whoosh

Presented by Team Whoosh

Outline

- Introduction
  - About Whoosh
  - Team Whoosh
- Project Origins (Initial Timeline)
- PM Timeline
- Logistics Timeline
- Development Timeline
- Design Timeline

What is Whoosh?

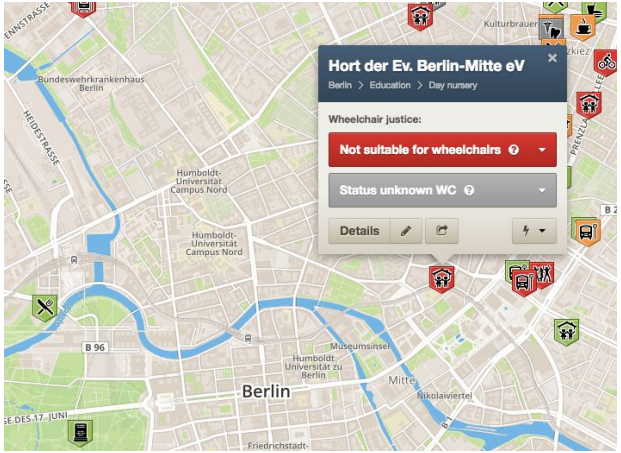
- UTD campus navigation app for the movement impaired
- Provides wheelchair/crutch friendly routes
- Find ways across campus

Who are we?

Luke Carr Logistics	**Elise Keller** Logistics	**Dustin Endres** Logistics
Taber Hust Development	**Izuchukwu Elechi** Design	**Marie Imperial** Development
Jason Nguyen Project Management	**Thomas Grice** Design	**Sasha Borodin** Project Management
Maelene Tacata Design	**Dustin Grannemann** Development	**Jessica Jennings** Design
Tayaba Saleem Logistics		**Kesha Shrestha** Logistics

Current State

- Not many large-scale applications for accessible routes exists, however some small scale exists
- Wheelmap.org based in Germany gives details of the accessbility of public places without navigation
- Cannot tell handicap-accessible routes from UTD Campus Map:



As-is Scenario

- Scenario: Jimmy is starting out college and has a wheelchair. He is unfamiliar with UTD’s campus and looks for his classes on a map. Upon going to his first class, he cannot find an accessible route to the fourth floor of Green. He ends up late to class and is anxious about getting to his next class.

To-Be Scenario

- Scenario: Jimmy downloads the Whoosh app and inputs the classroom number he wants to go to. The application navigates him to his classroom using accessible routes. Jimmy is early to his class and confident about getting to his next class.

Goals

- To assist disabled people in navigating around campus by providing accessible routes via a smartphone application.
- To provide information about the Office of Student Accessibility.

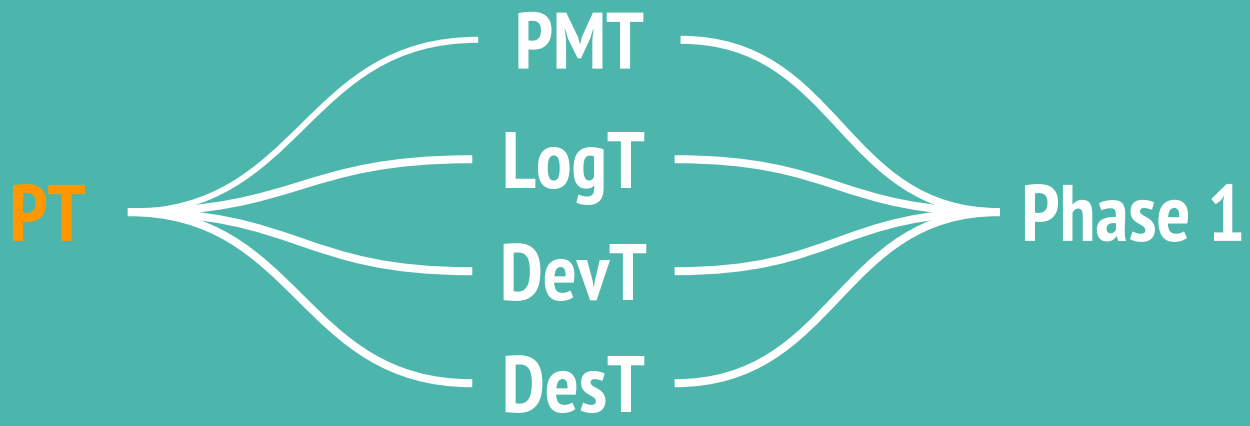
Motivation

- We recognize a need for students, faculty, and visitors who use wheelchairs and need to get around campus
- We want to both welcome guests and make current students feel at home by making getting around campus easier

Scope

- Primary Use Cases
  - navigate between two known points on campus using accessible routes
  - navigate between current location on campus and another known point
  - browse campus map and building floor plans with accessibility markers
  - browse contact information for OSA
- Constraints
  - Implement as Android smartphone application
  - proof of concept limited to ATEC and SSB buildings

Preliminary Tasks (PT)



In the Beginning...

- Our team was put together from random people sitting around the classroom.
- While building our project management plan we tossed around ideas for an app to assist the disabled.

Problems:

1. Project Idea (P1)
2. Team Organization (P2)

Project Idea (P1)

- Before dividing up into sub-teams, we first needed an idea to work with
- Primary requirement was that our App had to help those with disabilities
- Many good ideas were thrown around, and we eventually decided on a making a navigation app
- App would later be called Whoosh

Team Organization (P2)

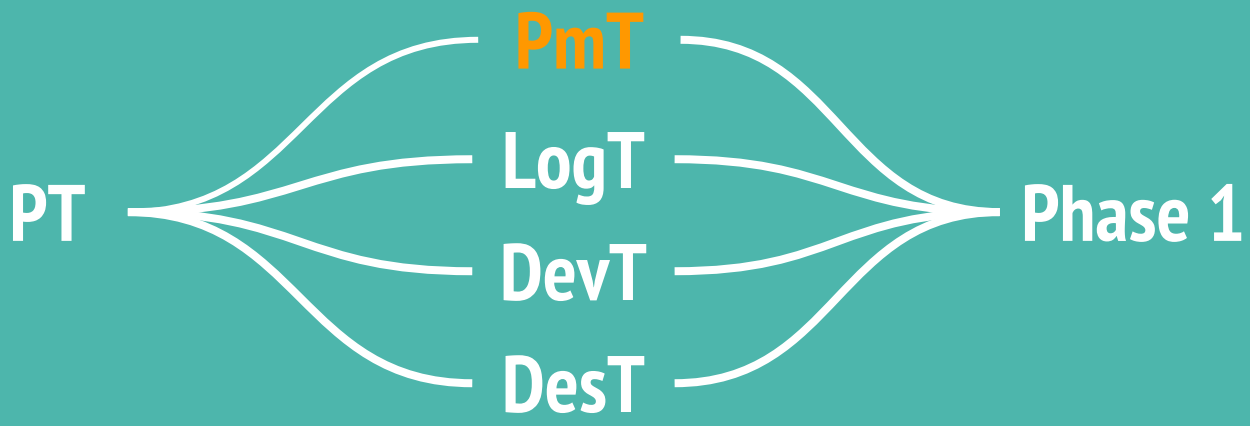
- After the project idea was decided, we worked on dividing up the work
- Agreed on 4 Teams
  - Project Management
  - Logistics
  - Development
  - Design
- Used a sign-up sheet
- Worked out the final teams and ready to go

