

Ethan Reed Summary of Hours

Proof of all coding work can be verified in the commits section of our repo:

<https://github.com/reed2ep/SeniorDesignProject/commits/main/>

We met weekly on teams and the Professor requested no recordings, so we do not have direct proof. They were hour long meetings. In the fall we also met in person for an hour weekly to plan.

Total hours: 54 hr Fall, 54 hr Spring = 108 hours total

Total Contribution: roughly 35-40%

Fall

Team: about 150

Myself: 54

I contributed about 30-35% of effort

Reasoning: Our weekly in-person meetings were to take care of the weekly group-assignments for the course (user stories, timeline, etc.). Our advisor meetings were to go over project progress, which in this case was our layout of the app and its intended functionalities. We also decided individual weekly work at these meetings. My main role at this point was using my climbing knowledge to plan out how we will get the information from the climber (picture of route, route height, climber height, start/finishes, blob detection) as well as how we will choose paths (A* search) and display them.

Spring

Team: about 150-200

Myself: 54

I contributed about 30-35% effort

Reasoning: Spring semester was largely dev work. We only had 1 weekly meeting that was an hour long with our advisor. Here we went over what we did, possibly demoed it, then

went over issues and gave things to work on for the next week. Personally, I was developing the blob detection, pathfinding, and path display pages for the majority of the semester. Blob detection dealt with identifying holds based on a user-selected color in a picture. Pathfinding dealt with running A* for each limb of the climber and assigning costs based on factors such as positioning, hold size and balance and then fine tuning with testing. Path display dealt with finding a suitable method to translate the path to the climber, which I ended up doing by drawing different color lines for each limb sequentially so that the moves can be followed in order from the start to finish.

Timesheet:

Week of September 2

- Group Meeting: Intro

discussion o Time: 1 hour

- Emailing Potential Group

Members/Advisors o Time: 1

hour

Week of September 9

- Meeting Planning o Time: 1

hour

- Individual capstone and

team contract review o

Time: 1 hour

Week of September 16

- Group Meeting o Time: 1

hour

- Researching and project

write-up o Time: 2 hours

Week of September 23

- Meet with project advisor o

Time: 1 hour

- Researched AI methods o

Time: 3 hours

o [https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%206/PathFindingResearch_Ethan.pdf)

[Week%206/PathFindingResearch_Ethan.pdf](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%206/PathFindingResearch_Ethan.pdf) o

[https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%206/A_Star_Heuristic_Example%20(1).pdf)

[Week%206/A_Star_Heuristic_Example%20\(1\).pdf](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%206/A_Star_Heuristic_Example%20(1).pdf)

- Task List Creation o Time: 1

hour

Week of September 30

- Meet with Project advisor o

Time: 1 hour

- Group Meeting o Time: 1

hour

- Generate

Milestones/Timeline/Effort

Matrix o Time: 1 hour

Week of October 7

- More research on specific

climbing path-finding o

Time: 2 hours

o [https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%207/A_Star_Heuristic_Example_Expanded.pdf)

[Week%207/A_Star_Heuristic_Example_Expanded.pdf](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%207/A_Star_Heuristic_Example_Expanded.pdf)

- Meet with Project advisor o

Time: 1 hour

- Group Meeting o Time: 1

hour

- Identify Project Constraints o

Time: 1 hour

Week of October 14

- Set up environment o

Time: 2 hours

- Meet with Project advisor o

Time: 1 hour

- Group Meeting o Time: 1

hour

Week of October 21

- Brainstorming on move²sequencing for path-finding

(arms vs legs) o Time: 3

hours

o [https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/](https://github.com/reed2ep/SeniorDesignProject/blob/main/Research/Week%208/Move%20Sequencing.pdf)

Week%208/Move%20Sequencing.pdf Week of October 28

- Meet with Project advisor o

Time: 1 hour

- Group Meeting o Time: 1

hour

Week of November 4

- Added Camera functionality

o Time: 3 hours

o <https://github.com/reed2ep/SeniorDesignProject/pull/1>

Week of November 11

- Began Researching blob

detection and identifying

tools to use o Time: 4 hours

Week of November 18

- Attempted to set up OpenCV

library (create binding

library) and prototype B.D.

o Time: 15 hours

- Group Meeting o Time: 1

hour Week of November 25

- Researched alternative blob

detection methods o Time: 2

hours

Total semester 1: 54 hrs

Week of December 30th

- Identified Emgu CV for blob detection and created initial implementation: 3 hrs

Week of January 6th / January 13th

- Build upon blob detection to include support for other colors and modified parameters

to work on actual climbing routes: 5 hrs

Week of January 20th

- Group meeting : 1hr

- Pathfinding planning (heuristic construction): 2 hrs

Week of January 27th

- Group meeting: 1hr

- Development on initial pathfinding (simple 1-line path): 3 hrs

Week of February 3rd

- Group meeting: 1hr
- Research/planning for 4-limb search (4-line path): 2 hrs

Week of February 10th

- Group meeting: 1hr
- Research/planning for 4-limb search (4-line path): 2 hrs

Week of February 17th

- Group meeting: 1hr
- Developed 4-limb pathfinding: 5 hrs

Week of February 24th

- Group meeting: 1hr
- Added visualization of 4-limb path (4-line overlay on route): 3 hrs

Week of March 3rd

- Group meeting: 1hr
- Code cleanup (moving app pages around and combining similar functions), pathfinding tweaks: 2 hrs

Week of March 10th

- Blob detection fixes for small holds, pathfinding modifications, added ability to view sequential moves instead of entire path at once: 6 hrs

Week of March 17th

- Group meeting: 1hr
- Removed hold types and instead added option to apply difficulties to specific holds on route, pathfinding tweaks: 2hrs
- Created draft poster: 2hrs

Week of March 24th

- Group meeting: 1 hr
- Ui adjustments, button fixes, help button link to repo user docs, pathfinding tweaks : 2

hrs

Week of March 31st

- Group meeting: 1hr
- Button reordering, added home button on path display page, modified pathfinding to avoid duplicate paths (limbs taking same path up wall): 4 hrs

Week of April 7th

- Expo
- Self-assessment, final project bookkeeping: 1 hr

Total Semester 2: 54 hrs

Total overall: 108 hr