CS^2

Connect and Support for Computer Science Students

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Table of Contents

Member Contributions

Venus Sun

I think I contributed the most in the process of actual design and summaries. I spent a lot of time designing and editing the prototypes and I'm also responsible for polishing and finishing the final design. I interviewed two subjects during the initial phase of setting up requirements and also did observation with two subjects during the evaluation of 1st and 2nd prototypes. With regard to this final paper, my contributions include the following: needs and requirements, presentation and summary of evaluation notes for two versions of prototypes(paper and 2nd), the final design and walk-through presentation, and analysis regards usability criterion, user experience goals and cognitive factors. I was also responsible for all presented notes in the appendix including the interview notes and 2 rounds of observation notes, formatting and organizational wise. And I also spent some time helping my teammates to work on their responsible parts. I believe that I deserve full credit for this project because I made well contributions to the team and always made sure that communication and collaboration are fine within members of our group. And right now looking at the all the prototypes and final design and how far we've gone through this project, I am really proud of all the work me and my teammates have done.

R Matthews

Our team's idea selection process was very much one of trial and error. We found ourselves coming up with ideas that didn't quite fit with the requirements and expectations of this course. Ultimately we submitted three separate proposals for three different ideas, which set us back slightly. CS^2 came from a conversation I had with Professor Alterman and Maria, during office hours one day where they asked me about a problem I was passionate about. After explaining my interest in looking at minorities in computer science, it was suggested that we consider tackling this problem for our final project.

My contributions throughout the creation process remained primarily conceptual and organizational. I spent time a lot of time thinking about how we should go about bringing an application like CS^2 to life. I was responsible for one subject who I interviewed, and did a observation of our paper prototype with. With regards to this final paper, my contributions include the following: Title Page, Table of Contents, Executive Summary Section, Conceptual Model, and the Cognitive Walkthrough. I also made sure to include our consent form in the appendix. I also took part in overall editing of the final paper as I really enjoy editing for grammar! I believe that I deserve full credit for this assignment because I made sure to communicate regularly with my group and complete my assigned tasks on time. I did my work, I did my best, and my philosophy is that that's all anyone can ask of me.

Xiaodong Qu

I contributed in the initial brainstorm process and the interview and observation parts, I suggest two project ideas and then we pivot to this current one based on Rick and Maria's feedback. During the interview and observation parts, I did 2 interviews, 4 first round observations and 2 second round observations, we pick the most information ones in the appendix.

Executive Summary

Problem Space

The Computer Science Department, like many other departments at Brandeis, is home to resources, events, and other helpful tools for their students. But alas, these resources and tools are scattered across various platforms making them inaccessible and unknown to many students, particularly certain underrepresented minority groups in Computer Science who find themselves on the margins of the CS population at Brandeis. These same underrepresented students begin to fall behind in their Computer Science courses as a result of this lack of resources and support that other students may have. This also serves as one factor responsible for the low retention rate for many of these students. We, as a team, wanted to create an effective technical solution to combat this important issue in the Computer Science department. And that is where CS^2 comes into play.

Design Problem

CS^2 (CS Squared) was conceptualized from the need for underrepresented minorities in Computer Science at Brandeis to be exposed to all the possible resources that brandeis offers in order to succeed throughout the completion of their major and beyond. Many of these students are unaware of all of the resources available to them at their disposal because of lack of promotion or exclusivity. Professors are concerned about how to support the underrepresented minorities in their department in ways that are most beneficial to the students themselves, but do not have many points of reference to base their help off. By having access to CS^2, professors would be able to identify the areas in which the students would most benefit from. To date, there is currently no simplistic and efficient platform to provide Brandeis students in Computer Science access to a cohesive and organized collection of relevant resources and events. Now more than ever with the field of Computer Science diversifying and growing, it is imperative to nurture and support as many students as possible from start to completion of their degrees.

The design problem behind CS^2 focuses mainly on a lack of unified information. CS^2 strives to find an interactive, community-like space to share Computer Science resources primarily to support the underrepresented minorities who need it most. With CS^2, the mode of interaction should allow users to converse with other users and explore existing resources that the Computer Science department has to offer. Our market research and data gathering showed a strong need for a product like CS^2. The design must accommodate students from diverse backgrounds through a familiar and easy-to-use design. Our design adopts the conceptual model of a online forum in a similar style to the defunct Google+, where one is free to engage with other people in the forum, while still having access to various resources both inside and outside of the forum itself. We do this in order to promote communication and sharing

between various members of a community by interacting with technology. We incorporate elements of popular and successful social media sites like Facebook and Google+ to give users a familiar feel when using our application.

Role of Technology

Technology serves as an excellent mediator between users because it eliminates the physical barriers and boundaries associated with an in-person connection. Technology allows for users to connect and interact without needing to be in the same physical space, or even know the person. For students who may not feel comfortable with in-person interactions because of intimidation or language barriers, for example, having the option to still make these important connections using technology for assistance is extremely important and valuable. Another important advantage of technology is that solutions can exist multimodally for various types of users. Our target user population, as Computer Science students, tends to spend a large portion of their day behind the screen of their computer. But also existing as millennials, these students are constantly mobile and we want to accommodate those needs by allowing this to be accessed from as many different types of devices as possible.

Market Overview

We analyzed the market and existing solutions in the following categories: social media platforms, the department website, and Non-technological solutions. The reasoning behind the three different categories comes from the desire to learn from applications that are similar to our product concept or offer similar interaction/functionality. Coming across many such applications had allowed us to determine that our product concept is feasible and doable, as it offers users a combination of already well tested and desired functionality on top of technology that is widely used. Having users respond positively in the data gathering phase and later test out our designs and prototypes showed that the conceptual models that we chose for our application are familiar and would not consist of a large learning curve. Here is our analysis:

Some existing solutions to some of these problems are clubs like National Society for Black Engineers (NSBE), Society for Advancement of Chicanos/Hispanics, Native Americans (SACNAS), Women In Tech, Girls Who Code, but many students are unaware of the existence of such clubs and organizations.

Another space for potential Computer Science connections to be made and resources shared among such students is Vertica Computer Science Lounge. Vertica is a great, but intimidating space for students new to computer science who already feel uncomfortable in stereotypical Computer Science spaces. Although Vertica serves as the home to the majority of the Teaching Assistants, many international students feel intimidated and inhibited to interact with them because their English is not perfect. Other students avoid Vertica for fear of seeming stupid or unintelligent, even if they are in desperate need of help.

The current technological solutions simply lack the effectiveness necessary to properly promote and expose students to the resources offered. When taking into consideration the existing tech solutions, the department website is the number one product. It is clear to many that the website is outdated and lacking the information helpful to the students currently in the program.

Many of these students feel as though their specific needs are not covered in these current platforms where the school-sponsored support systems such as the department website and academic advising resources are static in nature and not fully able to accommodate the needs of their students.

Methods (Product Development Narrative)

Data Gathering Overview

Our initial data gathering plan is as follows:

1. Interviewed the subjects to establish requirements
2. Observed our subjects using our paper prototype
3. Observed our subjects using our Moqups prototype
4. Sent out a questionnaires to evaluate prototype and confirm problem space

Week 1(11/6):
Identify subjects utilizing focus group and conduct interview with subjects, identify user needs and requirements based on Interview feedback, develop scenarios, and try to develop a first draft paper prototype based on the developed scenarios.
Week 2(11/13):
Conduct first round of observations with subjects, see how subject use the paper prototype, identify any unforeseen possible user requirements and existing bugs/possible improvements, at the same time use questionnaire to get more detailed and quantified feedback on paper prototype. Modify first draft paper prototype to create second draft prototype using mockup.
Week 3(11/20 short):
Conduct second round of observation with subjects and see how subjects use the second prototype, identify any unforeseen possible user requirements and existing bugs/possible improvements, at the same time use questionnaire to get more detailed and quantified feedback on paper prototype.
Week 4(11/27):
Conduct large-scaled questionnaire to get more feedback on the usability of the app, finalize paper prototype. Finish any undone goals, collect all paperwork and write up final report.

We pretty much keep the same for the interview and observation part. There are some questions we would like to make changes slightly to make it more straightforward. Another change we may make is when to do the Questionnaires, we use it more for evaluating the Moqups prototype 2. And it it a little bit slow to get students responds during final week. We may start it earlier.

We think this is a good data gathering plan because the following:

For the interview part, as you can see from our interview script in the appendix, we selected semi-structured interviews, which are more open-ended, interactive, and exploratory to collect data for the requirement. The interview questions are designed based on the following Rules of Thumb:

- Short, straightforward, avoid asking too many questions (Most interview take only about 8 to 14 minutes)
- Avoid long questions
- Avoid compound sentences
- Avoid jargon or language
- Avoid leading questions

For our observations, our questions are designed based on the following Rules of Thumb:

- Make questions clear and specific
- Use short and simple instructions
- Let the user interact with the prototype more while we silently observe

For the Questionnaire, we collected demographic data and users' opinions, as attached in the appendix. We created the questionnaire using Google Forms and and distributed it to a large number of people. We made sure to include both open and closed questions to gather a wide range of data. The closed format questions are quick and easy to fill in, and the results are easily reported. We received interesting feedback from our open questions, which helped us to explore some ideas we had never thought about before. Our questionnaire questions are designed based on the following Rules of Thumb:

- Make questions clear and specific
- Use short and simple sentences
- Ask for only one piece of information at a time and break long questions to one piece per question
- Avoid words or terms that have more than one meaning ad try to use straightforward expression
- Choose words carefully for sensitive issues
- Avoid questions that are biased for the subjects to answer

Stakeholders

1) Underrepresented Minority CS student
Age: 17-22
Gender: Any
Origin: Anywhere international
Behavior: Typically pretty technically savvy
Abilities: Facility with using laptop, uses social media often, and is an owner of multiple electronic devices

2) CS Professor
Age: 35+
Gender: Any
Origin: Anywhere but typically US

Behavior: Also technically savvy, and pays more attention to students' feelings and experience
Abilities: Facility with using laptop, but might not use social media often, and is usually an owner of multiple electronic devices

2) CS UDR
Age: 17-22
Gender: Any
Origin: Anywhere but typically the US
Behavior: Typically pretty technically savvy, and pays more attention to what students expressed as their needs
Abilities: Facility with using laptop, uses social media often, and is an owner of multiple electronic devices

Needs and Requirements

Our needs and requirements are mostly established based on the results of our semi-structured interviews. We found out that most subjects were having some difficulties in trying to find resources and the current solution is apparently not good enough to solve all of their problems. Many of our subjects are also having trouble trying to connect with their peer CS students, especially the ones who have more experience and could actually offer substantial help. Besides, some subjects are aware that the CS department are not doing as well as some other Brandeis departments in providing a clear guide and forming a community between students. Finally, all of our subjects express that they do feel that they are underrepresented as minorities in the Brandeis CS community. Therefore, in order to improve the current available solutions to solve the above questions, we establish our needs and requirement as follows:

Functional:

- Users should be able to connect with peer classmates and everyone in the major based on shared interest and concerns.
- Users should be able to message their contacts.
- Users should be able to access useful information that will not only help with what they are doing in classes, but also extracurricular things like finding jobs, improving their programming techniques etc.
- Users should be able to see any events hosted by the department or their peer classmates on topics that they are interested and needed for help.
- Users should have access to some kind of peer counseling.
- Users should be able to share information and experience with each other.

- Users should have access to a clear and filtered resource guide to learn more about what available resources are around them.

Data:

Type:

- Personal profile information, for example, name, major, interest, email etc.
- Event-related information, for example, time, location, host information etc.
- Messages.
- Texts including blog posts, introductions, reviews, discussion board posts etc.

Accuracy/safety:

- All data should be accurate and protected with appropriate privacy.

Environmental:

- The app will be web-based and the users will access it using mostly computers. Therefore, the layout of the app will be designed as a web page and full width will be utilized to have better organization in visualization.
- Interactions with the app should be fast and effective.

User:

- Mostly college students, a young population with high adaptability to technologies. These users usually have high skills in using any computer-based applications which are familiar to the ones they use in daily life.
- Minority students who might not have a native speaker level of proficiency in English is also a big group in the users. Easy languages and other cultural accommodations should also be considered.

Prototyping

Scenarios

CS Student Scenario:

Sarah is a first-year student looking to study Computer Science at Brandeis University. She has absolutely no coding experience and feels somewhat uncomfortable in this predominantly white male institution. Sitting in her first computer science class ever, she looks around to see many white students and very few other black students. She sits alone and tries to keep up with the first day's lecture. Sarah slowly but surely becomes less able to follow along in the class, while the other students all seem to be comprehending faster. After class one day, Sarah goes to talk to her advisor about finding resources and community in Computer Science. Her advisor recommends that she try CS^2, an application made for underrepresented groups of students in Computer Science at Brandeis.

Sarah opens CS^2 and is brought to a login screen, but since this is her first time using the application, she needs to sign up for an account. After clicking the button to sign up, she is presented the option to register using her Brandeis UNet ID and password. Sarah likes this option because she doesn't need to remember another set of login credentials. After logging in, she is brought to her initially empty profile page. By going to her profile settings, she is able to edit some of her basic information such as her class year, interests, and some tags for her profile to appear in search queries.

Next, Sarah navigates to the groups page, to see if there are any groups she can join to start establishing relationships with other Computer Science students at Brandeis. She finds a group for students in COSI 11A, the course she's currently enrolled in, with ten other members. After joining, she also sees a list of alumnae members with links to their personal profiles.

Sarah then wants to make at least one friend in her COSI 11A class, so she sends a message to Jane Doe, a current member of the the group, and introduces herself to them. She sends another message asking to form a study group as early as possible in order for the two of them to both succeed in their first college Computer Science course.

CS UDR Scenario:

Emily is a junior at Brandeis and one of the UDRs for CS department. She sometimes feels that certain members in the CS community are not really connected to each other and usually not many people would show up at UDR's hosted events. She gets a bit frustrated about this because she feels there are these barriers in her way of working as an UDR and she wants to change this situation to better serve the CS community, especially as she finds out that there are some underrepresented groups of students like female students and international students. So she went to talk with the UAH one day and the UAH suggested her to try CS^2, an application made for underrepresented groups of students in Computer Science at Brandeis.

Emily opens up CS^2, and logins with her Brandeis Account since that way she doesn't need to remember another account name and password. After setting up her profile, Emily starts browsing through the different functions in the app and see if she can get any useful information.

Emily first goes to the "Group" page to take a glance at all the groups existed. She then realizes that she could post some questions asking for people's opinions on what they would like from the UDRs. So she goes to the international group since she's a more concerned about how some international freshman are doing in their CS career in a foreign country. She joins the group and add a discussion board asking "what event would you like the UDRs to host to better help you?" 30 minutes later she gets a few comments from people in that group and one of it saying "I heard that UDRs at Chemistry department hosted a 'meet the major' event last week, wondering if the CS UDRs could do that too". She recognizes that as a wonderful idea and immediately get in touch with her fellow UDRs.

Later that day, all of the UDRs agree to do that event and they've discussed a bit come up with a detailed plan. Then Emily posts the event with details on the "event" page and also links the events with several groups (international group, freshman group etc.) since the app reminds her that she can link events to certain groups to get all those group members notified.

Later when the event day comes, a bigger crowd than any events earlier shows up and Emily is really thankful that the situation she wants to solve earlier gets improved with using the great app CS^2.

Conceptual Model

From conception, we saw a forum as the ideal conceptual model because it was a simple, yet effective way to share information between people. Because it is so open, it allows for users to express themselves in a multitude of ways, especially when combined with other application features like a blog, or social-media-style interface. We used responses from our interviews to compare and analyze what users wanted most from the the application itself alongside our ideas as designers and creators. And for the most part, our ideas aligned nicely, where we as designers shared similar visions with our user population. Users expressed a need for interacting with other students, which they said would be extremely helpful when picking upcoming courses. A discussion forum works well for this because a user can source answers and responses from many users at once in a simplistic manner.

The other conceptual model we incorporated was that of Google+, Google's social media platform. Stylistically, CS^2 most resembles the layout and format of Google+, with a messaging feature similar to that of Facebook. While Google+ is not as widely used, we felt it's style was more comfortable and unique than implementing a similar model to Facebook. As for our messenger, contacts, and events sections of our application, Facebook was the logical go-to because we want users to have a familiar feel when using that aspect of our application. The events section resembles aspects of Facebook and Google Calendar, two of the most popular event planning calendar applications in use today.

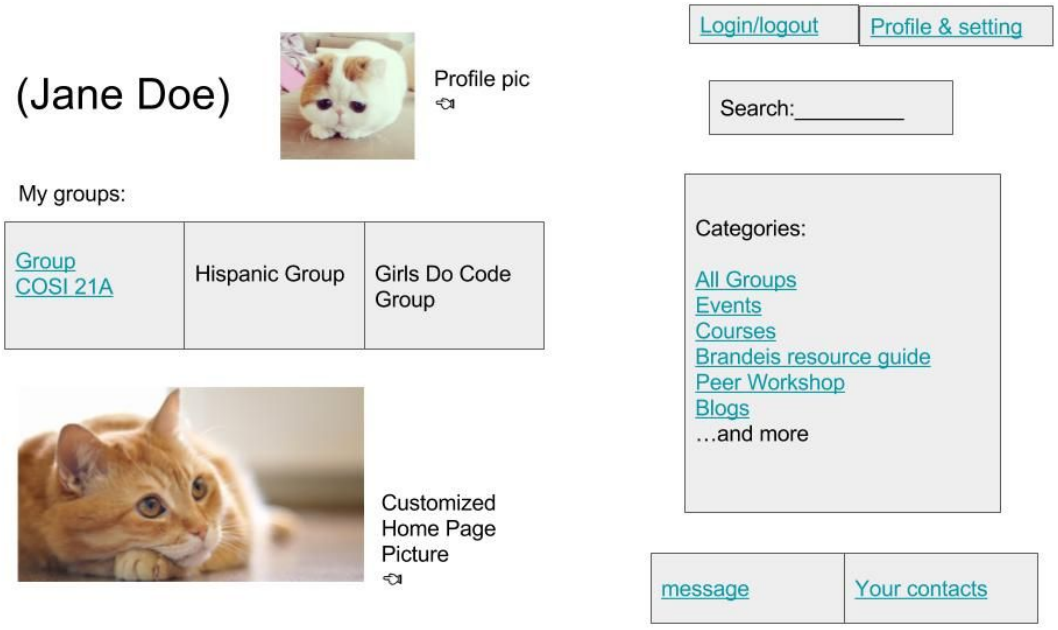
Conceptual Model: Forum
Interface Metaphors: Online discussion board
Interaction Type(s): Conversing (with other users), instructing (selecting items / issuing various commands)
Interface Type(s): web, multimedia, menu-based
Supported Activitie(s) / Function(s): make a post / read other people's posts / go to other forums
Relationship Between Functions: Having multiple threads in the the forum allows for discussions and conversations across multiple topics.
Information Requirements: Multiple users, internet access

Conceptual Model: Google+
Interface Metaphors: Social Media web application
Interaction Type(s): Conversing (with other users), instructing (selecting items / issuing various commands), Manipulating (personal user data, event information)
Interface Type(s): web, multimedia, menu-based
Supported Activitie(s) / Function(s): messaging, contacts, events, user profiles
Relationship Between Functions: using contacts to have private or group conversations with specific users
Information Requirements: Multiple users, internet access

Paper Prototype & Evaluation

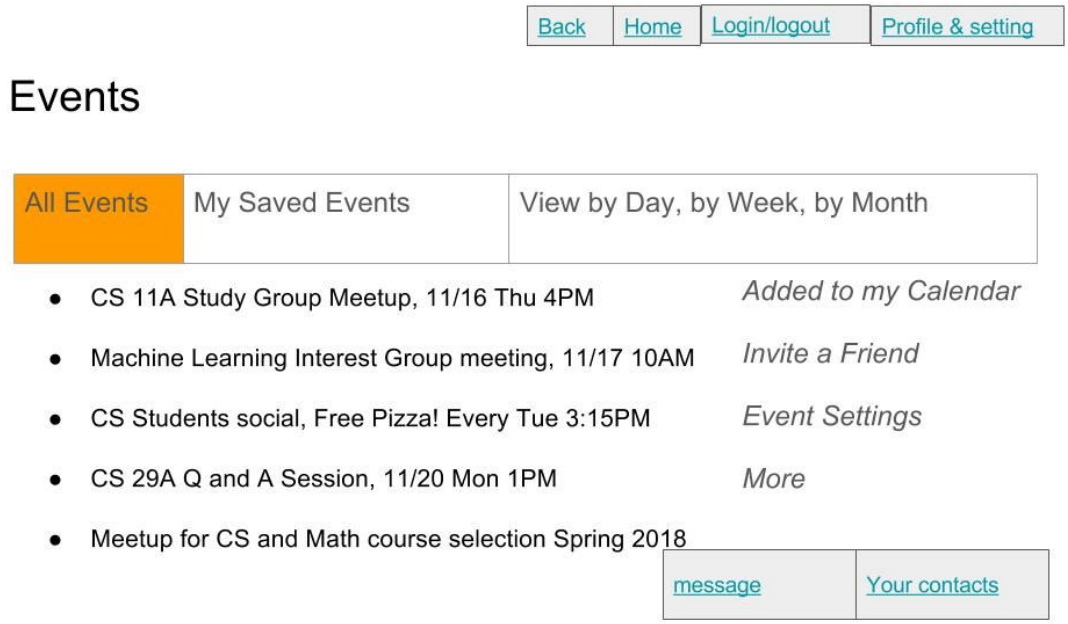
Evaluation from observation:

- Users can't easily understand the title of the page.
- Missing register button
- Users want to have other login options, e.g. gmail login, brandeis login.



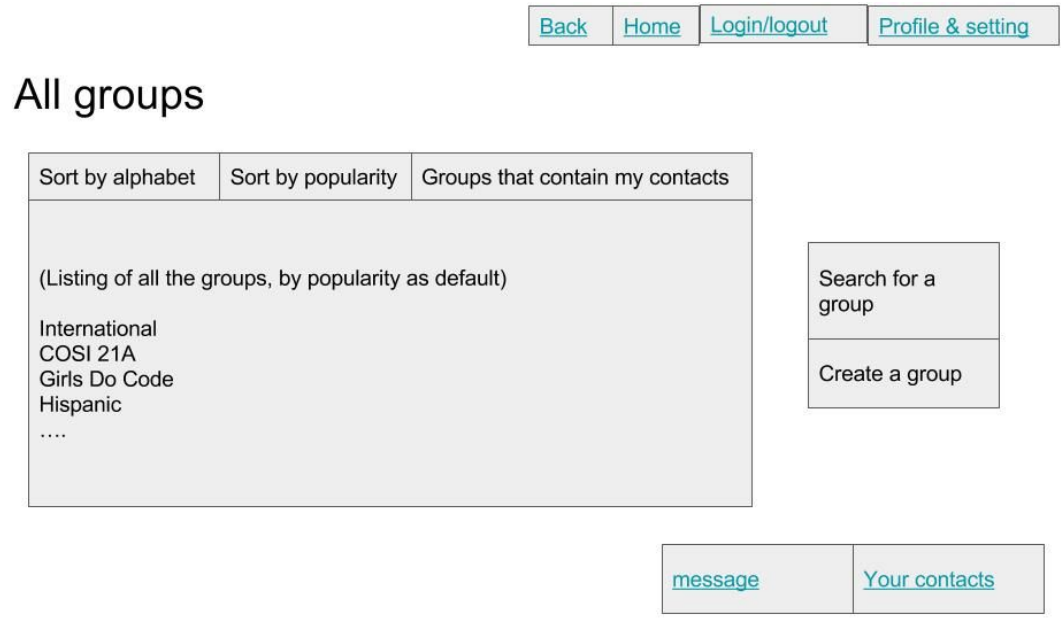
Evaluation from observation:

- Users want to add notification function.
- Missing a primary menu: people found top + left the most important section of the page.
- "Question mark" for each section, whereas explanation of functionality is embedded.
- Users want flexibility in the design of the menu and categories.
- Category names are too long, better with only one word.



