



Constrained Re-Planning in Spatial Crowdsourcing

Team 51

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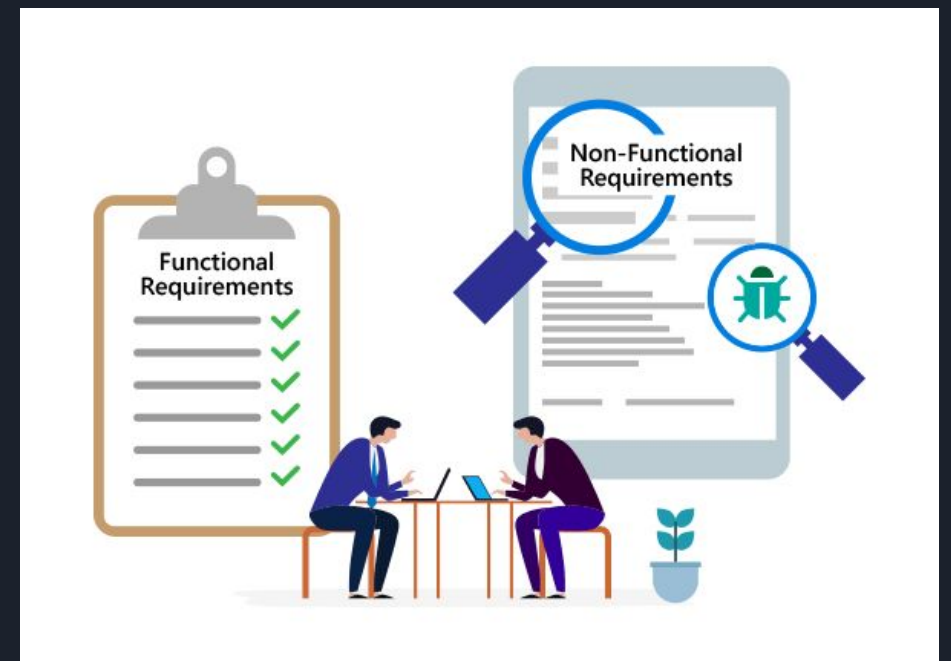
Client and Advisor
Goce Trajcevski

Functional Requirements

- Allow task generators and workers to be able to create accounts (stored in DB)
- Take input of workers: skills, location, and reputation
- Take input of tasks: location(s) and skills required
- Optimize a schedule based on task and worker input
- Alert workers of incoming tasks
- Re-optimize schedule in the event of new constraints
- User interface for visualization of work schedule

Non-Functional Requirements

- Reliability - few bugs or issues that impede user experience
- Performance - algorithm is polynomial time and app is optimized for web/mobile
- Scalability - able to be used by a large number of users simultaneously
- Maintainability - readable code with documentation
- Usability - intuitive/easy to use



Constraints

- Must run as a mobile and desktop app
- Requires internet connection
- Google Maps API (\$200 per month per person)
- Project must not exceed provided budget
- Project must be completed within given time frame

