1. Risk Analysis

Initial Velocity Calculation:

We calculated the velocity for MS2 Iteration 1 based on MS1 Iteration 2:

Velocity = hours of estimated work finished / work hours available

Work Hours Available in Iteration 2:
7hr/person * 6 people * 0.7 velocity = 29.4 work hours available per iteration
Hours of estimated work finished = 20 hours estimated work finished

MS2 Iteration 1 Velocity = 20 / 29.4 = 0.68
Current projected velocity: 0.68

This velocity was calculated based on our finalized velocity during iteration 2 of MS1, hence, we project a velocity of 0.68 going forwards into our current iteration of MS2. Our previous support for our velocity still holds true. While developing our project, we know that there will be small common interruptions that will affect our productivity, such as needing to talk to team members during work periods, fatigue from being stuck on bugs, etc.

Iteration: 7 days

Risk Analysis:

Risk: Not Enough Meetings
Description: Due to schedule conflicts, we don't have any good mutually available hours except for weekends, so we may not end up meeting enough.
Severity: Medium
Resolution: We meet over Discord (voice and video calls) to work on the project, use WhenToMeet to help find windows where we can get together.
Status: In Progress

Risk: More advanced Git usage (version control)
Description: Group members are still getting used to version control commands and learning more complicated commands to work with branches and commits.
Severity: Medium
Resolution: Review and understand lab tutorial on Git/GitHub, search for commands if needed, communicate with teammates if unsure of usage. Communicate with teammates and avoid duplicate work or multiple people working on the same files to keep merge conflicts to a minimum. Resolve conflicts when we get to it, practice good Git etiquette, and use safeguards like tests, reviewers, preventing unreasonable force pushes, etc.
Status: Resolved

Risk: Android Studio Experience
Description: Our team is still getting used to Android Studio, and have had issues with the physical device/emulators.
Severity: Medium
Resolution: Go over old labs, try hard in new labs, looking up tutorials, learning from previous experience (MS 1)
Status: In progress

Risk: Balancing Available time
Description: All of us are students with many other commitments of varying and inconsistent intensity. Finding the time to consistently complete project milestones may be difficult.
Severity: High
Resolution: Communicate when we can't pull 100% of our weight so the others can pick up the slack, keep reminders via programs like Google Calendar to dedicate time to project
Status: Resolved

Risk: Ensuring progress
Description: Ensuring that everyone is making some form of progress, and putting in the hours
Severity: High
Resolution: daily check-ins & properly planning work divisions amongst sub-groups
Status: In progress

Risk: Division of work
Description: Dividing up work between team members
Severity: low
Resolution: Pair programming
Status: In progress

Risk: (Relatively) Large Group Environment Unfamiliarity
Description: None of us are very experienced with large groups, thus we may struggle to coordinate our efforts, delegate tasks, and communicate effectively.
Severity: Medium
Resolution: Mutual patience and understanding and willingness to accept input from every group member.
Status: Resolved

Risk: Open-Ended Nature of Project
Description: The project does not have a clear "solution" to a problem; we'll have to make decisions on design implementation, team meeting logistics, etc.
Severity: High

Resolution: Q/A customer meeting, and customer emails (piazza posts)
Status: Resolved

Risk: Google Location API Unfamiliarity
Description: The replanning user stories require us to work with user location services, but none of us have experience with this.
Severity: Medium
Resolution: Understand Lab 7 to familiarize ourselves with the steps of how to implement and work with the Google Location API.
Status: In progress

2. User Stories

User Story 1: Display selected exhibits - high priority / 3 hours

As a parent I want the selected exhibits displayed in a compact list so that I can be reminded at a glance all the exhibits we plan to visit

Scenario 1: Selected some exhibits
Given: I'm on the search page and searched for baboons and hippos
When: I select the baboons and hippos exhibits
Then: The baboons and hippos exhibits should be displayed in a "selected exhibits" list

Scenario 2: Selected no exhibits
Given: I have have searched for "mammals"
When: I see the search results
And: I do not select any animal exhibits
Then: I should not see any exhibits added to the selected exhibits list

User Story 2 : Route plan summary - low priority / 2 hours

As a parent I want the route plan of our chosen exhibits displayed in the planned order of visitation with distance hints so that I can get a sense of how things are going to go

Scenario 1: Planning with no animals selected
Given: I have not selected any animals
When: I hit the plan button
Then: I am taken to a search bar where I can begin searching for zoo animals

Scenario 2: Planning route to see "Baboons" and "Hippos"
Given: I have selected "Baboons" and "Hippos" as exhibits I want to see
And: Baboons are 200 ft away from the entrance
And: Hippos are 300 ft away from the entrance
When: I press the "plan" button
Then: I should be shown a listing of "Baboons - 200 ft" followed by "Hippos - 300 ft", each with the street/trail name of their exhibits