Summary of IT

- Problem (P1): Project Idea
  - Solution (P1):
    - Discussed several ideas focusing on assistance
    - Decided on making a navigation app (Whoosh)

- Problem (P2): Team Organization
  - Solution (P2):
    - Decided what areas of work needed to be accomplished
    - Agreed on 4 team structure
    - Assigned people based on interest

Project Management Timeline (PmT)



Project Management

Primary Responsibilities

Project Management

Primary Responsibilities

- **communication**
  - *How do we keep 14 people with different schedules on the same page?*
- **delegation**
  - *Who is responsible for what?*
- **planning**
  - *What must be done, in which order, by the deadline?*

Project Management

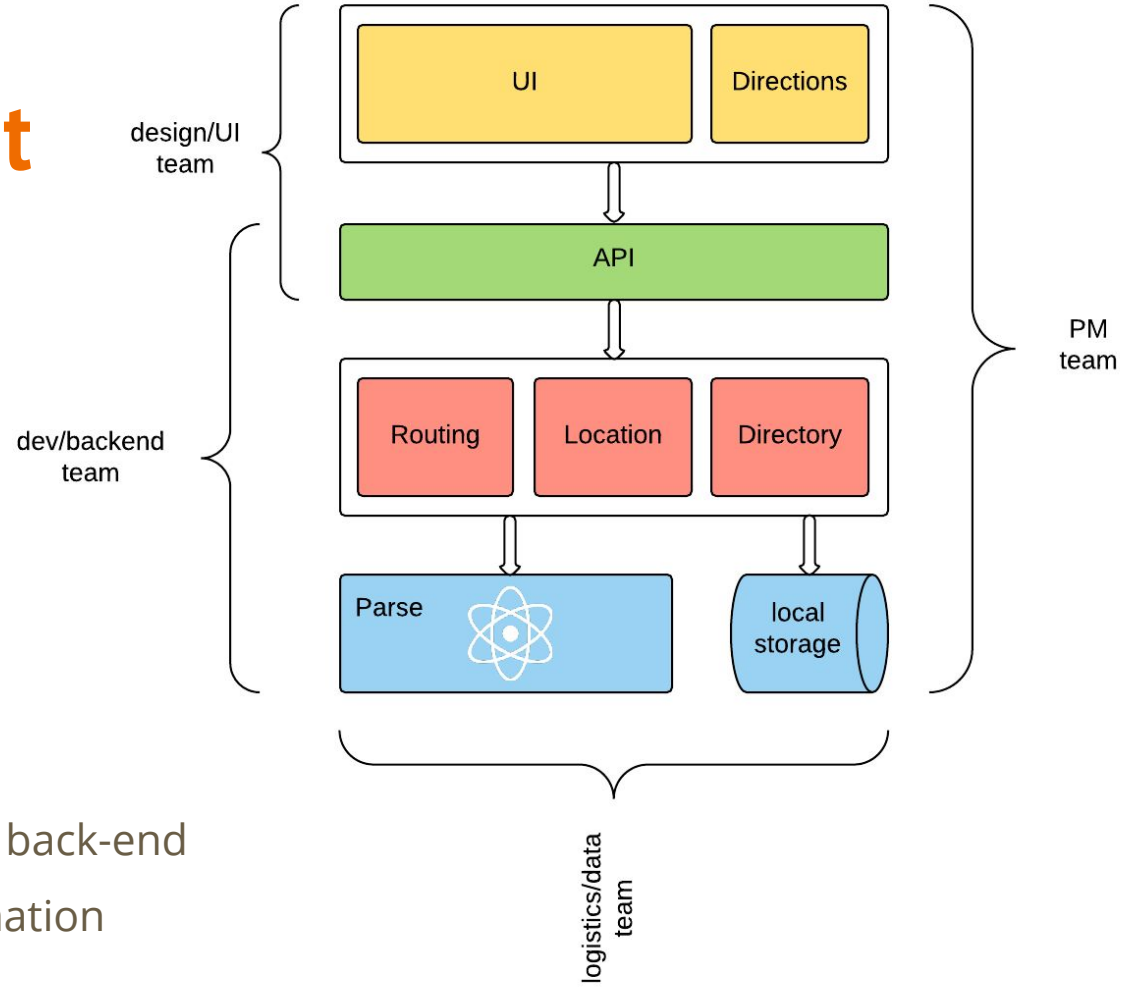
Communication

- teams have *leads*
- *weekly meeting* between leads and PMs
    - communicate team progress and concerns
    - make key decisions
- leads take away key decisions and take necessary *action within their teams*

