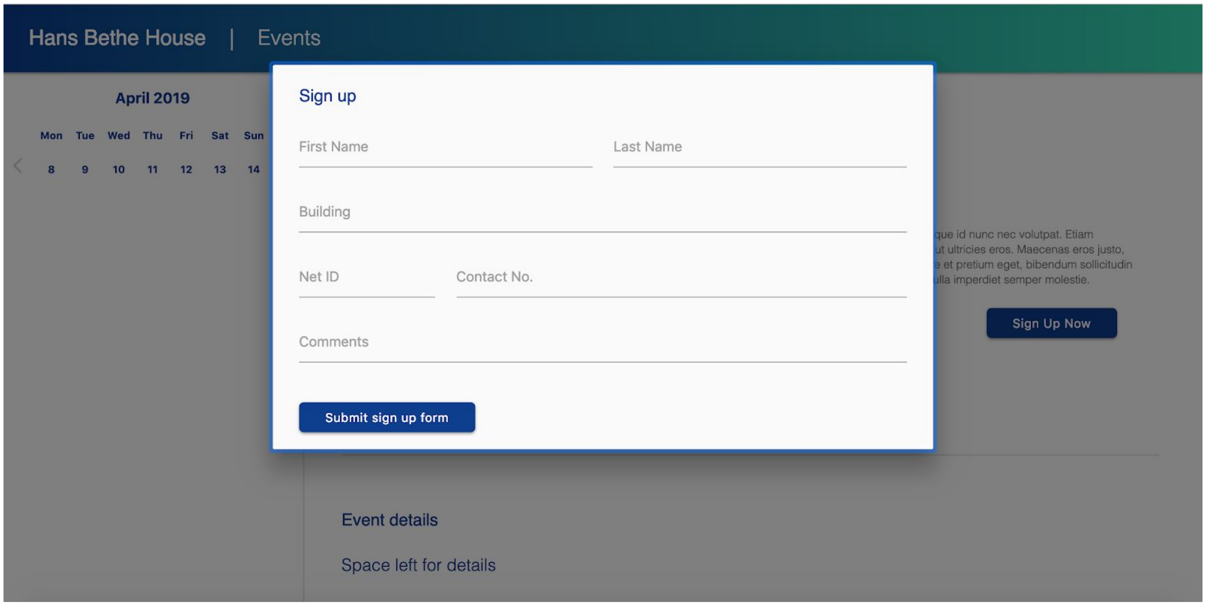
10/45 spots reserved
on a first come first serve basis

Event details

Space left for details

Front-End Implementation Sign-Up Form



que id nunc nec volutpat. Etiam
ut ultricies eros. Maecenas eros justo,
e et pretium eget, bibendum sollicitudin
ulla imperdiet semper molestie.

Event details

Space left for details

6 User Interface Next Steps

6.1 Design Next Steps

Sidebar Reviews

The design team will review the sidebar options using the preliminary design iterations it currently has and identify which information the team wants included in the sidebar to ensure clarity and brevity for users.

Event Detail Screen Refinement

The design team will review the current design's event detail screen and determine which elements it wants to maintain and which it wants improved or removed. The event availability indicator is under review to ensure that it meets the client's needs.

Administrative Interfaces

Most of the design team's efforts until this point has been focused on building an interface for students signing up for events. As a part of the next iteration, the design team will design interfaces for event leaders and admins.

6.2 Front-End Next Steps

For the next iteration, the front-end subteam's main goal is to have a functional user interface for students, and begin the implementation of the administrative side. This includes linking the front-end and the back-end.

Regarding the user interface front-end implementation, the front-end subteam plans on adjusting the current event landing page based on the adjustments made to the designs after getting client feedback. The front-end team will then finish the implementation of the event landing page, including the sidebar. After these adjustments, the design and navigation on the event landing page should be functional, and user testing for the interface can begin. After, the front-end team plans on beginning the implementation of the UI of the administrative interface for the various users according to the desired design of the client. The goal will be to at least finish implementing the general layout and functionality of the administrative interface.

In order to make the user interface fully functional, the front-end team will start to link the user interface to the backend database. This will be done by using Node Express templating. Our goal for the next iteration is to dynamically load event information data onto the event landing page.

7 Back-End Progress

Before implementing any back-end functionality, the back-end team needed to meet with SSIT members to address a few concerns such as hosting the system, integrating CUWebLogin as the system's login authentication component, checking if there was an emailing API specific to Cornell mass mailing, and support for databases. The client and the back-end team were under the assumption that Cornell had servers available to support hosting systems, such as the Bethe OPS, an email API as described above, and databases available for Cornell-related systems. Meeting with members of SSIT that the client referred the team to essentially resulted in the conclusion that these services and support were not provided by Cornell, and, thus, the client and the team would need to find solutions to these requirements. As for integrating CUWebLogin, this implementation is doable but requires time as further discussed in section 7.3.

