User Interface Design

SmartBus

version 1.4

Delivery: UID 2015 course personnel	Printed: 14.11.2017
256307, Yan Song, song.yan@student.tut.fi 202146, Jarno Pietikäinen, jarno.r.pietikainen@student.tut.fi 211374, Mette Rahunen, mette.rahunen@student.tut.fi Group number: 25	
Document status: ready	Date modified: 14.11.2017

VERSION HISTORY

Version	Date	Authors	Explanation
0.1	14.11.2015	Song	Deleted unnecessary chapters from the old template, added instructions and basic information for chapters 1-5.
0.2	15.11.2015	Rahunen	Modified the document style, overview.
0.3	16.11.2015	Rahunen	Started chapters 2.3 and 2.3.1.
0.4	19.11.2015	Song	Modified the design diary and chapter 2.
0.5	19.11.2015	Pietikäinen	Added content diagram and navigation model, modified chapter 3.
0.6	19.11.2015	Rahunen	Overall style, modified 2.2, 2.1 and 4.
0.7	02.12.2015	Rahunen	Added a reference to context of use.
0.8	09.12.2015	Song	Added screen shots to chapter 7.
0.9	12.12.2015	Pietikäinen	Modified content diagram and navigation model, started chapter 5.
1.0.	12.12.2015	Song	Modified chapter 7.
1.1	12.12.2015	Pietikäinen	Added finished screenshots to chapter 6.
1.2	12.12.2015	Rahunen	Worked on chapter 5.2 and modified chapter 5.3.
1.3	12.12.2015	Rahunen	Worked on chapters 5.1., 7 and 8.
1.4	14.12.2015	Song, Pietikäinen, Rahunen	Finished all chapters and the document layout.

TABLE OF CONTENTS

1. INTRODUCTION

This document is used in User Interface Design course as an exercise assignment. In this document, we will introduce Tampere Smart Buses Project, **SmartBus**. We will present **UI** design plan and initial **GUI** design prototype.

1.1 Overview

SmartBus is an application for mobile phones and it is used to search routes, search timetables and to pay for tickets. Also it offers a way to check information about sightseeing locations and other useful information on your bus route. Main goal of this application is to offer new services to travelers and enhance the **user** experience in bus travel.

In this document we first introduce definitions and terms then we list our references. After that we go through our users, context of use and value proposition. The next chapter issues hardware and then we introduce our content diagram and navigation model. Lastly we have our design diary and appendixes with pictures of the user interface.

1.2 Definitions and terms

In table 1 we have explained terms used in this document.

Table 1. Terms.

GUI	Graphical User Interface
OS	Operating System
SmartBus	Name of the application
UI	User Interface
User	Him/Her who uses application

2. USERS AND CONTEXT

2.1 Context of Use

All different contexts of use are presented in the following tables, from table 2 to table 6. All contexts are references from [1].

Table 2. Physical context.

Physical context	Spatial Location	Functional place and space	Movement and mobility
	in Tampere (later other cities too)	place where internet is offered or possible to connect with mobile connection	Users can move everywhere in Tampere (mobile phones have no limitations on mobility)
	public places		
	in the bus		

Table 3. Technical and informational context.

Technical and informational context	Networking connection	OS
	application needs access to internet and user's position	no need to store personal information or contacts

Table 4. Social context.

Social context	
	only Tampere in the beginning, cultural background and localization related to Tampere and Finland
	languages Finnish and English

Table 5. Temporal context.

Temporal context	**Duration**	**Date**
	depending on the situation so could vary from 1 minute to 30 minutes	day/month/year 24-hour clock

Table 6. Task context.

Task context	User goals	Interruptions	Task type
	Search a certain route: users could enter places (departure and arrival) then search for routes	No internet connection: services will be interrupted, users can still see their route search results if it is open when internet connection is lost	Query task: users search routes and timetables
	Search bus timetable: users could search bus services by bus number or stop name and they get information about them		Shared task: users share position or routes
	Pay for tickets: users can pay tickets and check their purchase history		Pay-for task: users can buy tickets
	Share positions and routes: users can share positions or routes		

2.2 Tasks

In table 7 we describe the main task users perform with the system.

Table 7. Main tasks.

Search routes	Users need to type departure address and destination address into search fields, then click search button. With this task user can see the route between two places.
Search timetables	Users need to type in the name of a bus stop or the line number then click search. Users need to choose an option from suggestions or the exact bus stop or line number. User wants to search timetables for a specific bus stop or bus line.
Pay for tickets	Users need to scan the code on the bus and click to pay for tickets. Users can also pay a ticket that is valid for a certain time. User wants to pay for tickets with mobile payment or user wants a faster, more enjoyable, easier way to pay for tickets even beforehand.
Share position and routes	Users need to open the share screen and click share-button in order to share their position and/or route. User wants to share his/her position or route to friends with one simple click. This way users can also comment locations and routes to others through social media.

2.3 Users

SmartBus has different user groups. Frequent or random travelers can use it but also bus drivers or non-travelers can use it. Our main group

are frequent or random travelers so SmartBus and the features are designed to meet their needs.