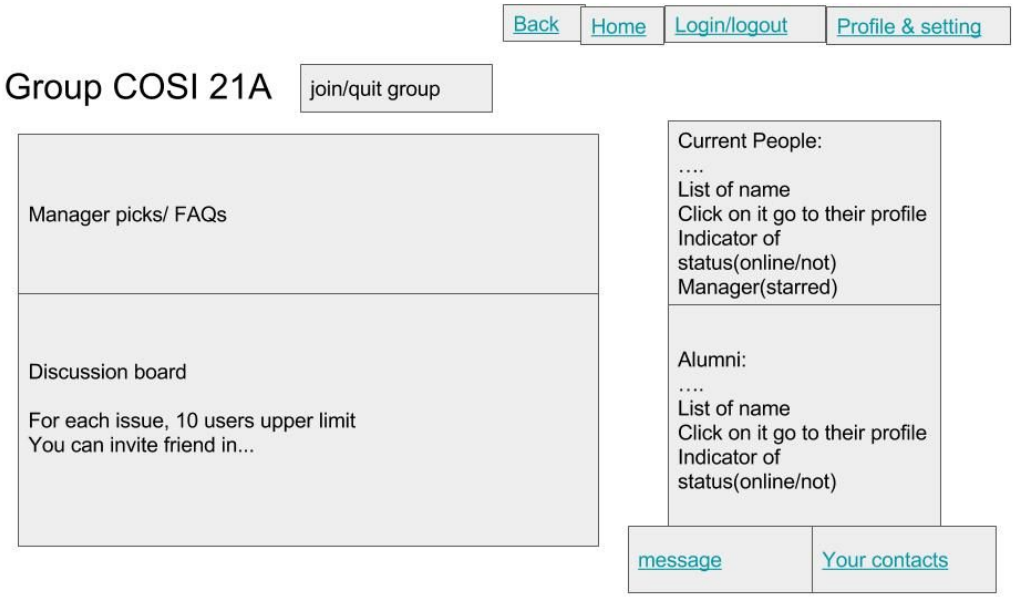
Evaluation from observation:

- Users want to add a search bar, a functionality of tagging events, options including “going”, “interested” and “not going”.
- Event names are too long.
- Sorting (view by day etc.) should be a “drop-down” list of option.
- Better filtering and recommendations towards events are desired.



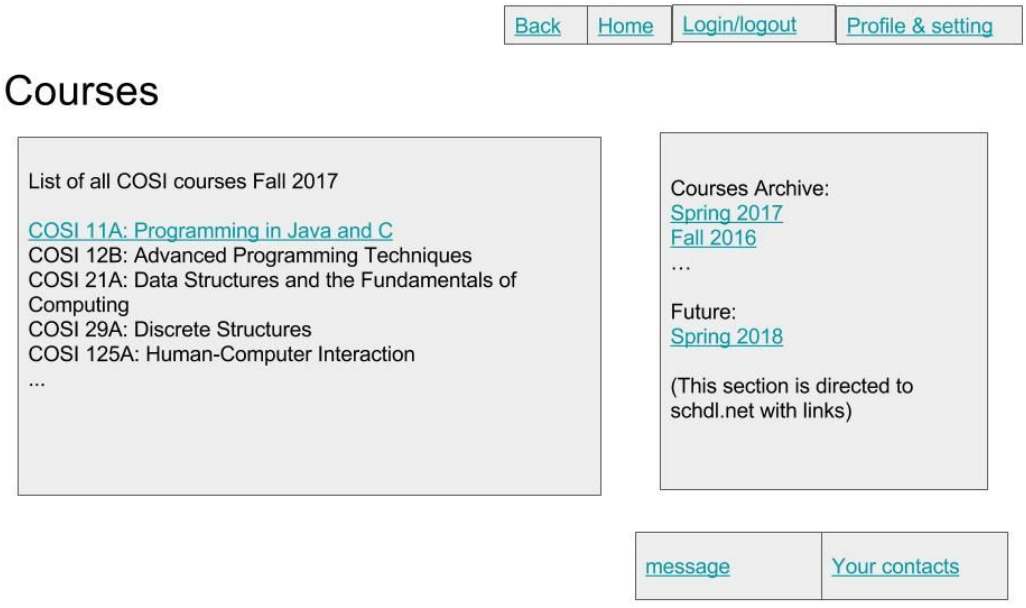
Evaluation from observation:

- Users want to add a search bar, a functionality of tagging events, options including “going”, “interested” and “not going”.
- Sorting (view by day etc.) should be a “drop-down” list of option.
- Create group buttons should be smaller.



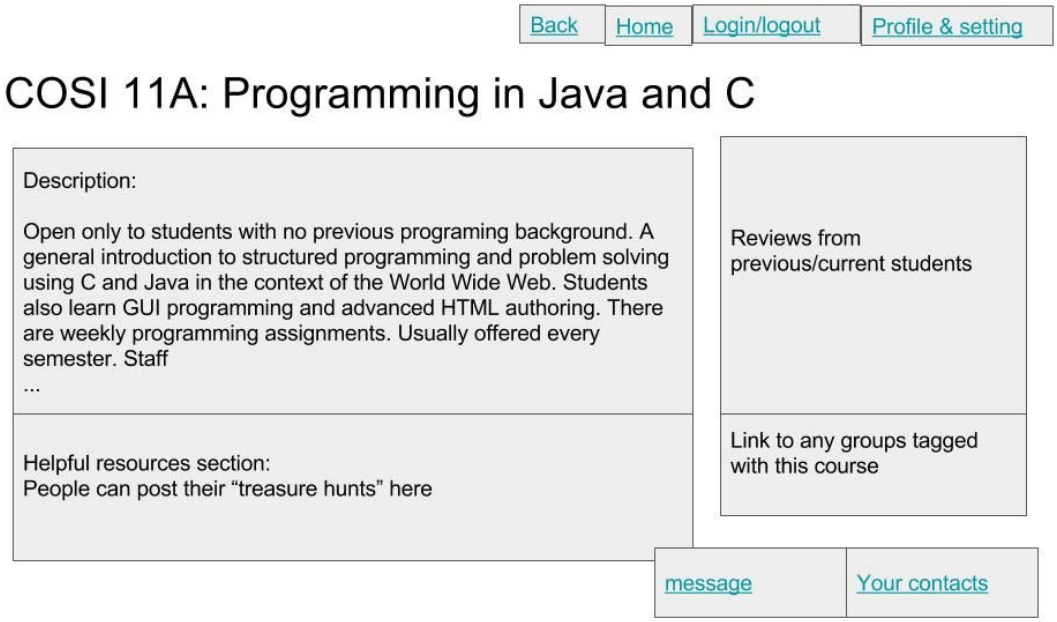
Evaluation from observation:

- Users confused about the group name, need a better example to illustrate group function.
- Introduction of the functions a group page can do is desired, especially the manager picks and alumni. Users seem to be pondered on those.
- Users wondered how should the group manager be chosen.



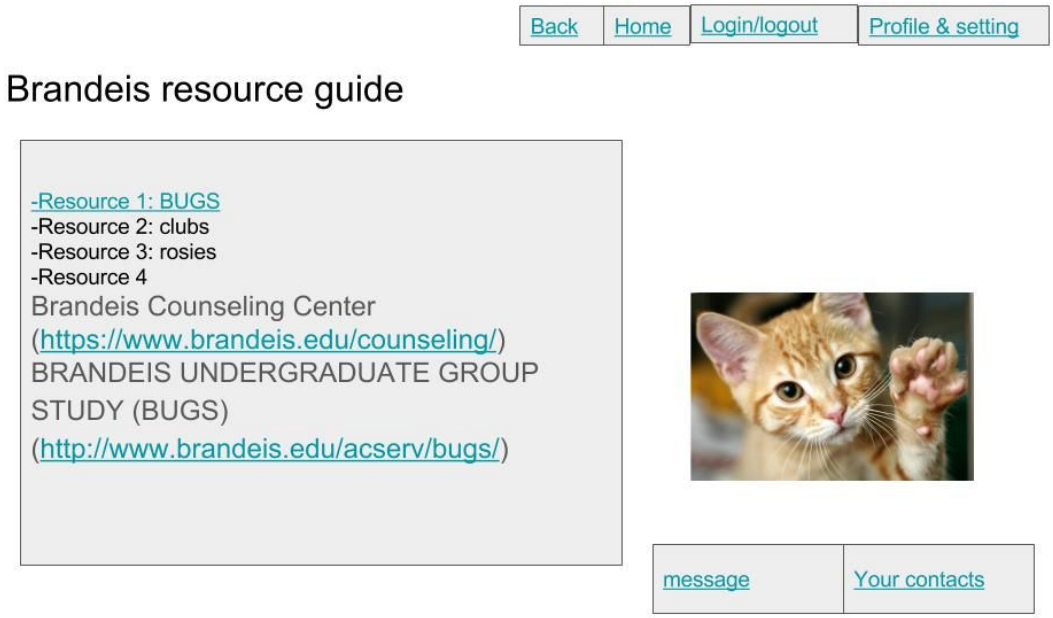
Evaluation from observation:

- Users want to be able to review the classes by rating/stars.
- Users wish to have more interaction with the classes, instead of only being able to get information, e.g. to be able to rate a class based on their own experience.
- Users want some kinds of filtering systems, e.g. tagging.



Evaluation from observation:

- Users confused between this page and the group page. Distinguisher desired.
- Some of the information this page provides are abundant, users suggest only keeping the reviews part.
- Correspondence with “workshop” within the webapp is desired.

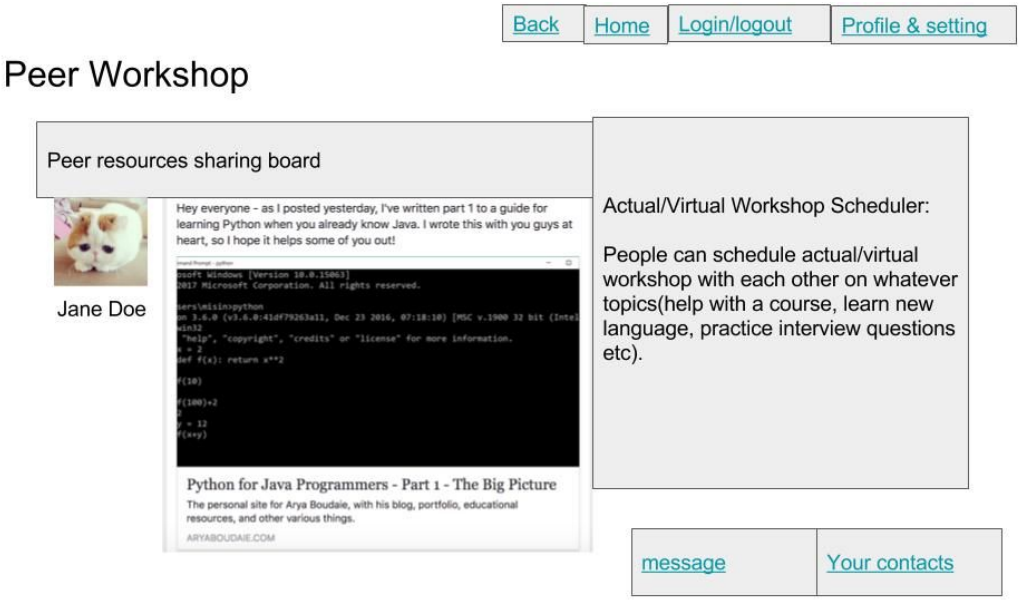


Evaluation from observation:

- Resources should be categorized.
- Users want to be able to review/sort the resources by rating/stars.
- Users wish to have more interaction with the resources, instead of only being able to know about them, e.g. to be able to rate a resource based on their own experience.
- Add office hours as a resource.

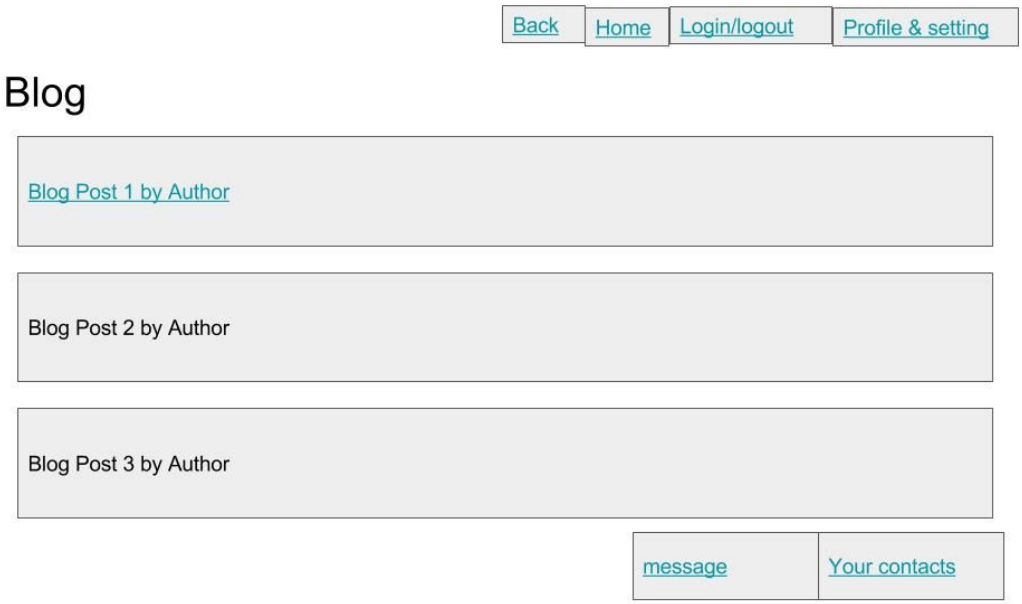
Evaluation from observation:

- Introduction of the functions this page can do is desired.
- Users wish to have more interaction with the resources, instead of only being able to know about them, e.g. to be able to rate a resource based on their own experience.
- Better design of menus/buttons is desired.



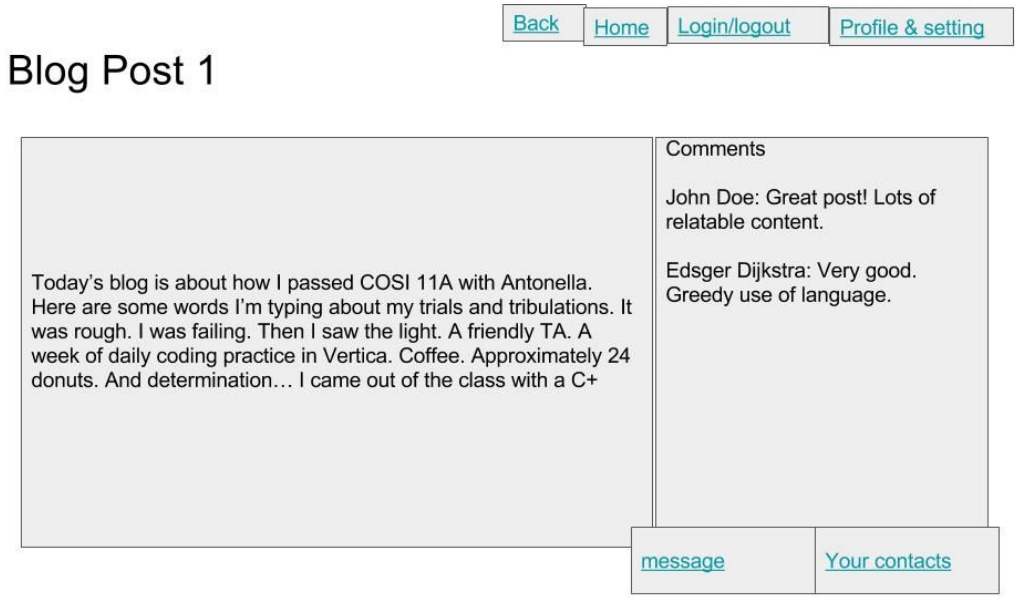
Evaluation from observation:

- Title: just call it “workshop”.
- Should be a list of the workshops, details could be seen once clicked but not displayed in the list.
- Description of the functionality, create a workshop/join a workshop buttons, and private vs public settings are desired.
- Scheduler should be in a familiar style, e.g. Google calendar.



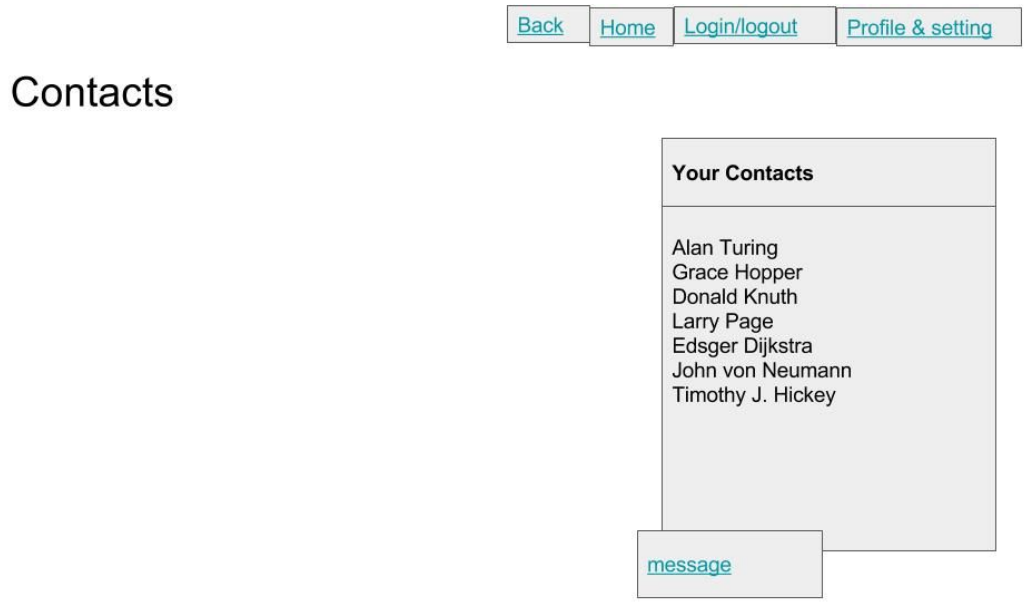
Evaluation from observation:

- Buttons for create a blog and favorite a blog are desired.
- Users wish to have access to “my blogs”, “favorite blogs”.
- Users wish to be able to have taggings for blogs and be able to search via that criteria.



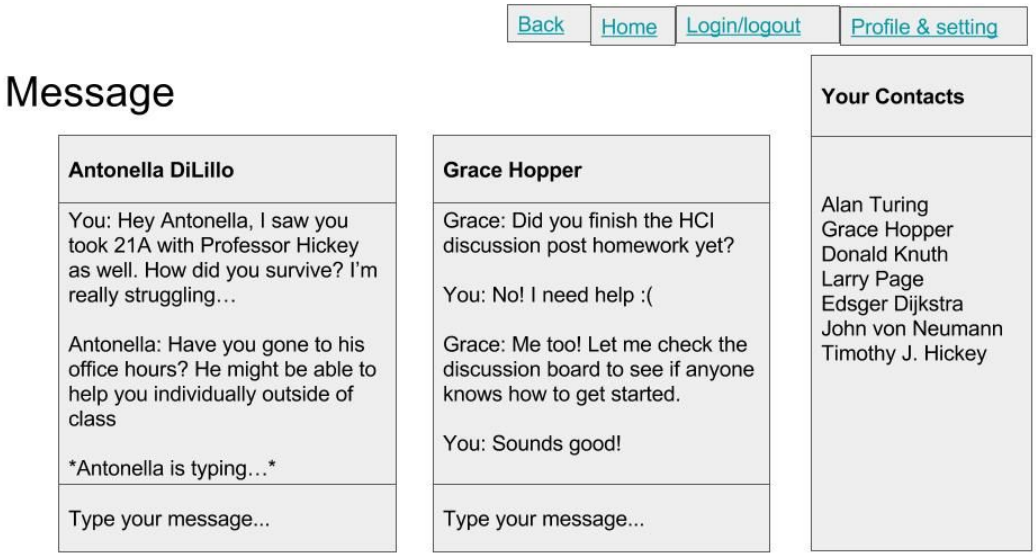
Evaluation from observation:

- Users suggest of using full width of the page.
- Users wish to be able to count and display total views of a blog.
- Functions of likes or thumbs ups, and subscription are desired.



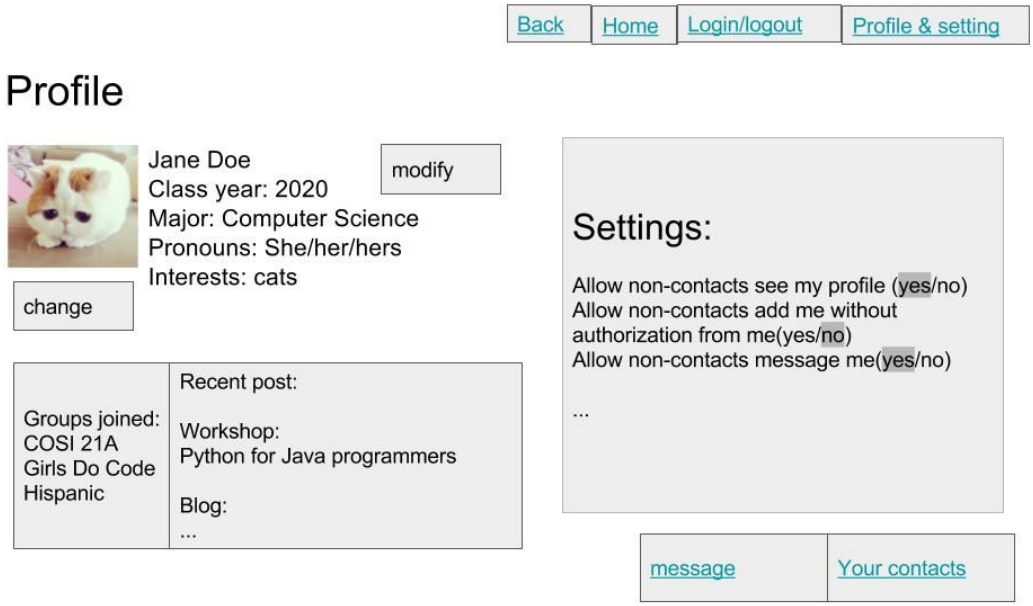
Evaluation from observation:

- Users suggest of learning from the way Linkedin works.
- Buttons of add/delete contacts are desired.
- Users wish to be able to import outside contacts.



Evaluation from observation:

- Users wish to be able to share photos, links, files, etc.