System design and implementation was held off due to the need to schedule a time to meet with the SSIT team and discuss these issues. Thus, the back-end team spent most of the first iteration on system design and preliminary implementations of the various back-end components to ensure the technical feasibility of implementing these components, and to visualize how these functions can be fully developed and integrated with the entire Bethe OPS system.

7.1 Routing

Since the main focus of the first iteration was developing the system design, user interface, and front-end, the routing in the back-end has not been fully established. Currently, the back-end team has basic routing for handling requests (GET, POST, etc.) for a few pages. such as the landing page.

As the project develops, the back-end team will refactor the code using Express's router-level middleware. This will allow the back-end team to have separate .js files for handling requests for different pages, and make the code easier to understand and debug for future use.

Since the system is expected to allow users and admins to log in, the back-end team will have to deal with cookies and handle different sessions. Luckily, Express has middleware to handle this. Additionally, the back-end team will need to update its current routing functions, specifically the callback functions, to handle the functionality of having different sessions.

Finally, the back-end team will need to connect the back-end to a MySQL database too. This is discussed in section 7.5 below.

7.2 Hosting the System

As mentioned above, Cornell does not provide servers for hosting systems such as Bethe OPS as the client and the team had assumed. As a result, the client and the team will need to consider third-party hosting options, as recommended by the SSIT members the team spoke to. One of the options for hosting the back-end team considered and recommended to the client is AWS since that is a common third-party hosting service that Cornell uses to host many of its applications; the back-end team could sign the client up for a one-year free trial to test and develop on while it is working on the project this semester. The client understands that she will need to take responsibility for providing the resources (e.g., budget) to support third-party hosting for the system and that this will likely to a significant amount of time. Given these circumstances, the client is fine with allowing the team to mainly focus on developing in a local environment, and not worry about finding and setting up third-party hosting for the system. The back-end team will still likely set aside time and resources to compile a set of options for third-party hosting the client can consider.

7.3 Login Authentication

After speaking with members of SSIT, the back-end team was able to confirm that using Cornell's login authentication system, CUWebLogin, is possible. However, to acquire permission to utilize CUWebLogin, the team will need to submit an application and may require sponsorship from SSIT. SSIT agreed to carry out this process for the team, and the back-end team is currently waiting on a response from the members of SSIT it spoke with.

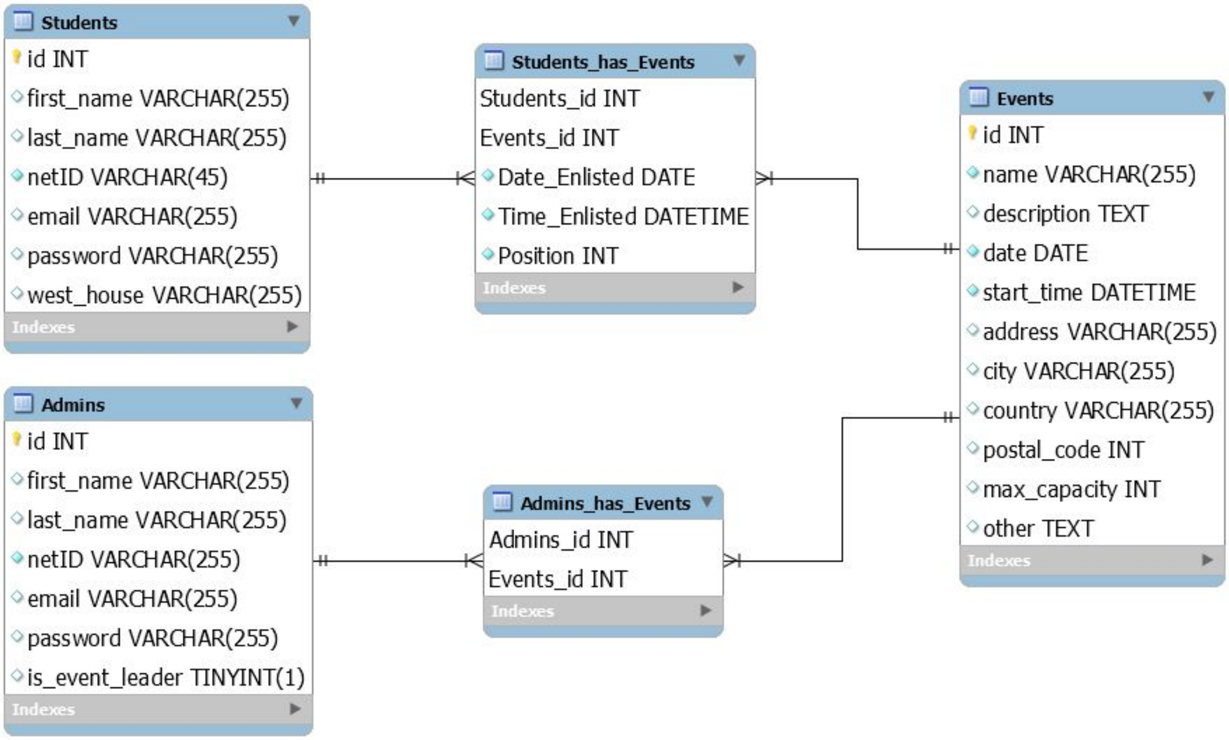
7.4 Preliminary Email Notification System Setup

