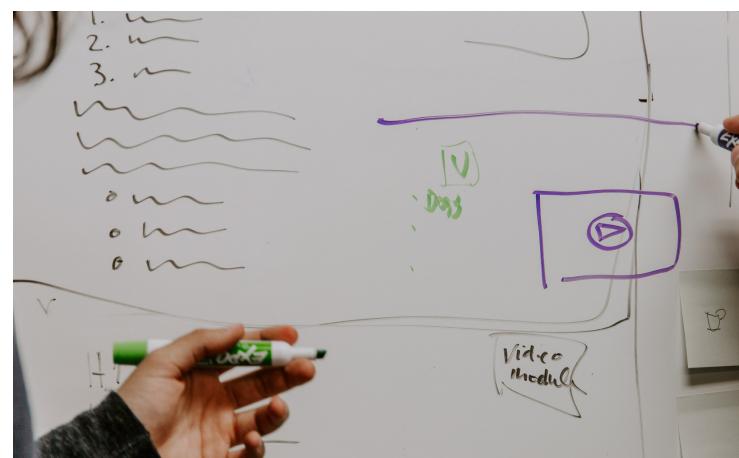


AR CLIMBING APPLICATION - STAGE 3



**CPSC 481
FALL
2020**



Our application is an augmented reality (AR) mobile application that solves the problem of rock climbers not being able to find routes that they wish to climb. The user would point their device at a wall, and specific climbing routes would then be outlined on the phone via AR. If the user would like to add a new location, they can do so by drawing the route out in the AR mode while pointing their device at the wall. When there are many different routes at the user's location, the routes can be filtered by grade, name, and rating. Once the user climbs the route that they found through the application, they can both ratings and tips.

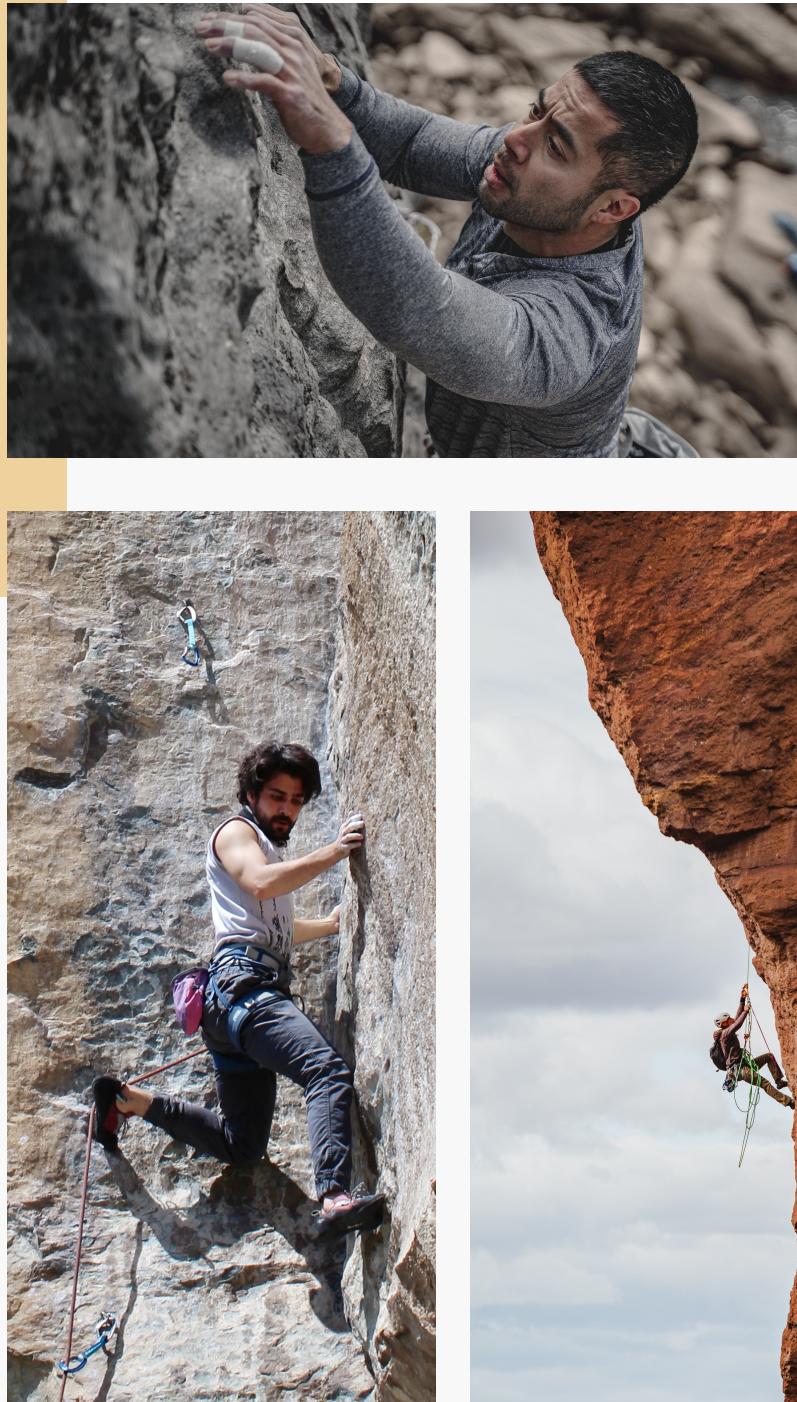
The following tasks were prototyped in the ideation process of this application following multiple rounds of sketching (Appendix A) and organizing of ideas through affinity diagrams (Appendix B, C, D, E):

Vertical Tasks

1. Users should be able to view selected climbing routes in an AR mode.
2. Users should be able to search and filter routes by grade (difficulty), name, location, etc.
3. Certain users should be able to add new routes to the system by mapping out the route in the AR app.