2.3.1 Frequent or random travelers

Frequent or random travelers use SmartBus from a range of every other month to daily. Some might use SmartBus daily but some more random travelers only a few times a year. This is why we need to make the application easy to use and understand. We cannot lose random users because the application is too hard to use or understand. Skill level of travelers can vary but we can assume our users know how to use smart phones and do recognize basic logos and structures.

Our users could have disabilities meaning we need to make sure you can use the application with just one hand if needed. SmartBus is easy to use so no extra skills are needed. Travelers who know how to use smart phones can use SmartBus without learning new skills.

2.4 Value Proposition of SmartBus

SmartBus is a traveler's choice for easier, more convenient bus travel with all necessary features to make your trip more enjoyable and fun. Users will should choose SmartBus because of following reasons

1. Convenient

   Users can search routes and bus timetables through only one application.

2. Pay for tickets

   Users can pay for tickets without a bus card, everyone will take their mobile phones with them, but sometimes they forget their bus cards. Paying via mobile phones makes payment much easier.

3. Suggestions of routes

   Users can share their routes and add comments, then travelers can gain more information and make a better traveling plan.

Users can find everything they need for fast and easy bus travelling through SmartBus-application. It offers location based route finding to anywhere inside the city by just simply selecting destination from "Find route" option in application. Also our application offers social aspects and travelling users can comment and share info about their routes and travels to Facebook, Twitter or any other social media application. User can also read comments written by other users about specific lines and

bus stops through application. Users can also buy tickets before the trip which allows faster travelling on bus and that allows users to plan their travels beforehand. Also our application is very user friendly since it remembers users actions like searches, ticket purchases etc. Application is designed to be used every day and anywhere. Most needed functions are easy to access and use. No need to shuffle through many different views and menus to get simple bus timetable or stop specific timetable. Color scheme on application is also designed to be clear and calm for eyes to use, even for long periods of time. Our value proposition is: SmartBus - the only application that lets you to search, find and pay for your bus travel on the go.

3. HARDWARE

Any size smartphone or tablet with touch screen is sufficient for using this application. Device should have a camera for some built-in features like paying for tickets. Application communicates with user by touch and seeing. Touch is used by vibrating device when user makes selection in UI. Seeing is shown by highlighting the UI element user pressed or touched. Information is inputted to device by onscreen keyboard. It outputs data to text field element user has selected. Inputs are 1) users type to text fields 2) users click buttons. Output is that results will be displayed on the screen. In picture 1 we have few smartphones showcased that users could use.

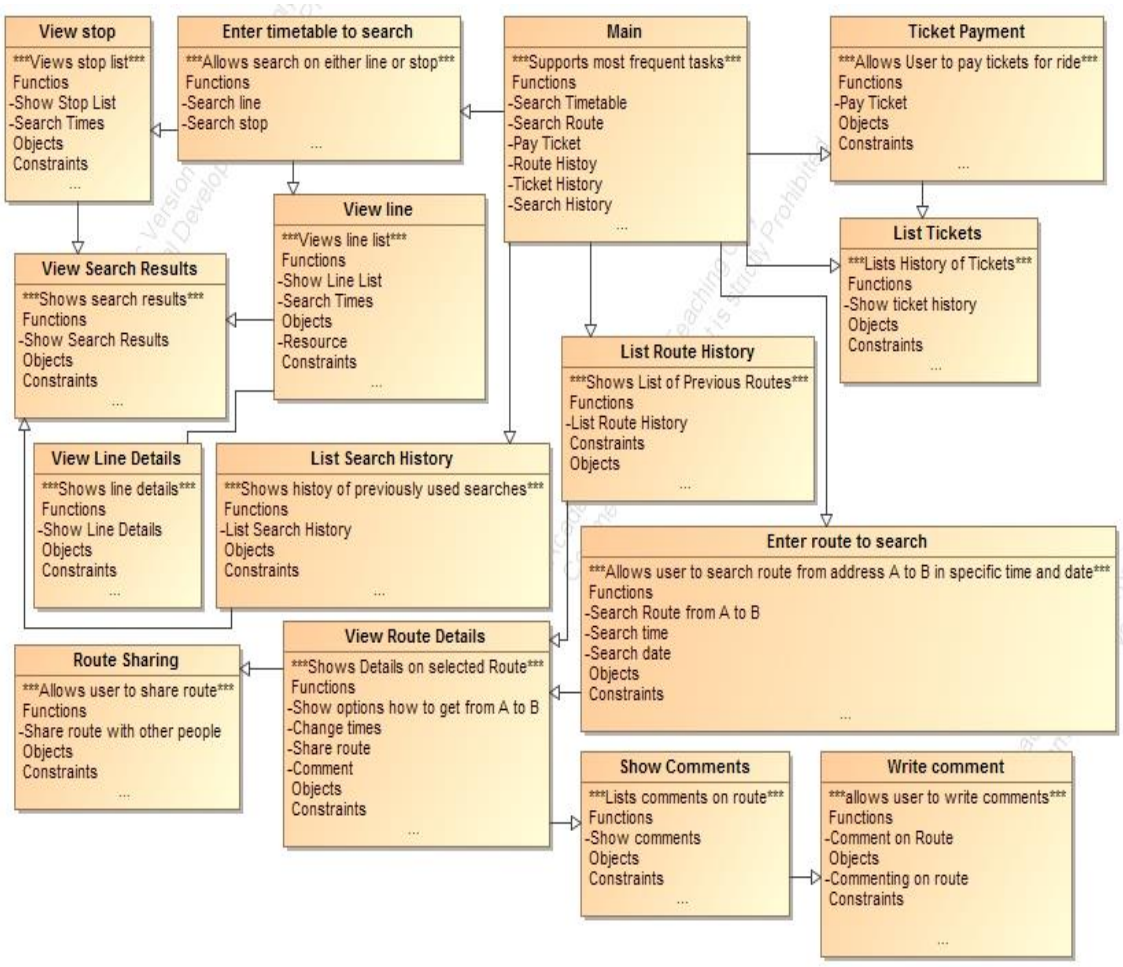
Picture 1: Smartphones with touch screens.