To implement the email notification system, the back-end team utilized the Nodemailer module, which can send an email given the recipient email, the subject, and the message. For this module to function, the back-end team changed Gmail settings to allow non-secure apps to access gmail. For the preliminary email notification system setup, the server sends an email every time users access the route '/email'.

7.5 Database Design

Since data about users, admins, events, etc. needs to be stored, the back-end team decided to use a database. The first design decision made by the back-end team regarding decisions is to use a relational database rather than a non-relational database. This is as there were clear relations between the entities (users, admins, etc.) that were of interest. Thus, the back-end team decided upon MySQL as the database of choice due to its popularity, large amount of documentation, and ease of integration with NodeJS. Additionally, MySQL's open-source software, MySQL Workbench, allows us to easily create the database.

After several design meetings with the client to specify the type of data that is stored, the back-end team designed an enhanced entity-relationship (EER) diagram to represent how the data would be stored in the database. The following EER diagram was created using MySQL Workbench.



EER diagram

Each table in the above diagram represents an entity (except the tables "Students_has_Events" and "Admin_has_Events"). Specifically, the entities in the EER diagram are "Students", "Admins", and "Events". The two other tables, "Students_has_Events" and "Admins_has_Events", are intermediary tables that indicate a many-to-many relationship between "Students" and "Events" as well as between "Admins" and "Events". The intermediate table "Students_has_Events" has additional fields besides the IDs of the students and events, which will be used for implementing the waitlist.

The back-end team decided not to include a table to represent "event leaders" as this would add extra clutter to the diagram. Instead, the back-end team added an extra field in the “Admin” table called “is_event_leader”, which indicates whether an admin is an event leader or not.

Based on the information provided by the client, the EER diagram captures all the requirements. By using the “forward engineer” feature available in MySQL Workbench, the database has already been instantiated. Additionally, any future updates to the database can be easily implemented.

The next steps are to find hosting for the database as well as to implement query requests in the routing. Once this is done, extensive testing will be done to ensure the connection between the back-end and database is robust and functional.

8 Back-End Next Steps

Implementation: Routing, Email Notification, and Database

In regards to next steps, the back-end team will transition from system design and start the implementation stage, specifically for routing, the email notification system, and the database. For routing, the back-end team will implement a complete routing setup that includes the necessary URLs to cover all the required pages or interfaces (e.g., the landing page, the administrative interfaces).

For the email notification system, the back-end team aims to implement a setup that sends an email when (i) a student signs up, (ii) a student removes him/herself from an event roster, and (iii) a student is removed from the waitlist and added to the event roster. At the moment, the preliminary email notification system setup executes on the ‘/email’ route. The back-end team will remove the ‘/email’ route and instead implement the email notification system to be a separate set of functions that are appropriately called when certain events occur (e.g., when a student signs up for an event, when it is the day before an event).

For the database, the back-end team plans to set up a MySQL database with all the tables included in the ER diagram depicted in section 7.5 and to connect the database with the rest of the system. Functionality to store data extracted from event profiles and sign-ups, as well as data concerning users (e.g., students, event leaders, admins) in the appropriate tables, will be implemented as well for the database.

Hosting

As described in section 7.2, the back-end team will not prioritize setting up third-party hosting for the system, as consented by the client. The back-end team will focus on local development, but it will also look into third-party hosting options to consider for the future when the system will need to be deployed.