User Story 3 : Step backwards in plan - medium priority / 6 hours

As a parent I want a way to step back one exhibit in the Directions so that I can explore the plan or retrace my footsteps

Scenario 1: Going back to exhibit page
Given: My planned route is from Gorillas to Foxes to Lions

And: I have visited gorillas and foxes by taking directions from gorillas to foxes on the previous exhibit page
And: The app is currently showing directions to from foxes to lions
When: I click the “previous” button
Then: Directions displayed will route me from my current location back to foxes

User Story 4 : Retain selected exhibits - high prior/ 2 hours

As a parent I want it to be that if the app is killed and restarted our list of exhibits will be retained so that I don’t have to enter them all back in again
NOTE: with this Story also comes the necessity of being able to erase the current plan. This is because, with data retention, there is no other way to start a new plan, e.g., on a new visit to the Zoo.

As a: Zoo Visitor
I want: To be able to delete my current plan
So that: If I decide not to follow this plan I can clear my current exhibit path and create a new plan

Scenario 1: Erasing my current plan
Given: I am on an exhibit page looking at the directions
When: I click the ‘erase plan’ button
Then: I should be directed back to the search page to start a new exhibit plan

Scenario 2: Retaining selected exhibits
Given: I am on the search/selection page
And: I have selected Baboons and Hippos
When: I close the app
And: I reopen the app
Then: The app still has Baboons and Hippos selected.

User Story 5 : Settings to change direction view - high priority/ 4 hours

As a: Zoo Visitor
I want: To be able to choose to view ‘**detailed directions’** instead of **‘brief directions’** in **settings** while looking at directions
So that: I get the most accurate directions and won’t miss any turns

Scenario 1: Getting detailed directions
Given: I am on the directions page from “baboons” to “hippos”

And: The screen shows 1 direction: “Proceed on Treetops Way 160 ft towards Hippo Trail”
When: I click on the toggle to turn the directions to ‘detailed directions’ instead of ‘brief directions’
Then: The screen should show a list of directions: “
Proceed on Treetops Way 50 ft towards Fern Canyon Trail
Continue on Treetops Way 10 ft towards Orangutan Trail
Continue on Treetops Way 40 ft towards the Africa Rocks Exhibit
Continue on Treetops Way 20 ft towards Orangutan Trail
Continue on Treetops Way 40 ft towards Hippo Trail
Proceed on Hippo Trail 50 ft to the Lost Forest Hippo Exhibit”

Scenario 2: Getting brief directions
Given: I am on the directions page from “baboons” to “hippos”
And: The screen shows a list of directions: “
Proceed on Treetops Way 50 ft towards Fern Canyon Trail
Continue on Treetops Way 10 ft towards Orangutan Trail
Continue on Treetops Way 40 ft towards the Africa Rocks Exhibit
Continue on Treetops Way 20 ft towards Orangutan Trail
Continue on Treetops Way 40 ft towards Hippo Trail
Proceed on Hippo Trail 50 ft to the Lost Forest Hippo Exhibit”
When: I click on the toggle to turn the directions to ‘brief directions’ instead of ‘detailed directions’
Then: The screen should show 1 direction: “Proceed on Treetops Way 160 ft towards Hippo Trail”

User Story 6: Update Directions to Next Exhibit - high priority / 8 hours

As a: User
I want: to have automatically-updated directions to the next exhibit from my current location
So that: I still have the shortest path towards the next exhibit if I take a detour/am off track

Scenario 1: Going off track
Given: A planned route of {monkey,gorilla,lion} is in progress
When: I am going from the monkey to gorilla exhibits, but I go off track along the way
Then: my planned route should be updated to include my new current position and the updated directions to the next exhibit of gorilla.

Scenario 2: Making the wrong turn
Given: I am walking along Penny Lane towards the Lion Exhibit and reach an intersection of the streets Penny Lane and Abbey Road

And: My planned route directions is telling me to continue straight along Penny Lane towards the Lion Exhibit
When: I turn right onto Abbey Road by mistake
Then: The directions should adjust to say turn right back onto Penny Lane

User Story 7: Replanning Routes - medium priority / 5 hours

As a: User
I want: to see a prompt saying “Replan”, when I am off the planned route and close to a future exhibit
So that: I can re-plan the best (shortest) route possible to visit the remaining (unvisited) exhibits

Scenario 1: Replan creates a new optimal route
Given: I am walking along my planned route of {penguins,lions,tigers} and I am going between penguins to lions.
When: The next exhibit on my route is the lions exhibit, and I take a detour to a distant bathroom off-route.
And: I am now closer to the exhibit tigers than lions.
Then: The option “Re-plan” appears, and upon clicking it, a new optimal route is generated of {penguins,tigers,lions}, such that I should now visit tigers before lions.