In SmartBus application the user needs to use tap, drag and pinch (multi-touch) while operating the system. We decided that the user does not need to use double tap or flick because all necessary features are accessed with tap, drag and pinch but also because we do not want too many different touch options. The user can either use pen or a finger. The onscreen keyboard makes it possible to use both options.

4. CONTENT DIAGRAM AND NAVIGATION MODEL

4.1 Content Diagram

In picture 2 we have our content diagram that represents the structure of the user interface.

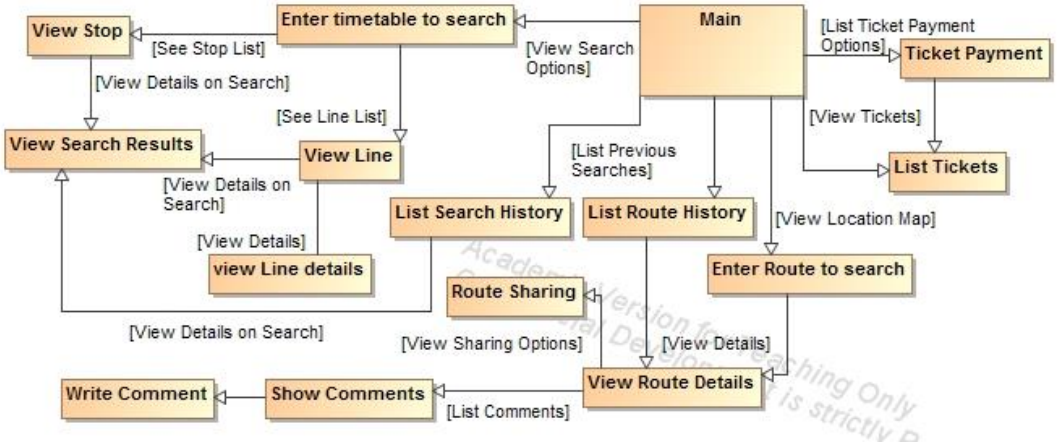


Picture 2: Content diagram.

Content diagram explains name, purpose, functions, objects and constrains for each container [2]. Main container supports most frequent or most used tasks the user needs the most. From Main you have options for Ticket Payment, List Tickets, Enter route to search, Enter timetable to search and List Search History.

4.2 Navigation Model

In picture 3 we have our navigation model that visualizes the user's movement between different states and parts of the system.



Picture 3: Navigation model.

In navigation model you can visually see which link leads to which page. Lines in the picture present user's selection and where they end up if they make a selection.

5. IMPRESSION DESIGN

5.1 Mood Board

In picture 4 is our mood board. It reflects the visual identity and mood of the design. It has our color palette, fonts and pictures of all the functionalities what the application does for example payment, trip search and timetables.

Picture 4: Mood board.

5.2 Color Design

Color scheme we used in our SmartBus application is TuT standard. Application uses 4 different colors which all are easy for eyes and do not stress user, which allows longer usage of program. We also chose two colors of blue tone since TKL uses white and blue in their busses.

Ten Commandments of color are taken into consideration in our color design. We have a maximum of 5(+-2) colors since we have 4 colors. We have green color for center and visual fields and two shades of blue color to use for backgrounds and borders. We also used familiar and consistent color coding meaning we took into consideration both TuT standard and TKL blue.

Our final color design is based on our mood board. We already thought about good design while creating our mood board so we really did not need to change the colors later.

5.3 Icon Design

Icons we used in our design are commonly known for their purpose and what they do for example "sharing icon", "nfc icon" and "QR code icon". For other parts we designed icons to represent the function they are used for. That way user can easily adept to meaning of that icon. Examples of those icons are commonly used picture for a calendar and a picture of a car.

