Convert an Industry-Leading Native App to React Native

sdmay19-02

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Client: Buildertrend

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Introduction

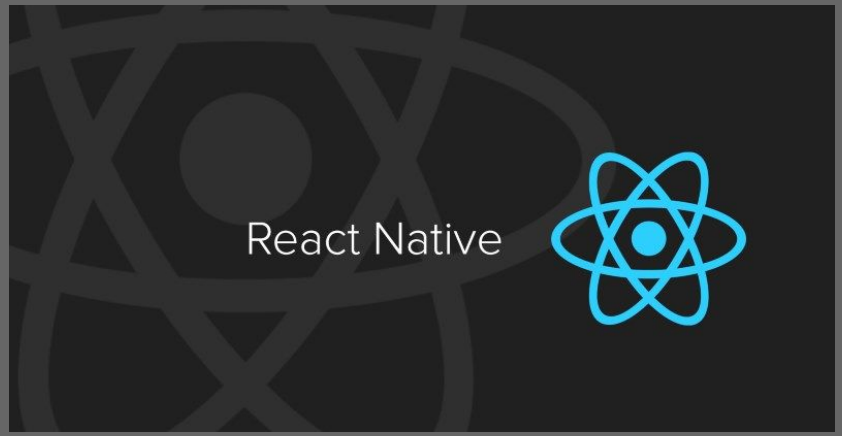
About Our Client

- Buildertrend provides a cloud-based construction management software
- Service includes, web and mobile applications for both Android and iOS
- **#1 Software** for home builders and remodelers

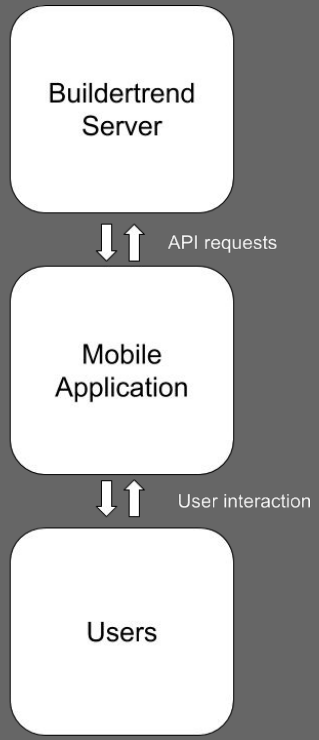
Problem Statement

BUILDERTREND

- Buildertrend currently has development teams for both iOS and Android applications
- Must develop, maintain, and test on both platforms
- React Native eliminates the need for development on two separate platforms



Conceptual Sketch



Requirements

Functional Requirements

- Users must be able to log in and out of their existing accounts
- User must must have access to all layers of project management
- Connect to Buildertrends servers and APIs
- Replicate subsets of project management

Non-Functional Requirements

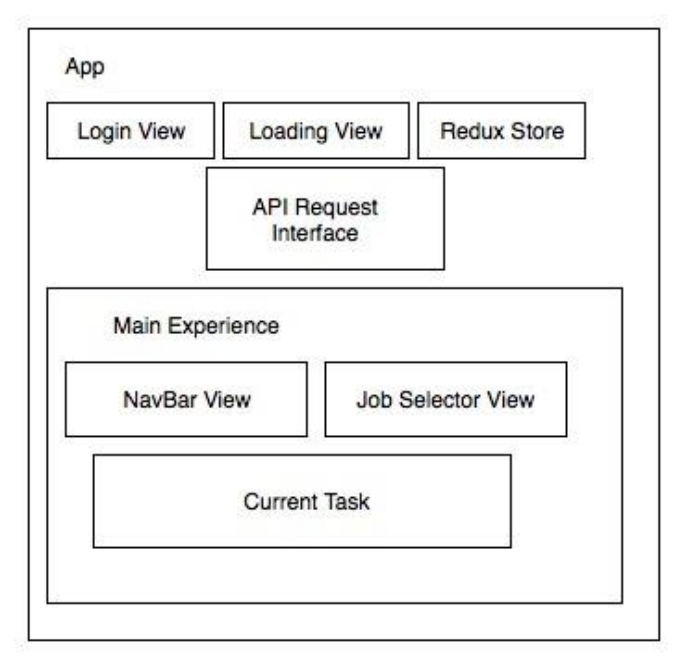
- Consistency - The application must replicate Buildertrend's current application with no major UX differences between platforms
- Usability - The mobile application should be perform similar to native solutions
- Maintainability - Code should be easy to understand for future developers

System Design & Development

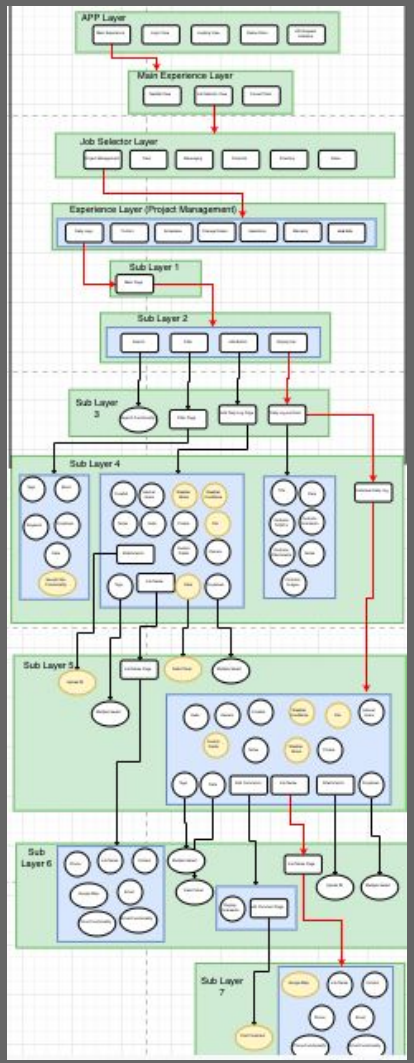
System Constraints

- Required use of React Native Framework
- Functionality needed to replicate Buildertrend’s current app
- Integration with pre-existing technology
- Labor and time