Horizontal Tasks

1. Users should be able to explore and view recommended routes for them. These recommendations will help the user find new routes that they may be interested in.
2. Users should be able to favorite routes and view these routes. This way, the user will be able to keep track of the routes they enjoy and find them with ease in the future.
3. Users should be able to view a log/history of previous routes that they have done. This climb history can also be viewed by other users.
4. Users should be able to leave reviews and ratings on routes that they have done.
5. Users should be able to view tips on routes. These tips will help the user when doing the route in question.



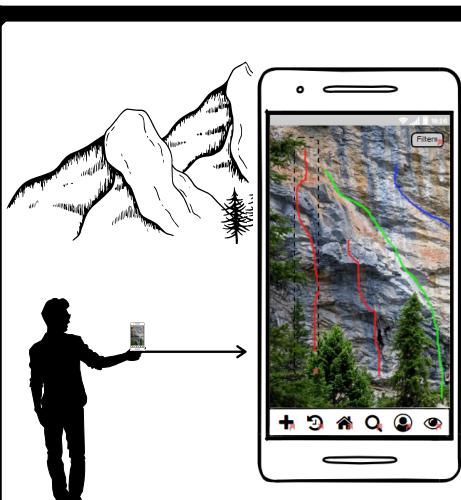
PROJECT DESCRIPTION AND TASK SELECTION

STORYBOARD

TASK: USER SHOULD BE ABLE TO VIEW SELECTED CLIMBING ROUTES IN AR MODULE



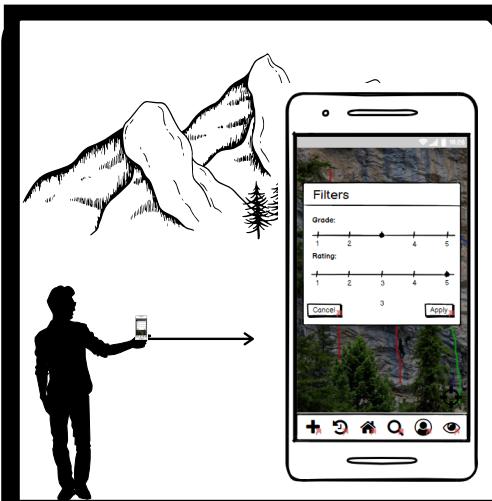
The user has just arrived at a location they have never been, and they cannot find any climbs.



The user navigates to the AR view of the application and sees all of the available climbs.



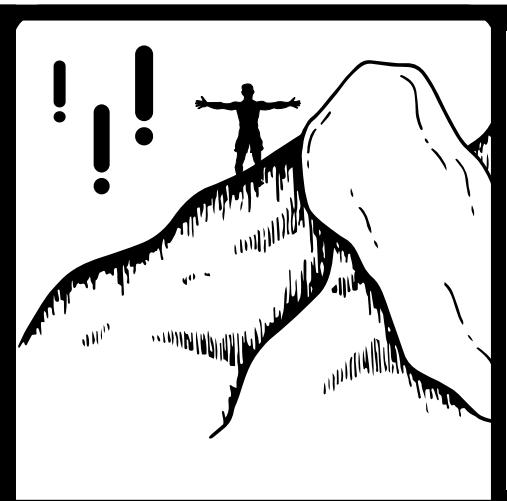
This user wants to climb the best rated climbs on the wall, so they want to filter out climbs such as Climb #3 with a non 5-star rating.



This user navigates to the filtering tab and filters by climbs rated only 5-stars.



Now the climbs that the user will be interested in are the only ones that show up in the AR module.



The user can now select the best climbs based on their criteria and begin to climb!

COGNITIVE EVALUTION

For the cognitive walkthrough, we used the task-centered walkthrough template and then individually went through each vertical task that we previously selected (Appendix F, G, H). As a reminder, these tasks were as follows. First, users should be able to view selected climbing routes in an AR mode. Second, users should be able to search and filter routes by grade (difficulty), name, or location. Lastly, certain users should be able to add new routes to the system by mapping out the route in the AR module. After selecting these tasks, we then identified and broke down the steps required for each task and built user stories around them. By doing this, we were then able to understand how and why a user would perform these steps in the tasks, and how important each step is. From our cognitive walkthrough, we learnt that there are a few tasks that users may not immediately know how to do, such as drawing a route in AR mode. This is because

AR is typically centered around just viewing objects on your device, not actually creating the AR yourself. We made note of these steps and added comments that helped us when creating our low fidelity prototypes. We also learned that each action we came up with has a believable story behind it that could motivate the user to perform that step. Therefore, we did not need to modify or revise our tasks when creating our low fidelity prototypes.