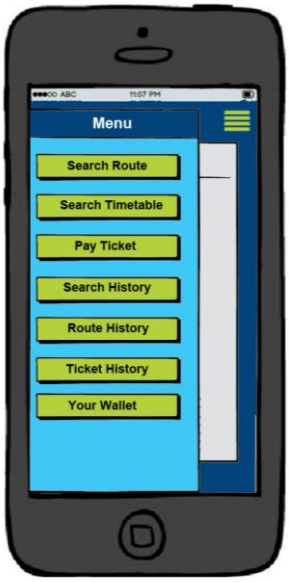
We have only symbol images as icons. We decided not to use text so that it fits to the limited space of a mobile phone screen. Because of the fact that we did not use text we made sure all our icons are recognizable, clear, informative and memorable.

5.4 Design patterns

We didn’t really use any specific design patterns in our design. We designed our GUI based on our own preferences and how we would like to have it in software for easy use and fast learning. Most of the design ideas are taken from already existing applications which we found nice, easy and understandable. If needed to specify some patterns then maybe one of them is the how menu is structured, how our popup-windows are shown and the top bar of program which is shown in all views and parts of application. Those patterns are taken from personal preferences of each of our group members.

6. SCREENSHOTS

In pictures 5 and 6 we have our polished visual design. We have used our color design in them and they also have some icons visible.



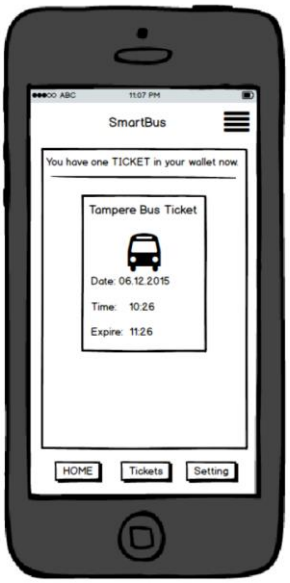
Picture 5: Menu view with polished visual design.

Picture 6: Share route view with polished visual design.

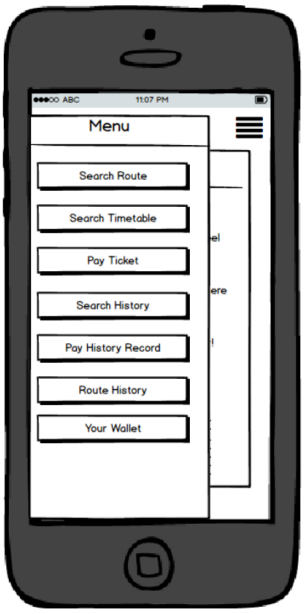
7. PROTOTYPE

In this chapter we introduce our prototype. Our prototyping was a two phased project. First we made rough sketches with pen and paper to see how it would look like. Pictures from these can be found in appendix 1 and 2. Second part we tested different prototyping tools and selected Balsamiq as our tool, because it was easy, fast and suited our purposes. We did our last and final prototype with Balsamiq. It contains all functions of our application and it is interactive. There were some problems when we needed to figure out how to make screen transactions and what screen to show when user starts the application and what to do when user does not provide correct date and time.

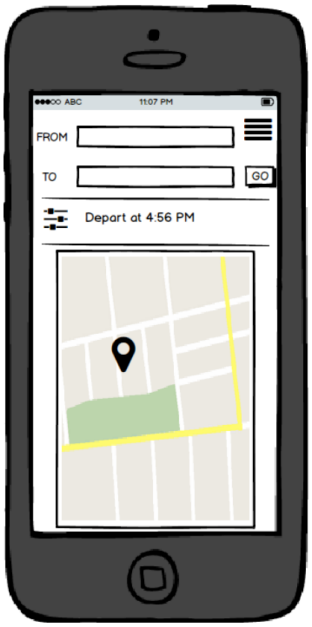
Picture 7: Front page if no tickets are valid.



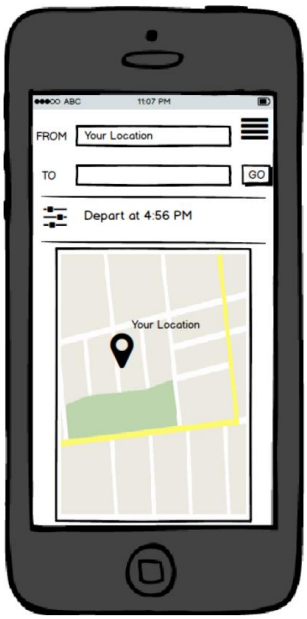
Picture 8: Front page if tickets are valid.



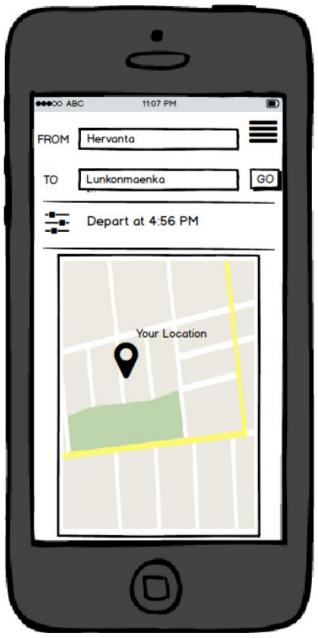
Picture 9: Menu view.