Overview of Design

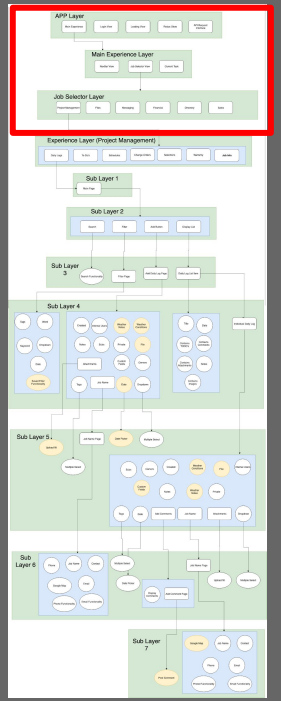


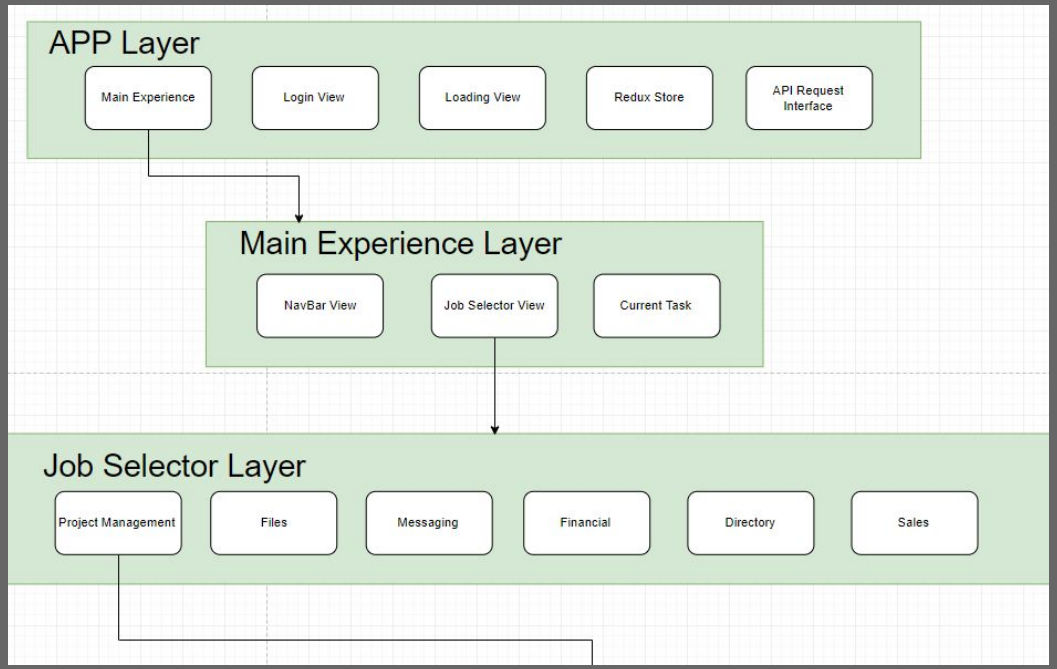
Layered Architecture

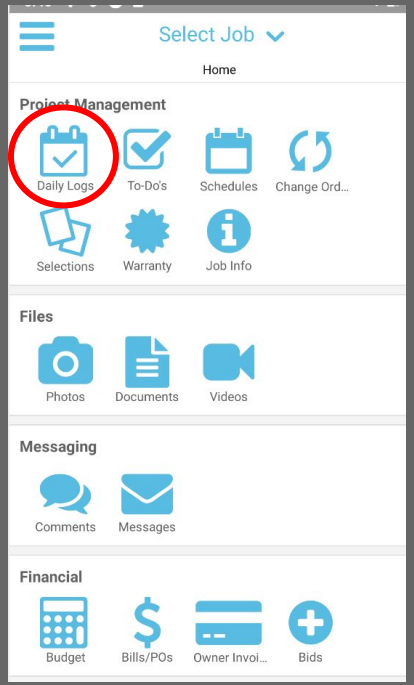


BUILDERTREND

Layered Architecture Cont.





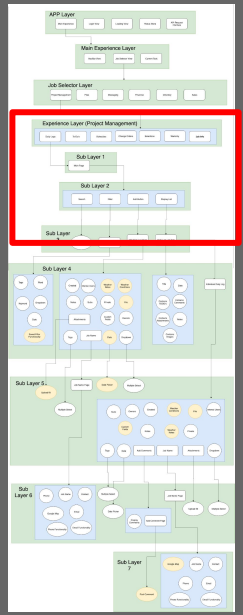


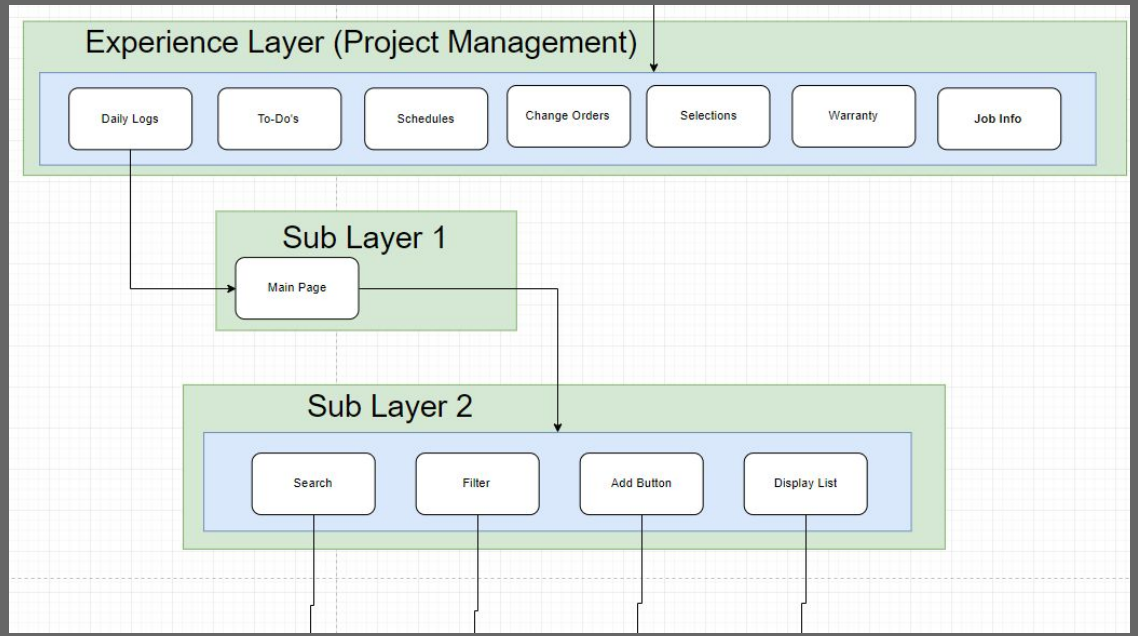
Overview

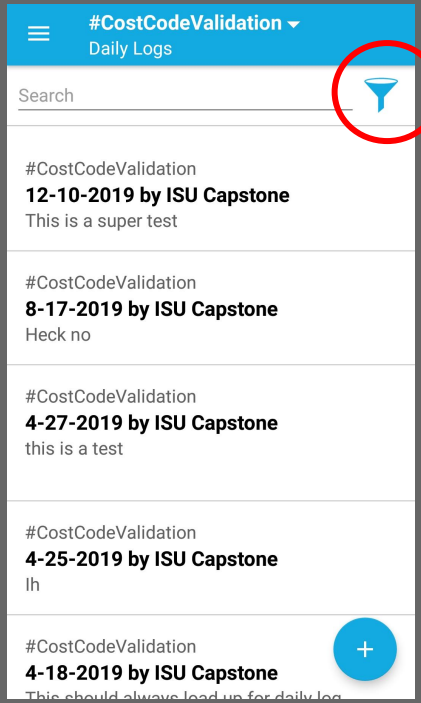
Red box

Screenshot

Layered Architecture Cont.