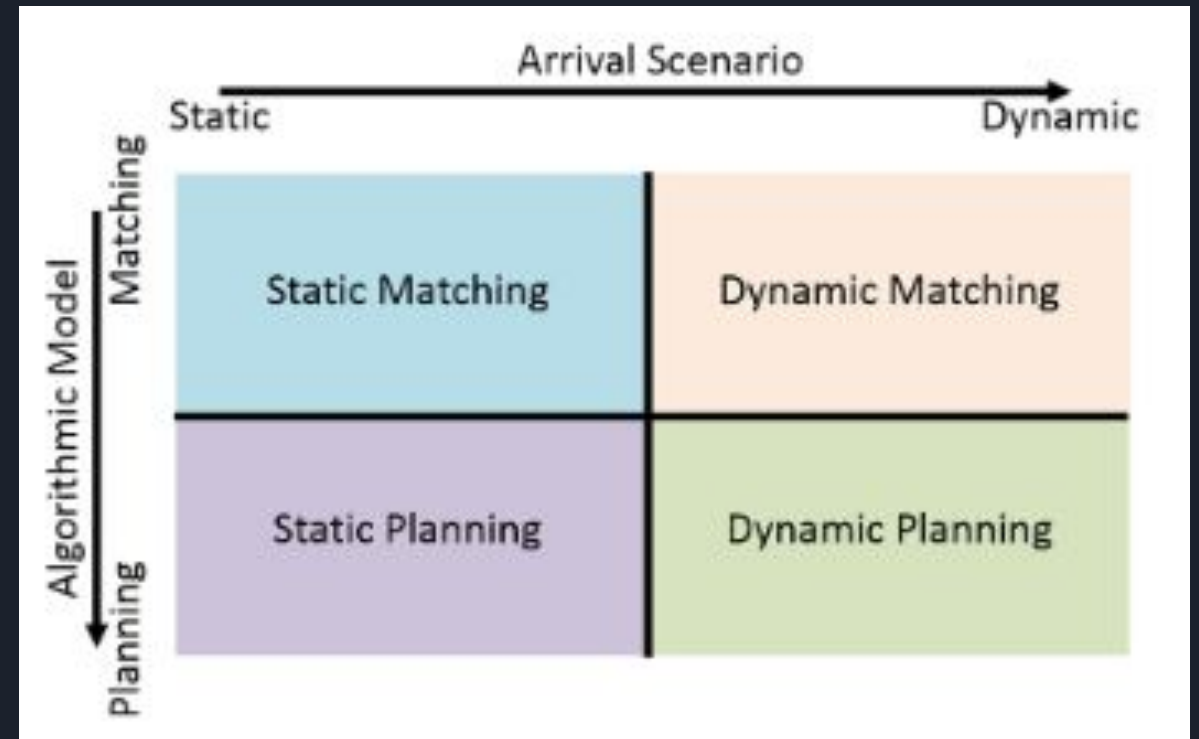
Algorithmic Models/Scenarios

4 types of spatial algorithms

- Static Matching
- Static Planning
- Dynamic Matching
- Dynamic Planning

Current Implementation plan

- Initial: Static Planning
- Final: Dynamic Planning



Current Algorithmic Approaches

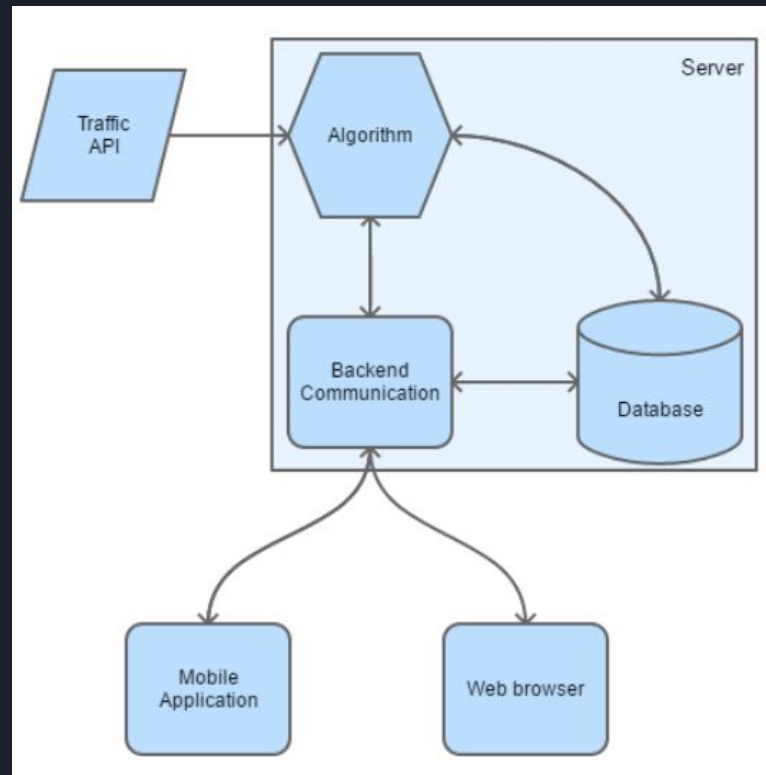
Different algorithms have different...