Picture 10: Route search-page.



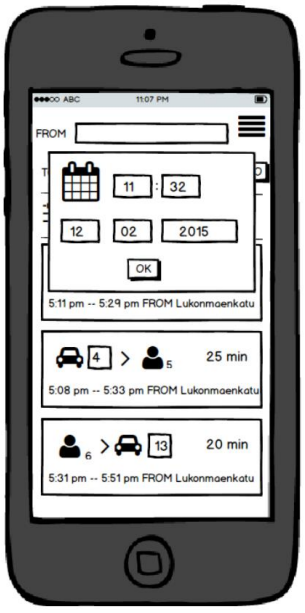
Picture 11: Route search-page with current location.



Picture 12: Route search-page with both from and to locations.

Picture 13: Route search-page with date selection.

Picture 14: Found routes-view.



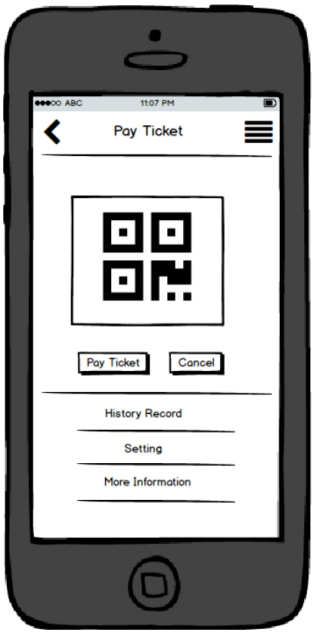
Picture 15: Change date/time on found routes page.

Picture 16: View of one option for route.

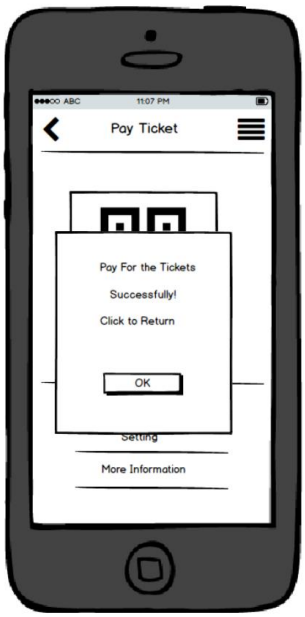
Picture 17: View comments page in Route Info.

Picture 18: Share route on Route Info-page.

Picture 19: Pay ticket page.

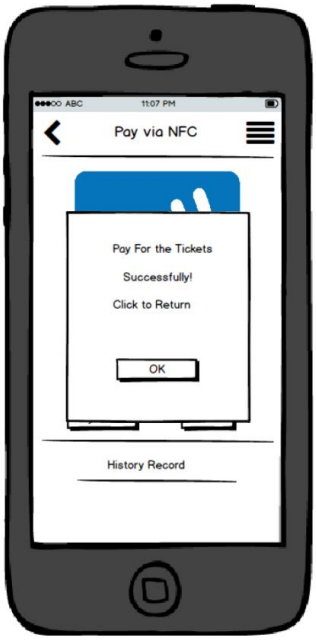


Picture 20: Pay ticket with scan code-page.

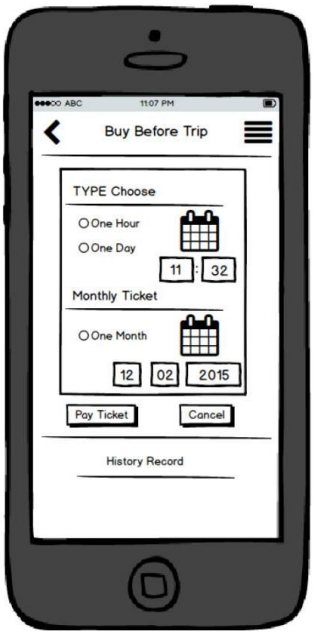


Picture 21: Pay ticket with scan code was success-page.

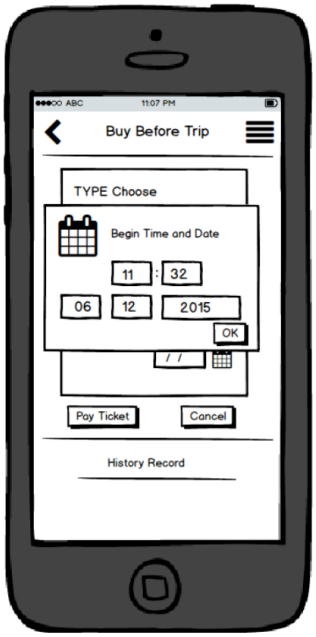
Picture 22: Pay ticket with NFC-page.