IDEATION PROCESS REFLECTION



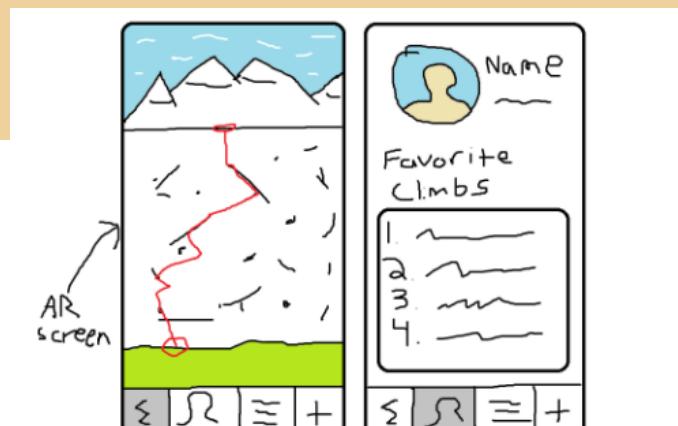
When our group went through this ideation process, we found it to be very helpful in assisting us create our prototype, since each of the next steps in this process were based off a previous step. This slowly helped us try to form the ideal prototype we would create. We found that doing brainstorming sessions in which each of us tried to come up with sketches for the app we were designing went really well for us, since it was easy for all of us group members to come together and try to bounce ideas off each other in what could work for our app.

The result of this brainstorming made it easier for our group to do the Task-Centered System cognitive walkthrough, since many of the sketches we had drawn out were done with trying to make things easier for the person using our app to complete the tasks we want to implement. However, we did find that doing the Affinity Diagramming Session went poorly for us since many of us were confused at first on how exactly we were to group our sketches from the brainstorming session. Therefore, we were unsure if we had to group them by

user tasks, or certain features. This as a result made trying to polish ideas and creating a storyboard tougher because of the initial confusion we had with the Affinity Diagram. If we were to do this process again, we would spend more time on understanding and discussing about the affinity diagram, since we feel that if we had discussed more about this stage from the start right after our brainstorming session, and it would make the following steps of creating a storyboard and polishing the ideas we have smoother and easier to follow.

APPENDICES

APPENDIX A - SKETCHES AND BRAINSTORMING



Top left: An AR view screen where the user is able to view a path in front of them through the camera.

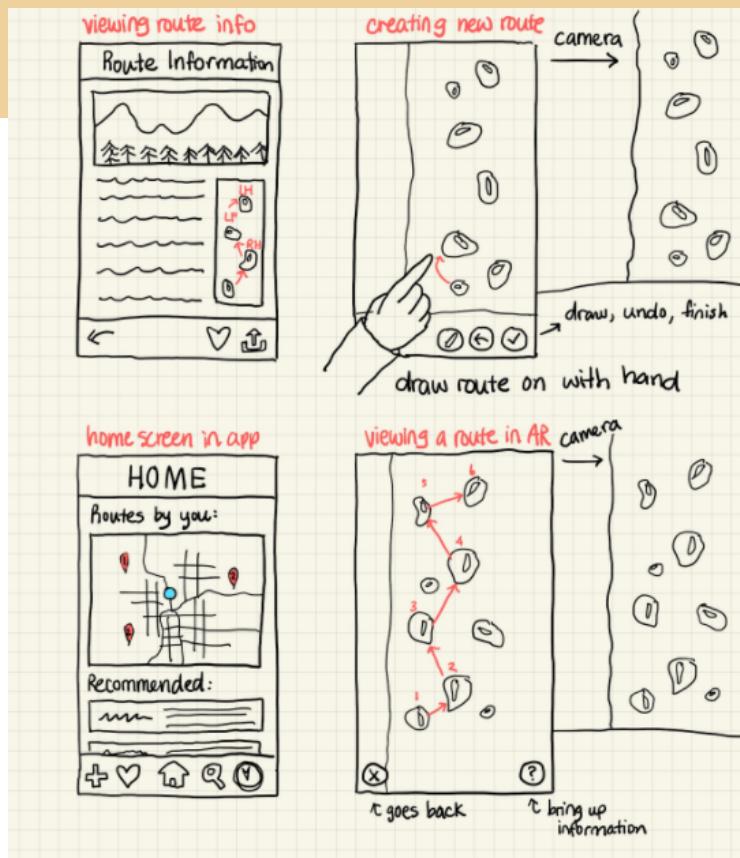
Top right: A profile page that displays the user's information and a list of their favourited climbs.

Bottom left: A map screen that shows the user nearby routes on an overhead map. Routes are marked using pins.

Bottom right: An add route screen that allows the user to add a new route. The user is able to enter in relevant information as well as upload a picture of the route.