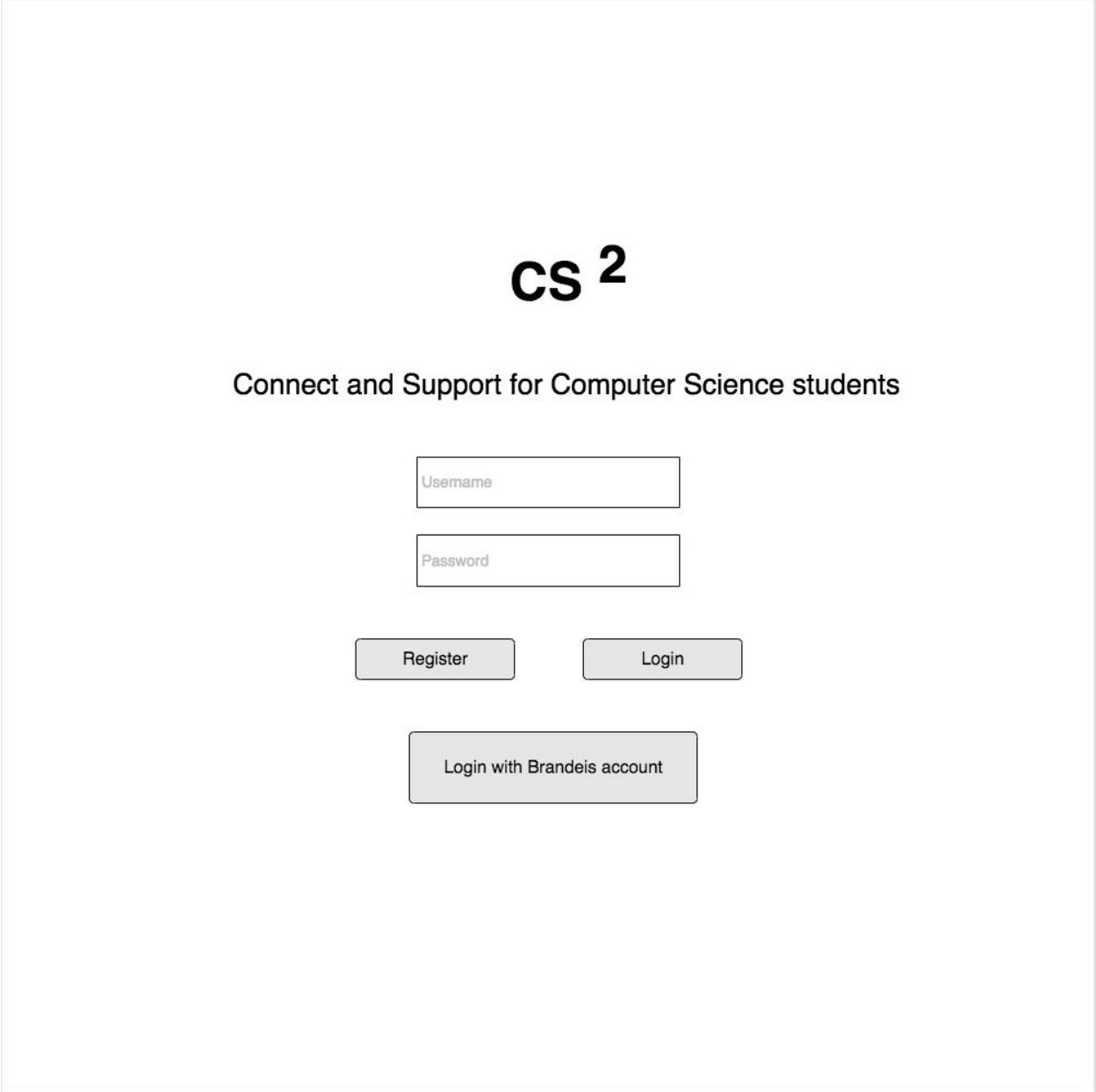


Evaluation from observation:

- Function of personal tags is desired.
- Users wish to see other people's profile page.
- Users suggest of having a contribution points system, so that people are encouraged to post things and contribute to the community.

2nd Prototype & Evaluation

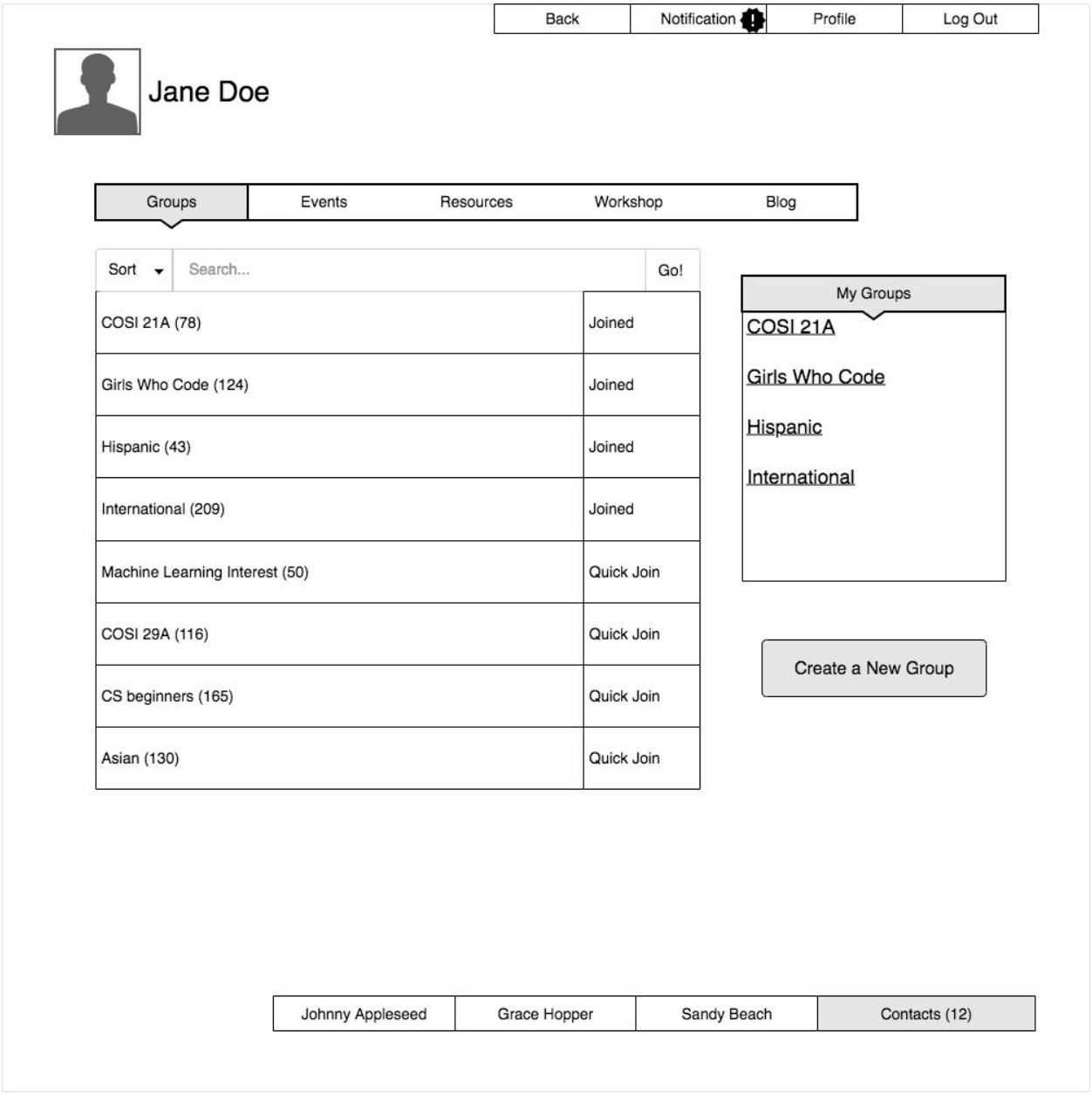
Login Page:



Evaluation from observation:

- Users are satisfied with this page.

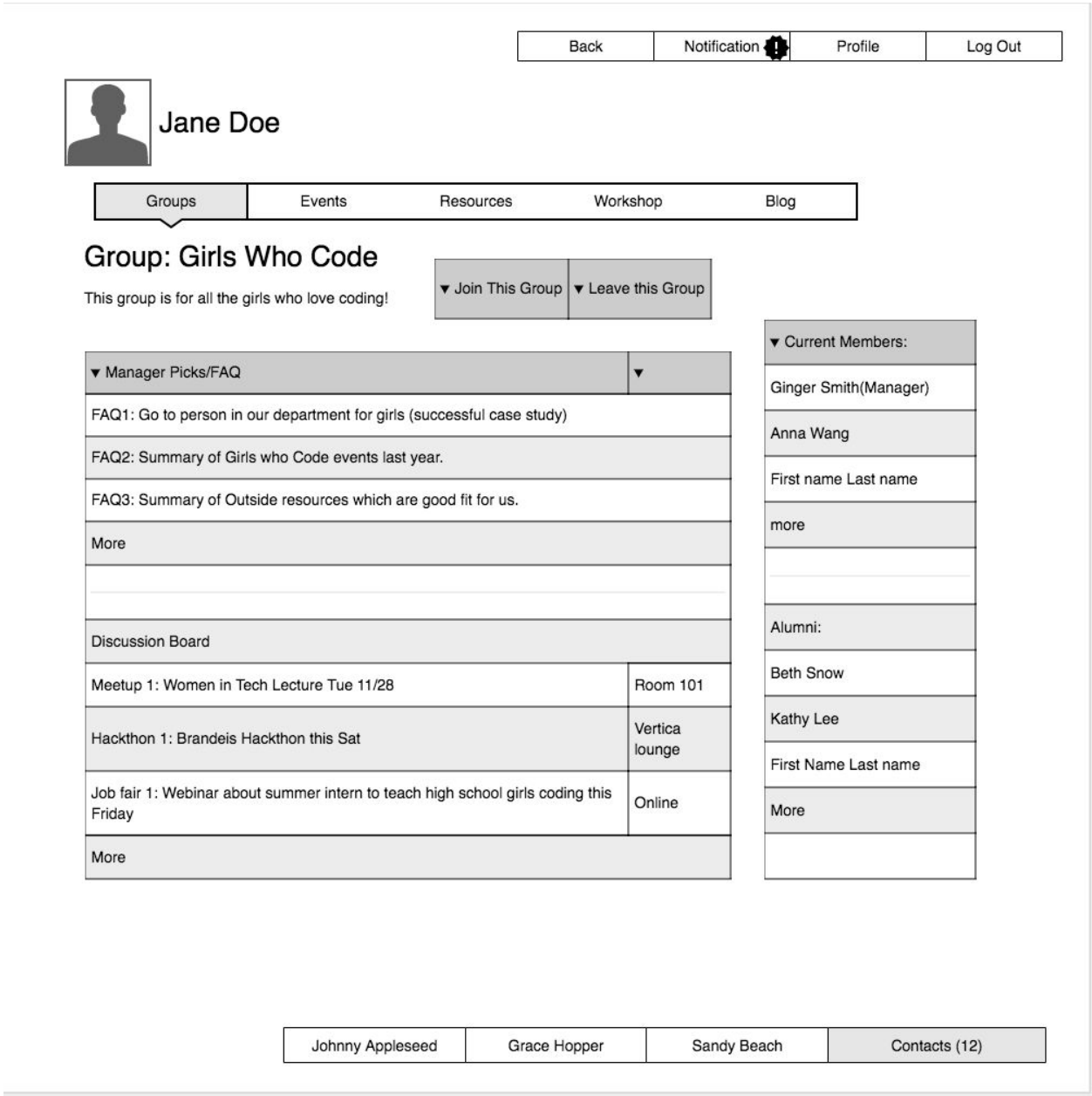
Group Main Page:



Evaluation from observation:

- Suggestion: some distinguisher between joined vs quick join, put joined group later in the list.

Group Example - Girls Who Code - Page:



Evaluation from observation:

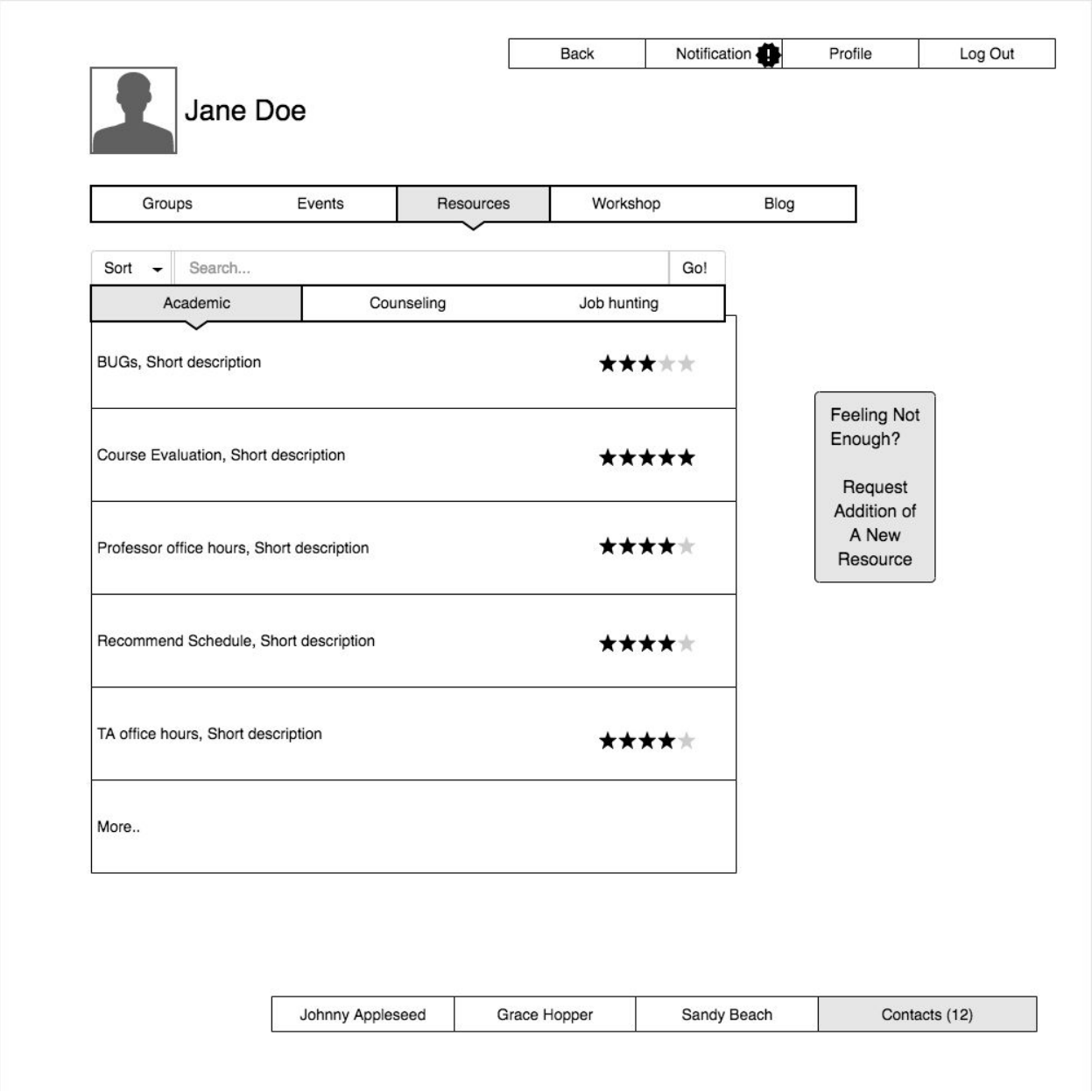
- Better explanation on manager picks is needed.
- Alumni fits for some groups, but not all. E.g. in this case it's a bit awkward.

Event Main Page:

Evaluation from observation:

- Want to add: link to add to the Google calendar, functionality correspondence with groups(convenient for events hosted by the group).
- Want to modify: put time together with the event title.
- Want to clarify: who can edit the tags.

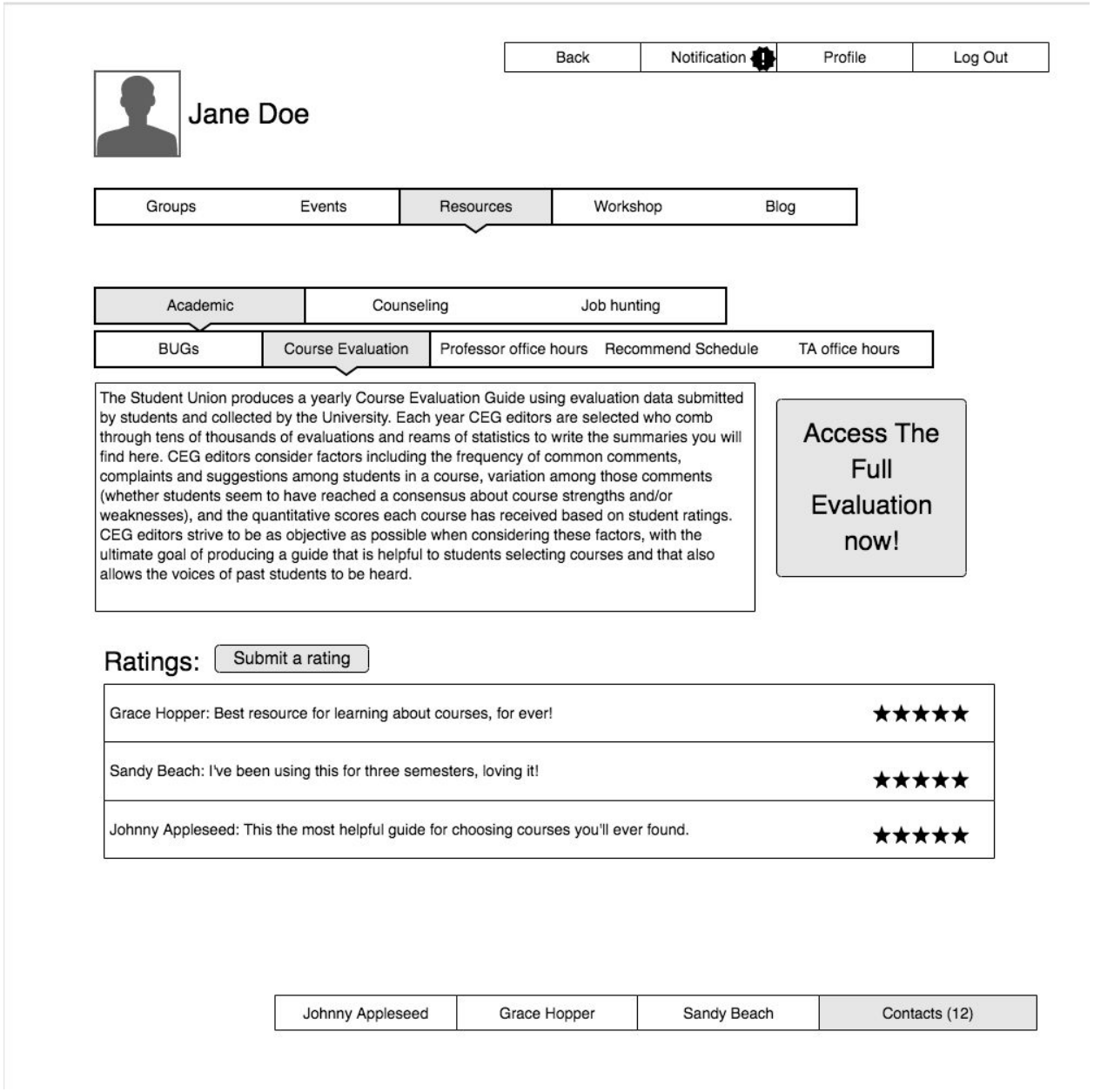
Resource Main Page:



Evaluation from observation:

- Want to modify: put time/ important details with the title, better categorized, separate human resources/database resources.
- Want to add: number of reviews per resource.
- Want to clarify: whether the Professor Office Hours / TA Office Hours were related to a specific class, or a pooled information page of ALL CS professors and TAs.

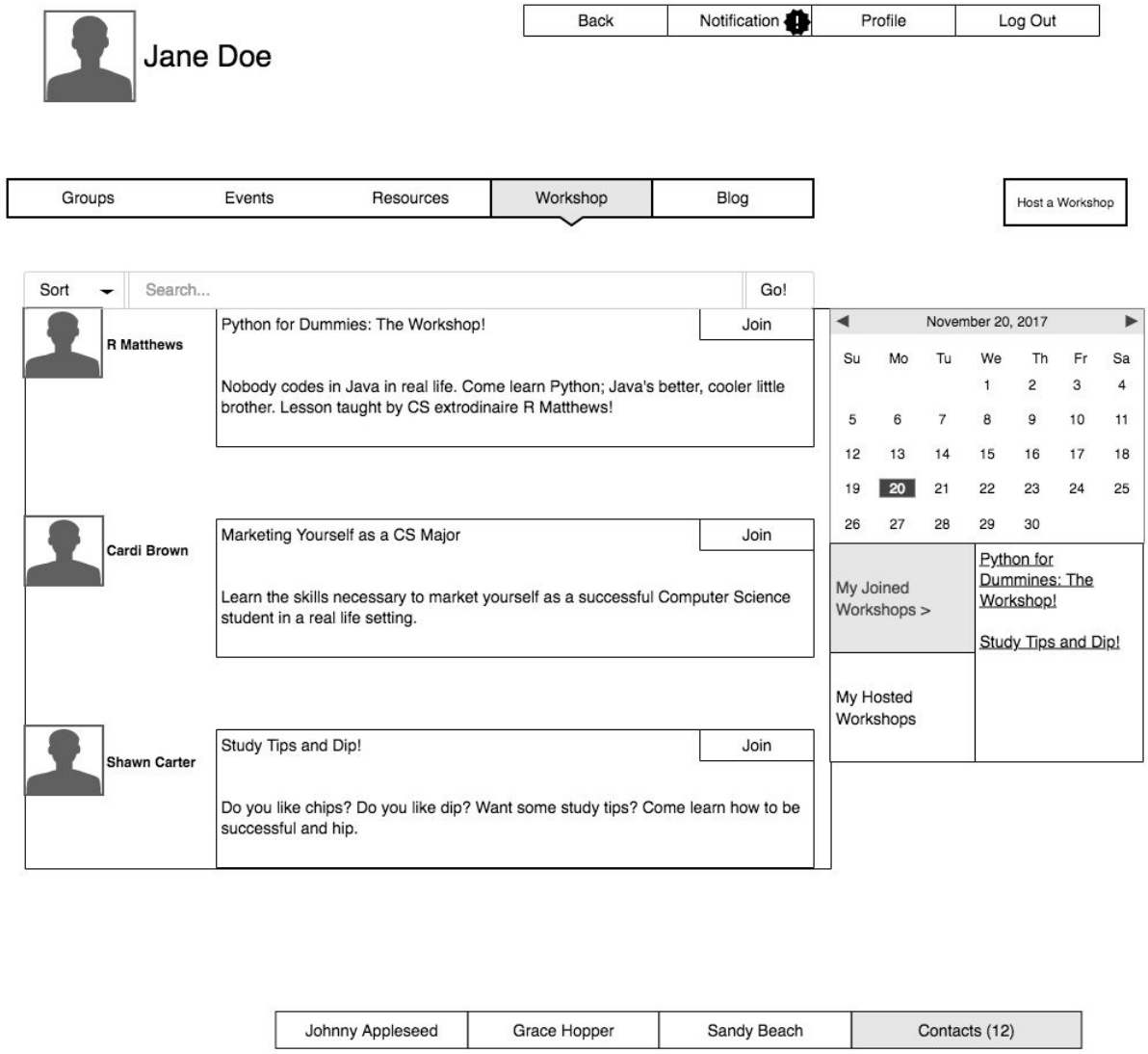
Resource Example - Course Evaluation - Page:



Evaluation from observation:

- Use bullet point instead of paragraph.