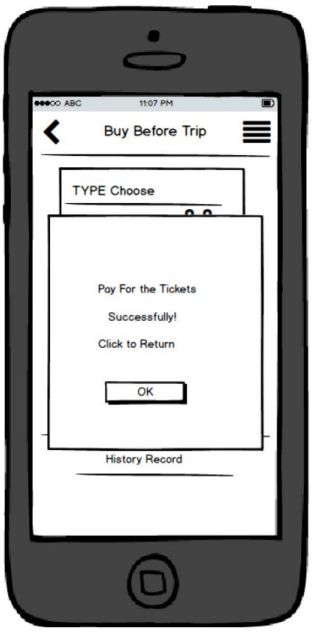
Picture 23: Pay ticket with NFC successful-page.



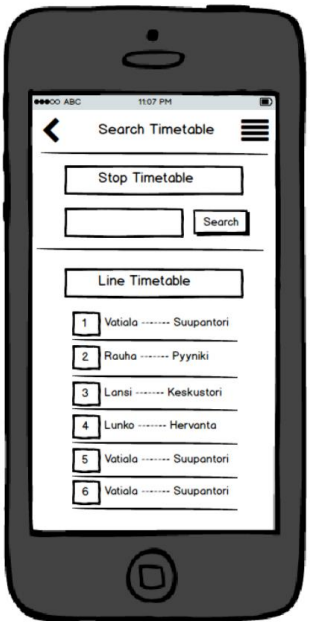
Picture 24: Pay ticket with before trip-page.



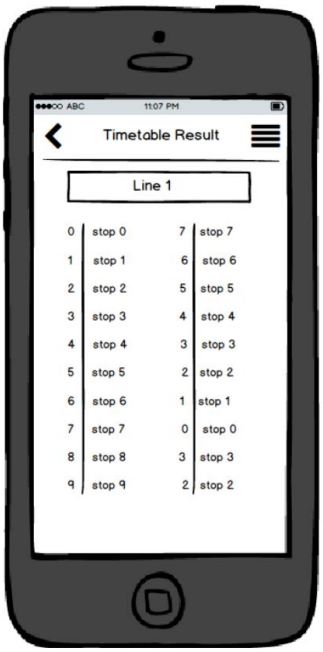
Picture 25: Pay ticket with before trip-page when choosing the date.



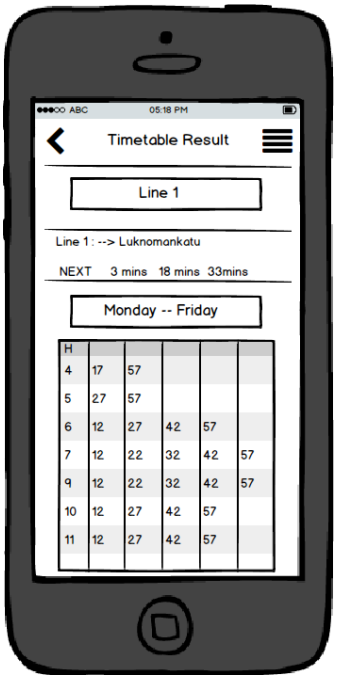
Picture 26: Pay ticket with before trip successful-page.



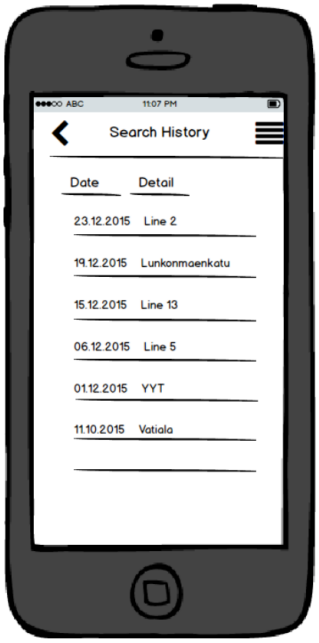
Picture 27: Search Timetable-page.



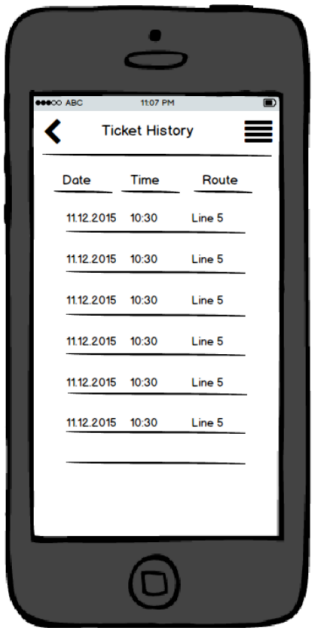
Picture 28: Timetable Result-page that shows found timetables.



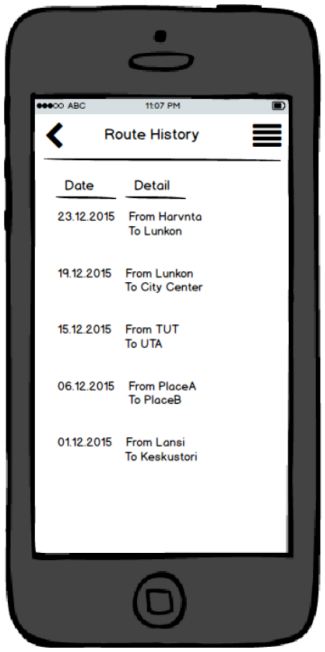
Picture 29: Timetable Result-page that shows next available busses.