APPENDICES

APPENDIX A - SKETCHES AND BRAINSTORMING



Top left: A route information screen that shows you relevant information about a selected route. A preview of the AR view is also shown to the user.

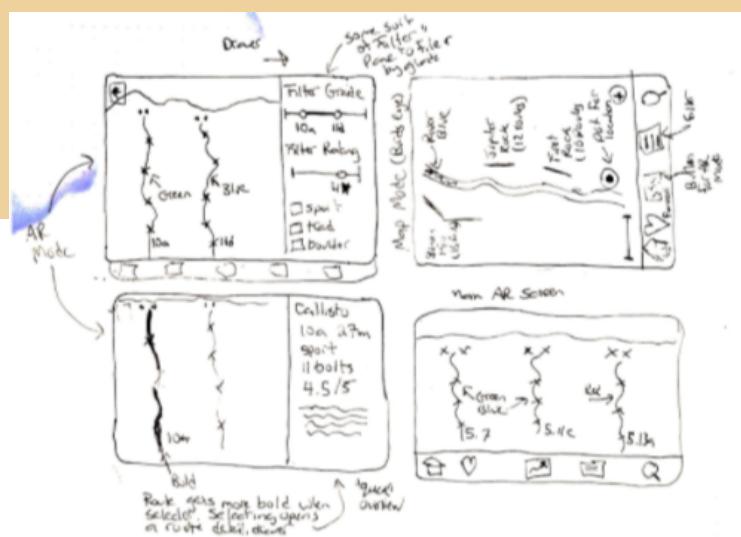
Top right: A route creation screen in AR that allows the user to draw a new route using their finger. The user can select draw, undo, and complete to enter different states.

Bottom left: A home screen that shows the user routes near them on an overhead map as well as a list of recommended routes.

Bottom right: An AR view screen where the user is able to see a route path displayed in front of them. The user is also able to bring up additional information about the selected route.

APPENDICES

APPENDIX A - SKETCHES AND BRAINSTORMING CONTINUED

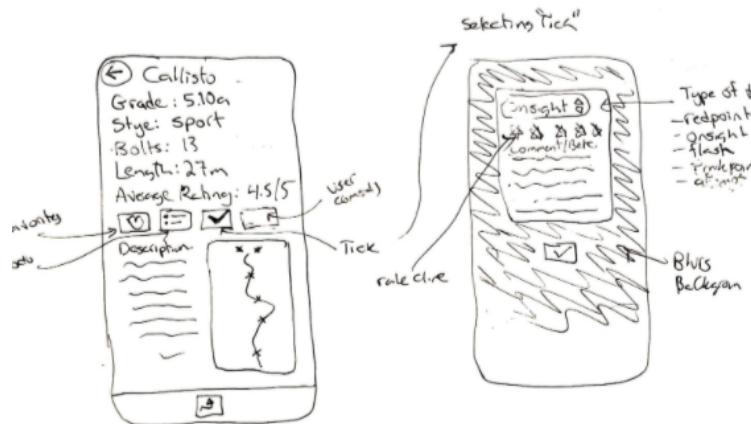


Top left: An AR view where all routes around the user are displayed on the screen. On the right side there is a filter pane that will allow the user to filter which routes are displayed to them based on difficulty, rating, and type.

Top right: A map screen that shows nearby routes on an overhead map. The names and number of climbs are displayed for each location.

Bottom left: An AR view where all routes around the user are displayed on the screen. On the right side there is an information pane that will show up when a user selects a certain climb.

Bottom right: An AR view where all routes around the user are displayed on the screen. Each route is displayed in different colors so that the user is able to tell them apart

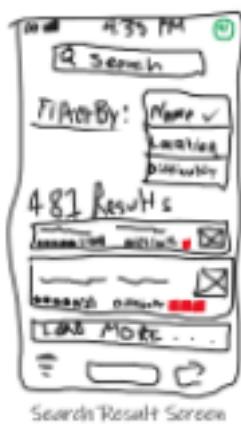


Left: A route information page that displays all the information for a selected route. This will show things such as the grade, style, length, and rating. A picture and description will also be provided.

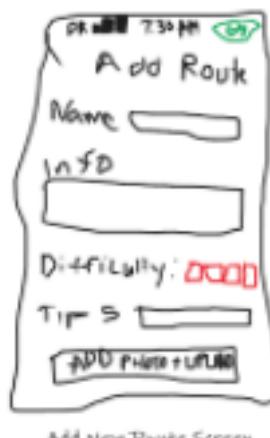
Right: A modal that pops up when you check that you have completed a route. This modal will prompt you to rate and leave comments about the route for other users to see.

APPENDICES

APPENDIX A - SKETCHES AND BRAINSTORMING CONTINUED



Search Result Screen



Add New Route Screen



Route Info Screen



Explore and View Recommendations Screen

Top left: A search screen that allows the user to search for a route and apply filters to a search. The results are shown to the user in list form.