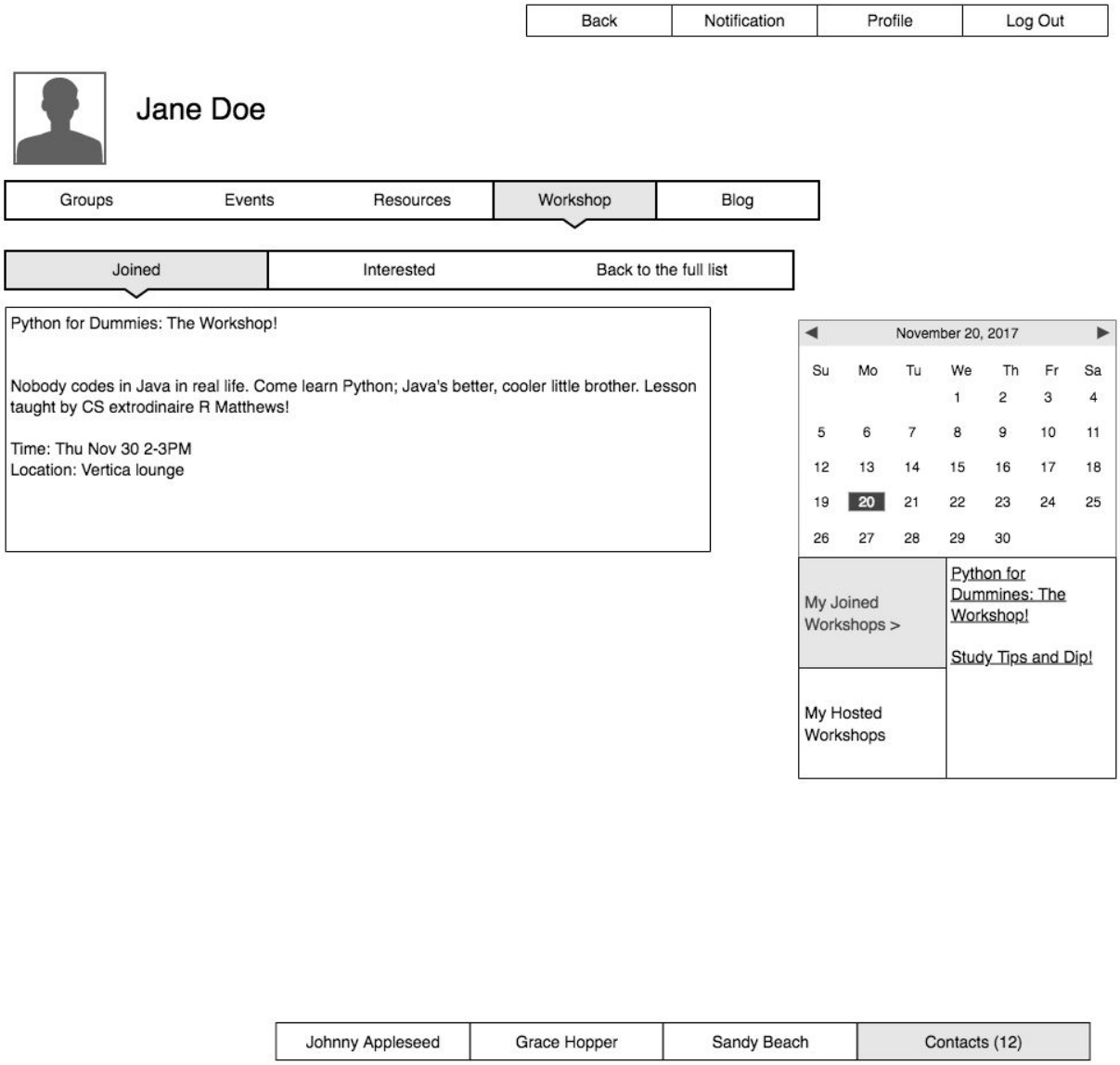
Workshop Main Page:



Evaluation from observation:

- Subject confused by the title, thought it's hosted by the school, should add more introduction of the workshop function/better name.

Workshop Example Page:



Evaluation from observation:

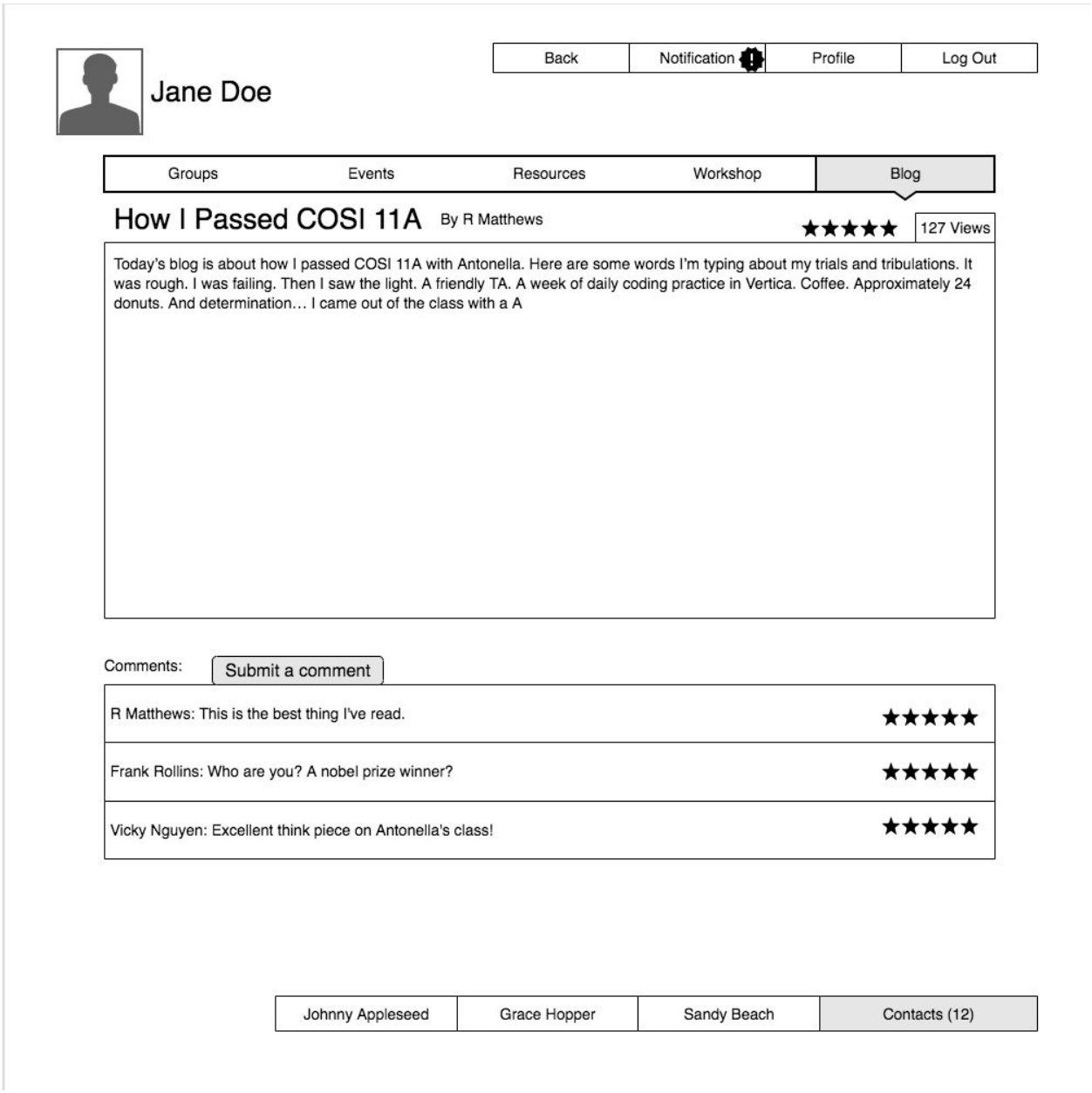
- Users wondered about how to track the shared information in the workshop.

Blog Main Page:

Evaluation from observation:

- Subject wanted to know who can write a blog post, and how.

Blog Post Example Page:



Evaluation from observation:

- Want to add: comment with comments.
- Subject suggest Only Thumb up, no Thumb down, to motivate students write more blogs.

Profile - Others - Page:

Back	Notification	Profile	Log Out

Sandy Clinton

▼ Sandy Clinton			
Add to Contact	Add a Tag	Give Contribution Points	
Class year: 2020	Major: Computer Science	Pronouns: She/her/hers	
Interests	Java	Python (the programming language)	cats^_^
Groups	Girls Who Code	Hispanic	COSI 11A
Tags	Junior	CS/Math	Summer Intern at Mathworks
Contribution Points	170	Member Since	Fall 2016
Blog Link:			
Recent Post:			
Summary of Brandeis Hackthon Last weekend.			
Movie review: 'social network'			
More			

Johnny Appleseed	Grace Hopper	Sandy Beach	Contacts (12)

Evaluation from observation:

- Add email.
- Modify: member since what date.
- Current format is too messy! Could copy linkedin.

Profile - Own - Page:

Back	Notification	Profile	Log Out

Jane Doe

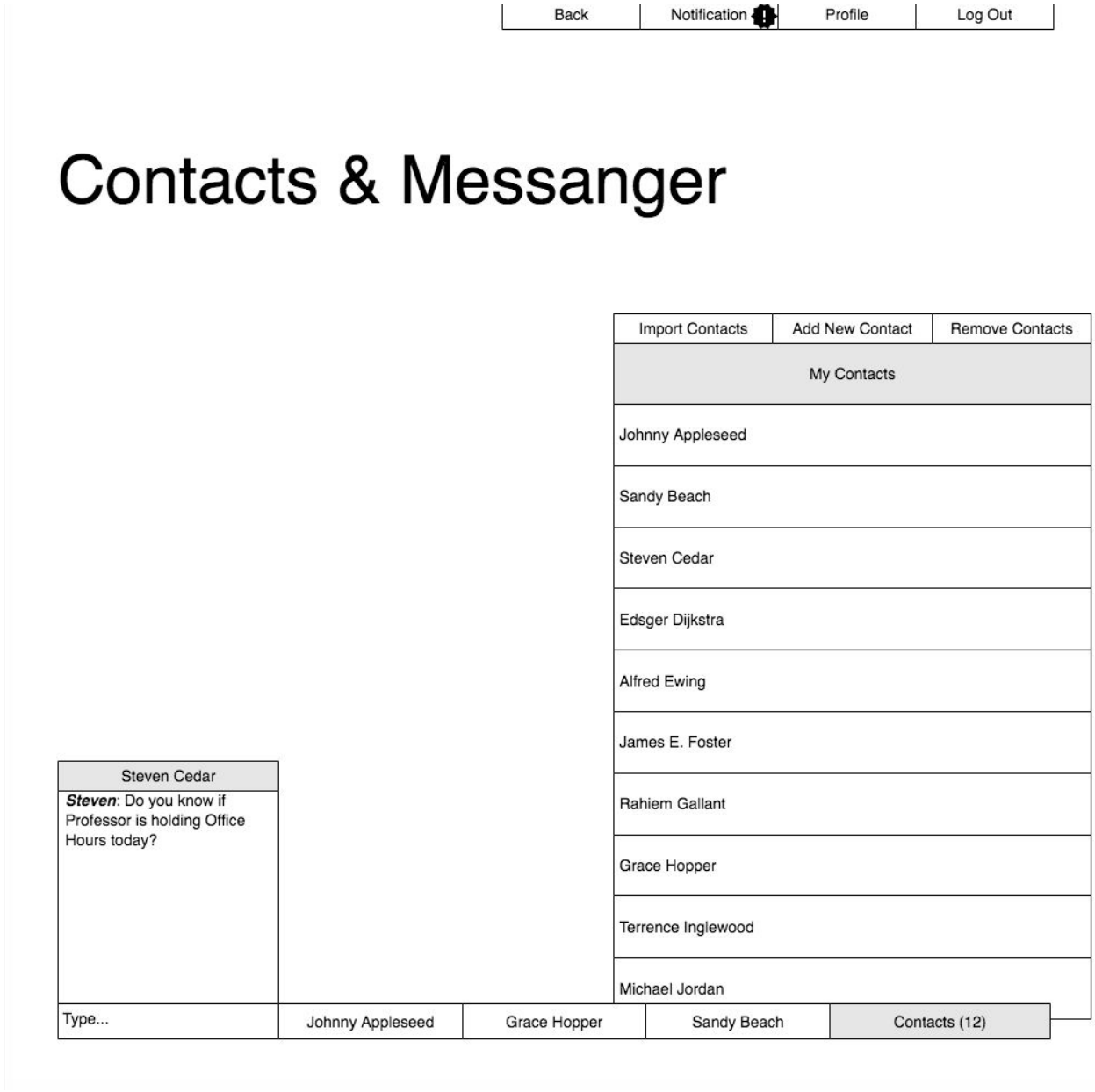
▼ Jane Dow			
Turn Editing On/Off	Change the Access Permission		
Class year: 2020	Major: Computer Science	Pronouns: She/her/hers	
Interests	Java	Python (the programming language)	cats^_^
Groups	Girls Who Code	Hispanic	COSI 11A
Tags	Junior	CS/Math	Summer Intern at Mathworks
Contribution Points	170	Member Since	Fall 2016
Blog Link:			
Recent Post:			
Summary of Brandeis Hackthon Last weekend.			
Movie review: 'social network'			
More			

Johnny Appleseed	Grace Hopper	Sandy Beach	Contacts (12)

Evaluation from observation:

- Add email.
- Modify: member since what date.
- Current format is too messy! Could copy linkedin.

Contacts & Messenger Examples:

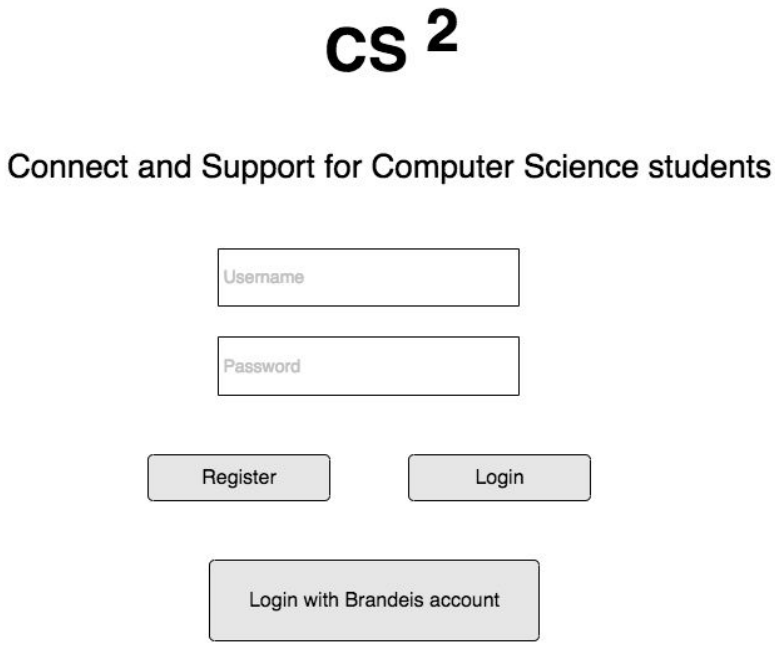


Evaluation from observation:

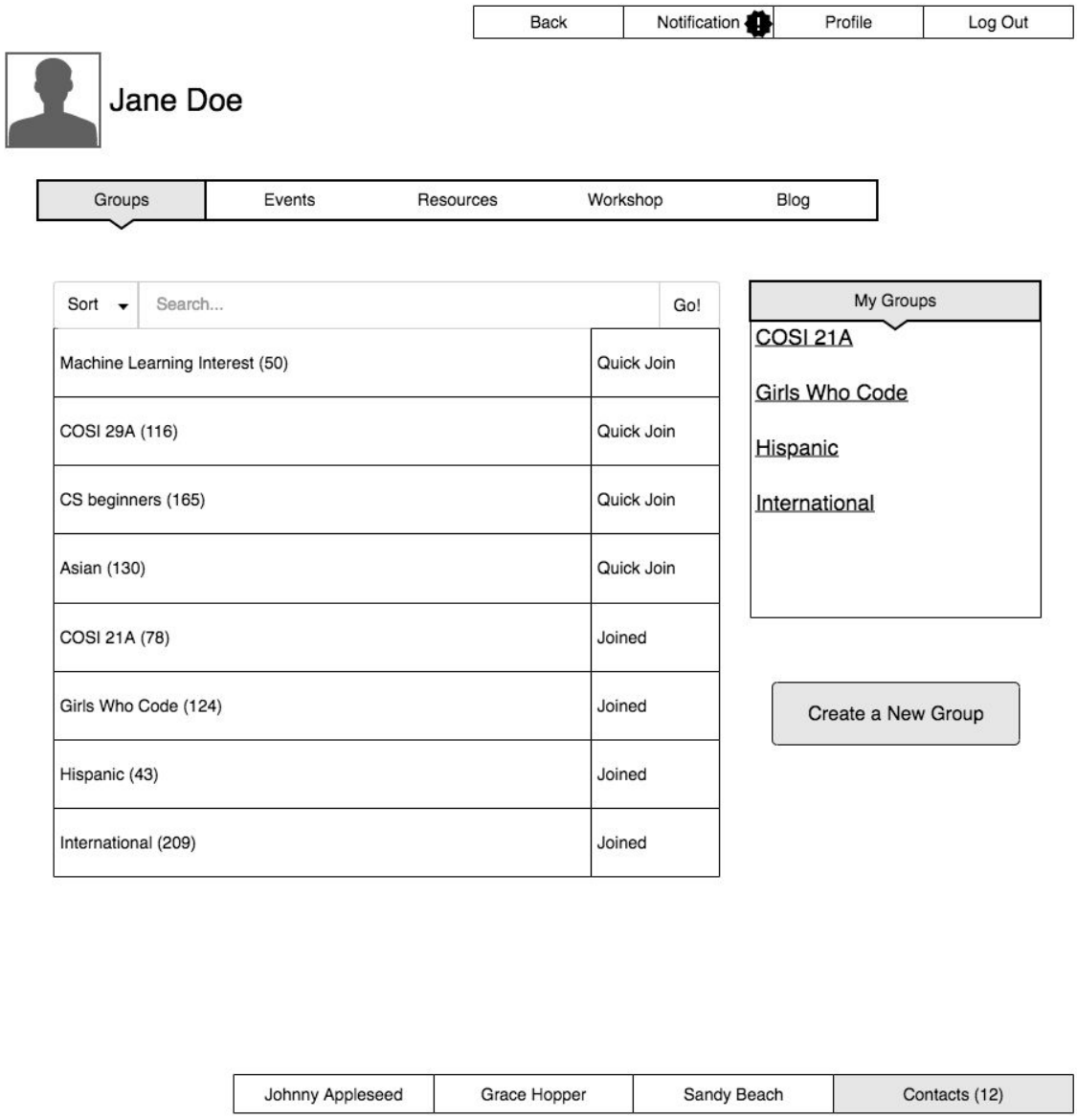
- Users are satisfied with this page.

Final Design

Final Prototype Presentation

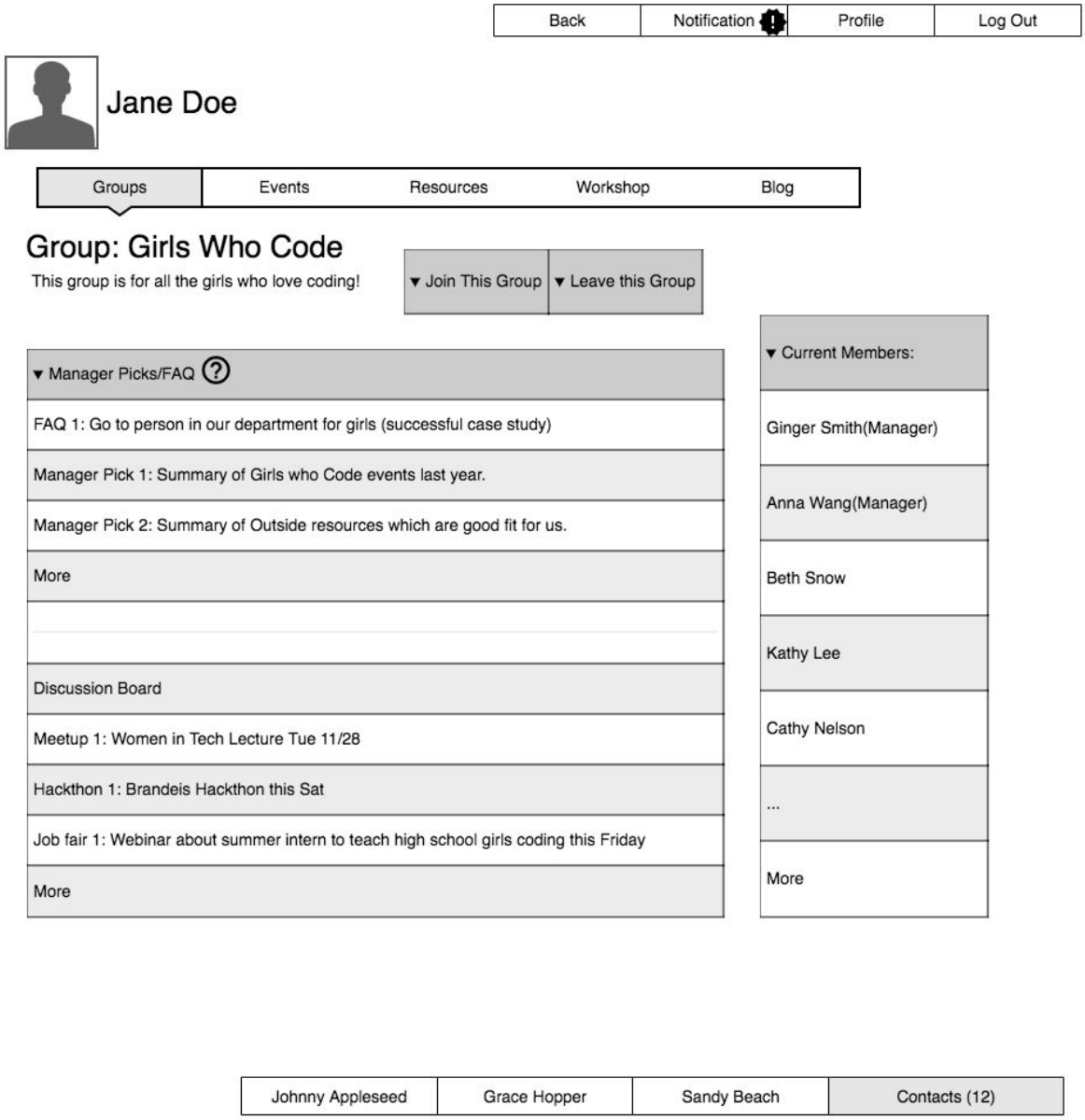


- This Login interface is designed with Minimalism ideas and will attracts the user's attention to the most important things: an eye-catching name and a simple yet elegant description of the functionality of the web application.
- Other than basic and easy-to-understand login/register buttons, this app is also featured with an alternate login portal - the Brandeis account login option - which is familiar and convenient for the user.
- Note: once logged in, the user will be prompt to the last page before logged off last time. This prevents the possible confusion that could arise from a base home page and reduces the complexity of the structure of the web application.