Picture 30: Search History-page that shows searched lines and bus stops.



Picture 31: Ticket History-page that shows all purchased tickets.



Picture 32: Route History-page that shows all searched routes.

8. DESIGN DIARY

03.11.2015 First meeting and topic selection

We decided the topic for our assignment which was to create a solution to enhance User Experience in buses in Tampere. After we came up with the idea we figured out our target user group and all the features we wanted our application to have. It was a little difficult to define the actual user group since this could be used by so many people. We solved the issue by using travel frequency and bus travel as user criterion and not age, gender or other possibilities.

After we had all our preferred features we started thinking if we want to make a web page or a mobile app. We wanted to do a mobile app because it felt better for our concept. Also in this meeting we created a Facebook group for our team. It allows us to use instant messages to talk easier but also this offers us nice and easy way to share pictures and ideas.

13.11.2015 Phase I document for the assignment

We came up with all the different and new features while doing the Phase I document. We got a better understanding of the application as a whole after finishing our content diagram and navigation model. In this stage we also started playing around with our value proposition since we knew what features and how we wanted to offer them to the user.

SmartBus is an application people will most likely use in different physical context. More likely people are moving and not in the house while using SmartBus. After recognizing this we worked through all other contexts of use.

In this phase we did start to think about how to give feedback to the user. But we managed to get some ideas about vibration, sound and pop ups. We also did think about localization and internationalization. Our application is relatively easy to change for international purposes since we only have a few localized things like date (day-month-year), time (24-hour clock) and language (English/Finnish).

17.11.2015 First Sketches for GUI

We made some rough sketches of our application to paper with pen, these can be seen in appendix 1 and 2. Those were also our first prototype version and we based our final design and second prototype on these sketches. We decided to make the application for mobile phones since people usually use or access bus services on the go. And

also because we know there are websites for route searching and line timetables.

We had a clear vision for putting main menu on the left side. This idea came from Windows operating system in tablets. We found it to be a clear and space saving way of showing the menu.

We looked up different options for route view and everyone gave ideas how to make screens clear and understandable but also usable so that people would want to use this application.

22.11.2015 Mood Board

We had a pre-task for exercises to do a mood board. We had to think about the "mood" of the application but also fonts and colors. Fonts were easy to select since we took them straight from TuT style guide. With colors we had to do some more thinking. TuT style guide had quite a lot of colors to choose from. We knew we had to take 5(+2) colors so we chose 4. Two of the blue colors we took because TKL uses white and blue in their busses and we wanted our application to have a relation to TKL too. Our other colors, green and grey, were selected because we wanted one color that pops out more and one color that can be used instead of white if needed.

24.11.2015 Finishing Prototype

During 5th exercise session we finalized our prototype as group and decided to continue developing application in our Facebook group. We also started coloring and doing finalized screens for SmartBus. At this meeting we also locked our design style.

In this part, we used the Balsamiq-tool to make the interactive prototype and complete almost all functions to our prototypes. We found Balsamiq as a better tool for us since we didn't meet up in person that much and with pen-paper-prototypes it was difficult to work on the same screens.

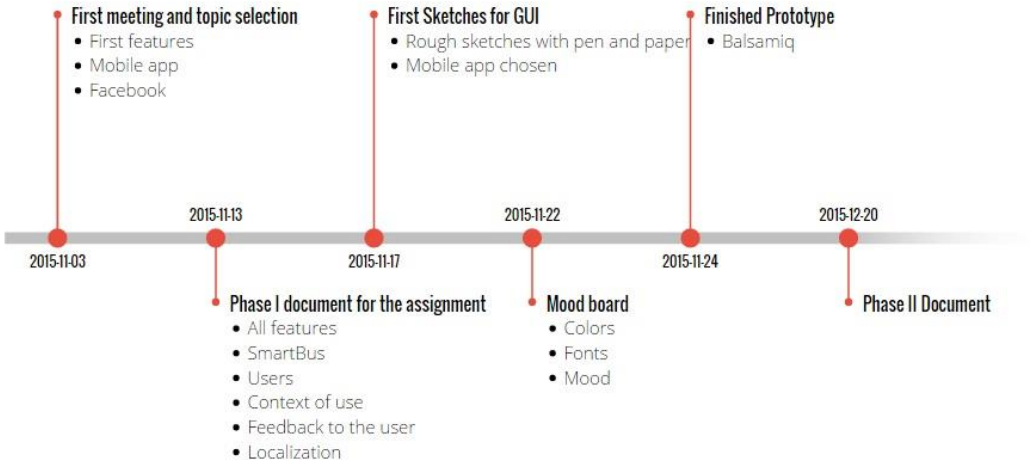
We think the prototype was successful and a good presentation of our initial thought process. All features were easily accessed and the application was easy to learn and use. The finalized screens and the interactive prototype were both successful and turned out how we wanted them to be.