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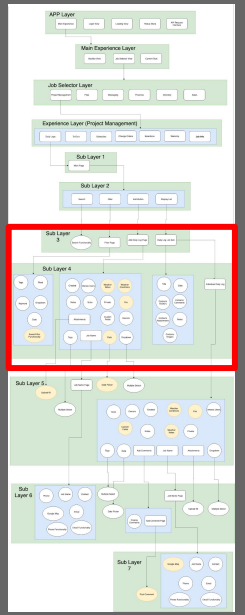

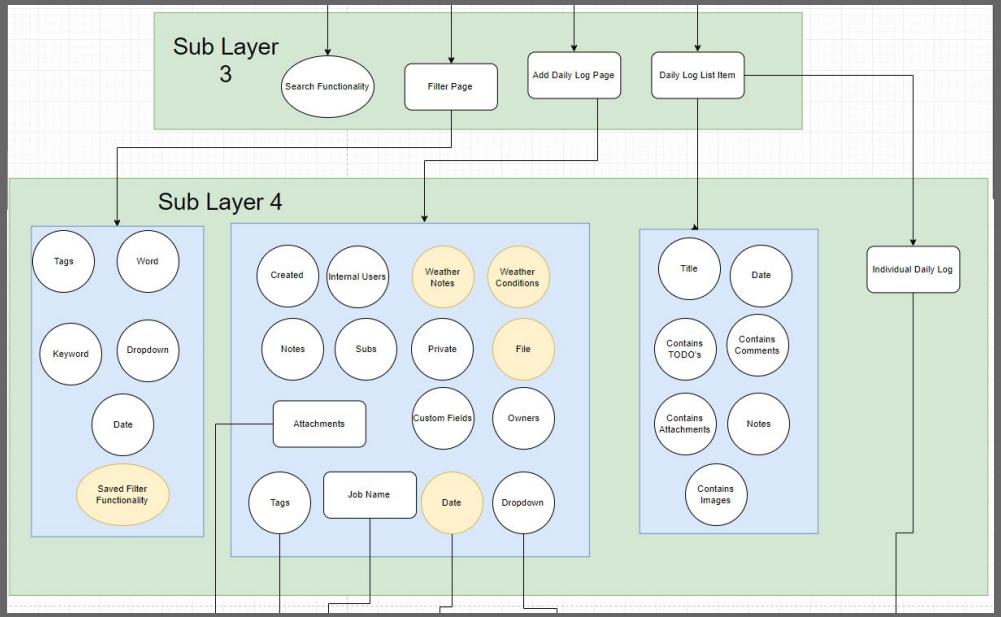

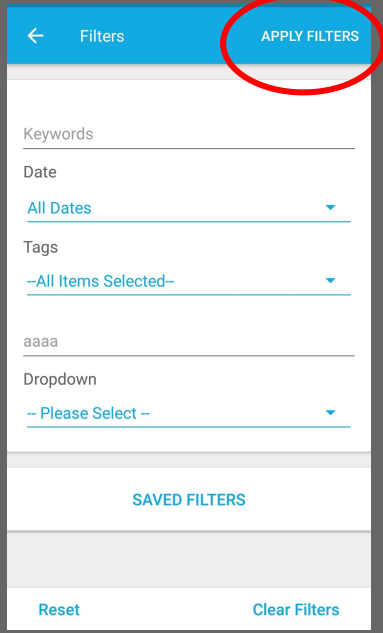

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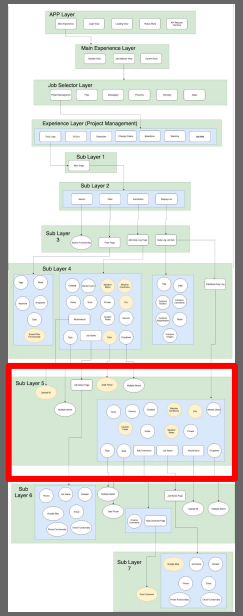