Project Management

Delegation

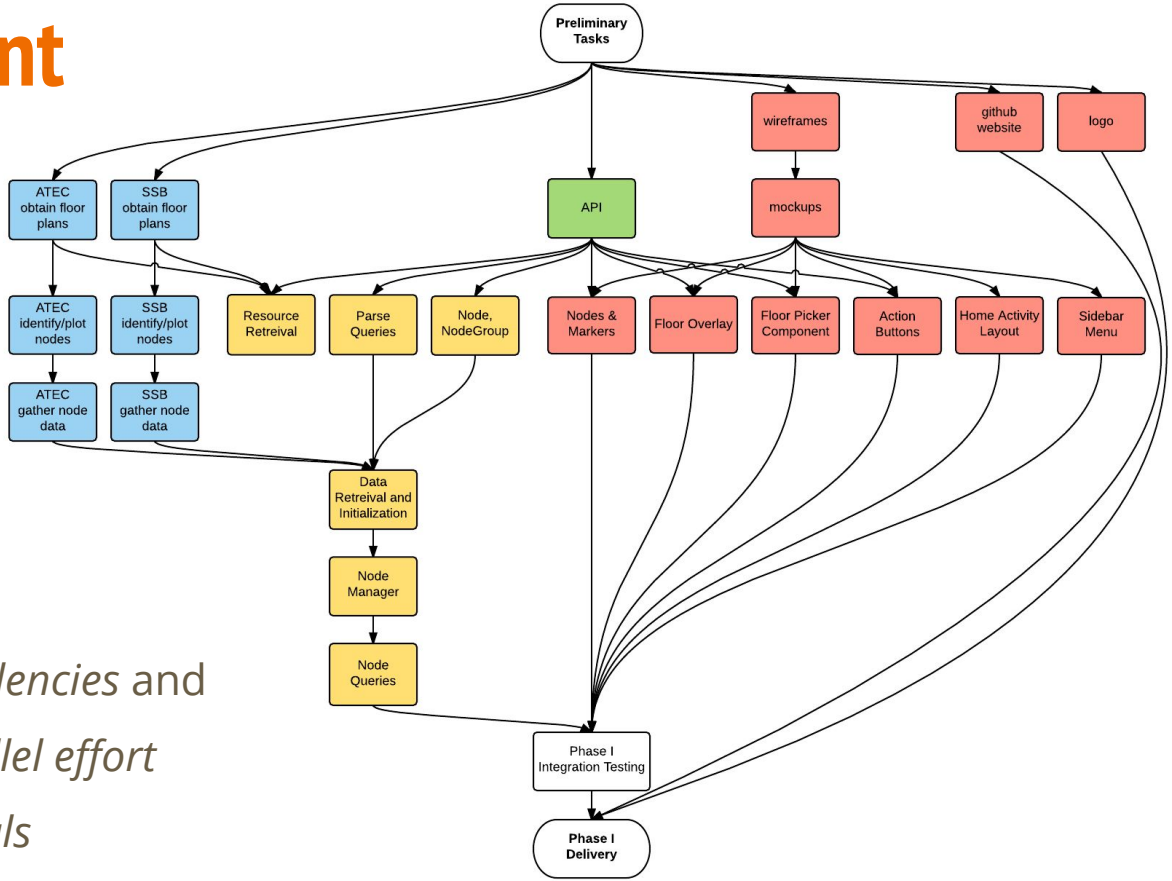
- PM's and leads determined high-level architecture
- inter-team division of effort along architecture *layers*
- intra-team division of effort along *modules*
- boundary between front and back-end teams required extra coordination
    - *API contract*



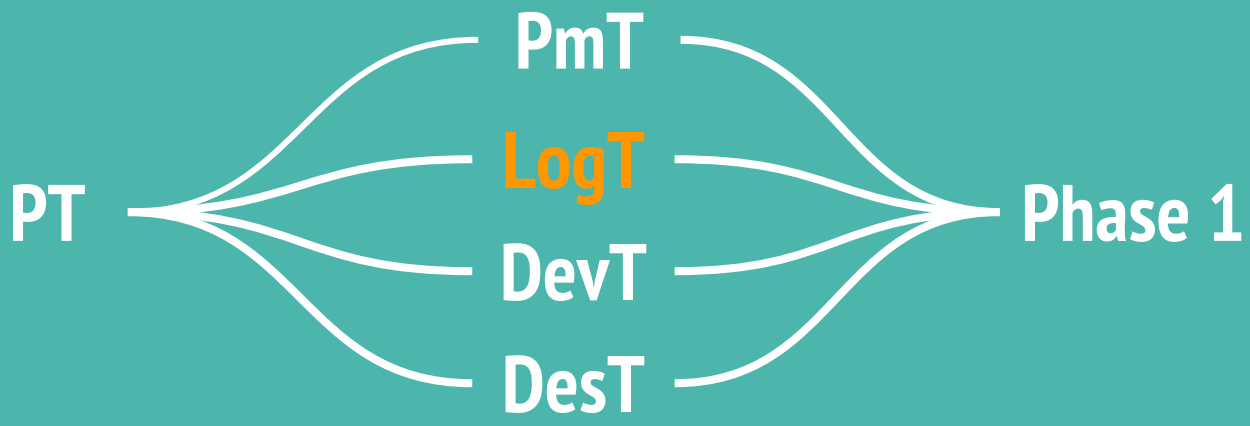
Project Management

Planning

- *Work Breakdown Structures*
  - express units of work
  - responsible parties
  - estimate of effort
- *Project Network Diagram*
  - expresses both *dependencies* and opportunities for *parallel effort*
  - helped set realistic *goals*
  - allows *monitoring* progress



Logistics Timeline (LogT)



Logistics Team Responsibilities

- To collect data and information for the app to process and calculate routes.
- Maintain and verify data which powers the app

Scope

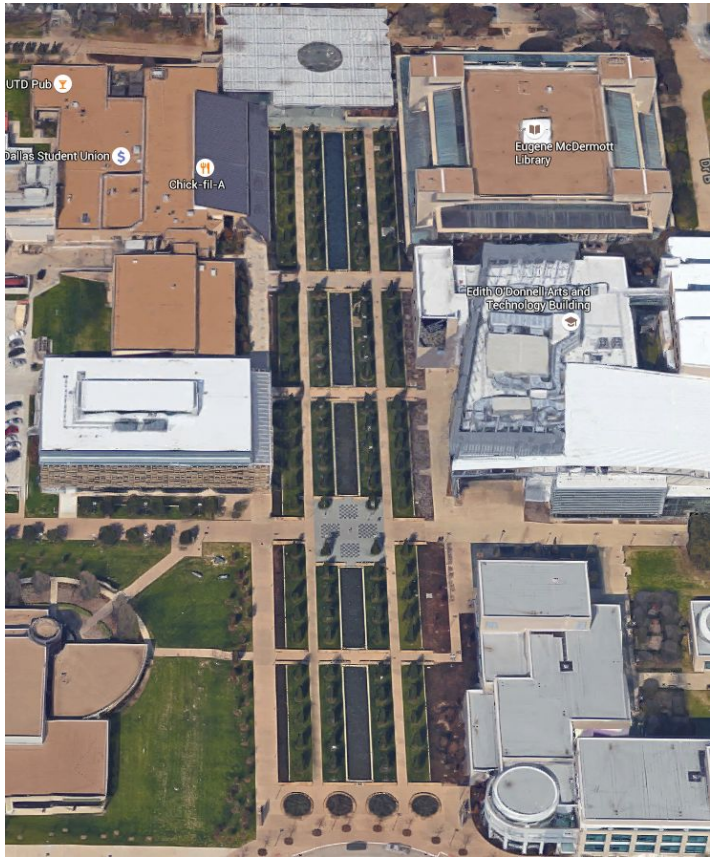
- We determined that we would only include data collection for the main buildings containing classrooms.
- On-campus housing and off-campus buildings would not be included.

Original Plans

- Plan 1: Contact the University Office of Student AccessAbility and University Facilities and obtain the locations of accessible routes around campus.
- Failure: The university was not able to provide any location based information which we could use for campus navigation.

Original Plans

- Plan 2: Use google maps for navigation through campus.
- Failure: Although google maps can provide walking navigation outside, it does not provide indoor navigation and does not consider the disabled.