Scenario 2: Replan is the same route as before
Given: I am walking along my planned route of {penguins,lions,tigers} and I am going between penguins to lions.
When: The next exhibit on my route is the lions exhibit, and I take a detour to a distant bathroom off-route.
And: the bathroom is closer to the lions exhibit than the tigers.

User Story 8: Skip Exhibit - medium priority / 4 hours (Dependent on 7)

As a: Zoo visitor
I want: To be able to skip an exhibit and **replan** my route
So that: I can choose not to see an exhibit and avoid walking long distances to see the following exhibit

Scenario 1: Skipping an exhibit between 2 exhibits
Given: I am walking along my planned route of {baboons, hippos, monkeys, gorillas, lions}
And: I have already visited the baboons and hippos
And: I am currently closer to gorillas than monkeys or lions
When: I press “skip” on the monkeys exhibit page
Then: The monkey exhibit will be deleted from my current plan

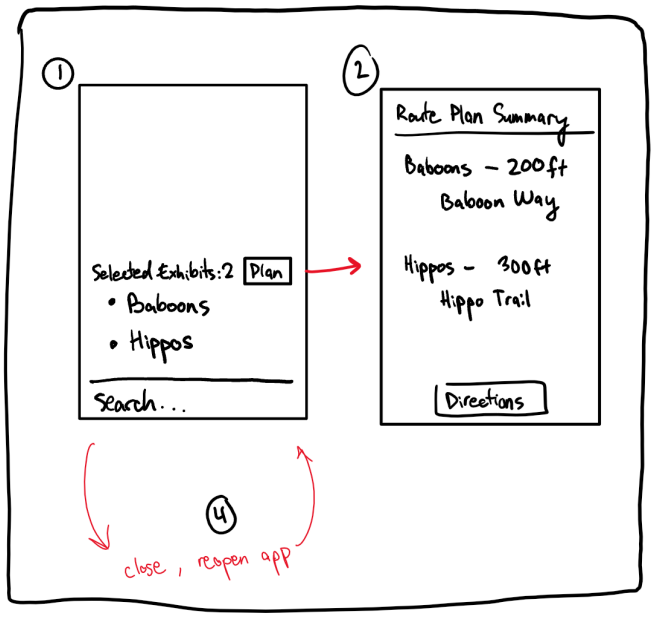
And: New directions should be generated on the ‘gorillas’ exhibit direction page, routing me from my current location to the ‘gorillas’ exhibit

Scenario 2: Skipping 1 Planned Exhibit
Given: I have just begun my planned route of {baboons}
When: I hit “Skip”
Then: My planned route ends
And: Directions are shown to take me back to the entrance/exit gate from my current location

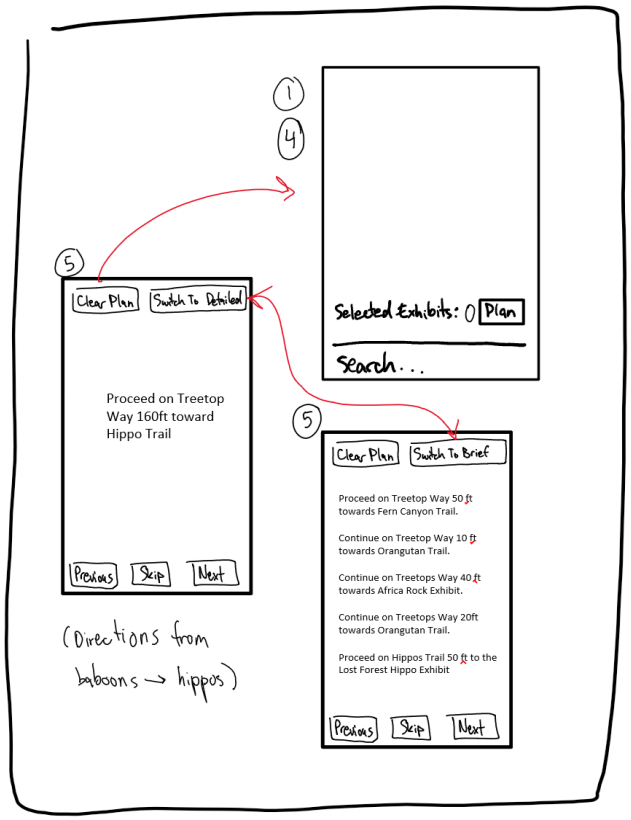
Scenario 3: Skipping last exhibit
Given: I am on the directions page taking me to the last animal exhibit, ‘monkeys’
When: I press ‘skip’
Then: I should be shown directions from my current location back to the entrance/exit gate

User Story Wireframes:

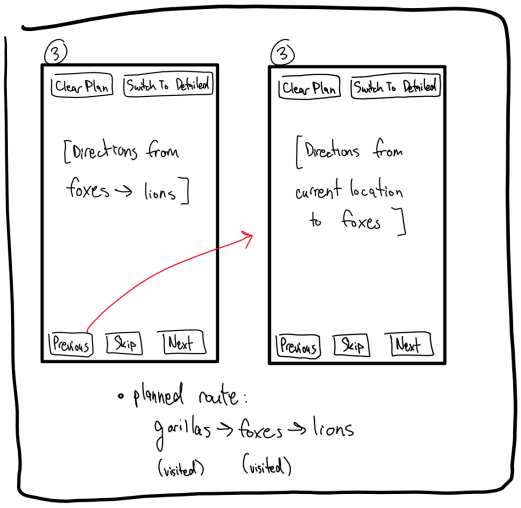
US 1, 2, 4



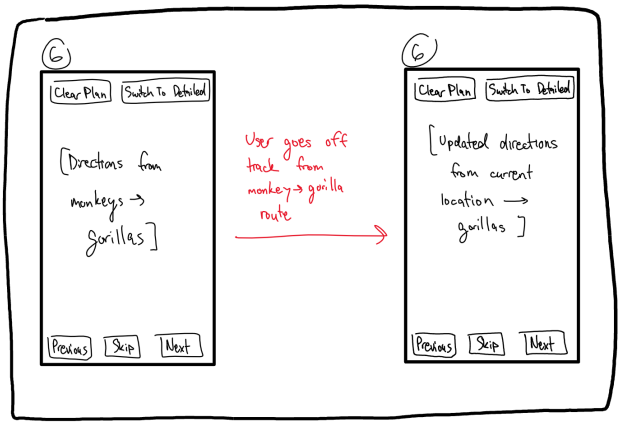
US 1, 4, 5



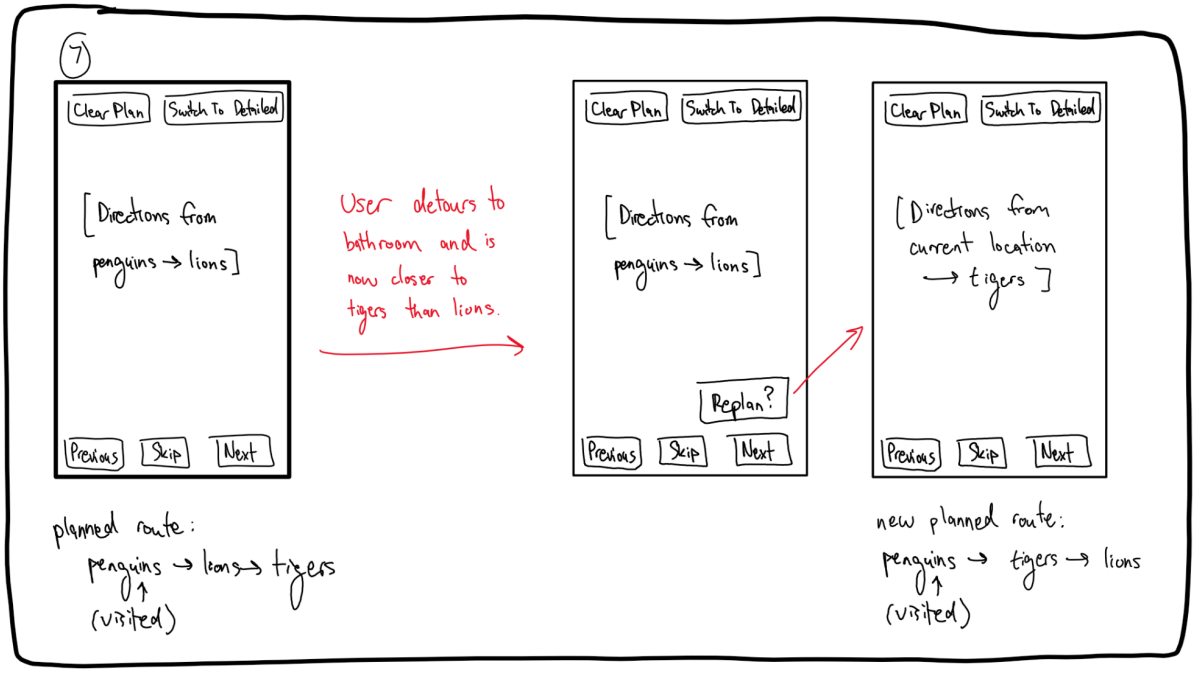
US 3


3
Clear Plan
Switch To Detailed
[Directions from foxes → lions]
Previous
Skip
Next
3
Clear Plan
Switch To Detailed
[Directions from current location to foxes]
Previous
Skip
Next
• planned route:
gorillas → foxes → lions
(visited) (visited)