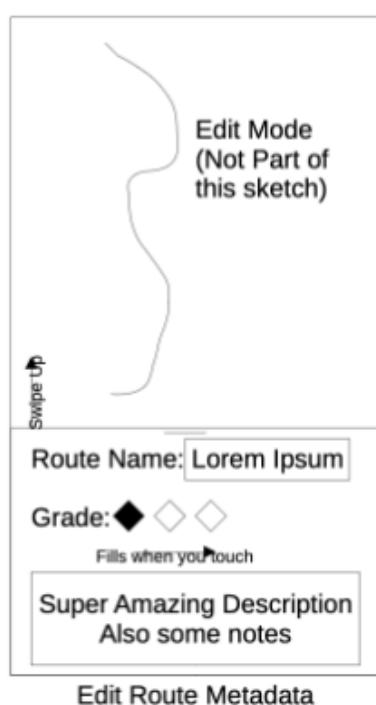
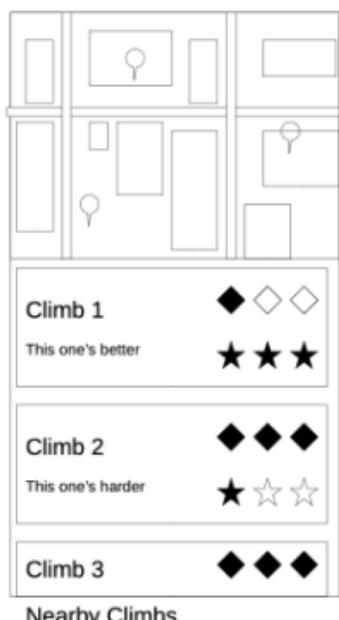
Top right: An add route screen that allows the user to add a new route to the app. The user is able to enter in relevant information about the route and upload it.

Bottom left: A rough information screen that shows you the name, rating, difficult, photos, directions, and description of a route. You are also able to leave a review for the route.

Bottom Right: An explore page that shows the user popular and recommended routes. This will help the user find new routes.

APPENDICES

APPENDIX A - SKETCHES AND BRAINSTORMING CONTINUED



Top left: A search result screen that shows the user a map with nearby routes pinned. The user can also view a list of these routes with relevant information displayed.

Top right: A search screen with a filter pane. The user is able to filter their search by difficulty, rating, and distance.

Bottom: An edit route screen that allows you to edit a route's name, grade, and description. This is shown to the user through a slide up panel.

APPENDICES

APPENDIX B - AFFINITY DIAGRAM BRAINSTORMING AREA

BRAINSTORMING AREA

Home Screen

- AR screen
- Viewing route info
- Creating new route

AR Screen

- Climbs Nearby
- Explore and View Recommendations Screen

Add Route

- Route Info Screen
- Search Result Screen
- Topo

Route Info Screen

Search Result Screen

Nearby Climbs

Explore and View Recommendations Screen

Add New Route Screen

Selecting "Topo"

Creating New Route (AR camera)