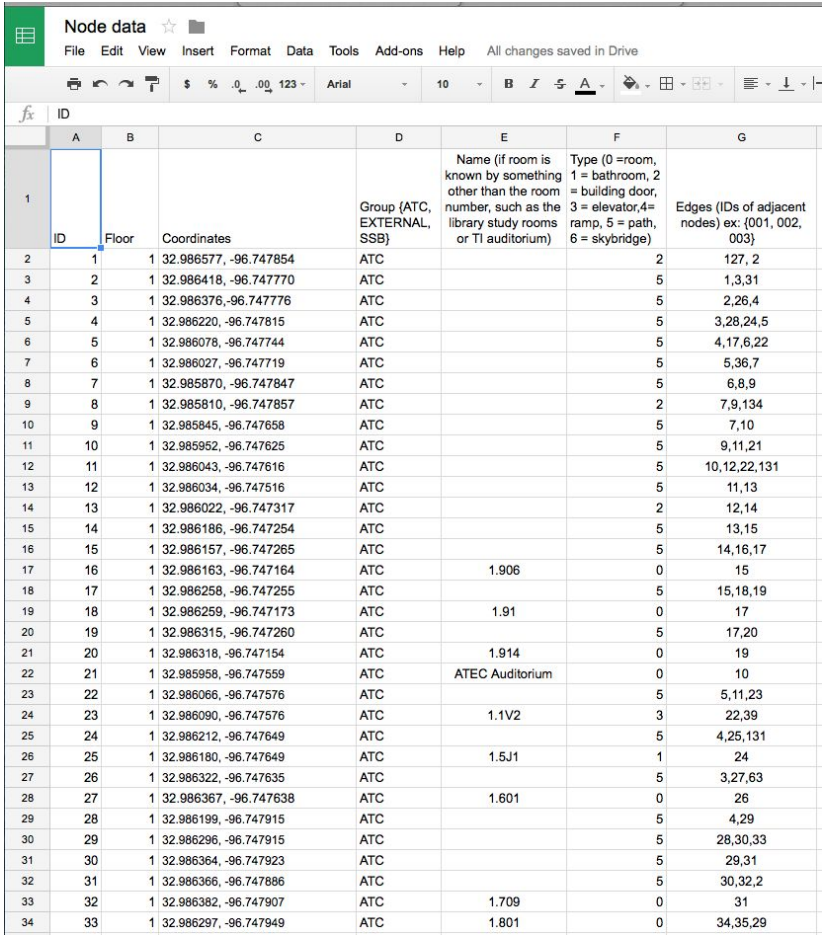


Final Plan

- Our final solution which required the most work but was guaranteed to work.
- As seen in the photo, each floor of each building has “Node” points which define a navigation point for the app.

Nodes

- We are able to use the indoor maps of buildings on top of google maps to calculate the coordinates of a specific node on the map.
- Examples of nodes include pathways, elevators, classrooms, etc. These nodes are sorted and processed by the app to provide navigation.



Node data

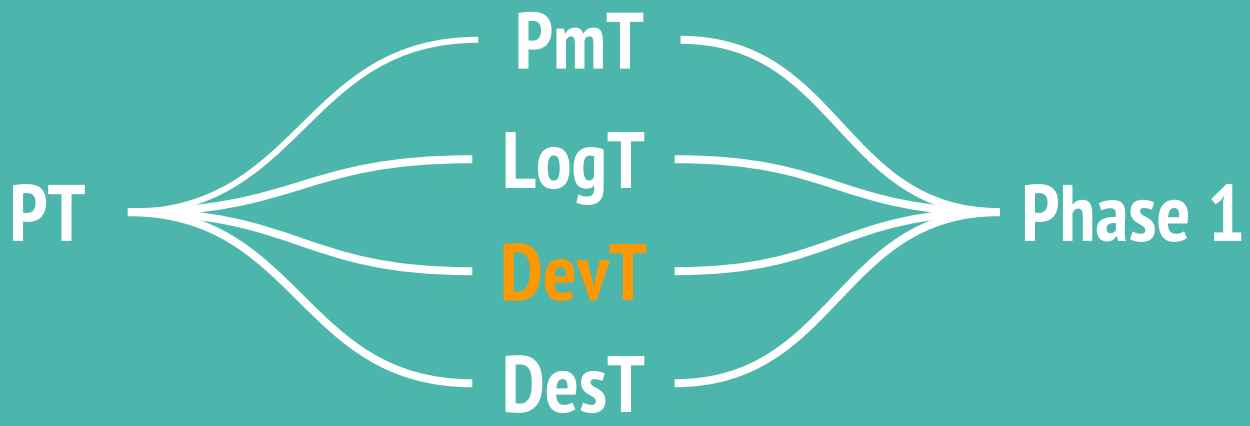
File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

Arial 10

fx ID

	A	B	C	D	E	F	G
1	ID	Floor	Coordinates	Group {ATC, EXTERNAL, SSB}	Name (if room is known by something other than the room number, such as the library study rooms or TI auditorium)	Type (0 =room, 1 = bathroom, 2 = building door, 3 = elevator,4= ramp, 5 = path, 6 = skybridge)	Edges (IDs of adjacent nodes) ex: {001, 002, 003}
2	1	1	32.986577, -96.747854	ATC		2	127, 2
3	2	1	32.986418, -96.747770	ATC		5	1,3,31
4	3	1	32.986376,-96.747776	ATC		5	2,26,4
5	4	1	32.986220, -96.747815	ATC		5	3,28,24,5
6	5	1	32.986078, -96.747744	ATC		5	4,17,6,22
7	6	1	32.986027, -96.747719	ATC		5	5,36,7
8	7	1	32.985870, -96.747847	ATC		5	6,8,9
9	8	1	32.985810, -96.747857	ATC		2	7,9,134
10	9	1	32.985845, -96.747658	ATC		5	7,10
11	10	1	32.985952, -96.747625	ATC		5	9,11,21
12	11	1	32.986043, -96.747616	ATC		5	10,12,22,131
13	12	1	32.986034, -96.747516	ATC		5	11,13
14	13	1	32.986022, -96.747317	ATC		2	12,14
15	14	1	32.986186, -96.747254	ATC		5	13,15
16	15	1	32.986157, -96.747265	ATC		5	14,16,17
17	16	1	32.986163, -96.747164	ATC	1.906	0	15
18	17	1	32.986258, -96.747255	ATC		5	15,18,19
19	18	1	32.986259, -96.747173	ATC	1.91	0	17
20	19	1	32.986315, -96.747260	ATC		5	17,20
21	20	1	32.986318, -96.747154	ATC	1.914	0	19
22	21	1	32.985958, -96.747559	ATC	ATEC Auditorium	0	10
23	22	1	32.986066, -96.747576	ATC		5	5,11,23
24	23	1	32.986090, -96.747576	ATC	1.1V2	3	22,39
25	24	1	32.986212, -96.747649	ATC		5	4,25,131
26	25	1	32.986180, -96.747649	ATC	1.5J1	1	24
27	26	1	32.986322, -96.747635	ATC		5	3,27,63
28	27	1	32.986367, -96.747638	ATC	1.601	0	26
29	28	1	32.986199, -96.747915	ATC		5	4,29
30	29	1	32.986296, -96.747915	ATC		5	28,30,33
31	30	1	32.986364, -96.747923	ATC		5	29,31
32	31	1	32.986366, -96.747886	ATC		5	30,32,2
33	32	1	32.986382, -96.747907	ATC	1.709	0	31
34	33	1	32.986297, -96.747949	ATC	1.801	0	34,35,29