12.12.2015 Phase II Document

We basically just made last changes to Phase I document and added all information we had gathered so far into one place – mood board, prototype and finished screens.

8.1 Timeline

In picture 33 is a timeline of our design process.



Picture 33: Timeline.

9. REFENCES

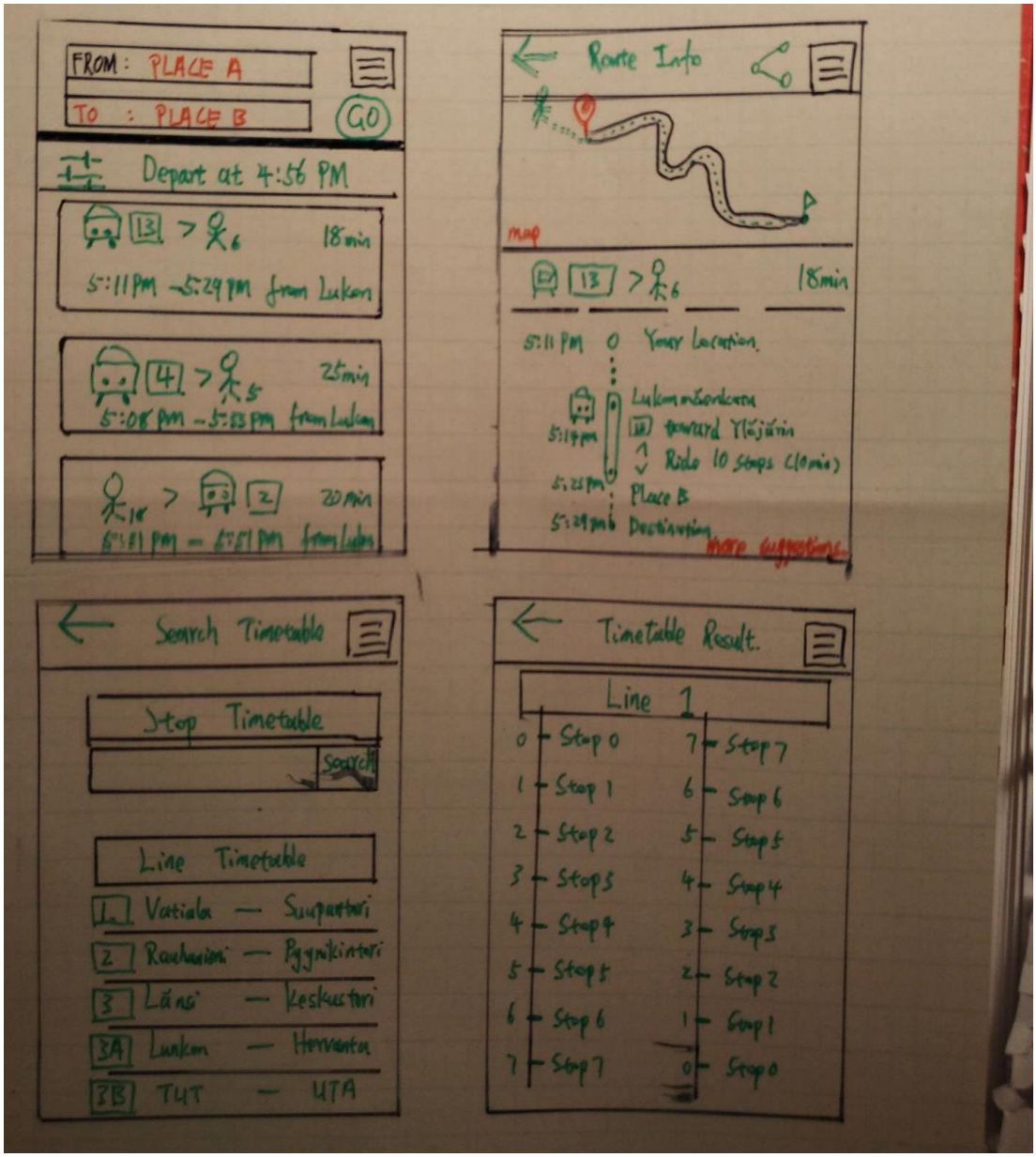
[1] Moodle link. Exercise 4: Context of use, value proposition 2015. Restricted access: https://moodle2.tut.fi/pluginfile.php/290455/mod_resource/content/1/UID%20Exercise%204%20Context%20of%20use%2C%20value%20proposition.pdf.

[2] Moodle link. Work reengineering and conceptual design – content diagram. Restricted access: https://moodle2.tut.fi/pluginfile.php/288713/mod_resource/content/1/contentdiagram154-161.pdf. Referenced 18.11.2015.

APPENDIXES

The pictures below are the UI pages designed by paper and pen during the design process and weekly exercises.

Appendix 1: Route Search and Timetable Search pages



Appendix 2: Pay-for, Pay-History and Main Menu pages