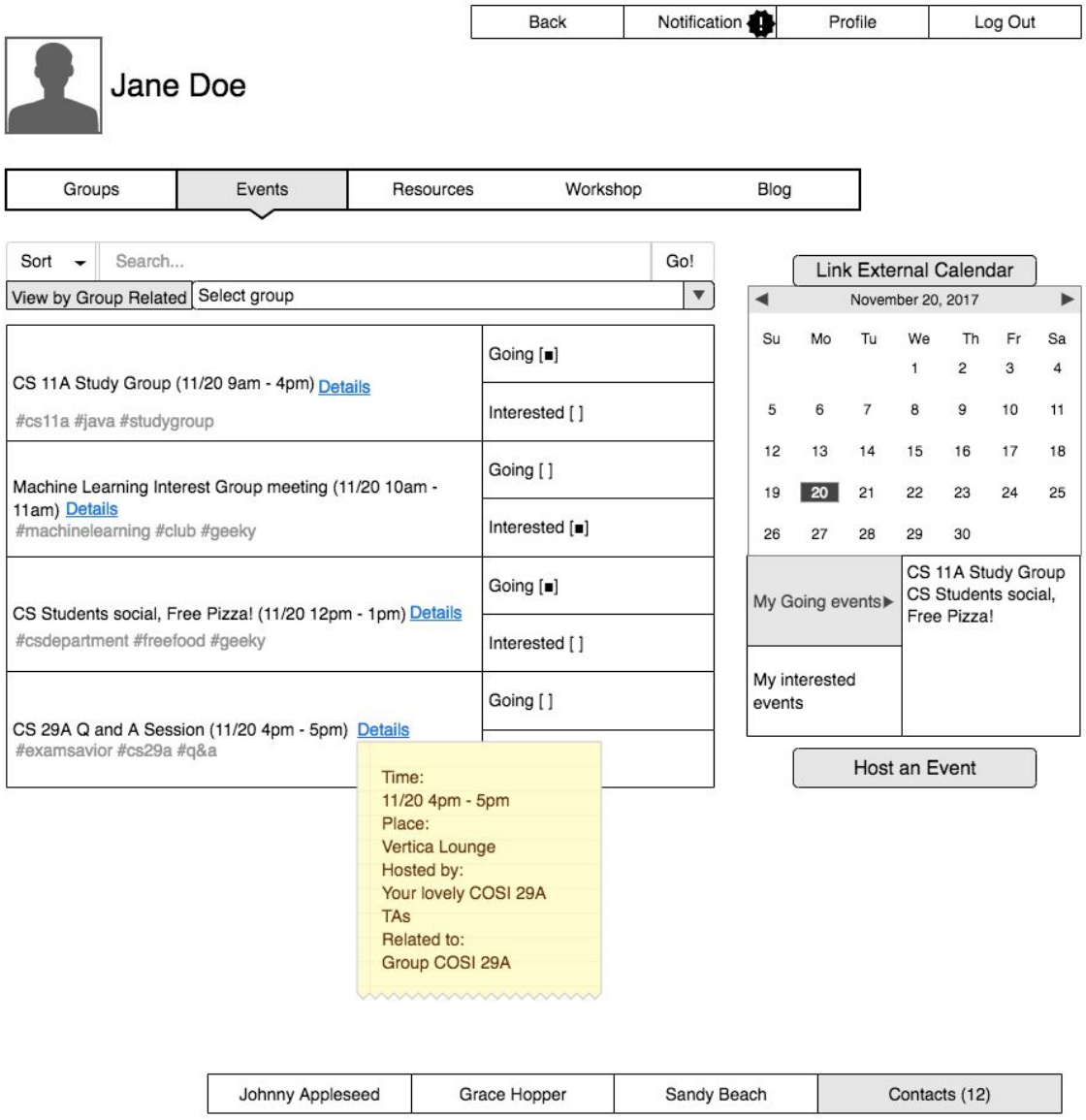
- This is the main page for the “Groups” function, one of the main five functions the app supports. The upper menu that lists all five functions are positioned top and left, considering that intuitively people would consider that part of the page important. The function currently using is indicted by the grey shade behind the text.
- This page lists all existed groups in the web platform. These “groups” can be created by the users in order to better connect with each other who shares a common interest. Users can search for specific keywords trying to find a group to join in; they can also sort groups by group size, created dates, or by categories including ethnic groups, current courses and programming language. There is also indication of whether they have joined or not and a “quick join” button. This page is also featured with “My groups”,

whereas user can view their joined groups separately and access those groups' pages faster.

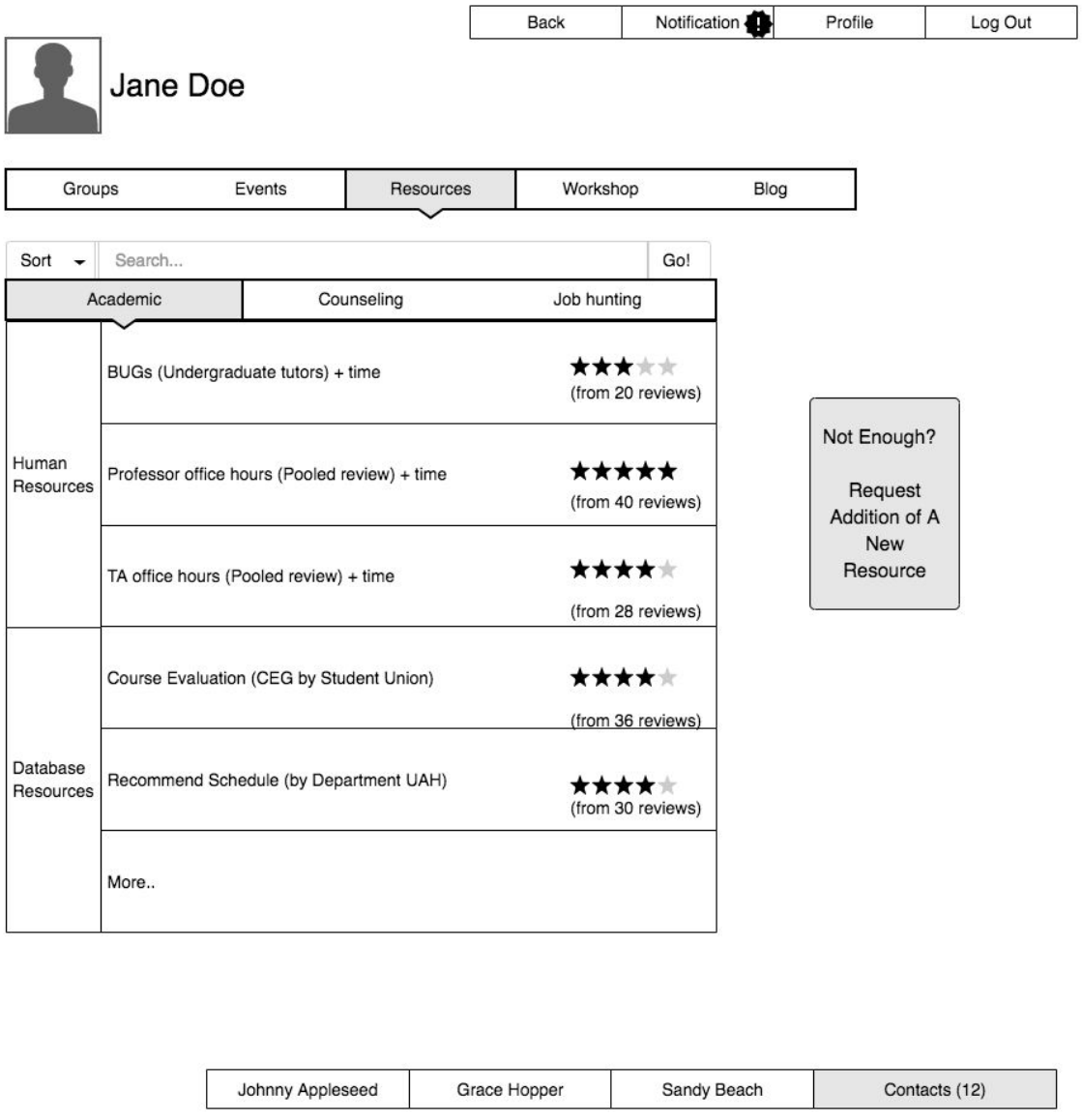


- This is an example of what a specific group page would look like. Name of the group together with a short introduction is provided, along with the buttons for joining/leaving the group. These are positioned top and left so intuitively the users will see these two important information when they first enters the page.
- Below the title is the body part and the main function of a specific group: a discussion board, where group members can post and share things as they like. The discussion board is also featured with a "manager picks/FAQs" section at the top, whereas managers of the group(elected by group members) can pick the most interesting and important posts from the discussion board and "sticks" those on top.

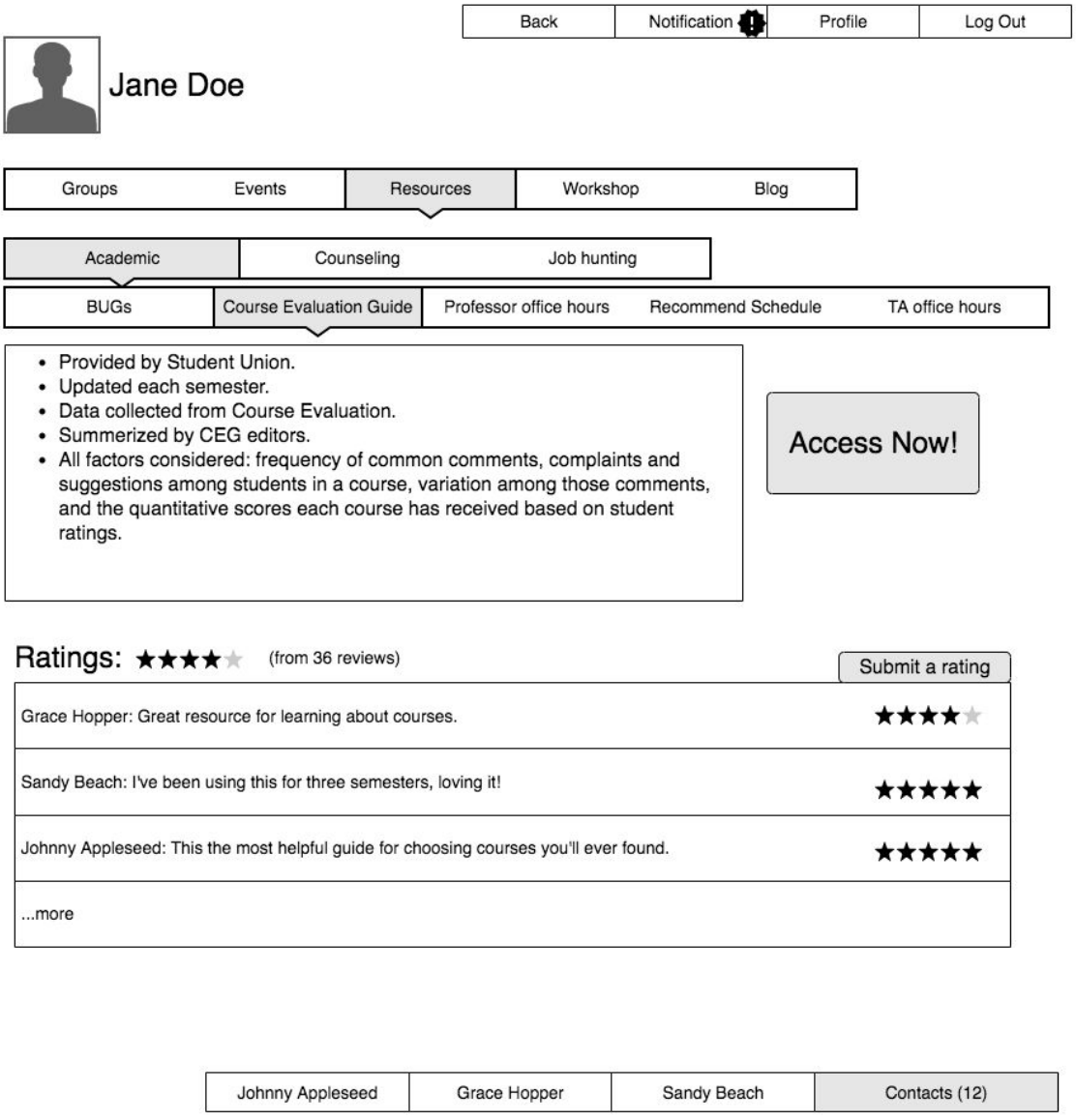
- Members of the group are also shown as a list, user can click on each name to go to that person’s profile page and make personal connection.



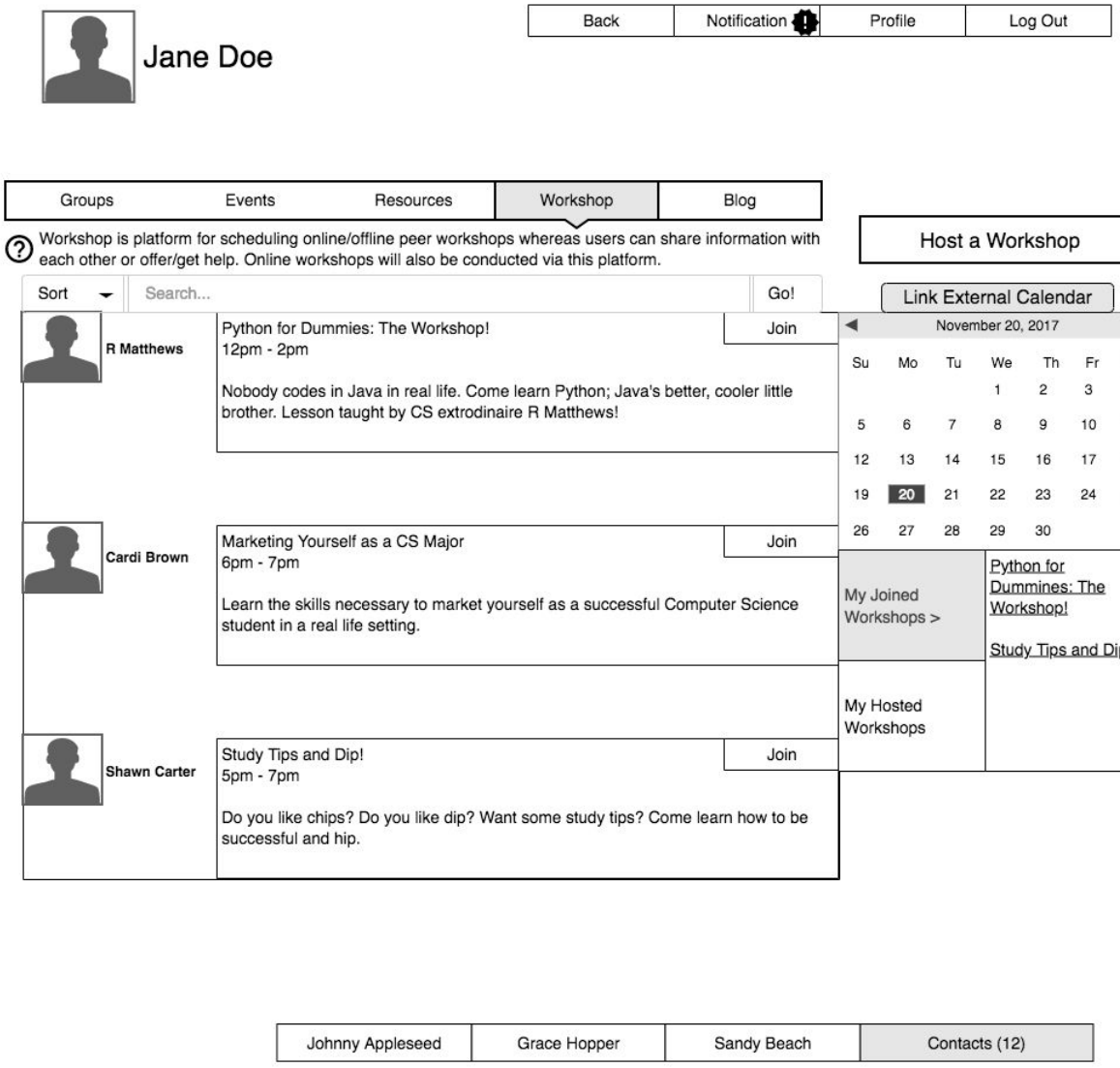
- This is the main page for the “Events” function, one of the main five functions the app supports. The idea behinds this page is to establish a better platform for organizing and joining events that happened in the computer science community.
- All events are shown by dates by default, user can use the calendar on the right to move to different dates to view the events happening on that date. The user is also able to search by keywords and sort by popularity and time. If an event is set to be related to a specific group from the platform, the user is also able to view the event lists related to some specific groups. For each individual events, time and tags are shown directly while more information could be accessed through a jump-out “Details” menu.
- The calendar function can support linking to external calendars and synchronize data via that connection. There are also options for “going” and “interested” for each event.



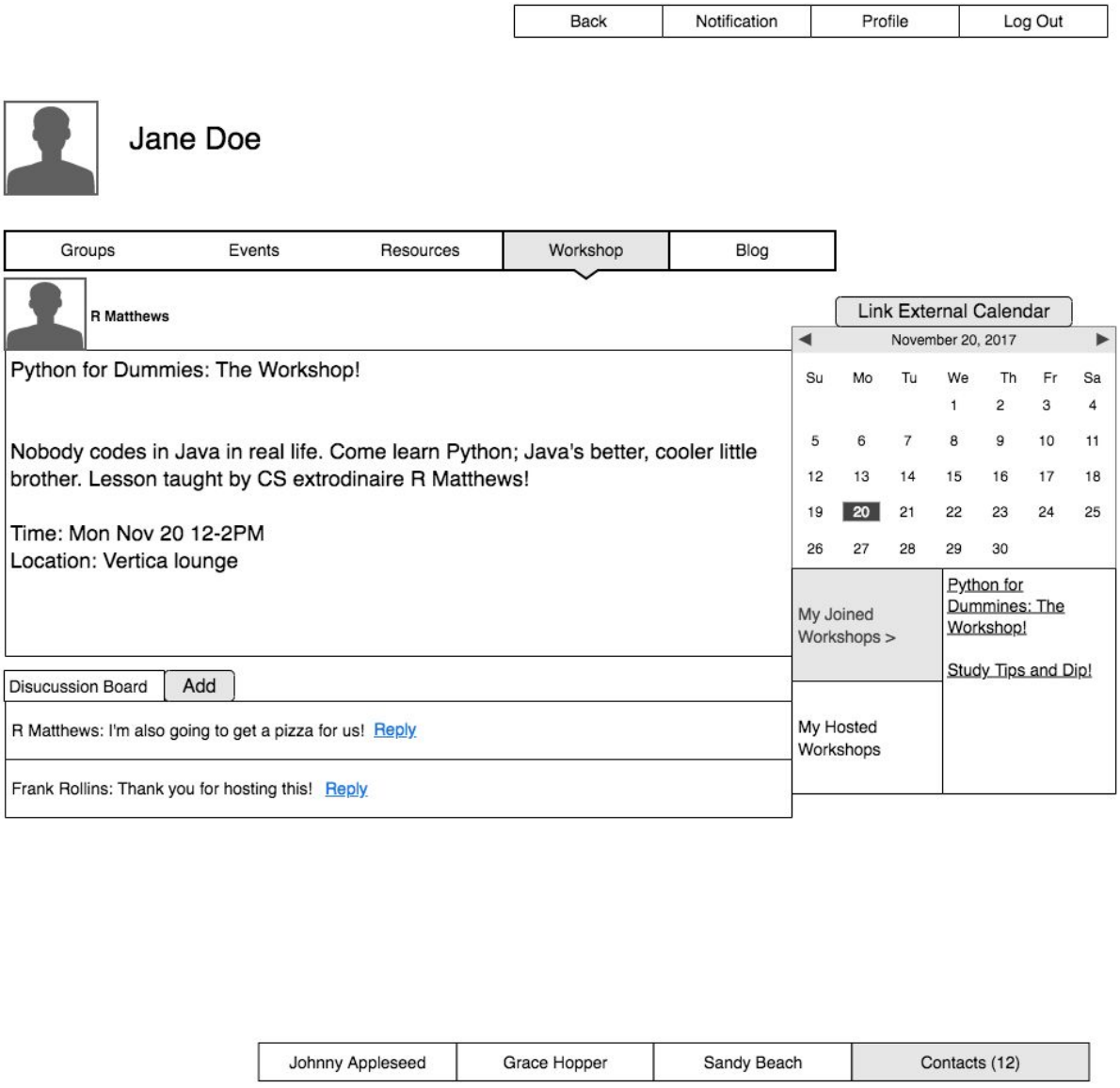
- This is the main page for the “Resources” function, one of the main five functions the app supports. The idea behinds this page is to provide a clear guide to all available resources regarding academics, counseling and job hunting issues.
- All resources listed are categorized clearly and informatively, it should be easy for the user to navigate while trying to get help. Another important feature this function serves is that it allows the users to submit reviews and rate how useful the resource is. This is also really important for someone who might have no idea whether the specific resource would be useful for his/her case. “5-stars” rating system are used because it’s easily visualized and understood.
- There is also an option of requesting more resources to be added to this “database”.



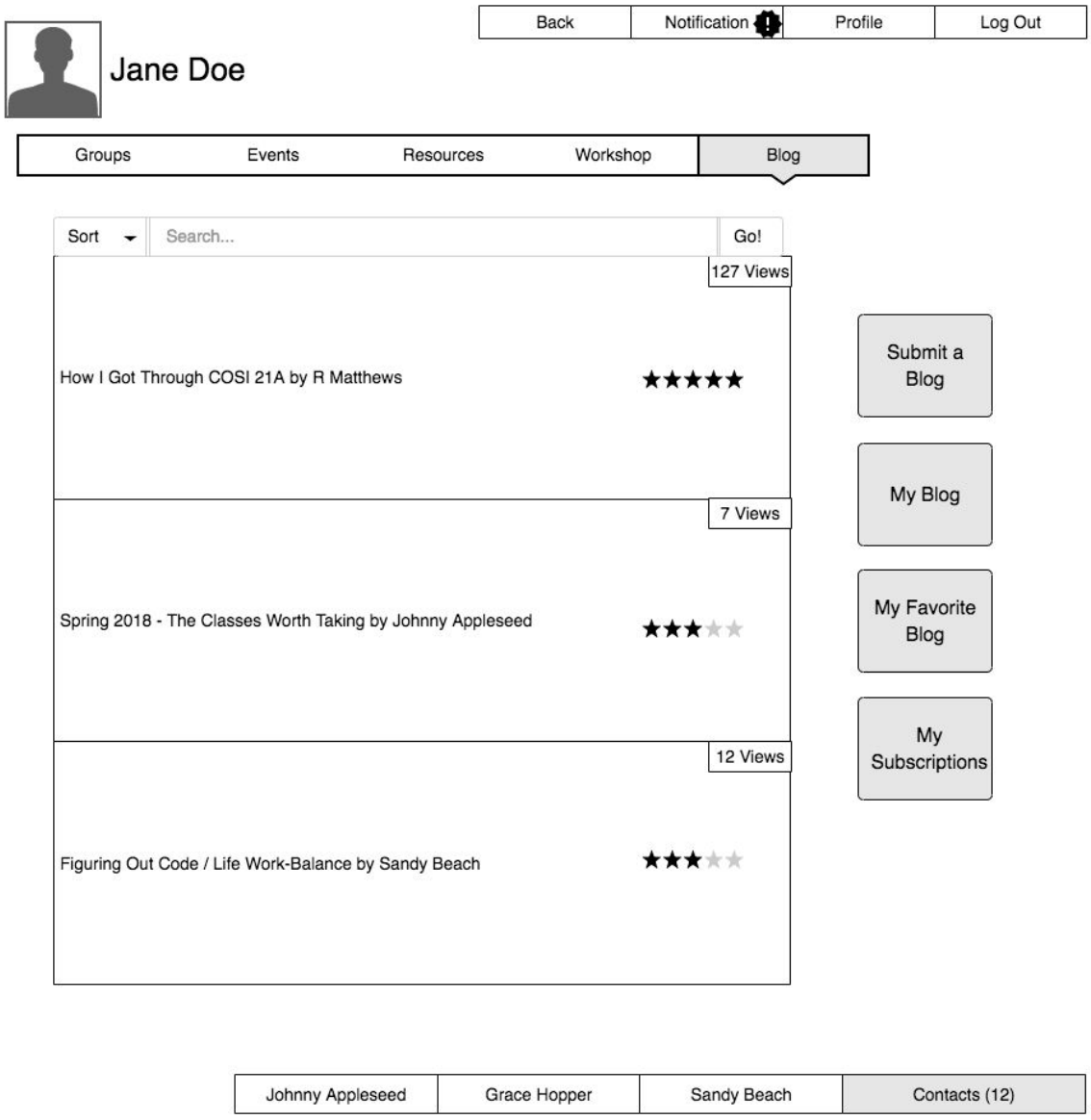
- This is how the page reviewing a specific resource would look like. It will provide the user with more detailed information about what the resource is, and it will also include some ways or instructions on how to access the resource. In this case, since the “course evaluation guide” is an online database, a link to it is provided. In other case like BUGs office hours, instructions including time and location will be provided.
- Users will be able to submit a rating together with some comments for the resource. All comments and the average total rating are also shown for user’s information.
- The menus on top is also keeping track of where the user is at within this “tree” of resources, and the user can go to other “branch” easily by simply clicking on the button.