Development Timeline (DevT)



Development Team Responsibilities

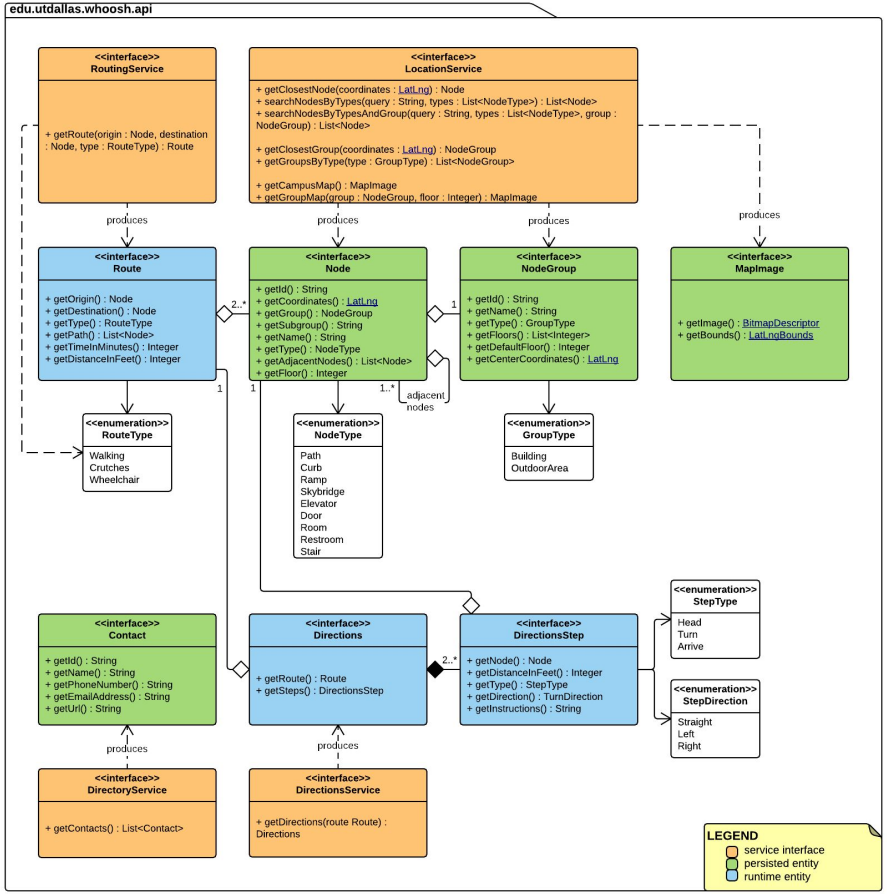
- Determine the best way to store the necessary data provided by the Logistics team.
- Figure out how to use this data to best route the user to their destination on campus.
- Link the front-end components created by the Design team with the back-end logic to create a working prototype.
- Incrementally improve the prototype until it is a suitable working app or time runs out.

Development Problems

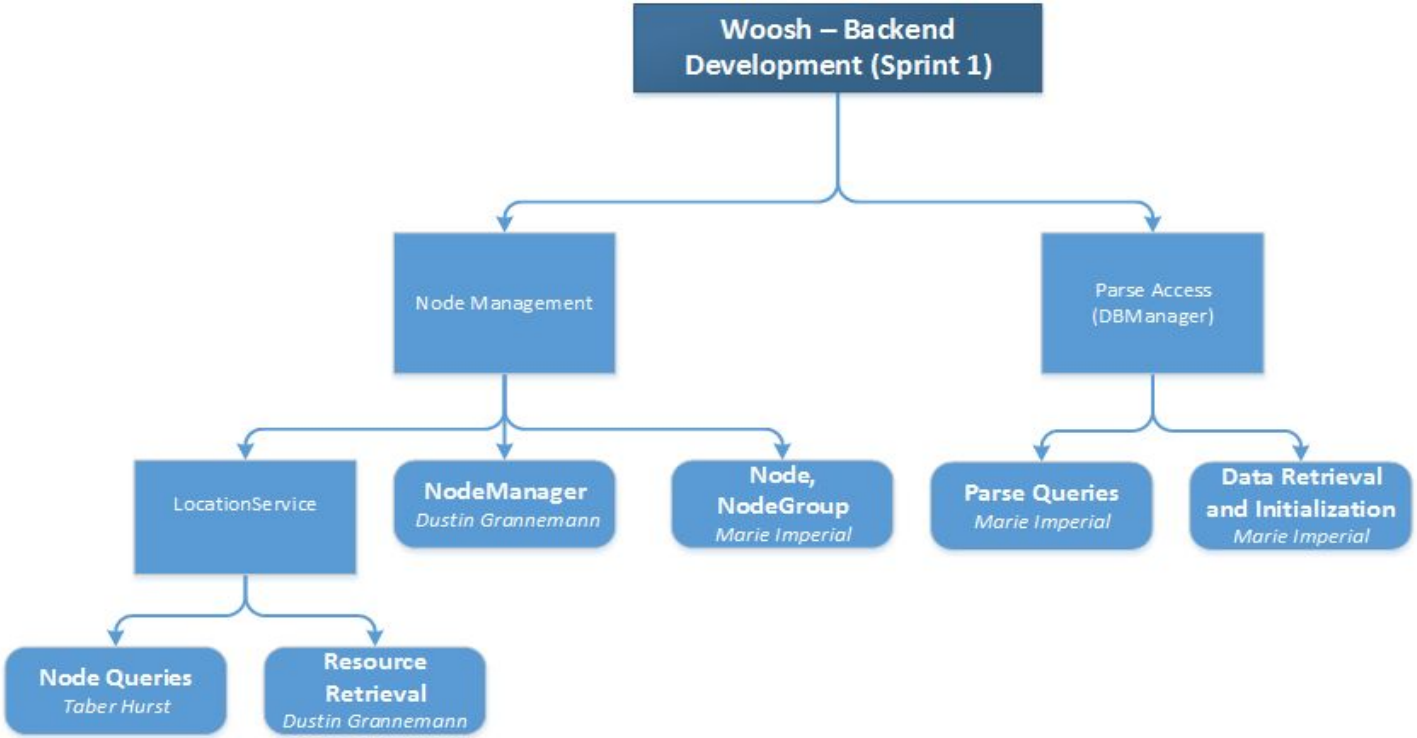
Problem	Impact	Solution
Determining minimum Android SDK version	Effects which Android functionality can be used within the application	Decided on Android API Level 15 (4.0.3), since it is supported by 93% of Android users
Determining which database to use for backend	Effects how node data is stored and retrieved, as well as node data entry process	Went with Parse, since it is free, simple to implement, and supported by Android
Deciding search and pathfinding algorithms	Effects how core functionality is designed and implemented	Went with Parse search queries and custom pathfinding algorithms
Deciding timeline of backend class implementation	Effects which core functionality the Design team is able able to implement	Decided to implement API functionality across several sprints. Features are added as needed by the Design team