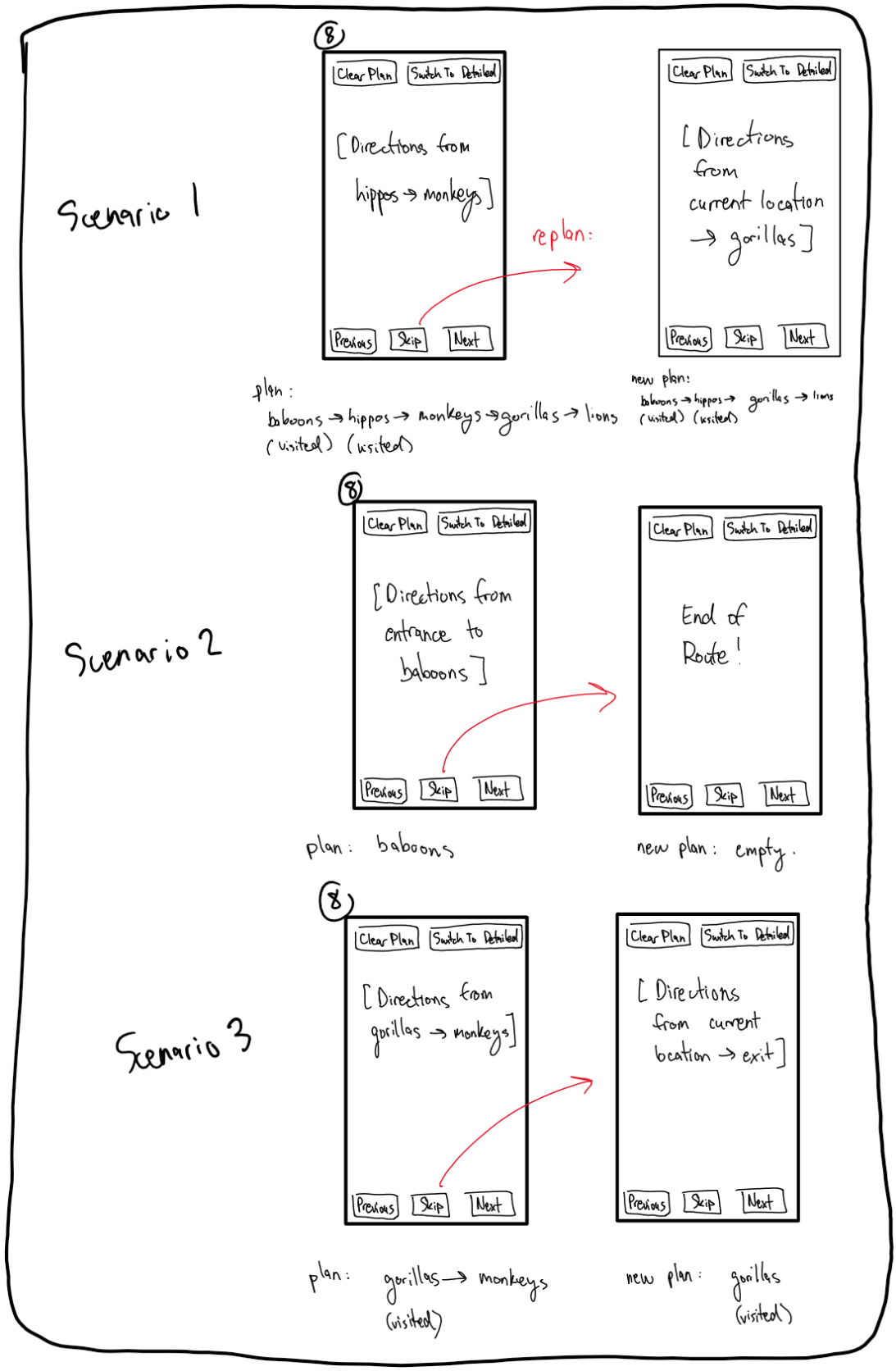
US 6


6
Clear Plan
Switch To Detailed
[Directions from monkeys → gorillas]
Previous
Skip
Next
User goes off track from monkey → gorilla route
6
Clear Plan
Switch To Detailed
[Updated directions from current location → gorillas]
Previous
Skip
Next

US 7


7
Clear Plan
Switch To Detailed
[Directions from penguins → lions]
Previous
Skip
Next
User detours to bathroom and is now closer to tigers than lions.
Clear Plan
Switch To Detailed
[Directions from penguins → lions]
Replan?
Previous
Skip
Next
Clear Plan
Switch To Detailed
[Directions from current location → tigers]
Previous
Skip
Next
planned route:
penguins → lions → tigers
(visited)
new planned route:
penguins → tigers → lions
(visited)