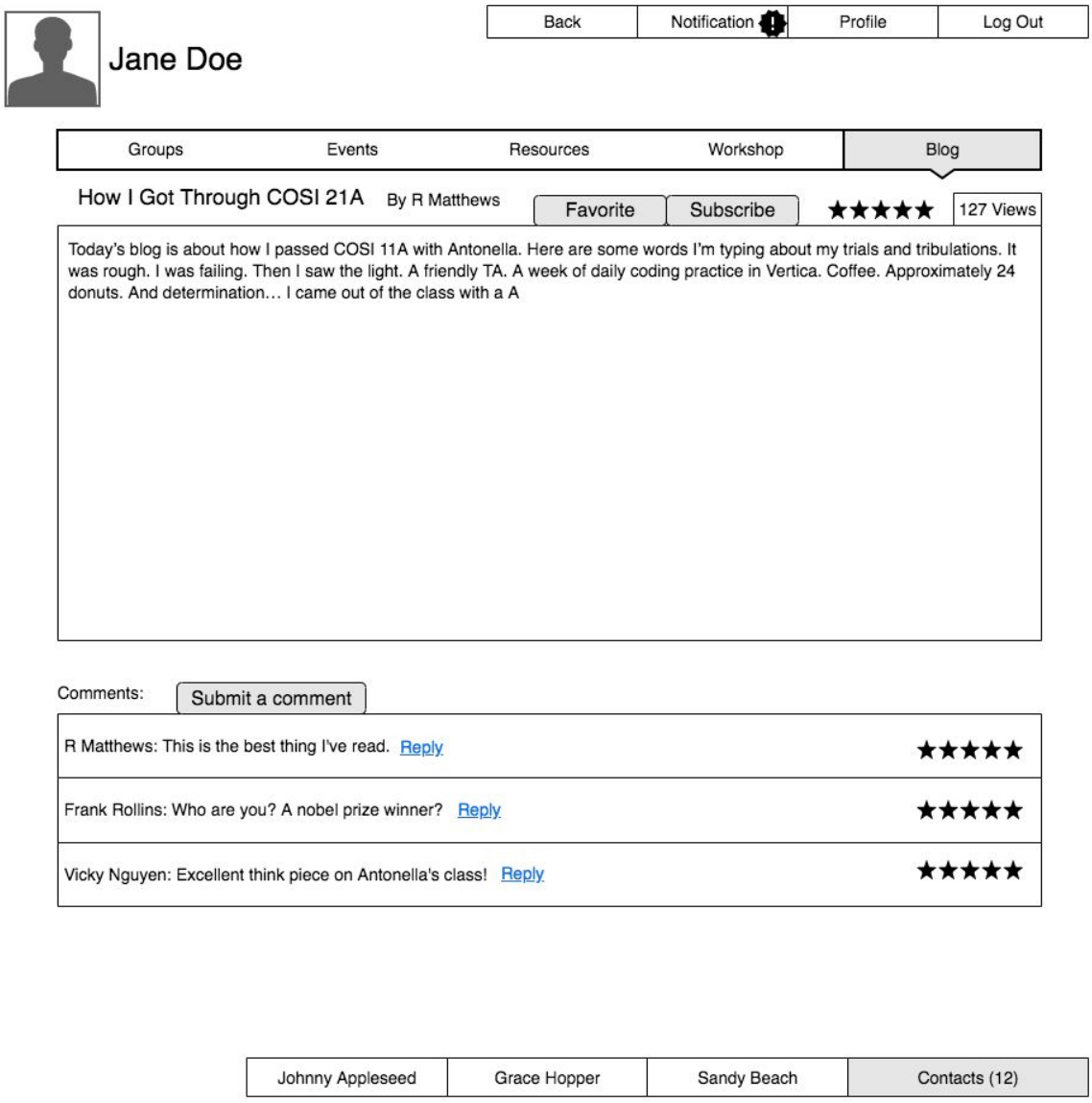
- This is the main page for the “Workshop” function, one of the main five functions the app supports. The idea behinds this page is to provide a platform for scheduling peer workshops among users to allow information sharing and peer tutoring. These workshops can be either online or offline, depending on the users. If it’s online, it will be conducted via the function itself. If it’s offline, the users can still use the function to discuss with each other.
- All workshops are shown by the dates and can be navigated using the calendar on the right, similar like the “event” page. Users can also search by keywords, or sort by popularity, time or categories including programming languages. For each workshop, the host’s username and profile picture are shown, together with some quick introduction to the topics of the workshop.
- Users can join any workshop as they want with simply a click on the “join” button, and can view their joined workshops and hosted workshop on the blocks under the calendar.



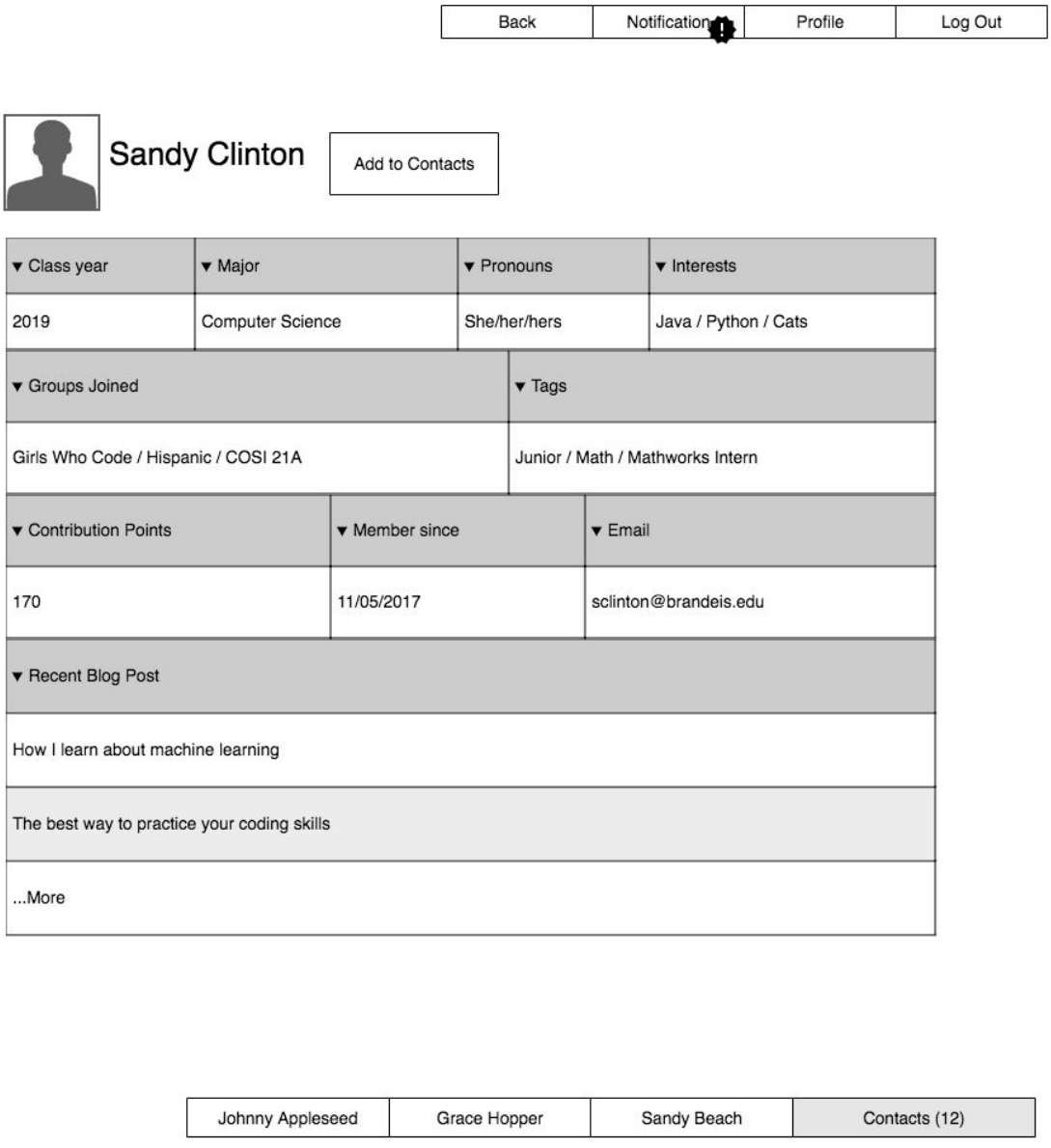
- This is how a specific workshop page would look like. The host will have a text area where he/she can post announcements or use as the “blackboard” while he/she is talking about some topics. It will be editable by the host and synchronize any changes. Under that there will be a discussion board whereas anyone who’s in the workshop can comment and also reply to other comments.
- As mentioned earlier, online workshops will be conducted via this, but such features are also useful for people hosting offline meetup-style workshops.



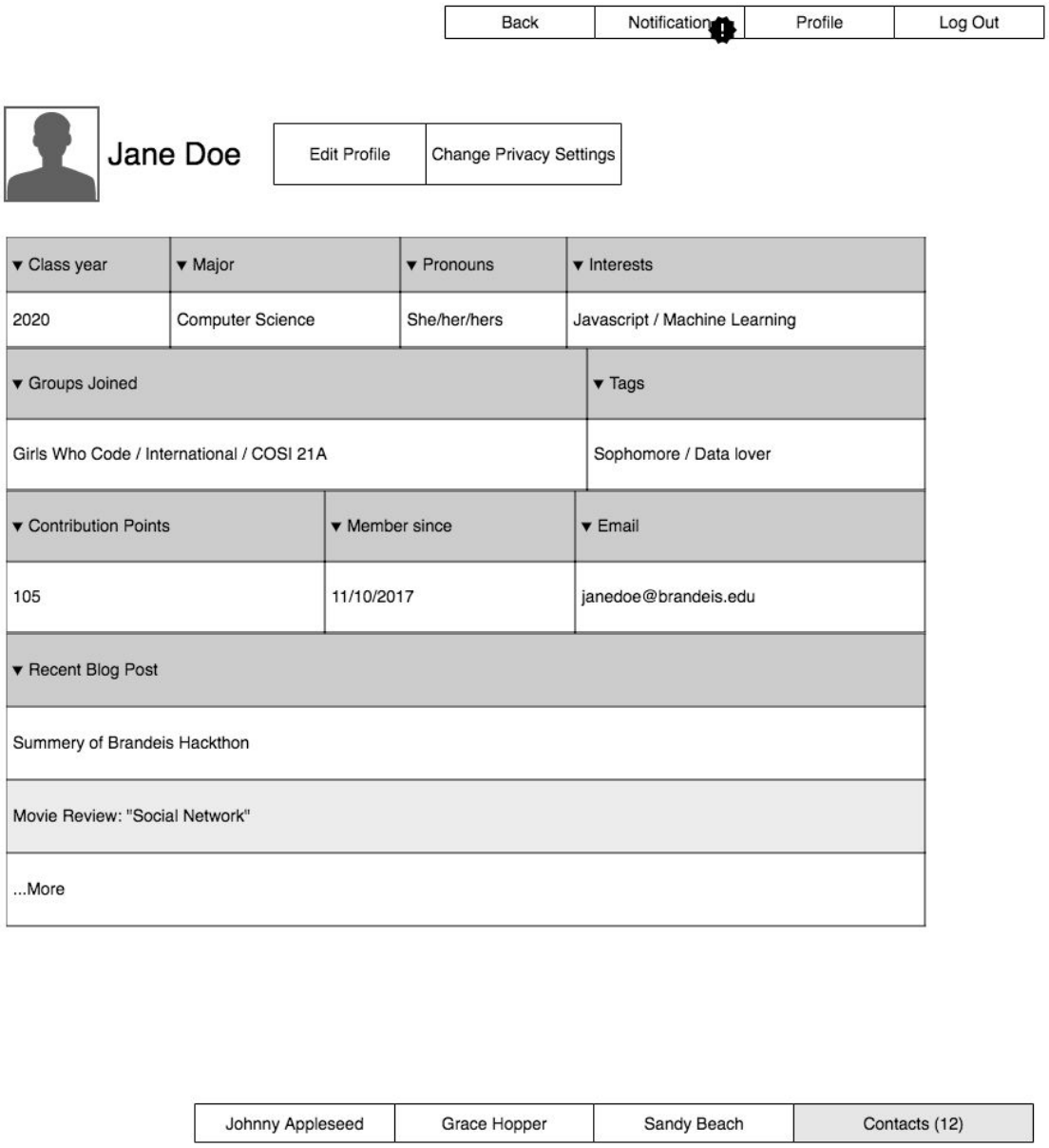
- This is the main page for the “Blogs” function, one of the main five functions the app supports. The idea behinds this page is to provide a platform for experience sharing via a blog style and also help making personal connections among users.
- All of the blogs will be listed by submitted time and the user is also able to search by keywords as well as to sort by popularity and categories like courses and programming languages. For each blog post, the title and author are shown, along with view counts and people’s ratings.
- There are also buttons for submitting blogs, viewing the user’s own blogs, viewing the user’s favorite blogs, and viewing the user’s subscriptions.



- This is what a specific blog post would look like. The whole width of the page is used for best visualization of the contexts of the blog post. And below the body of the blog post there's comments section for people to submit comment and ratings. Users will also be able to reply to other people's comments.
- Next to the title and the author's name. The user will also be able to favorite this specific blog post, as well as subscribe the author. If the user wants to add the author as a contact, he/she can view the author's profile to add by clicking on the author's name.



- This is what other people's profile page looks like. In this app, wherever one clicks on the name of some person(except in the messenger and contacts), he/she will be taken to that person's profile page.
- There will be buttons for add to contacts, if that person is already in the contacts, that button will become delete from contacts.
- Information of that person is shown and for "recent blog post" and "groups joined", the user is able to go directly to those posts/group pages by clicking on the title.
- "Contribution points" is a "reward" system that encourages users to contribute to the virtual community, there will points added when the user hosts a workshop, post a blog post, post something within a group etc.



- This is what a user's own profile page looks like. The user can access this page by using the functional menu on top-right.
- This page looks really similar to other people's profile page, however, instead of having a button "add to contacts", one have two buttons on their own page: "edit profile" to modify their information and profile picture, and "change privacy settings" to modify certain settings regarding privacy using the app. For example, whether allow other people to add them directly or only after permission.
- The top right function menu includes four buttons: "back" to go back to any prior pages, "notification" to view any notifications generated by the system (e.g. someone comments on your comment in … etc), "profile" to view one's own profile page, and "log out" to log out. This menu is consistent through all pages.

- This is not a page in the web application, but rather a demonstration of the contacts and messenger system. Without clicking to expand, this will just be consistent bar at the bottom of every page.
- Upon clicking on “contacts”, a list shown above will expand and let the user view all contacts he/she has. There will also be buttons available for importing contacts from external sources, add new contacts via search and delete contacts.
- Upon clicking on the names in the contact list, a new typing window will expand next to the contacts, allowing the user to chat with that specific person. Transmission of photos, files and links is also supported. And up to three most recent chats will also be kept in the bar.

Cognitive Walkthrough

Definition: The cognitive walkthrough is a type of usability evaluation where evaluators work through a series of tasks and ask a series of questions from a user perspective. The main purpose of a cognitive walkthrough is to gather any possible assumptions users may have when using the product. It can also be used to work through usability problems for both beginner and experienced users.

Procedure: When the task analysis has been laid out, the evaluators participating do a walkthrough by asking themselves a series of questions for a specific subtask. Below are four typical questions asked. When we asked ourselves these questions, the result was as follows:

Task Questions:

1. Will the user try to achieve the effect that the subtask has? *E.g. does the user understand that this task is needed to reach the user's goal?*
2. Will the user notice that the correct action is available? *E.g. is the button visible?*
3. Will the user understand that the wanted subtask can be achieved by the action? *E.g. the correct button is visible, but will the user understand that this is the correct button?*
4. Does the user get appropriate feedback? *E.g. will the user know that they have performed the correct action after execution?*

Cognitive Walkthrough Task: User finds the email address of another member of a mutually joined group

1. From the main group page, the user must navigate to the side of the page under the heading "My Groups" and select a particular group (knowledge: low, motivation high).
    a. User will need to navigate to the "My Groups" section
    b. User could be tempted to use search bar or existing full list instead of "My Groups" section to find their designated group.
        i. Partial Solution: use color to bring the attention of the user to the specific section
2. On the specific group page, the user will have to navigate to the side of the page under a section titled "Current Member" and click on the user who's email address they want to see (knowledge: low, motivation high).
    a. User could get confused if the user they are looking for is not readily visible to the point that the user has to click the "more" button.
        i. Partial Solution: add a search bar specifically for searching through members
3. On the designated users page, the current user is then able to see the desired user's email address (knowledge: low, motivation high).

Usability Criterion Analysis

Efficient to use

Design rationale: Group Discussion Board

This design will provide a much more efficient way of specific problem solving for many daily life struggles faced by CS students at Brandeis. Without the application, the person might have to go through the long and painful process of finding the right person to ask for help, try to communicate with that specific person and possibly not getting the exact help in time. With this function, the user can easily go to a related group and post his/her question in that safe space and immediately get access to help from more than one source. Because usually the situation of problem solving is time sensitive, this design will definitely be a more efficient choice.

Effective to use

Design rationale: Resource guide with reviews and ratings

The Resource guide provided by CS^2 is effective to use since it provides something that no currently existing resource guide could provide----the users' inputs of reviews and ratings on each specific resources. Because all of the reviews and ratings are coming from users who knows about the expectations someone might have while looking for helps, so their reviews and ratings will definitely be effective in the sense of helping another user find the best resource to use regarding a specific question.

Good utility

Design rationale: Incorporating information sharing, social connection and peer tutoring together within one app.

The main purpose behind CS^2 is to provide better connection and support between Brandeis CS students. All current solutions to that topic are not good enough, since usually they could only offer one specific kind of help. For example, facebook is a great app for social connection, but it doesn't work that well regarding information sharing, stackoverflow is a great website for peer technical supports, but it doesn't work that well regarding social connection. In this case, our app will provide maximized utility regarding all those needs in only one single web app.

Easy to remember how to use

Design rationale: Messenger and contacts system

We utilizes a lot of ideas from Facebook in our design of the messenger and contacts system and it would be really familiar for our users. In fact, they probably won't even need to remember that to know how to use it. The consistency within the visualization of that system is also really helpful for the easiness remember how to use the system.

Easy to learn

Design rationale: Question mark for explanation in a few functions, e.g. manager picks (?)

During our observation we've noticed that our subjects would get confused by a few functions

that we've designed. So in order to improve the easiness to learn how to use it, we incorporate this tiny detailed design of having a question mark button next to each of the seemingly confusing functions, e.g. manager picks. When the user clicks on the question mark, some explanation will jump out in a small window for the user to read and learn how to use the function. This feature will always be there when the functionality seems to be not that straightforward, and by designing it this way we are making our app easier to learn for the users.

Safe to use

Design rationale: Privacy settings in personal profile

One big problem that social apps usually face is the safety relating to privacy. To tackle that question, we includes a privacy settings that will allow the user to modify regarding their own opinions. For example, whether they want other people to add them as contacts directly or only with their permission. By doing this we are ensuring that nobody's privacy rights are being violated and the virtual space in our app is safe for everyone to use.

User Experience Goals Analysis

Positive User Experience Goals: satisfying and engaging

Design rationale: Contribution point system

"Contribution points" is a "reward" system that we designed to encourage users to contribute to the virtual community. There will points added when the user hosts a workshop, post a blog post, post something within a group etc. The idea behinds this is that we want our user to get such a user experience from using our app: for every goodness that they bring to the community, they will gain some points back. Using this quantified system measuring the contribution the user has made to the community, we are utilizing positive peer competition to achieve the user experience goal of engaging, and also utilizing the "reward"-like feedback to achieve the user experience goal of satisfying.

Negative User Experience Goals: frustrating and confusing

Design rationale: Resource guide with reviews and ratings

The design of a resource guide with users' reviews and ratings resolves the frustration and confusion that usually arises when someone is having a problem and doesn't have a clue of how to get help. We get this idea after learning about how people have been lost in trying to figure out what resources exist around them from our initial interviews. And in order to change the current "user experience" of frustration and confusion caused by a lack of a clear and useful guide over the topics of all existing resources, we designed the "resource" function on our app.

Cognitive Analysis

Attention
There are usually multiple things going on in the pages of our app. Therefore, trying to keep the user's attention to the most important things are quite vital in the design of page layout for our app. We follow the intuition that people will always pay more attention to the top-left corner to position our primary menu which contains all five main functions, since most of the apps are built in that way and people have long been used to that. For each individual function, we also keep the most important information around that place using the same logics, for example on a specific group page, the name of the group and the introduction of the group are positioned right down from the primary menu in the top-left corner.

Perception
Within the primary menu and many other menus, we are always using a darker grey shades to mark the menu position we are on currently. This difference in color helps users distinguish between different menu options and understand what task they are currently on easier and quicker.

Memory
For functions like events and workshops, we are utilizing external memory to ease the user from the need of remember everything with designs of "my going events", "my interested events" or "my joined workshops". Users can select certain options and view those in a specific place, so that they no longer needs to memorize those themselves. And automatically there will also be reminders sending to the users via the "notification" function when such events and workshops are coming up soon.

Learning
With the "group" and "workshop" functions that our app have, we are encouraging learning from each other in the whole user community. And that is achieved by using our functions to provide a better information sharing platform among each member of the community and utilizing a "reward" system of "contribution points" to encourage people to do so.

Reading, speaking and listening
Although currently our app doesn't incorporate functions that will allow the user to utilizing speaking and listening yet, we can definitely incorporate that into the messenger system and also make workshops. Some people might feel the need to have oral communication for a better understanding with each other. And having an audio presentation and recording for a workshop is not only useful for the sake of a better explanation over some tricky topics, but also great for anyone who wants to review the workshop after its live time period.

Problem Solving, Reasoning and Decision making

The initial purpose of designing our app is to provide a better platform for people to go to for problem solving. With all the functionalities allowing information sharing and peer support, we are definitely helping our users with problem solving, and reasoning in some cases too. The resource guide that we've provided and the blog system of sharing experience are also influencing our user's decision making in one way or another.