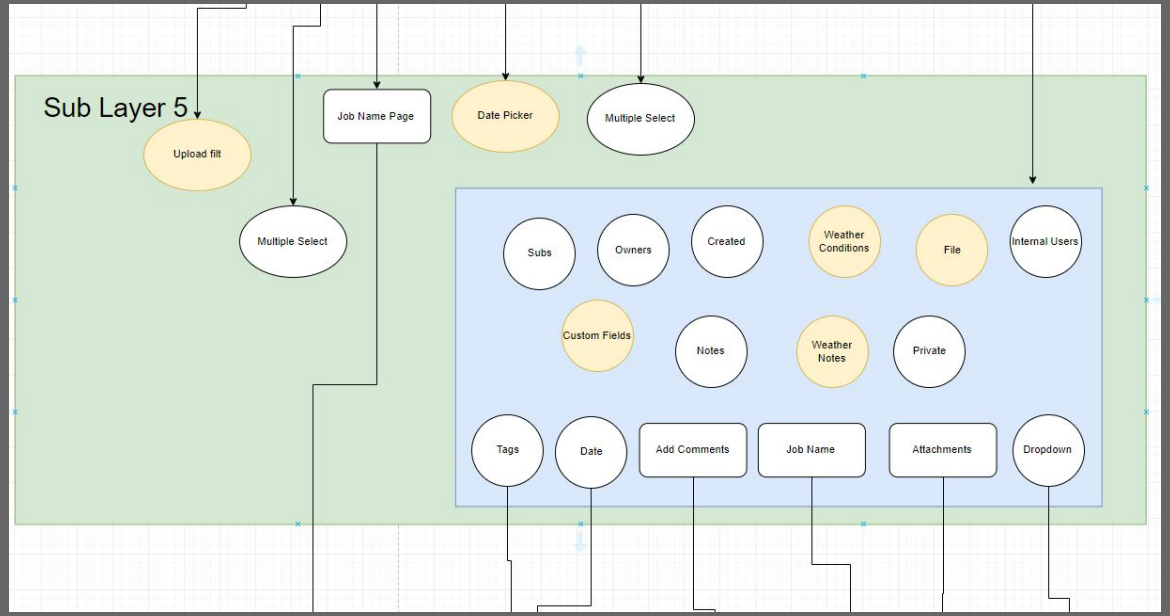

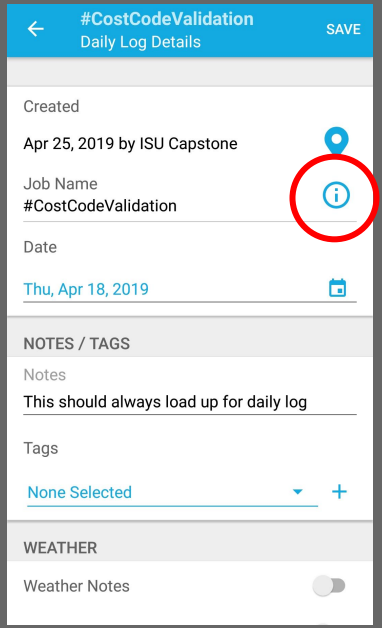

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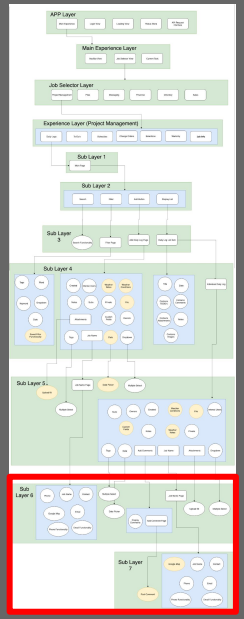

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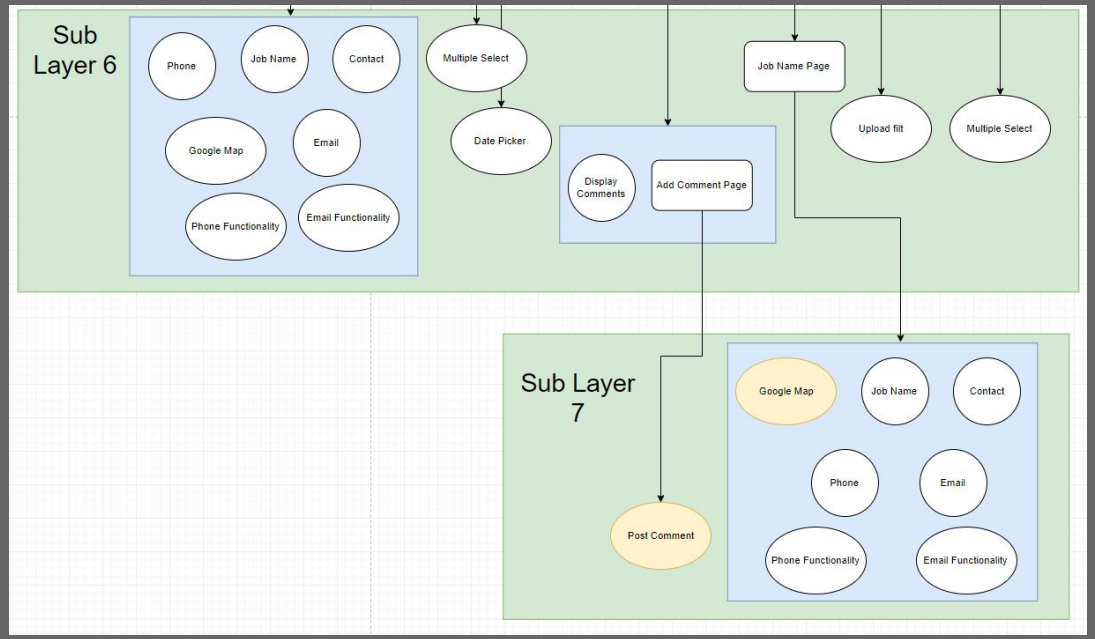

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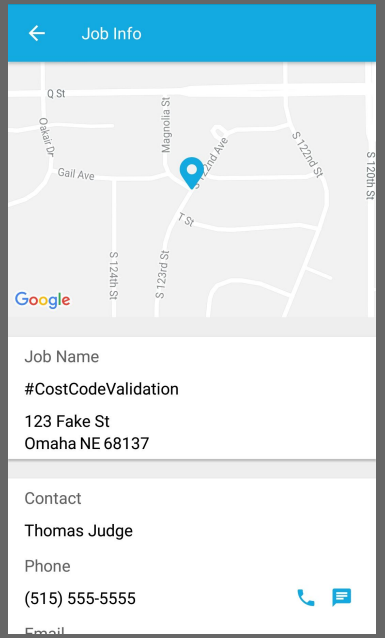


Screenshot

Implementation

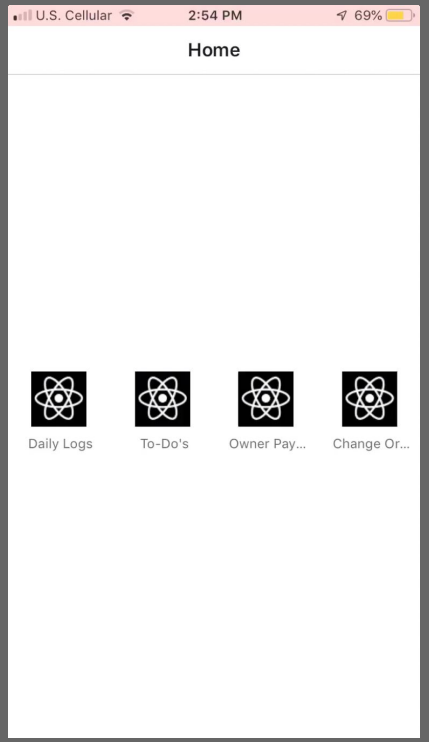
Hardware & Software Platforms

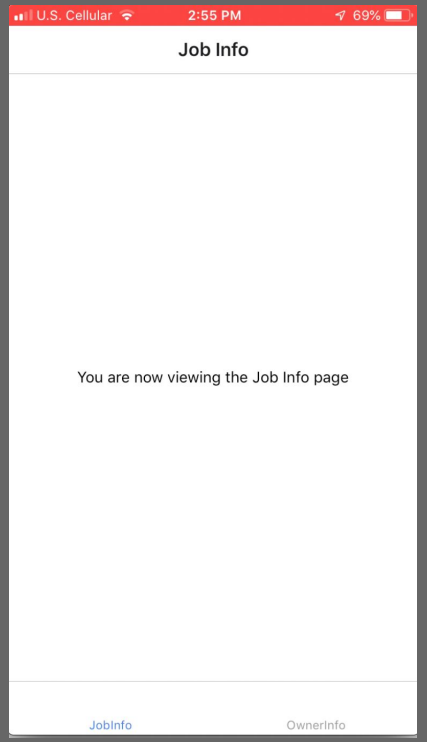
- Hardware: Smart Phones & Macbooks
- Android Studio/XCode: Simulation
- TypeScript
- Jest and React Test Renderer
- Redux
- Gitlab
- TSLint
- Yarn
- Charles
- React Native