Development API

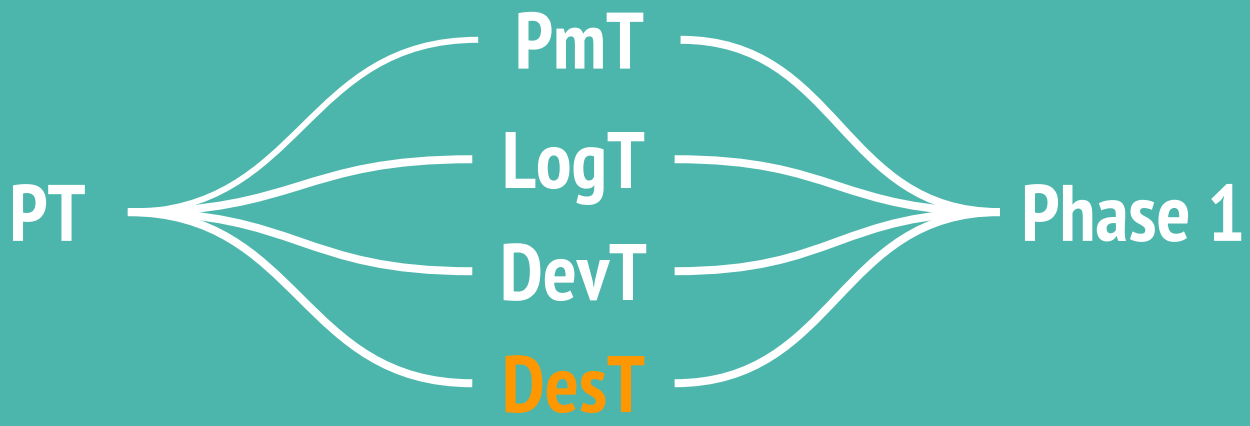
- Interfaces between Design and Development teams:
  - RoutingService
  - LocationService
  - DirectoryService
  - DirectionService



Development WBS



Design Timeline (DesT)



Design's Goal

Our Design goals were fundamentally about solving communication problems:

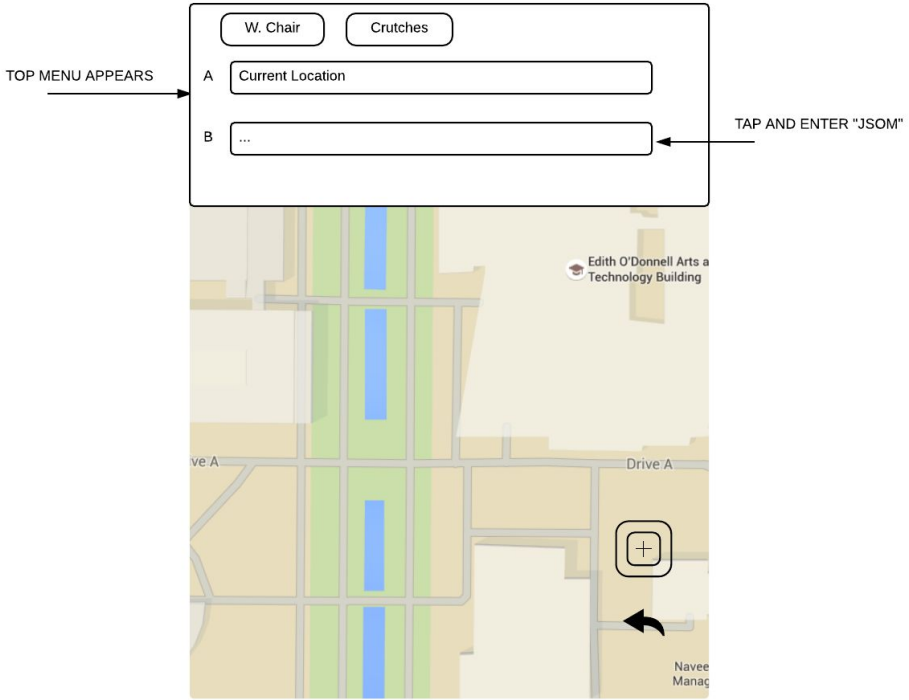
- How do we communicate the vision of the app between the various subteams?
- How do we design the app's interface to be usable, aesthetically pleasing, and to communicate its functions clearly?

We solved these problems through deliberation of ideas and by crafting mockups and wireframes.

Wireframes

Creating wireframes is about quickly creating a vision of the app's interface elements and their interaction flow.

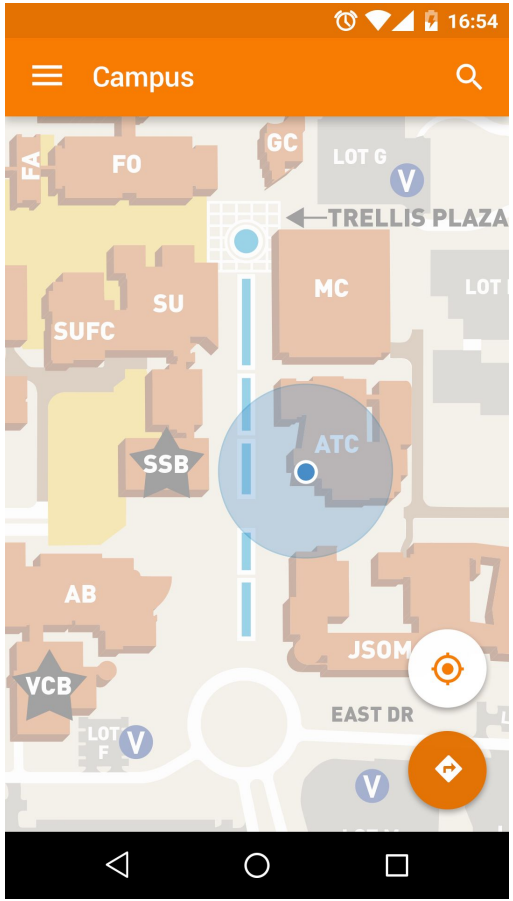
This is an example of one of our wireframes, from the "building to building navigation" scenario.