- Objectives
- Constraints
- Complexity

Method	Objective	Constraints	Time complexity ^a	Analysis model ^b	Ratio
Re-Route [144]	Maximizing total number	Deadline	–	AO	Heuristic
Auction-SC [38]		Deadline	–	–	Heuristic
Fast-Planning [192]	Maximizing total payoff	Deadline	$O(n^3)$	AO	Heuristic
APART [40]		Deadline, budget	–	AO	Heuristic
EPBR [190]		Deadline, range	–	–	Heuristic
PBM [247]		Deadline, budget	$O(n^3)$	–	Heuristic
t-share [158]	Minimizing total travel distance	Deadline	–	–	Heuristic
kinetic [119]		Deadline, budget	–	–	Heuristic
pruneGreedyDP [211]	Minimizing unified cost	Deadline	$O(n^2 + n^2 \log n)$	AO	Heuristic

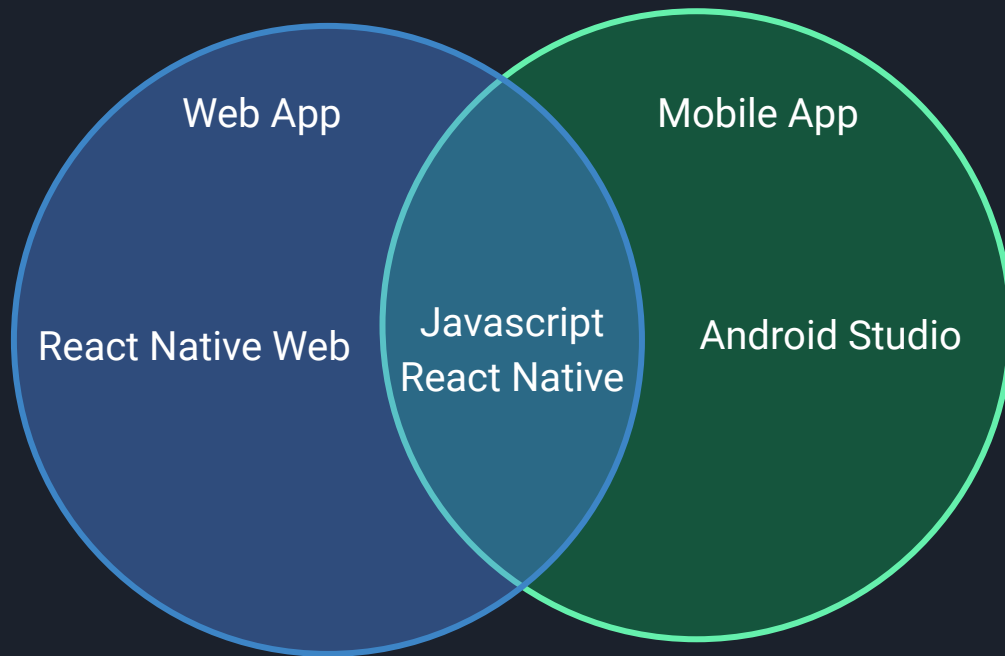
Conceptual Design Diagram

A high level diagram of your design approach



System Architecture

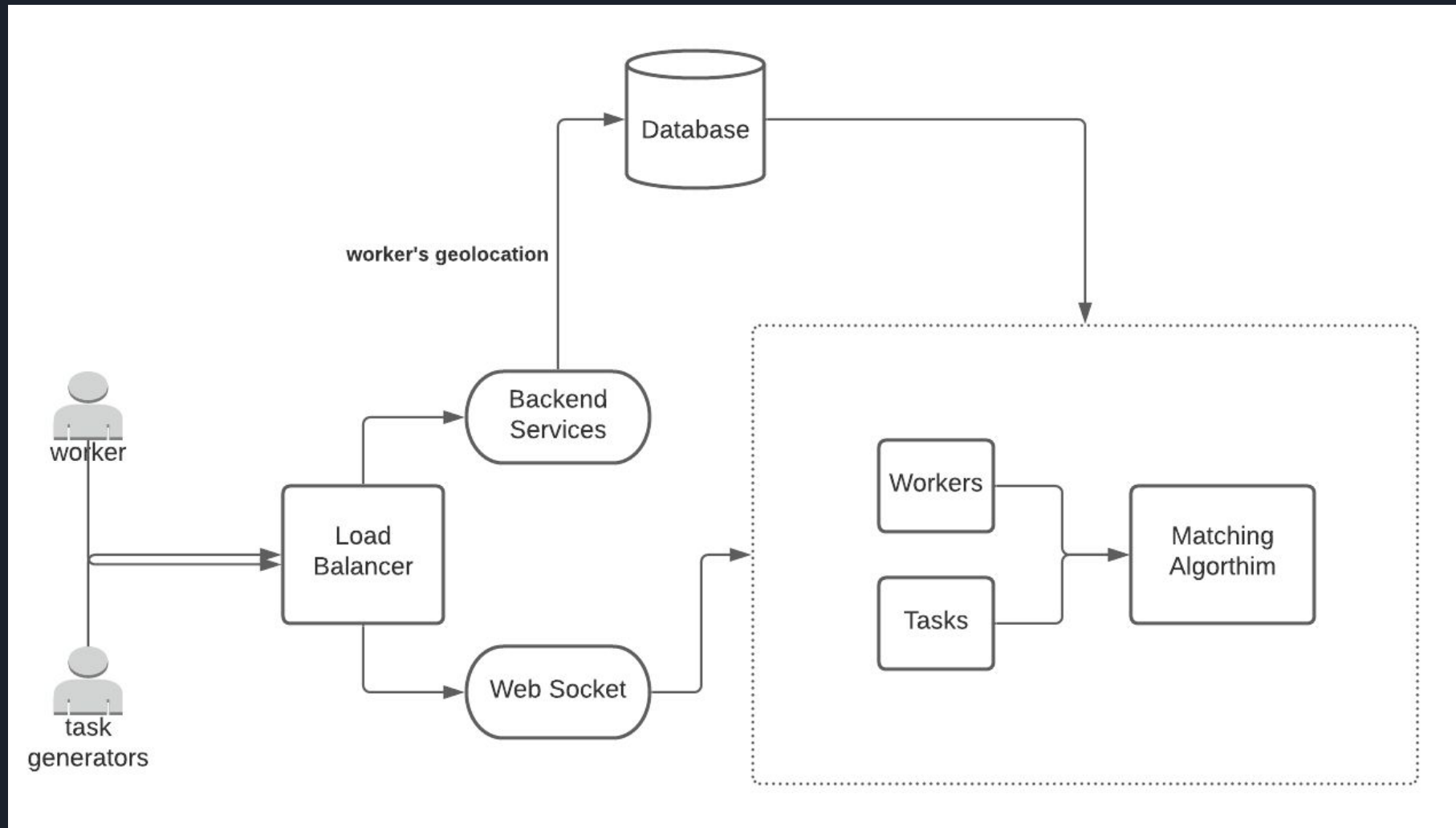
Frontend



Backend