Our Approach

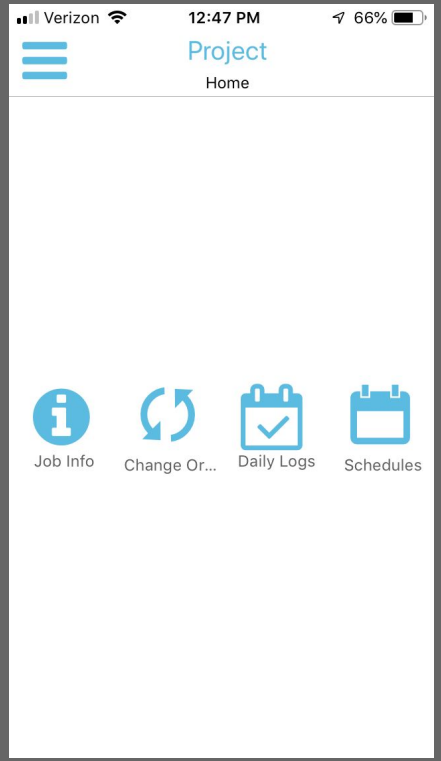
- Break it into three steps:
  - Initial Prototype
  - Structured Prototype
  - Final Prototype

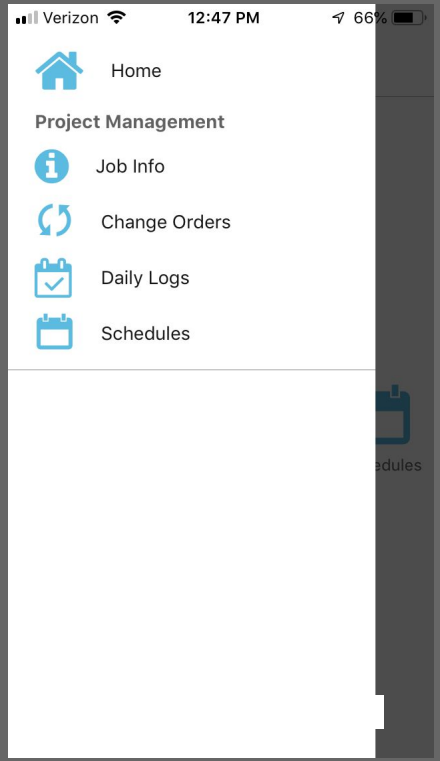
Initial Prototype

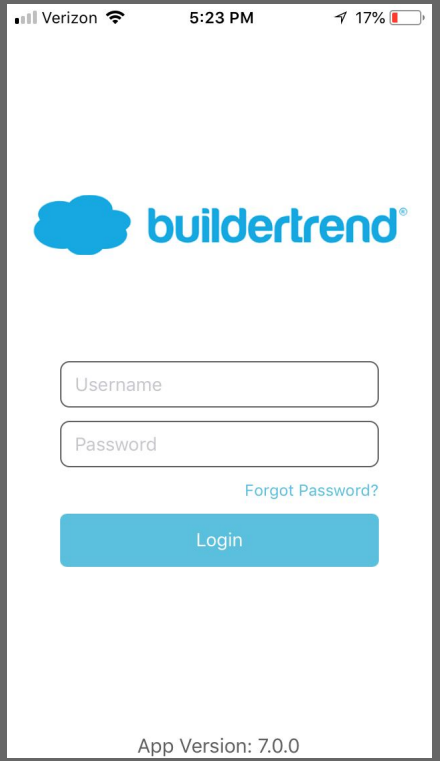




Structured Prototype



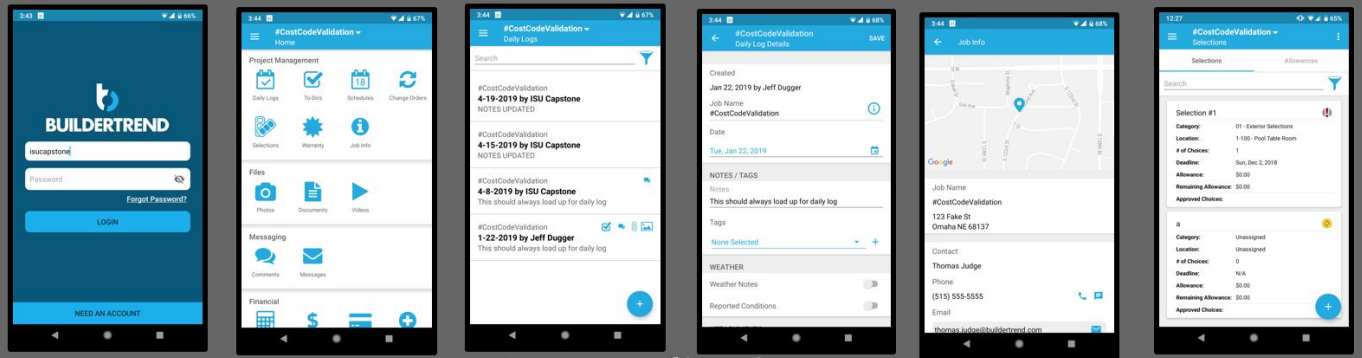




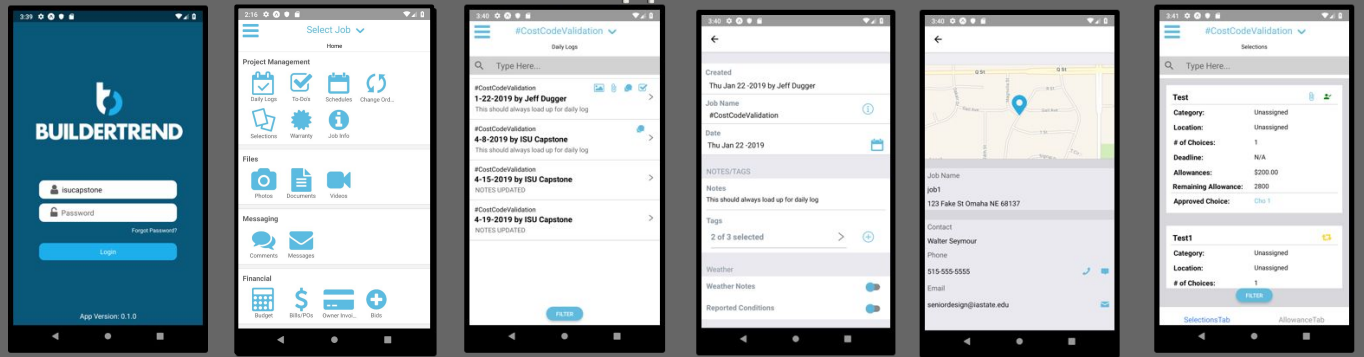
Final Prototype

BUILDERTREND

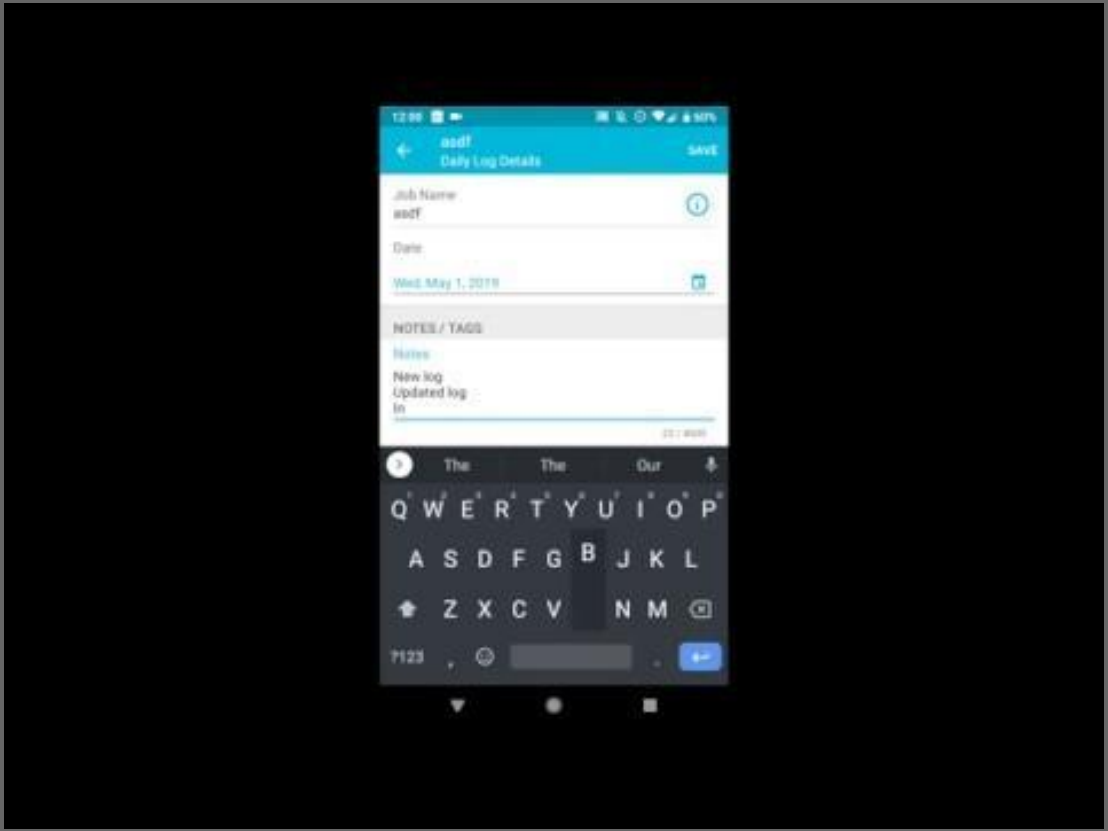
----- ----- Buildertrend's CURRENT Application ----- -----



----- ----- ----- ----- OUR Application ----- ----- ----- -----

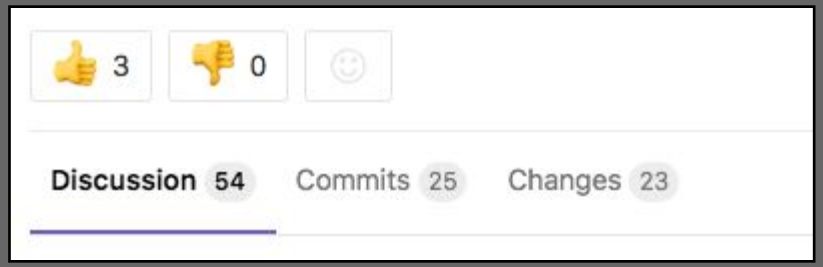


Final Prototype



Best Practices

- Ticket tracking
- Code Reviews
- Code formatting standards



Testing

Test Plan

- Continuous Integration (automated testing)
  - Unit testing (component based)
  - Functional testing (component interactions)
  - Integration Testing
    - Connection to servers
- Manual testing

Software Used

- Jest
  - Testing framework for Typescript
  - Snapshot testing for regression testing
- React Test Renderer
  - Provides a testing environment

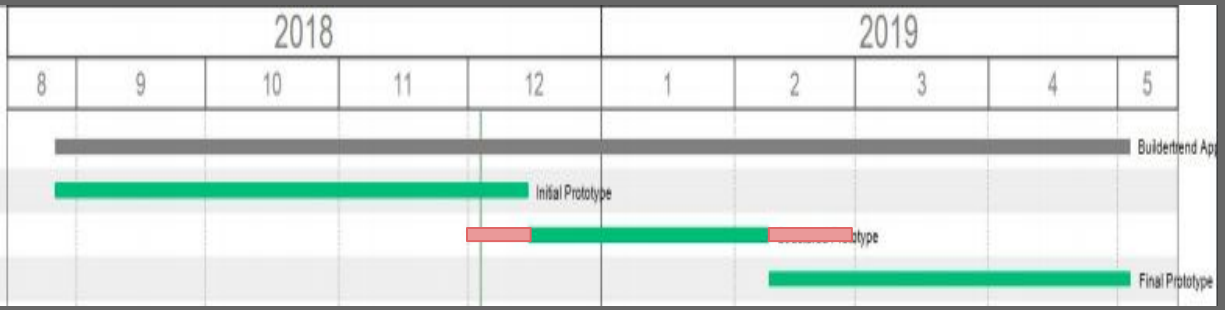
Project & Risk Management

Task Responsibilities

- Frank - Backend Service Coordinator
  - Login/Logout
  - Integration with BT backend
- Victor - Project Designer
  - Architecture Implementation
  - React Navigation
  - Redux Store
- Kyle - Communications Lead
  - Ambassador for Client
  - Arranges meetings
- Mich - UI Developer
  - Implements UI Components
  - UI Styling
- Lucas - UI Developer
  - Implements UI components
  - UI Styling
- Walter - UI Developer
  - Implements UI Components
  - UI Styling

Project Milestones & Schedule

Name	Start	Finish	Duration
Buildertrend App	**27.08.2018**	**03.05.2019**	**250d**
Initial Prototype	27.08.2018	14.12.2018	110d
Structured Prototype	15.12.2018	08.02.2019	56d
Final Prototype	09.02.2019	03.05.2019	84d



- Three prototypes (mentioned earlier)
- Our Prototypes began to blend together
- Structured Prototype took longer than expected

Risks & Mitigation

- Relying on captured HTTP requests **(Anticipated)**
  - Mitigated using Charles and confirmed with our client
- Lacking Understanding of React Native Framework **(Anticipated)**
  - Took time to learn and read documentation
- Large UI changes on an actively developed application **(Actual)**
  - Discussed new expectations with Buildertrend