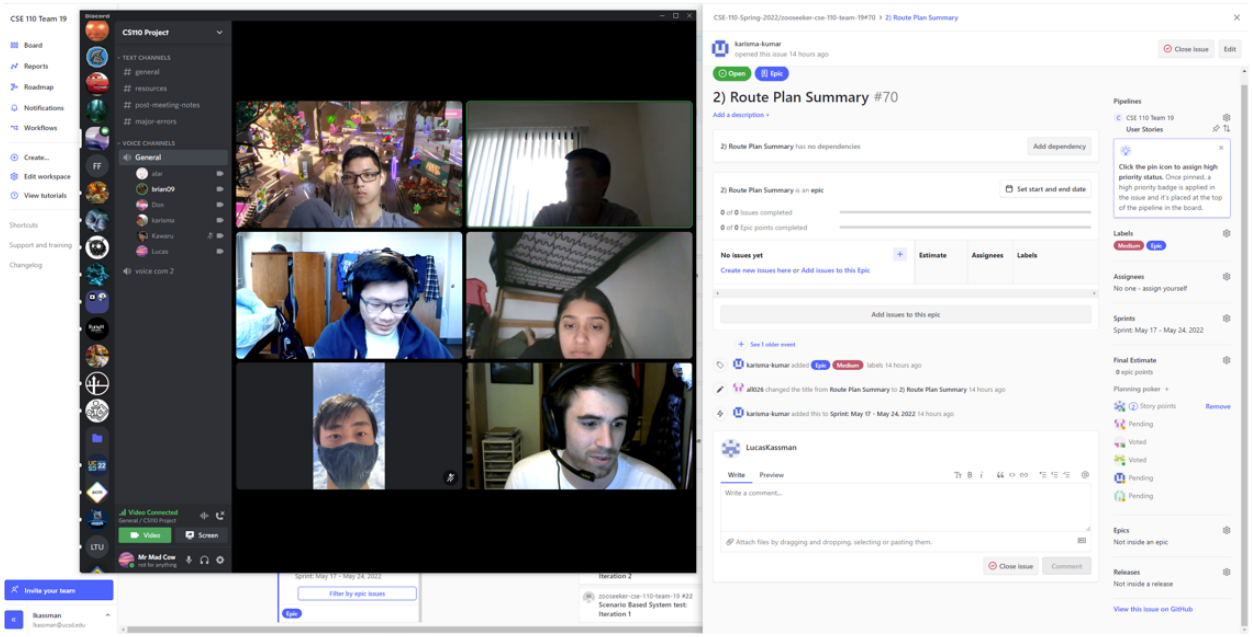
US 8


Scenario 1
8
Clear Plan
Switch To Detailed
[Directions from hippos → monkeys]
Previous
Skip
Next
replan:
Clear Plan
Switch To Detailed
[Directions from current location → gorillas]
Previous
Skip
Next
plan: baboons → hippos → monkeys → gorillas → lions (visited) (visited)
new plan: baboons → hippos → gorillas → lions (visited) (visited)
Scenario 2
8
Clear Plan
Switch To Detailed
[Directions from entrance to baboons]
Previous
Skip
Next
Clear Plan
Switch To Detailed
End of Route!
Previous
Skip
Next
plan: baboons
new plan: empty.
Scenario 3
8
Clear Plan
Switch To Detailed
[Directions from gorillas → monkeys]
Previous
Skip
Next
Clear Plan
Switch To Detailed
[Directions from current location → exit]
Previous
Skip
Next
plan: gorillas → monkeys (visited)
new plan: gorillas (visited)

3. Planning Poker

User Story	Voting Round	Hand						False Assumptions Uncovered
1.) Display Selected Exhibits	**1**	1.5	3	2	1	2	4	Testing is required, making a new list, UI may take some time to figure out
	2	3	3	3	3	3	3	
2.) Route Plan Summary	**1**	2	2	2	3	2	2	Already have the optimal list but need to implement the UI
	2	2	2	2	2	2	2	Add distances for each exhibit
								UI is pretty empty for PlanActivity so we'll have space
3.) Step Backward in Plan	**1**	6	8	8	5	2	6	
	2	6	5	6	6	6	4	
	3	6	6	6	6	6	6	
4.) Retain Selected Exhibits	**1**	1	3	2	2	2	2	Have functionality for retaining selected exhibits
	2	2	2	3	2	2	1	Need way to erase plan
	3	2	2	2	2	2	2	
5.) Settings to	**1**	5	4	6	4	3	2	Understanding

Change Direction View								difference between detailed and brief
	2	4	5	5	4	4	4	Need more information on graph assets
	3	4	4	4	4	4	4	
6.) Update Directions to Next Exhibit	**1**	6	6	8	8	9	8	Includes location API setup that provides functionality for other stories
	2	8	8	8	8	6	7	
	3	8	8	8	8	8	8	
7.) Replanning routes	**1**	6	5	6	5	5	5	Current location detection, UI for replan message
	2	5	5	5	5	5	5	Users picking 'yes'/'no'
8.) Skip Exhibit	**1**	4	5	5	4	4	4	Skip functionality' in different contexts
	2	4	4	4	4	4	4	Going to previous exhibits and skipping
								Skip removes current exhibit and route is replanned