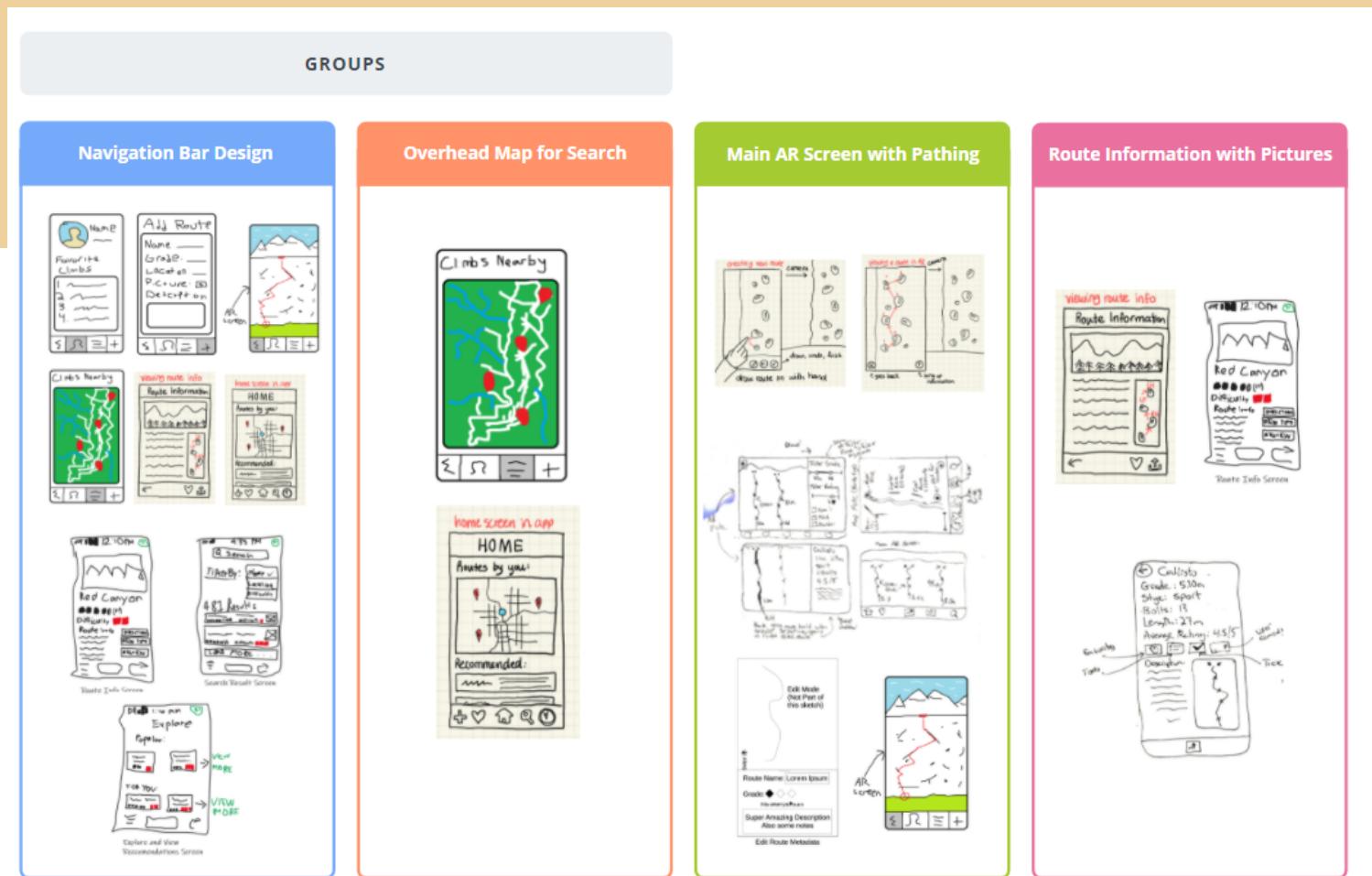
Viewing a Route in AR Camera

Nearby Climbs

Edit Route Metadata

APPENDICES

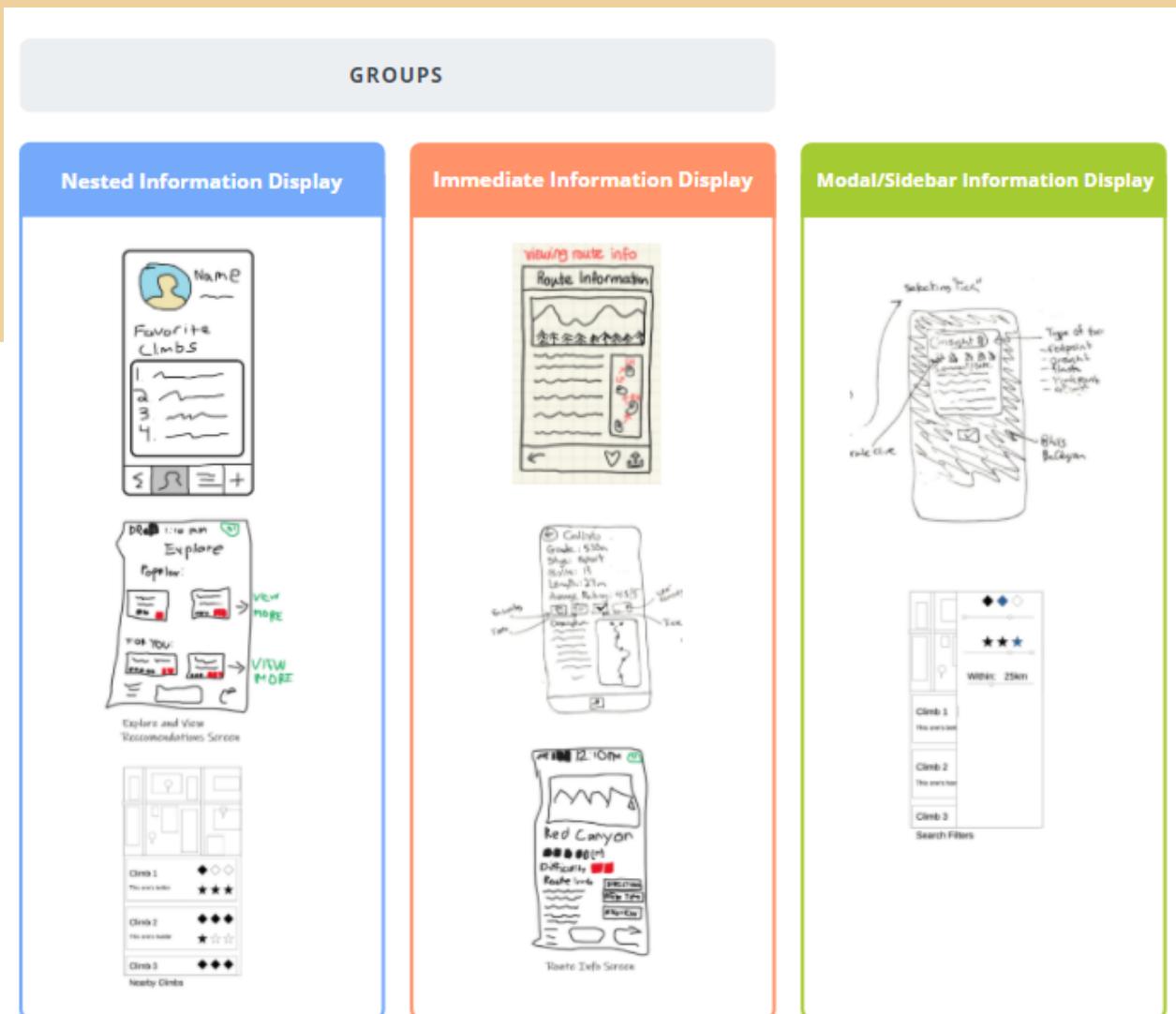
APPENDIX C - AFFINITY DIAGRAM DESIGN GROUPINGS



- 1. Navigation Bar Design (blue)** - Sketches that included a bottom icon centered task bar
- 2. Overhead Map for Search (orange)** - Sketches that included a map for discovering climbing locations
- 3. Main AR Screen with Pathing (green)** - Sketches that included AR designs where climbing path is mapped on the wall with drawing functionality