Lessons Learned

- Meet consistently with all affiliated members of the project
  - Keeps all members up to date
  - Keeps the project on correct track
- Separate platforms are essential for organization
  - Slack/Gitlab for code
  - Groupme for project management
  - Google Applications for important documents

Conclusion

Future Work

- Final code handoff and final meeting this week
- Buildertrend has all of our contact information and we are willing to help clear up any confusion
- Full-time developers at Buildertrend will be taking our existing project and investigate the pros and cons of React Native as a replacement plan

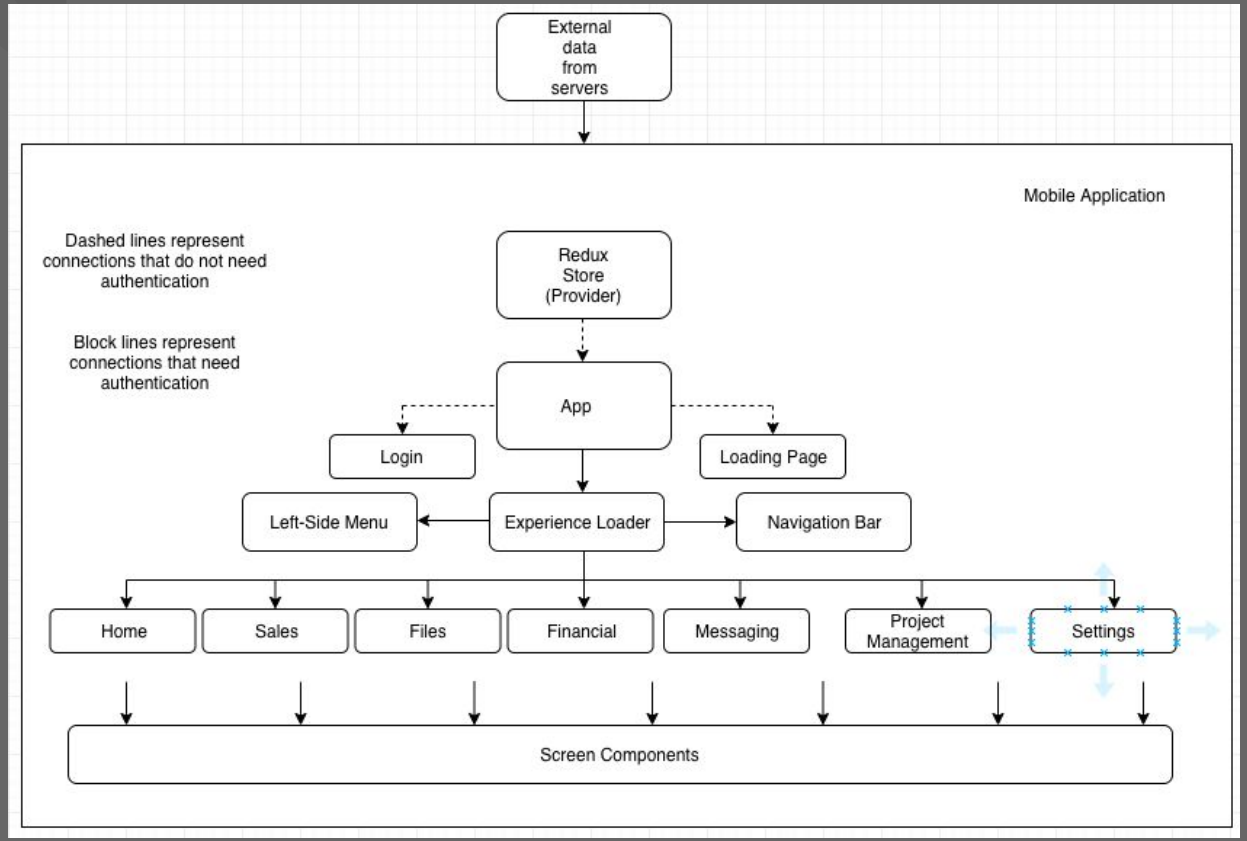
Closing Remarks

- We are really grateful to have had such an amazing team, client, and advisor!
- Thank you to Iowa State for connecting us with a company in the industry!
- Thank you all for coming out to help support the senior design program at ISU!

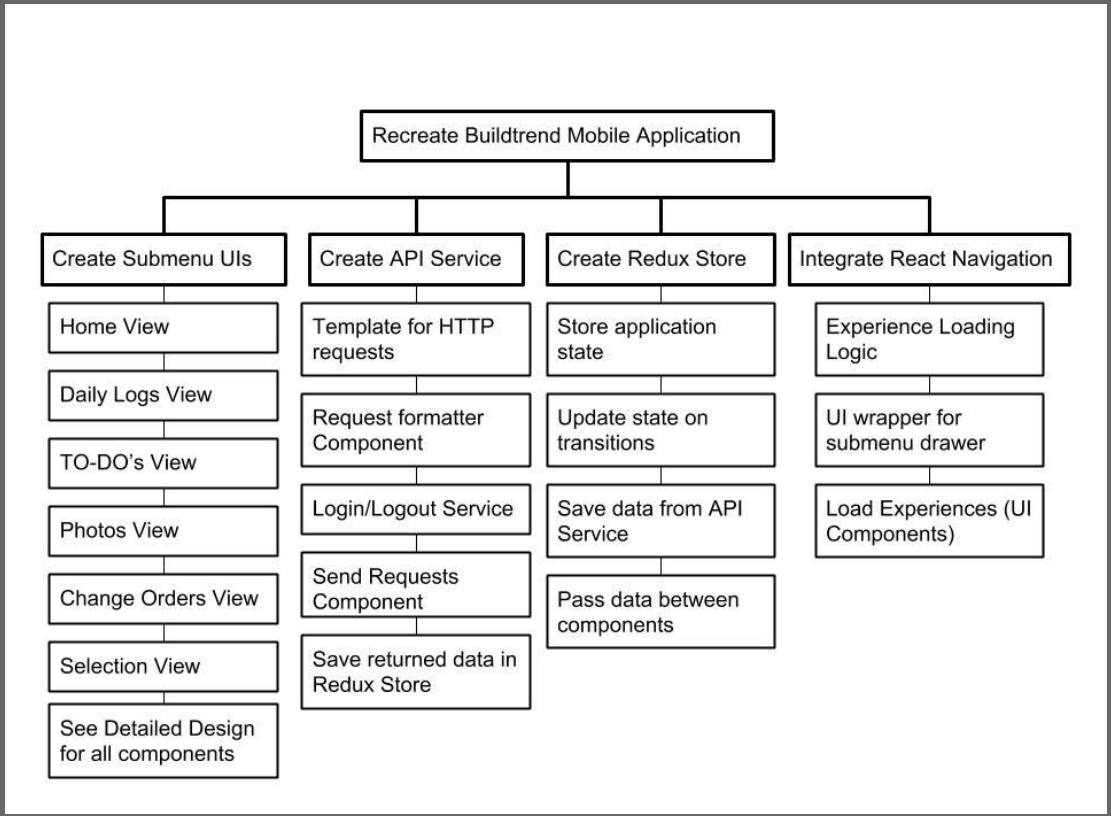
Thank You!