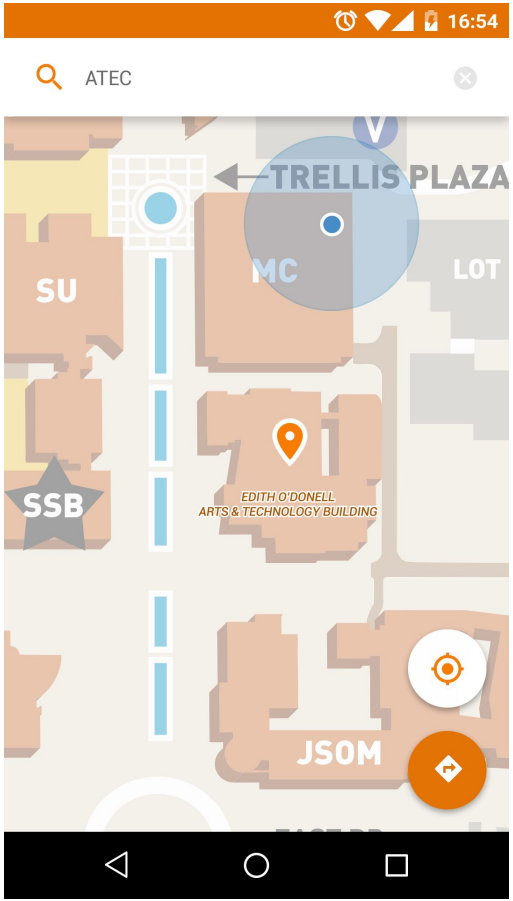


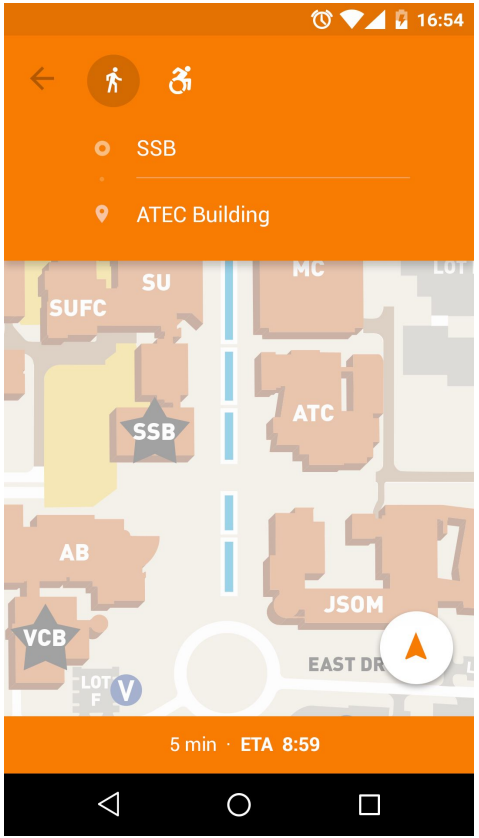
Mockups & Prototyping

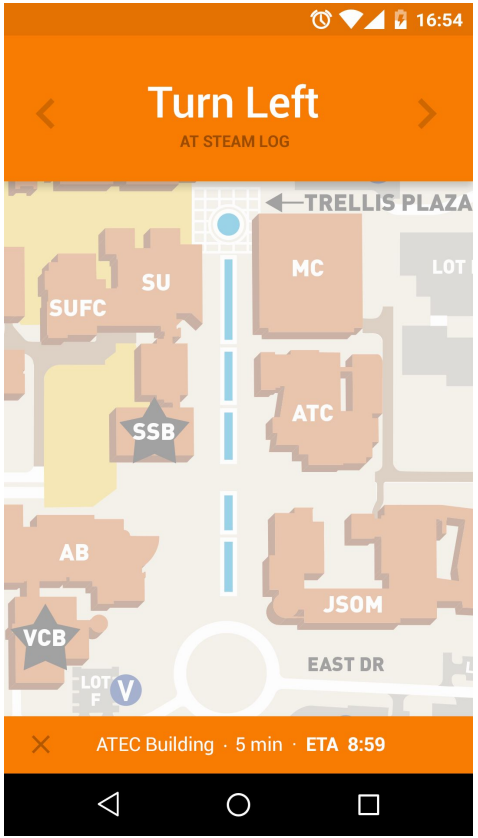
- Focused, consistent UI
- Simplifies design communication between teams
- Reduces implementation ambiguity