- 4. Route Information with Pictures (pink)** - Sketches that included user uploaded pictures along with route information

APPENDICES

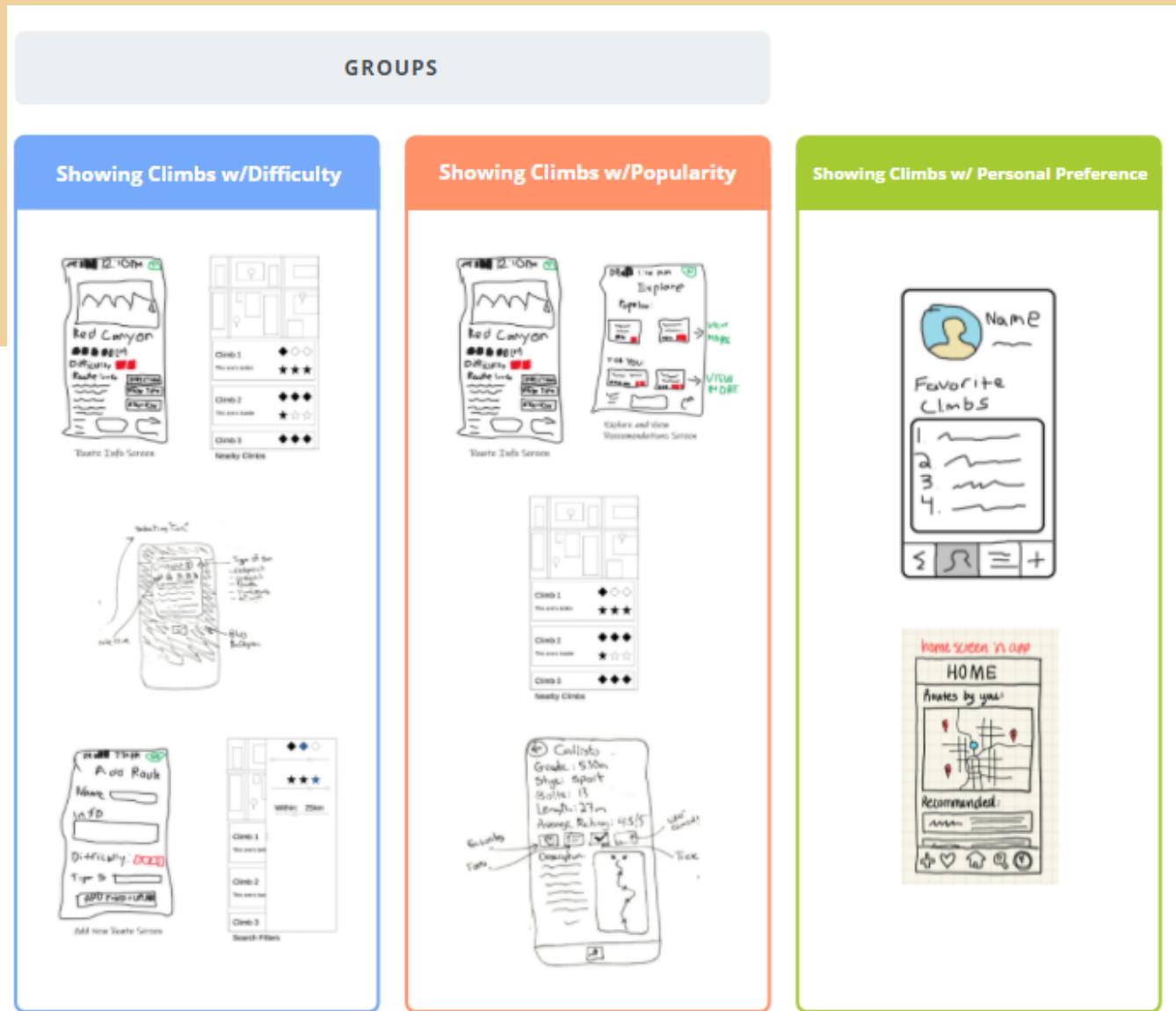
APPENDIX D - AFFINITY DIAGRAM DESIGN GROUPINGS



- 1. Nested Information Display (blue)** - Information that is displayed at a high level on the main screens
- 2. Immediate Information Display (orange)** - Information that is displayed in great detail only if it is clicked on from a card on a main screen
- 3. Modal/Sidebar Information Display (green)** - Information that is displayed in more unconventional components such as modals and sidebars