Gestalt Principles Analysis

Gestalt psychology attempts to understand psychological phenomena by viewing them as organised and structured wholes rather than the sum of their constituent parts. Thus, Gestalt psychology dissociates itself from the more 'elementistic'/reductionistic/decompositional approaches to psychology like structuralism (with its tendency to analyse mental processes into elementary sensations) and it accentuates concepts like emergent properties, holism, and context.

The law of proximity posits that when we perceive a collection of objects, we will see objects close to each other as forming a group. Our questions trying to group them together based on such collection of objects.

The law of similarity captures the idea that elements will be grouped perceptually if they are similar to each other. Most questions are grouped based on similarity

The law of symmetry captures the idea that when we perceive objects we tend to perceive them as symmetrical shapes that form around their centre.

Keystroke Analysis

Keystroke-level model (KLM) predicts how long it will take an expert user to accomplish a routine task without errors using an interactive computer system. Using KLM, execution time is estimated by listing the sequence operators and then summing the times of the individual operators. KLM aggregates all perceptual and cognitive function into a single value for an entire task, using a heuristic. KLM also does not employ selection rules.
According to this KLM model, it takes 8 to 14 minutes to accomplish the tasks. We did it step by step in our first round and second round obsevations. More details in our Observation notes in Appendix.

Expert Reviews

We evaluate using the following principles. Our prototype two, the Moqup prototype is following all these principles below.

Shneiderman’s 8 Golden Rules
1. Strive for consistency
1.1.Identical Terminology (unifying metaphor) in prompts, menus, and help screens
1.2.Consistency in color, layout, capitalization, fonts
2. Enable frequent users to use shortcuts
2.1.Abbreviations; Special keys; Hidden commands; Macro facilities
3. Offer informative feedback
4. Design dialogs to yield closure
4.1.Sequences of actions should be organized into groups
4.2.Beginning, middle, and an end
5. Offer error prevention and simple error handling
6. Permit easy reversal of actions
7. Support internal locus of control
8. Reduce short-term memory load
Our design is consistent with our design problem and subjects’ feedback, we offerd informative feedback. Make sure the Sequences of actions are organized into groups of “events, courses, groups” etc.

Nielsen’s Usability Principles
1. Visibility of system status
1.1.System keeps user informed with appropriate timely feedback
2. Match between system and the real world
2.1.Speak the users’ language, using words, phrases, and concepts familiar to user
3. User control and freedom
3.1.Provide emergency exits that are clearly marked. Support undo and redo.
4. Consistency and Standards
4.1.Clean semantics. Follow platform conventions
5. Error Prevention
5.1.Help users recognize, diagnose, and recover from errors
5.2.Careful design to reduce errors; Forcing functions
Our design match between the web app and the real work, using the subjects’ language, using the terms college students are most familiar with. Give users control and freedom by add tags and search. And have all kind of error prevention such as Notification before deleting or editing.

Appendix

Consent Form

Test Subject Agreement Document

Hello! Thank you for agreeing to participate as a user test subject for <Project Name>. We really appreciate you taking the time to do this and for helping us secure that A+! First and foremost we want to explain that this contract ***does not*** serve as a formal legal document, but it ***does*** serve as a binding contract with us stating that you are willing to participate in various interviews, discussions, observations, and data gathering sessions.

You are invited to participate in a research project being conducted by the <Project Name> Developer Team. In simple terms, we hope you will use our application to:
1) Find and connect with minorities in computer science at Brandeis
2) Gain access to professional development and computer science related resources
3) Find tutors or study groups

The <Project Name> Developer Team will be able to use your responses and performances in your participation in various interviews, discussions, observations, and data gathering sessions. Please note that you ***do not*** have to agree to all of this, and you may ***stop*** participating at any time.

You may sign by checking the boxes below, and signing your name afterwards. Please note that it's your decision and you ***do not*** have to check all boxes.
[ ] I allow any comments, opinions, and information I provide via interview/discussions/questionnaires to be recorded and analyzed by the <Project Name> Developer Team.
[ ] I agree to be the subject during several observations performing tasks as instructed and being observed.

Please choose the option you prefer from the three below:
[ ] I allow the interview/discussion/observation to be ***video recorded***.
[ ] I allow the interview/discussion/observation to be ***audio recorded ONLY***.
[ ] I ***DO NOT*** allow the interview/discussion/observation to be video recorded or audio recorded.

Please note that all personal information will be kept private and all comments/opinions will be quoted anonymously if they ever appear in public.

Name:
Email:
Signature:
Date:

Interview Script

Interview Type: Semi Structured; conducting with individuals

- Introduction:
    - Hi we are the <ProjectName> team. We are developing an application to (1) find and connect with minorities in computer science at Brandeis, (2) to gain access to professional development and computer science related resources, and (3) to find tutors or study groups.
    - Is it ok if we record the interview? (Video/audio)
    - Have them sign an interview consent.
- Warm-Up Questions:
    - What's your name?
    - Major?
    - Where are you from?
    - What classes are you taking?
    - Why are you taking these classes
    - Do you find yourself as a part of an underrepresented group in CS at Brandeis?
- Main Questions:
    - Can you find the resources you need in the Computer Science department?
    - Do you find the current resources helpful? How so?
    - Whenever you encounter a CS-related problem, do you know who to go?
        - If so, who?
    - Have you been in a situation where you weren't able to get the help you needed?
    - Specific resources:
        - Have you talked to your academic advisor? Your major advisor?
            - Why or why not
        - Have you reviewed the CS department website?
            - Why or why not?
        - Have you used a third-party review site such as Rate My Professor?
            - Why or why not?
        - Do you go to TA/BUGS hours / Professors' Office Hours?
            - Why or why not?
        - Are you a part of any minority specific support programs (NSBE, SACNAS, Women In Tech, GirlsWhoCode, etc.)?
            - Did you know these programs existed?
        - Do you know where to find CS majors who have taken the courses that you are about to take?
    - What kind of resources would you want to help support you?
    - In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
- Cool-Off Questions:

    - Are you friends with other CS majors?
    - Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
- Closing:
    - Thank you for your time.
    - Switch off recorder.

Interview Notes

1. **<u>Subject #1</u>**
    a. Warm-up questions
        i. Class year and major:
        Class of 2021, CS major, Math minor.
        ii. From:
        Beijing, China.
        iii. Current Classes:
        COSI 11, MATH 15, MATH 20, college writing course
        Why: Love math and computer science, took advanced math courses earlier, so skipped intro level class in math, others by major/minor requirements, university requirements.
        iv. Find self as in an underrepresented group:
        Yes, as a woman, people have stereotypes that male dominates the STEM world. Causing a bit of depression for her.
    b. Main questions
        i. Can you find the resources you need in the Computer Science department?
        Yes. She usually goes to her faculty advisor's office hour, to talk about problems she encounters, career plans.
        ii. Do you find the current resources helpful? How so?
        Yes, really useful.
        iii. Whenever you encounter a CS-related problem, do you know who to go?If so, who?
        She knows who to go to, advisor or students.
        iv. Have you been in a situation where you weren't able to get the help you needed?
        Not so far.
        v. Specific resources:

Academic Advisor/ Major advisor	CS depart. website	3rd party E.g. rate my prof.	TA office hours	Prof. office hours	BUGs tutoring	Minority support programs (SACNAC, WIT)
Yes	Yes	Yes	Yes	Yes	No	Yes

	(to determine courses)				(never heard of it)	Brandeis Encouraging Women in Sci and Tech Club

vi. Do you know where to find CS majors who have taken the courses that you are about to take?
She knows where to find all of those.

vii. What kind of resources would you want to help support you?
Online courses: Machine Learning on Coursera---good since there are feedback and grades/corrections, Berkeley 61B on Data Structure.
She is really knowledgeable about all the resources, but she also thinks that it's useful to connect students to resources, especially with a filtering system, which can tell like what resource is good/bad.

viii. In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
She prefer in-person contacts, she doesn't feel like she needs to connect with people on a platform of app. But she feels like that an app could give something like a "horizontal comparison" to help her know what others are doing, not towards the competition part, but more towards a sharable platform where people can post what they learned and learn from each other.

c. Cool off questions:
   i. Are you friends with other CS majors?
   Yes, majority of her friends are CS majors. Some of them met before coming to Brandeis and they took the same classes later, so they naturally became friends.
   ii. Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
   Yes. She's going to take 21,12, matlab, a math course, and a history course. She selects these classes because she wants to get an internship in the summer, so she wants to focus on her major-related knowledge. She feels it's easy to find all the classes she needs. The course selection process is really easy for her. She just feels that some of the classes is going to be really hard for her, so she might consider drop one of them next semester.

2. <u>Subject #2</u>

a. Warm-up questions
   i. Class year and major:
   Class of 2020, CS major, Business minor.

ii. From:
Shenyang, Liaoning, China.

iii. Current Classes:
BUS 10a, COSI 11a, MATH 15a, BUS 51b, UWS 2b
Why: Business classes are all core courses, major requirements, as for CS classes, she haven't thought of CS major earlier, but Tim is so nice, she feel motivated by him to go on in this field

iv. Find self as in an underrepresented group:
International students----natural minority, she does feel a lack in resource

b. Main questions

i. Can you find the resources you need in the Computer Science department?
Not really

ii. Whenever you encounter a CS-related problem, do you know who to go?If so, who?
Probably ask a TA, or email the professor. But more often, just Google.

iii. Have you been in a situation where you weren't able to get the help you needed?
In some of the reading assignments for CS, there are technical words that she does not understand. Google is not enough to help her solve the confusion.

iv. Specific resources:

Academic Advisor/ Major advisor	CS depart. website	3rd party E.g. rate my prof.	TA office hours	Prof. office hours	BUGs tutoring	Minority support programs (SACNAC, WIT)
No (Too lazy to make appointment)	No (Don't even know it exists.)	Yes (But opinions on that is not changing her decision.)	Yes (for questions relating to PA/home work due)	No (Don't know about it)	No (never heard of it)	No (Never know these exists)

v. Do you know where to find CS majors who have taken the courses that you are about to take?
Wechat (social media).

vi. What kind of resources would you want to help support you?
General information, selecting courses, how to perform well in the final exam, learn about more in CS, groups to join to do code and projects.

vii. In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
Introduction to Brandeis CS, professor ratings, connect to other CS majors, especially to the people who might be interested to offer help. On

the other hand, comparing to Business department, she says that they would have many social events with professors, e.g. thanksgiving dinners. And if you walk around IBS building, you will see a lot of bonding going on between students and professors. She feels that the CS department could do better on this.

c. Cool off questions:
    i. Are you friends with other CS majors?
    20% of friends of friends are CS majors, and they are mostly classmates. She feels that most CS students are shy, not that outgoing, but all honest and nice. In comparison, business students talk a lot, but they might not be honest with you.
    ii. Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
    Yes. COSI 12, 21,155, BUS 113 accounting, and BUS 71 finance.
    She mentions that business department has a clear course recommendation list on their website, which is really helpful. As for CS classes, she just finishes the registration after talking with friends, but she feels she's still not sure whether she should take those classes.

3. **<u>Subject #3:</u>**
    a. Warm-up questions
        i. Class year and major:
        Class of 2020, CS major, Biology major (double major).
        ii. From:
        Shanghai, China.
        iii. Current Classes:
        COSI 11, COSI 29
        iv. Find self as in an underrepresented group:
        Yes. Female, International, have not find student group with similar background, also I have Pascal experience before, not too much students use it.

    b. Main questions
        i. Can you find the resources you need in the Computer Science department?
        Not really, before I declare major, I am not getting the email notification about computer science events emails. After I declared major, I got a lot of unsorted emails about events and resource, as a newcomer to this field, I don't know which one worth going. Also, If I go, I don't know what I should prepare. For example, I went to the computer science job fair, but I am not sure what I should prepare before I go. It's helpful, but I feel there should be more.

ii. Whenever you encounter a CS-related problem, do you know who to go?If so, who?
First TA, then professor, after that, I don't really know.

iii. Have you been in a situation where you weren't able to get the help you needed?
<answer> Yes, A lot. I participated in Brandeis Hackathon last weekend. I need help with web development, CSS HTML etc. I have no idea where I can find help. The only source I can turn to is the youtube tutorial videos, that was a tough time.

iv. Specific resources:

Academic Advisor/ Major advisor	CS depart. website	3rd party E.g. rate my prof.	TA office hours	Prof. office hours	BUGs tutoring	Minority support programs (SACNAC, WIT)
Academic advisor, yes, she just helped me to set up the four year class schedule. Major Advisor, No. Also I do not know what topics I should talk to them.	Only before I declare my CS major, after that, Not really.	Not for my CS courses, more for biology courses.	Yes. Mainly for explain the scoring for homework, why TA subtract points.	No. Like to explore on my own. Course not that hard.	Never. I don't really know them.I have very limited inform about BUGs	I don't even know these things exist. I don't know how to get in touch with them.

v. Do you know where to find CS majors who have taken the courses that you are about to take?
No, I have no idea. Usually I just ask my friends whether they know someone.

vi. What kind of resources would you want to help support you?
Web or phone app, help me to reach out to students who have just took the courses I am taking, be Brandeis specific, be course specific. And platform we can post comments. Also more organized information, now the information are unsorted.

vii. In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
Review for brandeis courses, and suggestions about how such courses related to internship or job hunting. Instruction would be good, because I

feel the classroom instructions I received from courses are not enough. For CS students groups and clubs, just want to know how to get in touch with those people.

c. Cool off questions:
   i. Are you friends with other CS majors?
   Yes, some of them, but not much. Just in the same level with me, taking same classes.
   ii. Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
   Yes, COSI 12B, COSI 123. Brandeis schedule .net has more info than sage, but still want more review, rating, or comments. Would like to see other people's opinion from who just took it.
   iii.

4. <u>Subject #4:</u>

a. Warm-up questions
   i. Class year and major:
   Class of 2020, CS major, Econ major (double major).
   ii. From:
   Beijing,China.
   iii. Current Classes:
   COSI 11 and 29; ECON , Japanese and Music class.
   iv. Find self as in an underrepresented group:
   Female, International students.

b. Main questions
   i. Can you find the resources you need in the Computer Science department?
   I just declared CS major, and this is my first semester in COSI deparment, I have not actively looking for resource beyond the courses I take.
   ii. Whenever you encounter a CS-related problem, do you know who to go?If so, who?
   I will go the the TA. because so far I just have questions with the two courses I am taking this semester.
   iii. Have you been in a situation where you weren't able to get the help you needed?
   I don't think so.
   iv. Specific resources:

Academic Advisor/ Major advisor	CS depart. website	3rd party E.g. rate my prof.	TA office hours	Prof. office hours	BUGs tutoring	Minority support programs (SACNAC, WIT)
No, I don't even	Yes, Only before course	Only for Econ course,	Yes.	No, because time	Never.	NO.

know I have a major advisor and who s/he is.	selection. To review course descriptions.	but just one review. Not enough info.		conflict with my other courses		

v. Do you know where to find CS majors who have taken the courses that you are about to take?
I will ask my classmates who are taking the same COSI courses, to see whether they know someone from the upper class. Just word from mouth. Nothing like linkedin or any web app.

vi. What kind of resources would you want to help support you?
Be specific, for example, this year 11A 's final term project, the requirement is very general, very open ended, I would like to talk to some students who have took this course before.

vii. In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
Extra exercise. Because for some COSI courses, we do not have a text book.

c. Cool off questions:
   i. Are you friends with other CS majors?
   Just the ones who take the same COSI courses.
   ii. Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
   I just started COSI major, so the flexibility of course selection is very limited, so I just take the required courses so far.

5. <u>Subject #5:</u>

a. Warm-up questions
   i. Class year and major:
   Class of 2020, COSI/Econ Major
   ii. From:
   New York City, New York
   iii. Current Classes:
   COSI 21a, COSI 29a, Macroeconomics, FA 164a
   iv. Find self as in an underrepresented group:
   Yes

b. Main questions
   i. Can you find the resources you need in the Computer Science department?
   Not really...
   ii. Whenever you encounter a CS-related problem, do you know who to go?If so, who?

I go to my friends in my classes first. Secondly, I go to the TAs, but they are often unhelpful. Thirdly, I just ask around.

iii. Have you been in a situation where you weren't able to get the help you needed?
Mmmhmm… All of COSI 11a.

iv. Specific resources:

Academic Advisor/ Major advisor	CS depart. website	3rd party E.g. rate my prof.	TA office hours	Prof. office hours	BUGs tutoring	Minority support programs (SACNAC, WIT)
I've only spoken to my major advisor about determining whether or not to do a BA or BS	Not very helpful or updated.	Yeah, I've used it to figure out what the COSI professors are like before I came to Brandeis. Then I found out about the Course Evaluation site.	Sometimes.	I'll rather go to a professor's office hours than the TAs.	I've been but I had a bad previous experience so I haven't been back since.	Does Posse count?

v. Do you know where to find CS majors who have taken the courses that you are about to take?
No.

vi. What kind of resources would you want to help support you?
Tutoring, group tutoring, more available office hours for professors and TAs. The majority of hours happen when I have class or I have to work at my job. Also better training of the TAs.

vii. In an ideal world, what functions would you want to see in an app that could relieve some of your CS-related stress?
Groups based on classes by semester, access to the previous people who took those courses, messaging features, and maybe a peer-to-peer text editor for programming?

c. Cool off questions:

i. Are you friends with other CS majors?
Yes.

ii. Have you finished course selection for next semester? What classes are you going to take? How was that process for you?
Yes, but I am struggling to pick between the MATLAB course or Information Retrieval.

Survey Script

CS Squared

A questionnaire based around our web application idea for COSI 125A: Human Computer Interaction.

NEXT

Page 1 of 5

Demographic Information

Learning about our potential users :)

Class Year *

- ○ 2018
- ○ 2019
- ○ 2020
- ○ 2021
- ○ Graduate Student

Which ethnicity do you identify most with? *

- White
- Black or African-American
- Native American or American Indian
- Asian / Pacific Islander
- I prefer not to disclose
- Other...

Are you an international student? *

- Yes
- No

Which gender do you identify as? *

- Female
- Male
- Other
- I prefer not to disclose

BACK NEXT

Page 2 of 5

Understanding the Problem Space

Do you find yourself as a part of an underrepresented group in Computer Science at Brandeis? *

- ◯ Yes
- ◯ No

How easy it is for you to find resources you need in the Computer Science department? *

	1	2	3	4	5	
Extremely Difficult	◯	◯	◯	◯	◯	Super Easy

How often do you use the following resources: *

	Often	Sometimes	Rarely	Never	Never Heard of It
Academic Advisor	☐	☐	☐	☐	☐
Major Advisor	☐	☐	☐	☐	☐
TAs	☐	☐	☐	☐	☐
BUGS Tutors	☐	☐	☐	☐	☐
Professor	☐	☐	☐	☐	☐
Undergraduate Advising Head	☐	☐	☐	☐	☐
Department Website	☐	☐	☐	☐	☐
Course Evaluations Guide from Student Union	☐	☐	☐	☐	☐
3rd Party Tools (Rate My Professor, etc.)	☐	☐	☐	☐	☐

Of the "Often" resources you selected in the previous question, how helpful do you find them?

Your answer

Are these existing resources good enough? Can they solve your problems? *

	1	2	3	4	5	
Not good enough	○	○	○	○	○	It works all the time!

Are you a part of any minority specific support programs (NSBE, SACNAS, Women In Tech, GirlsWhoCode, etc.)? *

- ◯ Yes
- ◯ No
- ◯ I don't know what these are

Do you know where to find other Computer Science majors who have taken the courses that you are planning to take? *

- ◯ Yes
- ◯ No

BACK NEXT Page 3 of 5

Evaluating CS Squared

What do you think of our prototype?

We are designing a web app to help CS students solve their daily faced problems easier. The app is an academic online community platform featured with peer connection, resource guide and reviews, events and workshops etc. Here is the link to the latest version of our prototype. (Note: this prototype is just a demonstration of pages in our web app and it does NOT support interaction)

https://app.moqups.com/venusyixinsun@brandeis.edu/irNTJVnVNh/view

Please take a quick look and answer the following questions regarding the usability of the app.

How useful do you think the app is based on its functionality? *

	1	2	3	4	5	
Not Useful	◯	◯	◯	◯	◯	Extremely Useful

How easy is it to use the app? *

	1	2	3	4	5	
Not Usable	○	○	○	○	○	Easy to Use

How easy is it for you to remember how to use the app? *

	1	2	3	4	5	
Impossible	○	○	○	○	○	Very Easy

How much do you think this will help you solve some daily-life struggle you might face in your career of computer science at Brandeis? *

	1	2	3	4	5	
Not At All	○	○	○	○	○	A Lot

Please elaborate on the previous question. How can this app help you? Do you have any examples regarding what struggles this app could help you solve?

Your answer

Any questions about the prototype?

Your answer

Any suggestions for the app regarding our current prototype?

Your answer

Any other comments, feelings, or concerns?

Your answer

BACK NEXT Page 4 of 5

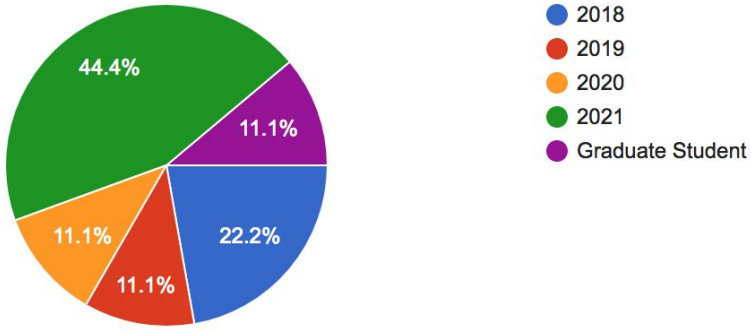
Thank you very much!

BACK SUBMIT Page 5 of 5

Survey Results

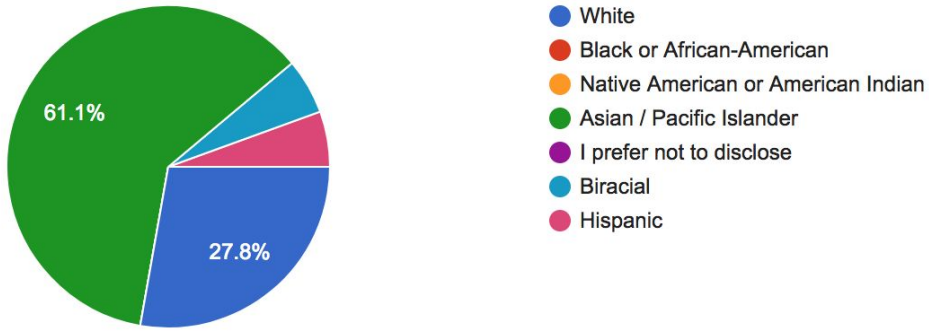
Class Year

18 responses



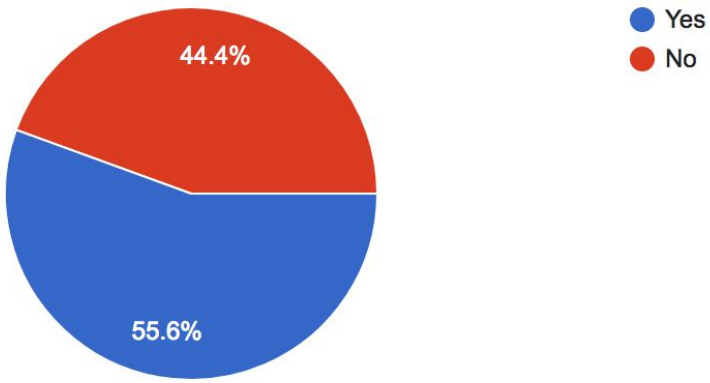
Which ethnicity do you identify most with?