CSE 110 Team 19
CS110 Project
2) Route Plan Summary #70
1) Display selected exhibits #78

4. Tasks

Iteration 1: 1,4,5,6 (17hr) - w/ 20 avaliable
Iteration 2: 2,3,7,8 (17hr)

User Story 1: Display selected exhibits

- Selected Exhibits List - 1.5hrs
    - Create (compact) list DS to store existing selected exhibits
    - Could pull data from

- Selected Exhibits List Display - 1.5hrs
    - Create UI to project list of user selected exhibits
    - Decide on UI for selected exhibits (refactor as drop-down or create page division)

User Story 2 : Route plan summary

- Plan Summary UI for Optimal Path information -2 hrs
    - Display exhibit information (exhibit name, distance, street name) for already generated optimal exhibit path
    - **Place this within the plan activity**

User Story 3 : Step backwards in plan

- Add Previous button UI - 2hrs
    - Implement UI for button and direct to previous page

- Generate new directions - 4hrs
    - Backend
    - Print new directions from current location to Point A on exhibit page that originally showed directions from A to B

User Story 4 : Retain selected exhibits

- Erase current plan - 2 hrs
    - Make button to clear plan list and return to search page

User Story 5 : Settings to change direction view

- Toggle UI - 1.5 hrs

    - Implement function to toggle between brief and detailed directions of planned route
    - Clone existing detailed directions list and modify for display?
- Generate Detailed/Brief Direction - Backend - 2.5hrs
    - On toggle activity, implement functionality to turn brief directions to detailed or from brief to detailed

User Story 6: Update Directions to Next Exhibit

- Current Location Detection - 3.5 hrs
    - Track user's current location
    - Detect if user's location is slightly off track/off planned route

- Update Directions - 4.5 hrs
    - Utilize user location to determine when to re-calculate path from (user location to next exhibit)
    - Recalculate path only when user travels to a path off planned route

User Story 7: Replanning Routes

- Current Location Detection - 2 hrs
    - Track user's current location
    - Show 'replan' message if close to future exhibit
- Replan message popup - 1 hr
    - When the current location is far enough, show message and take user input
- Call Dijkstra's to generate new route - 2hr
    - Create new order of exhibits to be visited
    - Recalculate directions based on current location

User Story 8: Skip Exhibit

- Skip Button UI - 2hrs
    - Add button to every exhibit page

- Button Activity - 2 hrs
    - Button response: deletes current exhibit from plan
    - Show 'Replan' message and take in user input
    - 'Yes' input: reroutes/generates new directions to following exhibit with new directions
    - 'No' input: Go to next exhibit directions

5. Scenario-Based Milestone Tests

End of Iteration 1 (User stories: Display Selected Animals, Retain Selected Exhibits, Settings to Change Direction View, Update Directions to Next Exhibit)

1. Jose launches the app by tapping the app icon from their mobile device. He presses the search bar and begins searching for animals he would like to see, starting with “Monkeys”
2. Jose selects “Monkeys” and immediately sees “Monkeys” appear in the list below the search results as well as an increment to the counter of the total exhibits selected so far towards the bottom.
3. Jose adds more animals to the list, “Toucan” and “Alligator”, and similarly sees them pop up in the list below the search results.
4. Jose suddenly gets a call and closes the app by accident. After finishing the call, he launches the app once more and sees the list below the search results still contain “Monkeys”, “Toucans”, and “Alligators”.
5. Jose then hits the “plan” button towards the bottom of the screen and is taken to the page containing the first direction of his route plan.
6. He clicks the “Switch to Detailed” button towards the top right and sees all the directions of the route plan, with details of the distance and street names. He clicks “Switch to Brief” to return to the original one direction view he was originally seeing.
7. Jose goes to the bathroom, which is 50 ft off-route on a parallel street, and after finishing his business, he checks the app once more. The next exhibit is still the Alligator exhibit, but the directions are now different from the original directions he had before going off-route. It appears the app has optimally updated the directions, and Jose can stay on the current street he is on!

End of Milestone 2 / End of Iteration 2 (User stories: Display Selected Animals, Route Plan Summary, Step Backwards in Plan, Retain Selected Exhibits, Settings to Change Direction View, Update Directions to Next Exhibit, Replanning Routes, Skip Exhibit)

1. Jose launches the app by tapping the app icon from their mobile device. He presses the search bar and begins searching for animals he would like to see, starting with “Monkeys”
2. Jose selects “Monkeys” and immediately sees “Monkeys” appear in the list below the search results as well as an increment to the counter of the total exhibits selected so far towards the bottom.
3. Jose adds more animals to the list, “Toucan” and “Alligator”, and similarly sees them pop up in the list below the search results.
4. Jose suddenly gets a call and closes the app by accident. After finishing the call, he launches the app once more and sees the list below the search results still contain “Monkeys”, “Toucans”, and “Alligators”.
5. Jose then hits the “plan” button towards the bottom of the screen and is taken to a page with the exhibits he selected. It is a summary of the planned route! He sees the animals

listed in a new order – the order that is optimal – where Alligator is first (100 ft), Toucan is second (300 ft), and Monkeys is last (400 ft). Street names are also specified.