APPENDICES

APPENDIX E - AFFINITY DIAGRAM DESIGN GROUPINGS



- 1. Showing Climbs with Difficulty (blue)** - Displaying climbs with their average difficulty level as chosen by the user base
- 2. Showing Climbs with Popularity (orange)** - Displaying climbs with their average rating in terms of enjoyability as chosen by the user base
- 3. Showing Climbs with Personal Preference Metric (green)** - Displaying climbs that are recommended to you based on previous climbs and climbs you have enjoyed before

APPENDICES

APPENDIX F - COGNITIVE WALKTHROUGH FOR VIEWING SELECTED CLIMBING ROUTES IN AR MODE

Description of Task Step	Does User Have Training Or Knowledge To Do Step?	Is It Believable That They Would Do It?	Are They Motivated?	Comments/Possible Solution
Enter AR mode	AR apps are not as common, but you will be able to navigate to AR mode wherever you are in the app through a navigation bar	Yes. Story: User wants to view the route on the screen and see how it looks, how tall it is, etc.	Yes, this is one of the main functionalities of the application	Make sure the navigation bar is clear and users know where to click to enter AR mode
Use AR camera	Yes, there are existing AR apps where you move the camera around	Yes Story: User wants to pan the camera around to view all the different climbs around them	Yes, in order to view the different climbs around them	Make sure it is clear that you can move the camera around to look in different directions. Maybe put arrows on all 4 sides to indicate this.
Apply filter	Yes, applying filters is a well known functionality	Yes Story: User wants to filter the climbs around them to only show the easiest ones	Yes, this way they can filter the AR screen to only show the climbs they are interested in	Make sure that the filter button is clear. Make sure the filters are easy to understand
Select a specific climb	Yes, selecting something to bring up additional information is a common functionality	Yes Story: User really wants to do a specific climb but wants more information about it before doing it	Yes, this way they can view specific information about a climb	Maybe add an icon or outline to each climb so that it is clear that it may be selected.

APPENDICES

APPENDIX G - COGNITIVE WALKTHROUGH FOR BEING ABLE TO SEARCH AND FILTER ROUTES BY GRADE, DIFFICULTY, NAME, LOCATION, ETC.

Description of Task Step	Does User Have Training Or Knowledge To Do Step?	Is It Believable That They Would Do It?	Are They Motivated?	Comments/Possible Solution
Type in the search bar	Yes, this is a very common functionality	Yes Story: User knows the name of a climb they want to do and want to find it	Yes, as that is how they will find specific routes	Make sure that the search bar is clear on the screen
Filter a search	Yes, the majority of searching has the filter functionality	Yes Story: User doesn't know the area very well and wants to find climbs close to them that have a certain rating/grade	Yes, this way they can get more specific results	Make sure that the filter button is clear. Make sure the filters are easy to understand
Select a pin/result	Yes, pins on maps are a common functionality	Yes Story: User sees a route that interests them and wants to see more information about it	Yes, as it will bring up more information about the selected result	Make sure it is clear that a pin can be selected
Drag map around	Yes, this is a functionality that most digital maps have	Yes Story: User wants to see what climbs are in the town next to where they live	Yes, this way they can look around and find pins in different locations	Add a button that allows the user to center back onto themselves. Display where the user currently is on the map

APPENDICES

APPENDIX H - COGNITIVE WALKTHROUGH FOR BEING ABLE TO ADD NEW ROUTES TO THE SYSTEM BY MAPPING IT OUT IN AR MODE

Description of Task Step	Does User Have Training Or Knowledge To Do Step?	Is It Believable That They Would Do It?	Are They Motivated?	Comments/Possible Solution
Enter the "Add New Route" screen	Yes, you will be able to navigate to "Add New Route" wherever you are in the app through a navigation bar	Yes. Story: User is a professional and wants to share their new route with other users	Yes (some users), certain users will want to add routes for other users to use	Make sure the navigation bar is clear and users know where to click to enter the "Add New Route" screen
Fill out information for new route	Yes, filling in boxes is a common functionality	Yes Story: User is a professional and wants to share their new route with other users	Yes (some users), this is required when adding a new route	Make sure each box is correctly labeled and make it clear what should be filled in
Upload pictures for new route	Yes, uploading photos is a common functionality	Yes Story: User is a professional and wants to share their new route with other users	Yes (some users), this is required when adding a new route	Add an icon to show that you can upload pictures (+ sign or camera).
Draw new route	Drawing on AR is not a common functionality so some users may not know	Yes Story: User is a professional and wants to share their new route with other users	Yes (some users), this is required when adding a new route	Adding a helpful note ("Use your finger to draw route") may help to assist the user