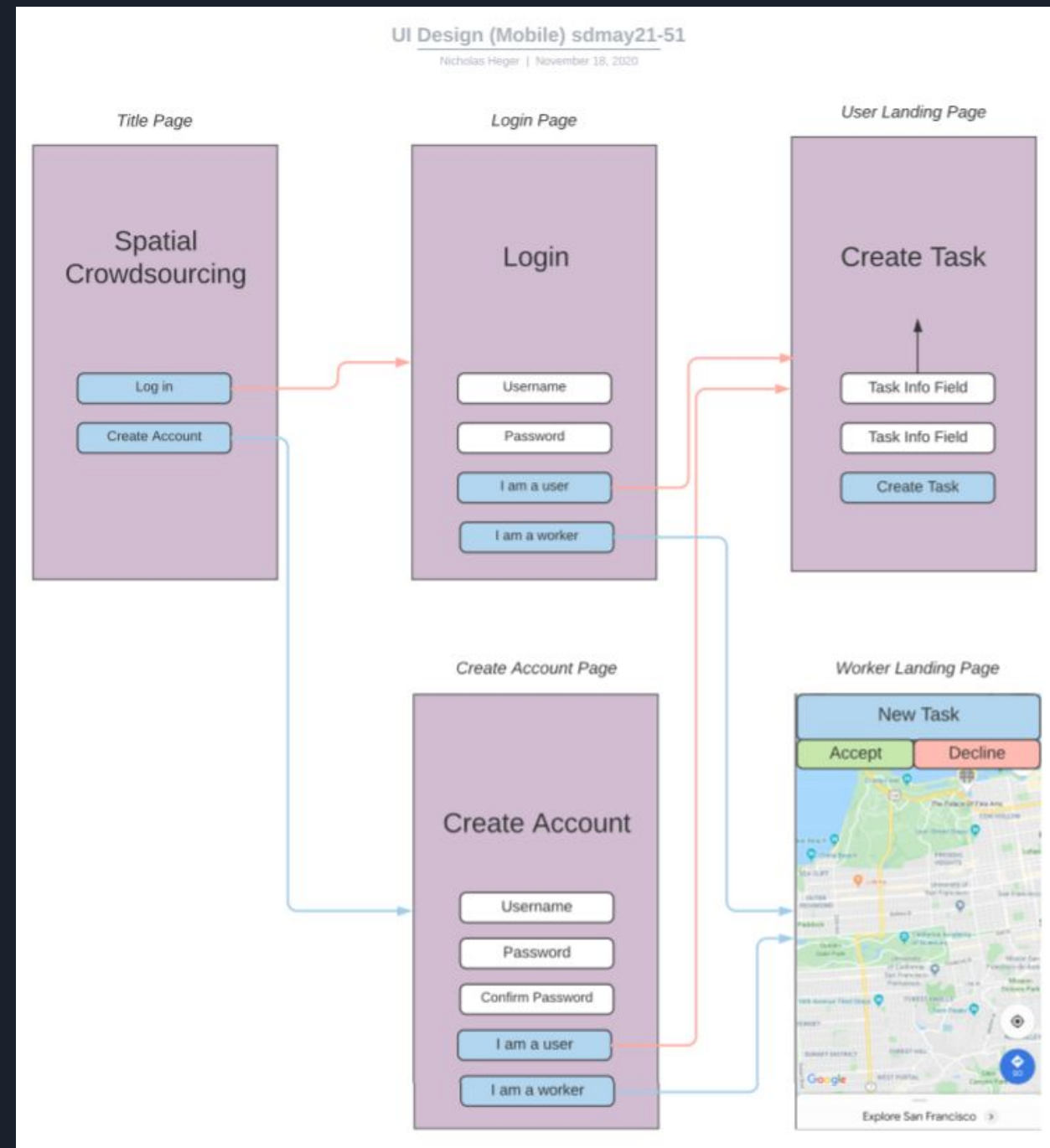
- Server - Spring Boot
- Database - MongoDB or MySQL

System Design - Component Diagram



System Design UI/UX

- Red lines = login/user
- Blue lines = create account/worker
- White boxes = text input
- Blue boxes = buttons

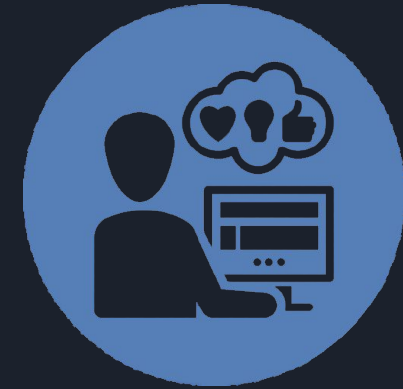
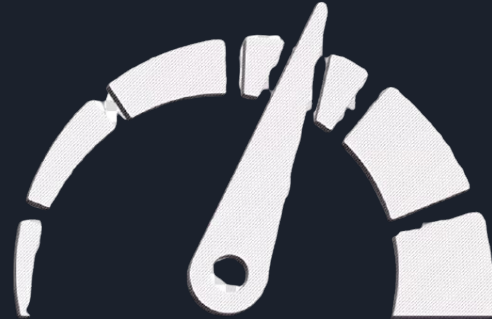


System Design Technologies



Project Plan – Metrics

- Usability



- Speed

- Bugs:

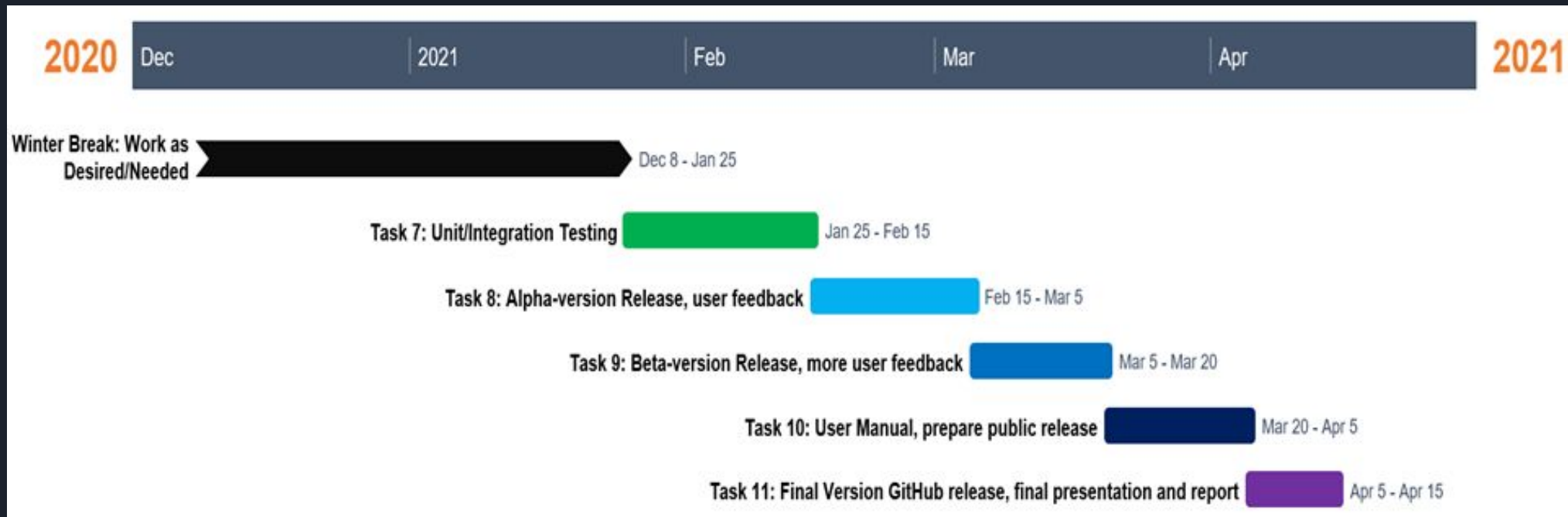


- Algorithmic Efficiency



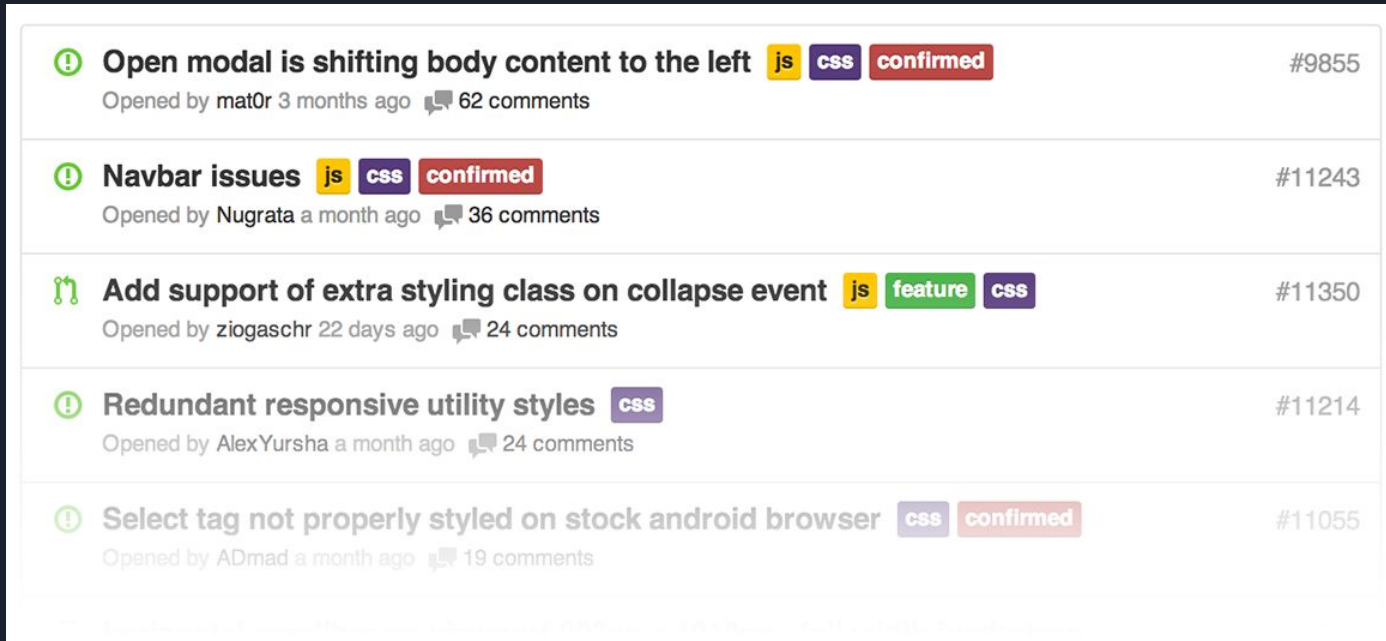
Project Milestones











1. Finalize the role/component assignments and start implementing collaborative modules
2. Complete unit testing; begin integration testing
3. Provide alpha-version for end-user testing; collect feedback
4. Finalize the revisions; release beta-version; run another set of end-user testing of functionalities
5. Finalize the user-manual; prepare for public release
6. Deploy the final version at GitLab; start the final report and presentation preparation

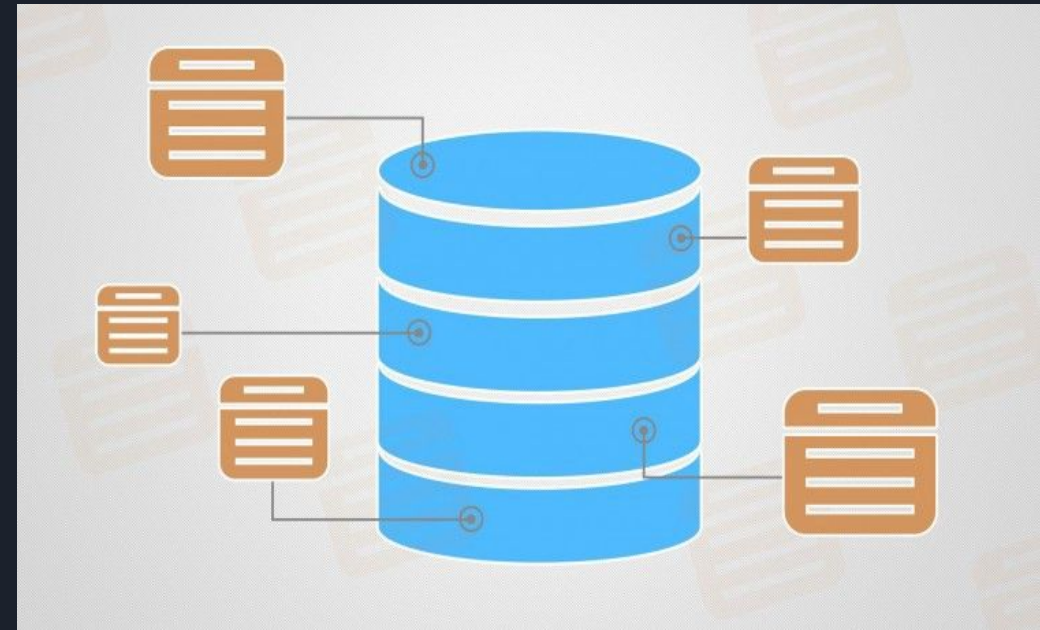


Immediate Next Steps

- Finalize tickets on Trello for each task and begin creating Git Issues for each ticket
- Assign tickets to team members
- Frontend - Begin implementation of skeleton web application to be added onto
- Backend - Design a more in-depth database structure and begin implementation



 Open modal is shifting body content to the left js css confirmed	#9855
Opened by mat0r 3 months ago  62 comments	
 Navbar issues js css confirmed	#11243
Opened by Nugrata a month ago  36 comments	
 Add support of extra styling class on collapse event js feature css	#11350
Opened by zioqaschr 22 days ago  24 comments	
 Redundant responsive utility styles css	#11214
Opened by AlexYursha a month ago  24 comments	
 Select tag not properly styled on stock android browser css confirmed	#11055
Opened by ADmad a month ago  19 comments	



Technical Challenges

- Implementing spatial crowdsourcing algorithm
- Familiarizing frontend team with React / Android development in React
- Familiarizing backend team with MongoDB and Springboot



Thank you!