18 responses



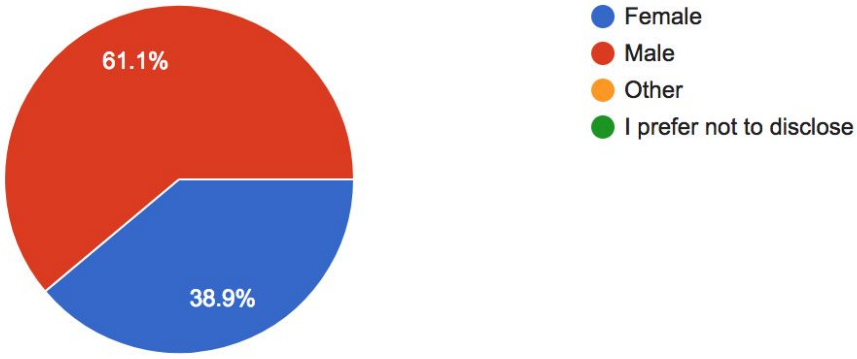
Are you an international student?

18 responses



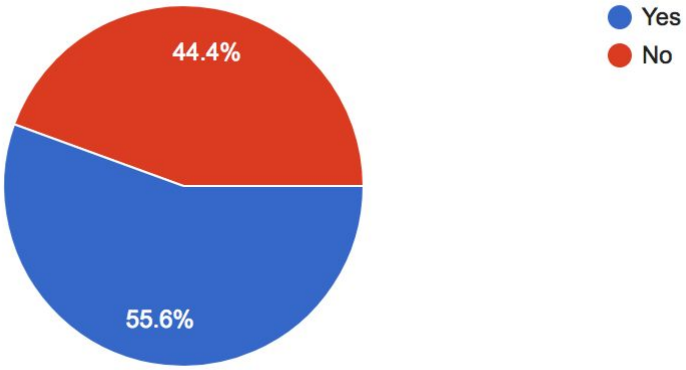
Which gender do you identify as?

18 responses



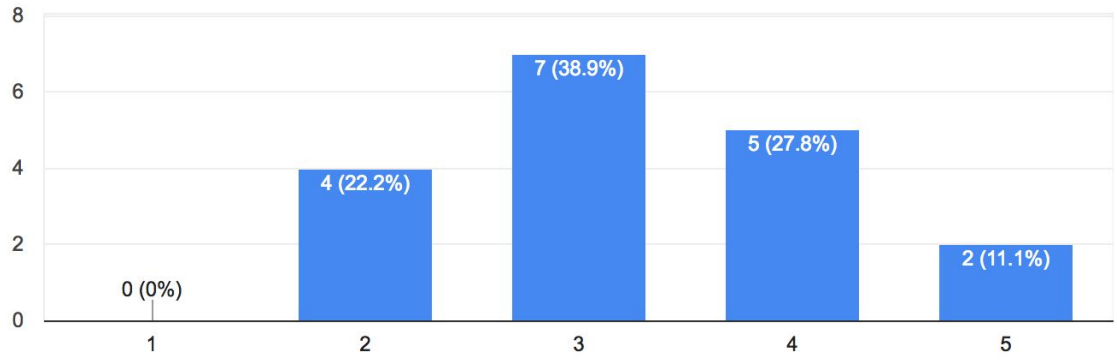
Do you find yourself as a part of an underrepresented group in Computer Science at Brandeis?

18 responses

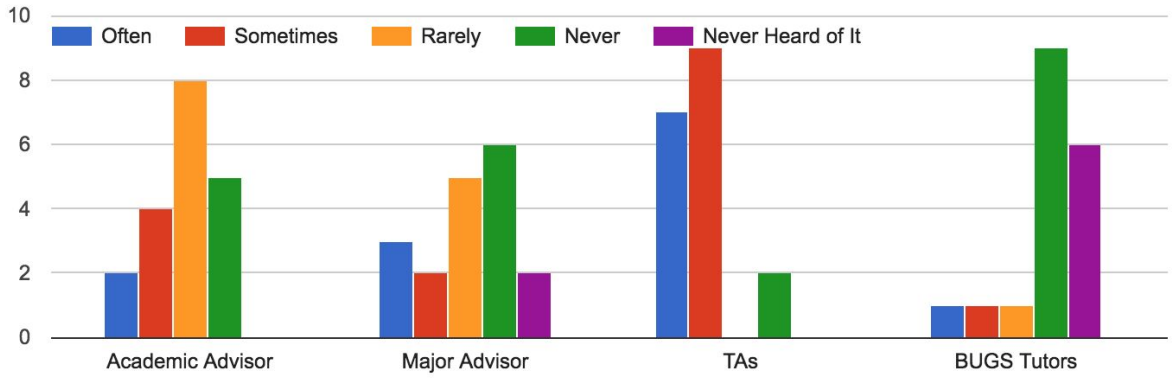


How easy it is for you to find resources you need in the Computer Science department?

18 responses



How often do you use the following resources:



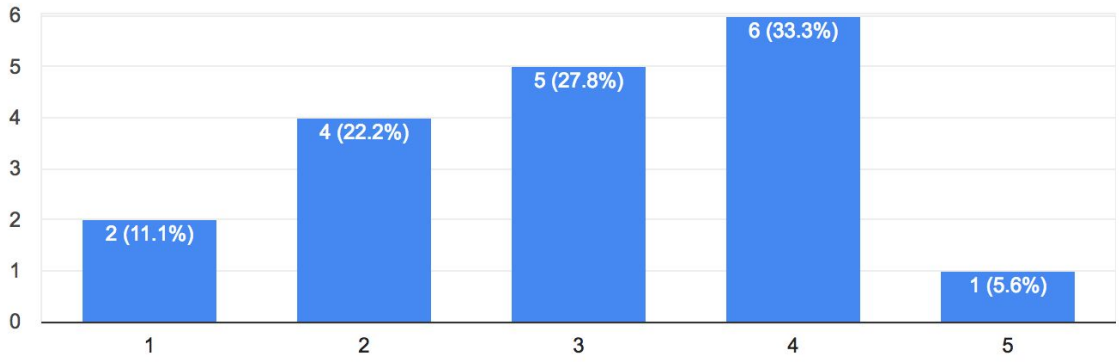
Of the "Often" resources you selected in the previous question, how helpful do you find them?

9 responses

TAs and Professors are extremely helpful to me. That's why I turn to them so much.
All professors I met are very helpful.
Superb
In my only experience I have found my TA in Computer Science 11a to be extremely helpful not just in application, but also inspiring.
Extremely helpful
Very useful
Very
Vaguely
often would be at least 5 times a week

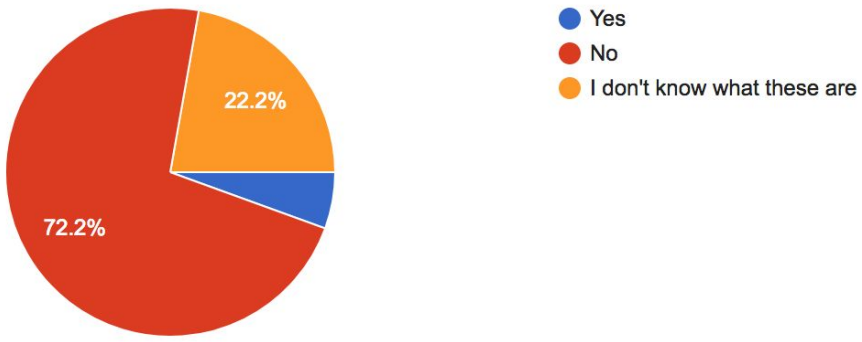
Are these existing resources good enough? Can they solve your problems?

18 responses



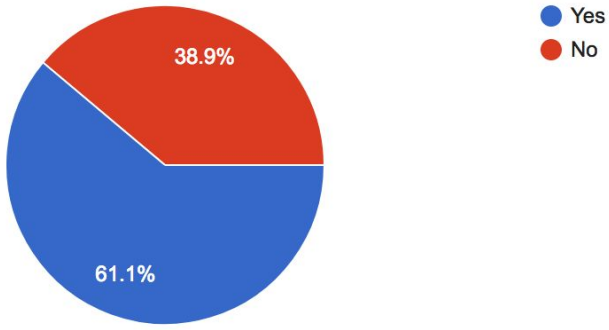
Are you a part of any minority specific support programs (NSBE, SACNAS, Women In Tech, GirlsWhoCode, etc.)?

18 responses



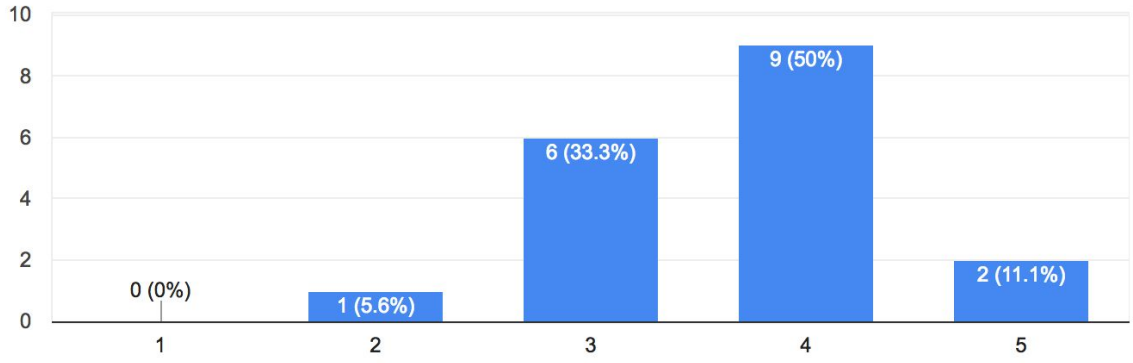
Do you know where to find other Computer Science majors who have taken the courses that you are planning to take?

18 responses



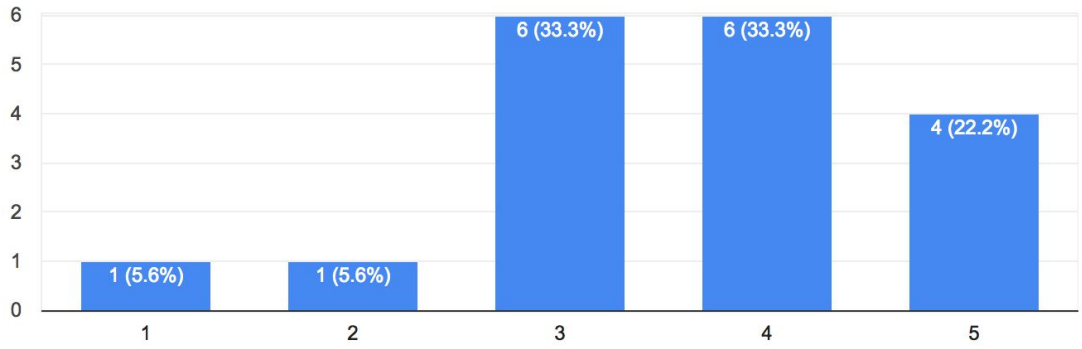
How useful do you think the app is based on its functionality?

18 responses



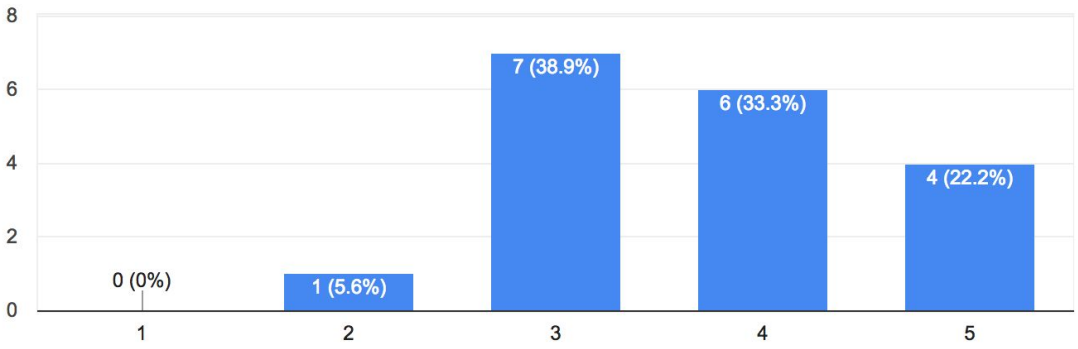
How easy is it to use the app?

18 responses



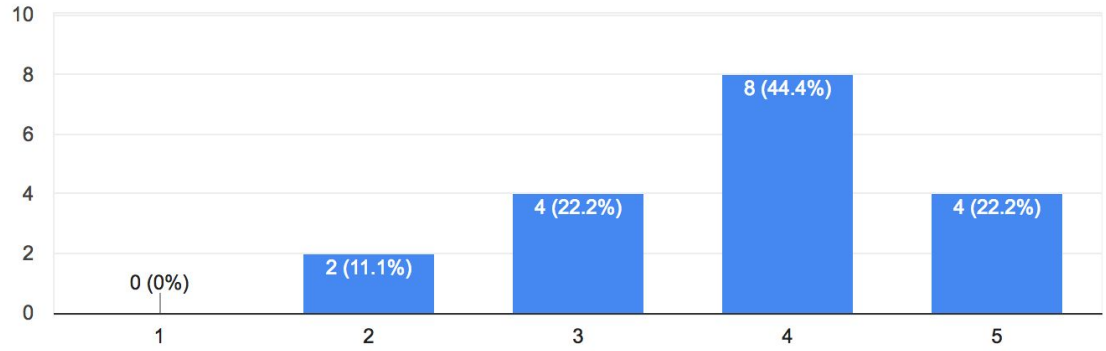
How easy is it for you to remember how to use the app?

18 responses



How much do you think this will help you solve some daily-life struggle you might face in your career of computer science at Brandeis?

18 responses



Please elaborate on the previous question. How can this app help you? Do you have any examples regarding what struggles this app could help you solve?

8 responses

It identified a very real problem and came up with a solution. I believe it provides a good platform for information sharing. It sort of reminds me of Quora. It has very detailed functionalities which I like, though I am slightly concerned about what's the main focus the app.
Update the coming events.
peer competition
Finding out about what class to take, what resources I can use, connecting to other students who have this information, meeting new students, seeing reviews
It depends on how many people get involved on the app.
I think that the idea of this app is really great because I feel it is an area that has more or less gone under the radar. This apps exists solely to help students in need.
It organizes all the CS info that is vital and incredibly difficult to procure at Brandeis.
It has everything all in one place and if I hadn't known one thing existed it shows where and what it can do

Any suggestions for the app regarding our current prototype?

6 responses

Improve User Experience, UI as well
Maybe you can add a discussion board or online chat function.
organize it in order
Make the clicking a little clearer(as I said above)
Make it colorful and more user-friendly .
Try adding a place where it describes what each section is for... for example, maybe a hover where it tells you what exactly resources include, or workshops, or about blogs, etc.

Any questions about the prototype?

5 responses

Other than CS department, can this be scaled to other departments as well?
looks a little messy
I think the button won't let me click on a few things. I couldn't move forward in the app because I could figure out how to toggle the next page. So is there a different thing I should've done that would've solved this problem?
Can you privately message someone on it ? or post anonymous posts in case one may be worried of others knowing the "dumb" question or concern they have.
Not really

Observation Notes (Paper Prototype)

1. **Subject #1**
    a. Tasks performance
        i. Task 1:
        Check out COSI 21A group, and chat with Antonella about COSI 21.
        # *Subject confused about what "manager picks" means. Subject didn't get what the example is without explanation.*
        ii. Task 2:
        Join a new group: international.
        # *Subject would go to search bar first instead of using the "All groups" page.*
        iii. Task 3:
        Imagine COSI 29 test in one week, need to find out if there's a review session for COSI 29. However, time conflict occurs, so need to find if any other resources on campus. Time conflict occurs again, so need to find if any peer resources are available.
        # *Subject got overwhelmed a bit by the multiple pages, got lost in the process of finding stuff.*
        iv. Task 4:
        Friend is thinking about taking COSI 11A, help her find information.
        # *Subject first went to Blogs which was totally unexpected. Subjects got confused between "group" and "courses" trying to find out information.*
        v. Task 5:
        Read a blog and comment
        # *No problem encountered.*
        vi. Task 6:
        Change profile pic and change personal settings.
        # *No problem encountered.*
    b. Subject's comments on each page
        i. Home page:
        # *Subject thought the categories was in lack of logics.*
        ii. Event page:
        # *Subject thought events should be categorized in some ways, e.g. class/club.*
        iii. All groups page:
        # *Subject felt some groups were too vague.*
        iv. COSI 21 example group page:
        # *Subject needed an introduction of the page's function and clarification on alumni.*

v. Courses page:
*Subject suggested to have a rating system to know how people would review the class and a filtering system to help find classes easier.*

vi. Blog page:
*Subject needed a subscription function.*

vii. Message page:
*Subject suggested of having a group chat function.*

viii. Contact page:
*Subject noticed a missing "add contacts" button.*

2. <u>Subject #2</u>

a. Tasks performance

i. Task 1:
Login /Register
*Subject confused what this web app is about, also, she asked could she login through brandeis login,*

ii. Task 2:
Review the Event and pick one to attend
*Subject want to search by keyword, or sort by tag or filter*

iii. Task 3:
Join a group
*Subject confused where to search or sort the groups.*

iv. Task 4:
Join a course
*Subject prefer internal Brandeis course and external online course tag.*

v. Task 5:
Find a Resource
*Subject want to search by keyword, or sort by tag or filter, subject like the reviews*

vi. Task 6:
Locate a Workshop
*Subject confused about what students shared here? Homework? What's different with Latte discussion board?*

vii. Task 7:
Find your Contact and send a Message
*Subject think this is straightforward.*

b. Subject's comments on each page

i. Home page:
*Categories should be in an more obvious place, like on the top or left, where to join a group?*

ii. Event page:
#*Subject suggest add search or filter to events, and want to add tag to*

event as "save" and "interested" , because sometimes she's interested but not sure she may have time to attend.

iii. All groups page:
*Subject cannot find where to join a group on this All group page. Subject prefer the wording, "Sort A-z", rather than "Sort by alphabet"*

iv. COSI 21 example group page:
*Subject want to invite friends to this group, the web app will send them a email or message?*

v. Courses page:
*Subject want to see the yelp style review for courses, e.g. five star or thumb up/down*

vi. Resource page:
*Subject want to see the yelp style review for resource, e.g. five star or thumb up/down*

vii. Workshop page:
*Subject confused with events page, why we have this workshop separate? It should be part of events or Groups.*

viii. Blog page:
*Subject suggest to add how many views for blog*

ix. Message page:
*Subject ask is this similar to the Facebook Messenger?*

x. Contact page:
*Subject ask can we add or delete contact on this list.*

3. <u>Subject #3</u>

a. Tasks performance

i. Task 1:
Login /Register
*Subject confused what this web app is about, suggest add intro text.*

ii. Task 2:
Review the Event list and pick one to attend
*Subject want to search by tags*

iii. Task 3:
Join a group
*Subject confused where to search or sort the groups.*

iv. Task 4:
Join a course
*Subject asked what's different between Course and group. And where the reviews*

v. Task 5:
Find a Resource
*Subject want to see all professor's office hours. All in one place.*

vi. Task 6:
Locate a Workshop
*Subject think this should not be separated section, should be part of events.*

vii. Task 7:
Find your Contact and send a Message
*Subject think this is using something similar to Facebook messenger.*

b. Subject's comments on each page

i. Login page:
*Subject think a little bit more intro text should make more sense.*

ii. Home page (first page after login):
*Subject ask about logic of the group, is it course based? What where to create a group? Can we have a primary menu? Are we getting some notification on homepage? E.g. upcoming events? Messages? Invitations?*

iii. Event page:
#*Subject want to get recommender events, based on events I already went, recommend new events I may interested. Make it obvious there is a calendar view like Google? School events? Or outside events.*

iv. All groups page:
*Subject can add tags? And replace the 'popularity ' with tags drop down.*

v. COSI 21 example group page:
*Subject want to invite friends to this group, the web app will send them a email or message?*

vi. Courses page:
*Subject want to use tags or filters , and rating system. Average score? Score range? E.g overall average is B+?*

vii. Resource page:
*Subject want to see the feedback for such resources*

viii. Workshop page:
*Subject confused, private or public.*

ix. Blog page:
*Subject think this page is OK*

x. Message page:
*Subject think this page is OK*

xi. Contact page:
*Subject ask what difference with Linkedin.*

Observation Notes (Final Prototype)

1. **Subject #1:**
    a. Subject's comments on each page
        i. Group main page:
        # *Subject is confused about which link to click to go to one of her JOINED group. Suggestion: color code to distinguish joined vs quick join, put joined group later in the list.*
        ii. Girls Who Code group page:
        # *Subject understands the concept of FAQs easily, but didn't get manager picks at first glance. Subject thinks that alumni is probably not applicable for all groups. For example, in this girls who code case, it's somewhat awkward.*
        iii. Events page:
        # *In the task to finding an event related to a course, the subject considered going into the course group page first, didn't think about looking at the event page. Want to add: link to add to the Google calendar, functionality correspondence with groups(convenient for events hosted by the group). Want to modify: put time with the event title.*
        iv. Resource Main page:
        # *Want to modify: put time/ important details with the title, better categorized, separate human resources/database resources. Want to add: collaborate with google calendar automatically check time availability of the user and indicate it.*
        v. Resource detailed page:
        # *Use bullet point instead of paragraph.*
        vi. Workshop page:
        # *Subject confused by the title, thought it's hosted by the school, should add more introduction of the workshop function/better name.*
        vii. Blog page:
        # *Want to add: comment with comments.*
        viii. Profile page:
        # *Add email, modify: member since what date. Current format is too messy! Could copy linkedin.*
2. **Subject #2:**
    a. Subject's comments on each page
        i. Group main page:
        # *Subject appreciated the similarity of implementation to that of Facebook*

/ LinkedIn. Easy to understand and use. Suggested adding colors to the overall design.

ii. Girls Who Code group page:
*Subject was unclear as to what Manager Picks was or its relevance to the page.*

iii. Events page:
*Subject liked that there were tags associated with events to make searching easier. Wanted to know if tags were generated by event creator, or if individual users could add their own tags.*

iv. Resource Main page:
*Subject suggested adding number of reviews per resource. Was also confused as to whether the Professor Office Hours / TA Office Hours were related to a specific class, or a pooled information page of ALL CS professors and TAs.*

v. Resource detailed page:
*Subject had no comments.*

vi. Workshop page:
*Subject was confused about Workshop concept and how it is different from an event or post in a group.*

vii. Blog page:
*Subject wanted to know who can write a blog post, and how. Subject found actual blog post page straightforward.*

viii. Profile page:
*Subject did not like layout and suggested sticking with something more familiar to that of Facebook or another social media site.*

3. **<u>Subject #3:</u>**
    a. Subject's comments on each page
        i. Login page:
        # *subject suggest the homepage of Facebook, login just on top right, without login you can still see public info, like ALL Groups or Events.*
        ii. Group main pages:
        # *subject click on the Girls who code page, find the info she need*
        iii. Girls Who Code group page:
        # *subject could find her friends already in this group and invite more friends.*
        iv. Events page:
        # *subject can search for the keywords and find the event she like.*
        v. Resource Main page:
        # *subject look for the evaluation function.*
        vi. Resource detailed page:
        # *Subject can find the feedback, review.*

vii. Workshop page:
*Subject asking any homepage for each workshop? What to track the shared info in each workshop?*

viii. Blog page:
*Subject suggest Only Thumb up, no Thumb down, to motivate students write more blogs.*

ix. Profile page:
*Subject suggest separate “My Profile” and “Others Profile” page.*