6. Jose begins his journey to the Alligator exhibit but forgot his backpack at the security bag check station at the zoo's entrance. He hits the "previous" button on the app towards the bottom of the screen and the directions change, directing him in the direction he just came from.
7. Once Jose gets his backpack from the bag check station, Jose hits "Next" towards the bottom of the screen and the directions are back to how they were when he originally began his plan.
8. Jose is tired and is beginning to doubt if he can finish the planned route. He clicks the "Switch to Detailed" button towards the top right and sees all the directions of the route plan, with details of the distance and street names.
9. "I can do this", Jose tells himself, as he clicks "Switch to Brief" to return to the original one direction view he was originally seeing.
10. Jose goes to the bathroom, which is 50 ft off-route, and after finishing his business, he checks the app once more. The next exhibit is still the Alligator exhibit, but the directions are now different from the original directions he had before going off-route.
11. "Interesting", says Jose, who begins to want to test something about the app. Jose begins to walk towards the Toucan exhibit on his own, and once he is 50ft away from the Toucan exhibit, he checks the app again. A "Replan?" button has appeared towards the bottom of the screen.
12. Upon hitting the "Replan?" button, the directions change to guide Jose the rest of the 50ft towards the Toucan exhibit
13. Jose checks the new exhibit order by clicking the "Switch to Detailed" button and learns from the detailed list of directions that the next exhibit is now the Toucan exhibit, followed by the Monkey Exhibit, followed by the Alligator Exhibit.
14. Jose clicks the "Switch to Brief" button to return to the current direction. Jose at this moment decides that he can simply see Toucans by buying a box of Froot Loops breakfast cereal and wants to skip the Toucan exhibit.
15. Jose clicks the "Skip" button towards the bottom of the screen, and the current direction updates to direct him to the Monkeys exhibit instead. By viewing the detailed directions list by clicking the "Switch to Detailed" button, he sees that any direction to the Toucan exhibit is now gone from the route plan.

6. Iterations/Milestone

Work Hours Available per iteration:

5hr/person * 6 people * 0.68 velocity = about 20 work hours available per iteration

Iteration Length:

- 1st iteration : 17 hours
- 2nd iteration : 17 hours

Iteration 1

- US 1 Display Selected Exhibits
- US 4 Retain Selected Exhibits
- US 5 Settings to Change Direction View
- US 6 Update Directions to Next Exhibit

Iteration 2

- US 3 Step Backwards in Plan
- US 7 Re-planning Routes
- US 8 Skip Exhibit
- US 2 Route Plan Summary

Developer Story for Iteration 1: Bug free Integration
As a Developer, I want to be able to work in parallel with my partners on integrated systems without causing bugs.

Task 1: Parameters and Return Types:
Specify what data values our code is going to take as parameters and return before we write it, so that others in our team can work on other sections before we are done without causing bugs.

Task 2: Communicate unexpected issues
If one of us discovers that something we agreed upon is not going to work, they will immediately notify the rest of the team so that the team can adapt before too much work is wasted.

Task 3: Good Mock Design
Before a class is finished being written, we will make a mock of it so that the other team members can begin testing their code that relies on the class.

Task 4: Getting Familiar with Android Studio
In order to avoid bugs based on things like misplaced code, we must all familiarize ourselves by reviewing the labs and practicing on our own.

Task 5: Using Design Patterns
We will implement design patterns from class to make sure our code has good and efficient structure.

Developer Story for Iteration 2: Good code design
As a Developer, I want to be able to work in parallel with my partners on integrated systems without causing bugs.

Task 1: Parameters and Return Types:
Specify what data values our code is going to take as parameters and return before we write it, so that others in our team can work on other sections before we are done without causing bugs.

Task 2: Communicate unexpected issues
If one of us discovers that something we agreed upon is not going to work, they will immediately notify the rest of the team so that the team can adapt before too much work is wasted.

Task 3: Good Mock Design
Before a class is finished being written, we will make a mock of it so that the other team members can begin testing their code that relies on the class.

Task 4: Good Algorithm Design for Plan
We will use a graph to represent the map in order to make the process of making the route simple.

Task 5: Using Design Patterns
We will implement design patterns from class to make sure our code has good and efficient structure.

7. ZenHub

https://app.zenhub.com/workspaces/cse-110-team-19-625e02ba59c8c4001894ec22/board