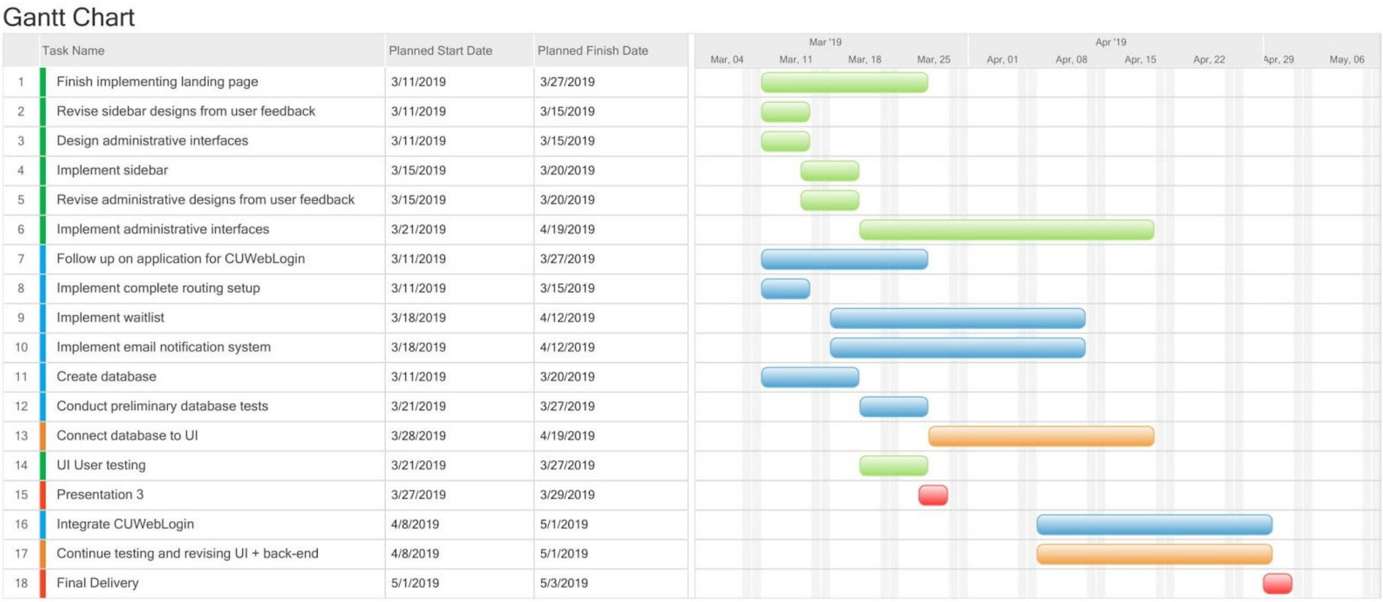
Follow-Up on CUWebLogin

As for login authentication, the back-end team will follow up with the SSIT members on the status for the CUWebLogin application and any required sponsorship needed to use Cornell's login authentication system in Bethe OPS. The back-end recognizes this will take time; thus, in the meantime, the back-end team will implement a baseline login and sign-up system for the purposes of developing the administrative interfaces and database functionality.

9 Timeline and Tasks

The Gantt chart below shows the team's revised schedule for the remainder of the project. By the third milestone, the team hopes to have a fully implemented landing page; a prototype implementation of the account interfaces for each of the student, event leader, and admin users; a complete routing setup according to the system design; a connected and working database; and a basic email notification setup with the functionalities outlined in section 8. After the third milestone, the team plans to finish implementing any remaining requirements still required by the client, and continuing user and program testing for quality assurance.

The green bars represent tasks to be done by the user interface team, the blue bars represent tasks to be done by the back-end team, the orange bars represent the tasks to be done by both the user interface and the back-end team, and the red bars represent presentations or final delivery by the team to the client.



Gantt Chart

	Task Name	Planned Start Date	Planned Finish Date
1	🟩 Finish implementing landing page	3/11/2019	3/27/2019
2	🟩 Revise sidebar designs from user feedback	3/11/2019	3/15/2019
3	🟩 Design administrative interfaces	3/11/2019	3/15/2019
4	🟩 Implement sidebar	3/15/2019	3/20/2019
5	🟩 Revise administrative designs from user feedback	3/15/2019	3/20/2019
6	🟩 Implement administrative interfaces	3/21/2019	4/19/2019
7	🟦 Follow up on application for CUWebLogin	3/11/2019	3/27/2019
8	🟦 Implement complete routing setup	3/11/2019	3/15/2019
9	🟦 Implement waitlist	3/18/2019	4/12/2019
10	🟦 Implement email notification system	3/18/2019	4/12/2019
11	🟦 Create database	3/11/2019	3/20/2019
12	🟦 Conduct preliminary database tests	3/21/2019	3/27/2019
13	🟧 Connect database to UI	3/28/2019	4/19/2019
14	🟩 UI User testing	3/21/2019	3/27/2019
15	🟥 Presentation 3	3/27/2019	3/29/2019
16	🟦 Integrate CUWebLogin	4/8/2019	5/1/2019
17	🟧 Continue testing and revising UI + back-end	4/8/2019	5/1/2019
18	🟥 Final Delivery	5/1/2019	5/3/2019