Questions?

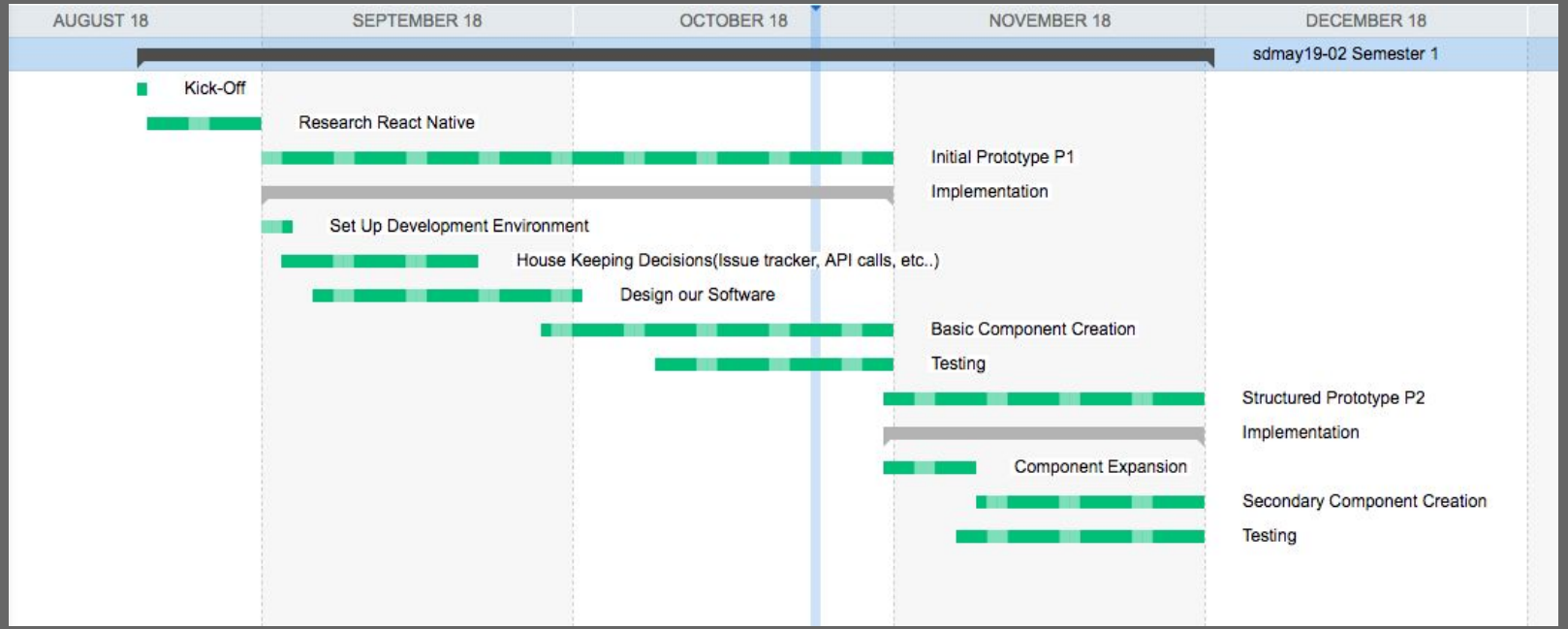
Conceptual Sketch



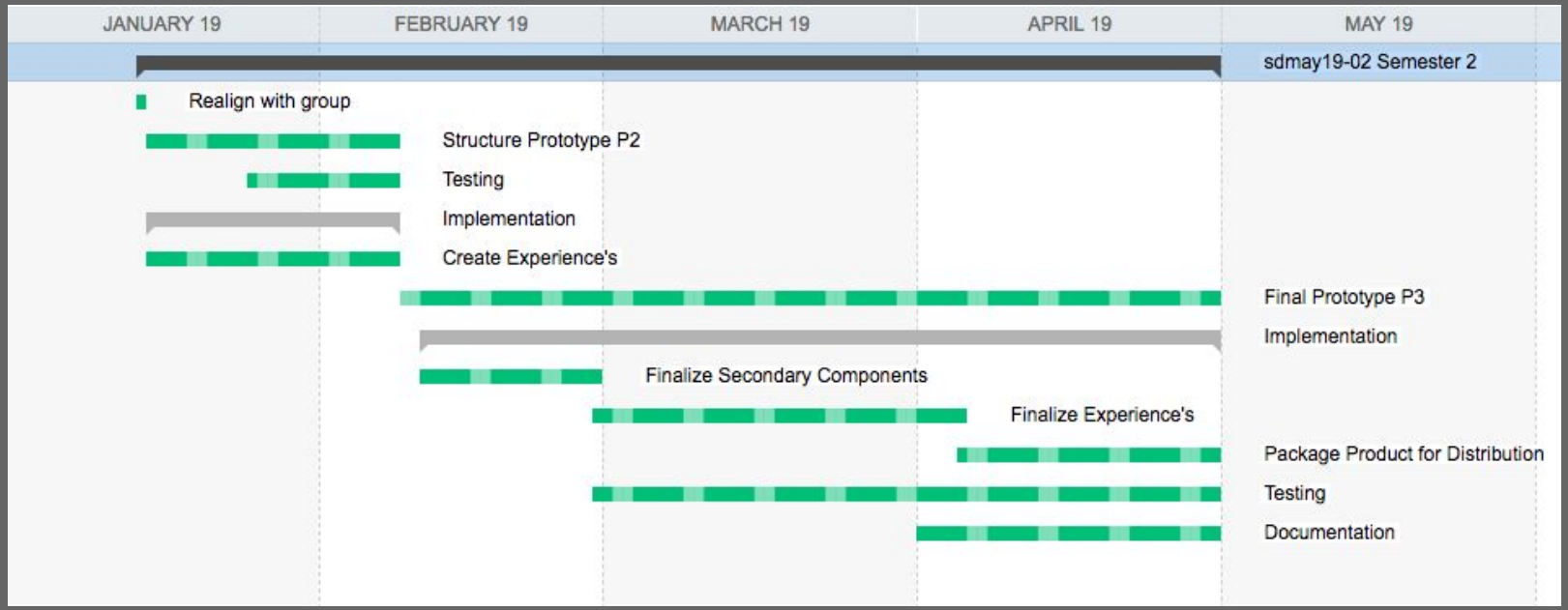
Functional Decomposition



Gantt Chart Semester 1



Gantt Chart Semester 2



Detailed Design