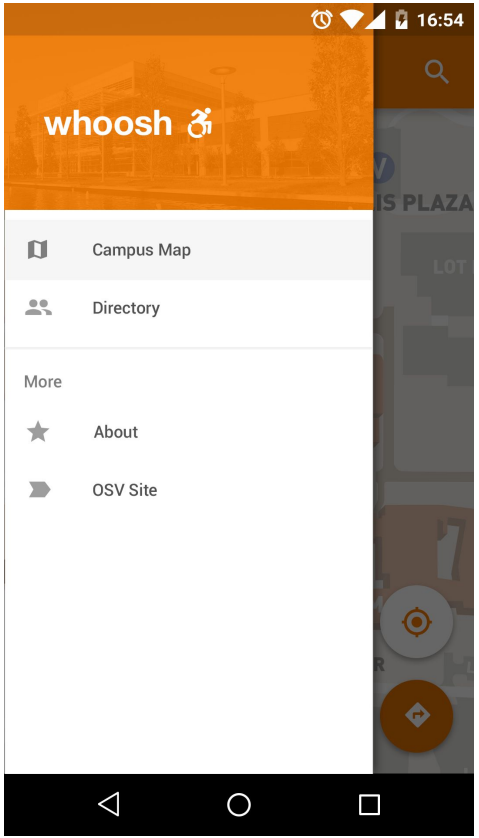
Campus Search











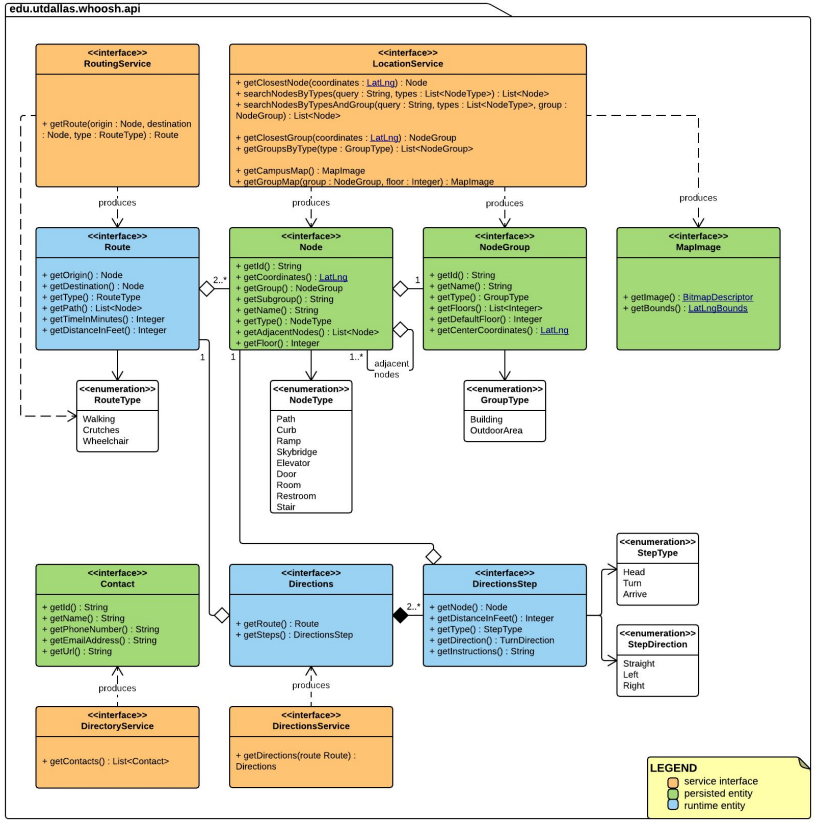
Navigation & Menu

Design API

Utilize back-end functionality with API

Communicate data from user to dev team

e.g. getRoute(Node origin, Node destination, RouteType type)



Logo Design

Communicate essential information to users

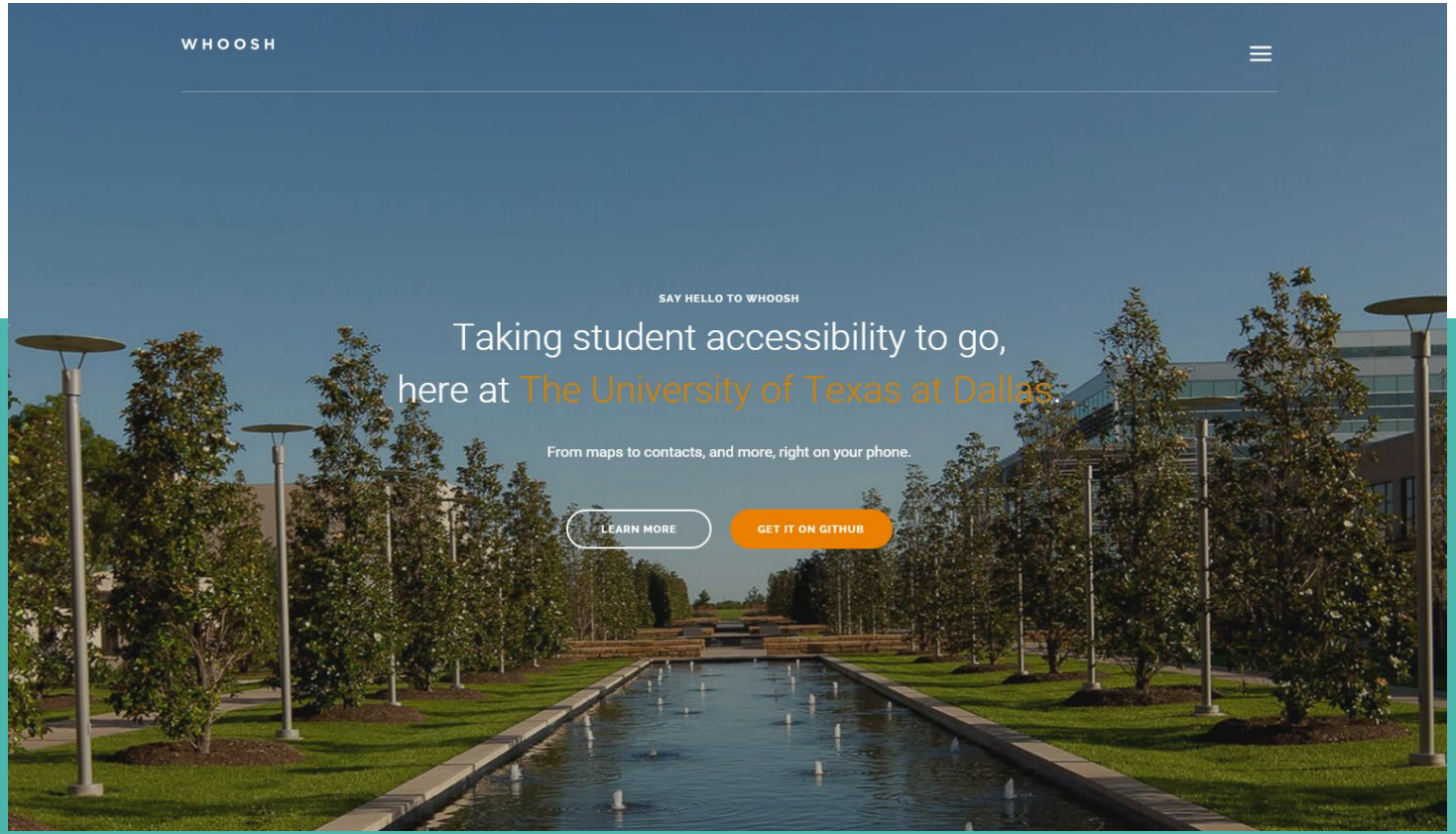
- purpose of the application
- primary colors, fonts, etc.

What's Next:

Possible Future Enhancements

- User profiles
  - Allow user to add data for locations (ex: comment on accessibility, pictures of route, etc)
  - Allow user to save frequent routes or locations
- Expanding to accessible bathrooms and parking spots

Visit Us at utdwhoosh.github.io



References

- "German IPhone App Guides Wheelchair Users to Find Accessibility." *Global Alliance on Accessible Technologies and Environments RSS*. 23 Feb. 2011. Web. 15 Sept. 2015. <http://globalaccessibilitynews.com/2011/02/23/german-iphone-app-guides-wheelchair-users-to-find-accessibility/>.
- "Mit Wheelmap.org Kannst Du Rollstuhlgerechte Orte Finden Und Markieren - Weltweit Und Kostenlos. So Einfach Gehts:." *Wheelmap*. Web. 15 Sept. 2015. <http://wheelmap.org/map#/popup/271670135?lat=52.5141054521424&lon=13.42306137084961&zoom=14>.