POLITECNICO DI MILANO

Corso di Laurea Magistrale in Computer Science and Engineering
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Travlendar+

Design Document

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Version 1.0.0
26/11/2017
Academic Year 2017-2018

Contents

Chapter 1

Introduction

This document is the Design Document (DD) of a mobile application called Travlendar+. It is mainly addressed to the software development team and its purpose is to provide an overall view of the architecture of the new system. The document defines:

- High level architecture;

- Used design patterns;

- Main components of the system;

- Runtime behavior.

1.A   Description of the given problem

Travlendar+ is a mobile, calendar-based application that helps the user to manage his appointments and to a greater extent set up the trip to his destination, choosing the best means of transport depending on his needs.
Travlendar+ will choose the most suitable way to get the user to his destination between a large pool of options, considering public transportation, personal vehicles, locating cars or bikes of sharing services and walking to the destination. It will take account of weather, traffic, possible passengers if any, the user-set break times and the potential will to minimize the carbon footprint of the trip, always focusing on taking him on time to his scheduled appointments.
Eventually the user will be able to purchase the tickets he will use to reach his destination in-app. The great customizability is one of the main strengths of Travlendar+, being able to fully comply with the user needs.

1.B   Definitions and Acronyms

1.B.1   Definitions

1.B.2   Acronyms

List of the acronyms used in this paper:

- RASD: Requirements analysis and specification document;

- DD: Design document;

- RMI: Remote Method Invocation;

- API: Application Programming Interface;

- UX: User experience;

- BCE: Boundary Control Entity;

- UI: User interface.

1.C   Revision History

- 26/11/2017 Version 1.0.0 - First complete drawing up of the DD;

1.D   References

Documents list:

- Mandatory Project Assignments.pdf

1.E   Document Structure

The paper is structured as follows:

- Chapter 1: Introduction to the document, including some information about its composition and the description of the problem;

- Chapter 2: This chapter shows the main components of the system and the relationships between them. It also explains the main architectural styles and patterns adopted in the design of the system;

- Chapter 3: This chapter explains how the system will work using algorithms. Java code is used to write down the most significant algorithms for the application;

- Chapter 4: This chapter shows mockups of the application and more details about the User Interface using UX and BCE diagrams;

- Chapter 5: This chapter explains how the decisions taken in the RASD are associater to design decisions;

- Chapter 6: This chapter describes the order of implementation of the subcomponents of the system and the order in which integrate such subcomponents and test the integration;

- Chapter 7: Effort spent by the authors to draw up the document.

1.F   Used tools

The tools used to create this document are:

- Photoshop for mockups;

- Draw.io for diagrams;

- Atom for algorithms drawing up;

- Github as version controller and to share documents;

- LaTeX for typesetting this document;

- Texmaker as editor;

Chapter 2

Architectural Design
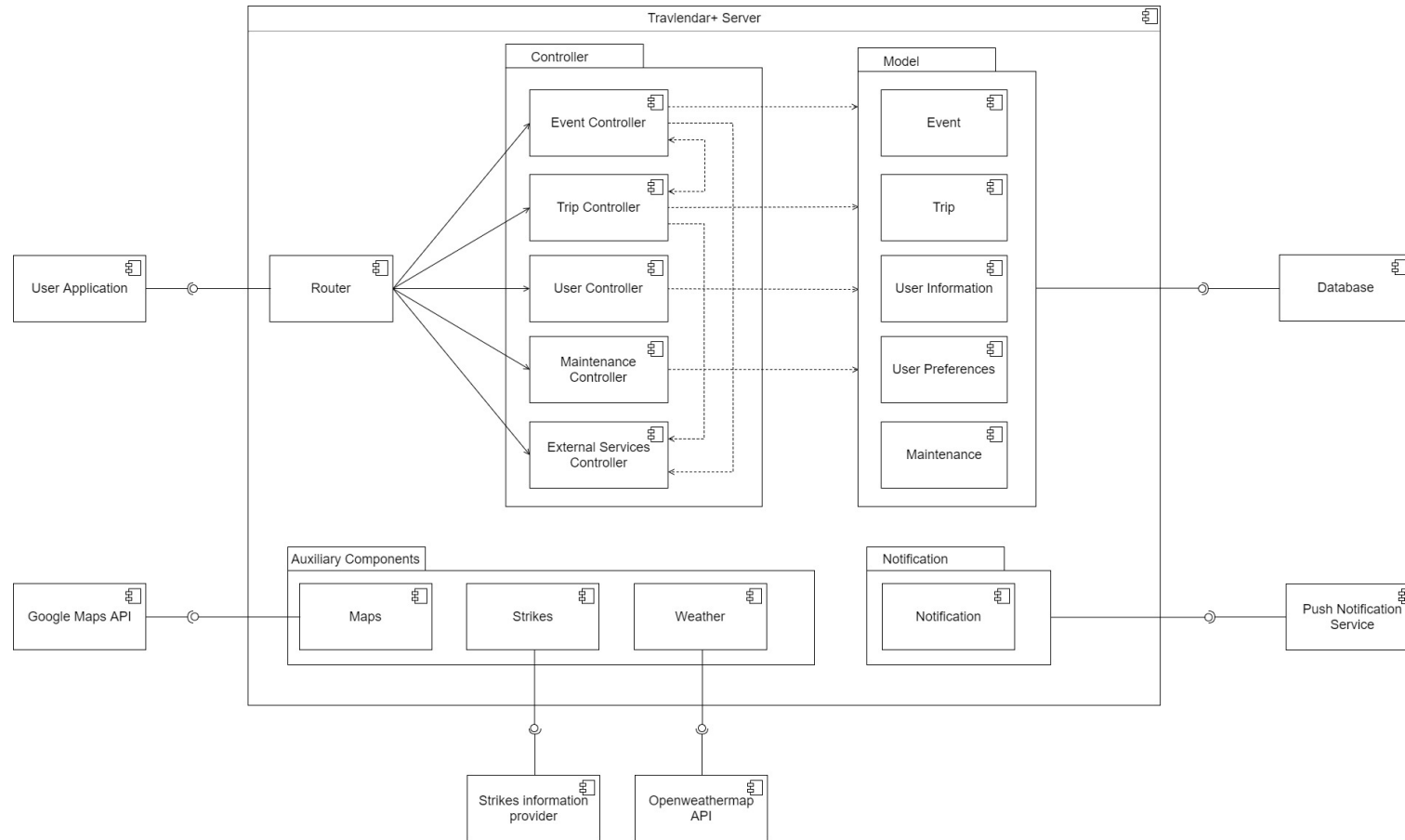
2.A   Overview

2.B   Component View

Figure 2.1: Component View of the systen

2.C   Deployment View

2.D   Runtime View

2.E   Component Interfaces

2.F   Selected Architectural Styles and Patterns

2.G   Other Design Decisions

Chapter 3
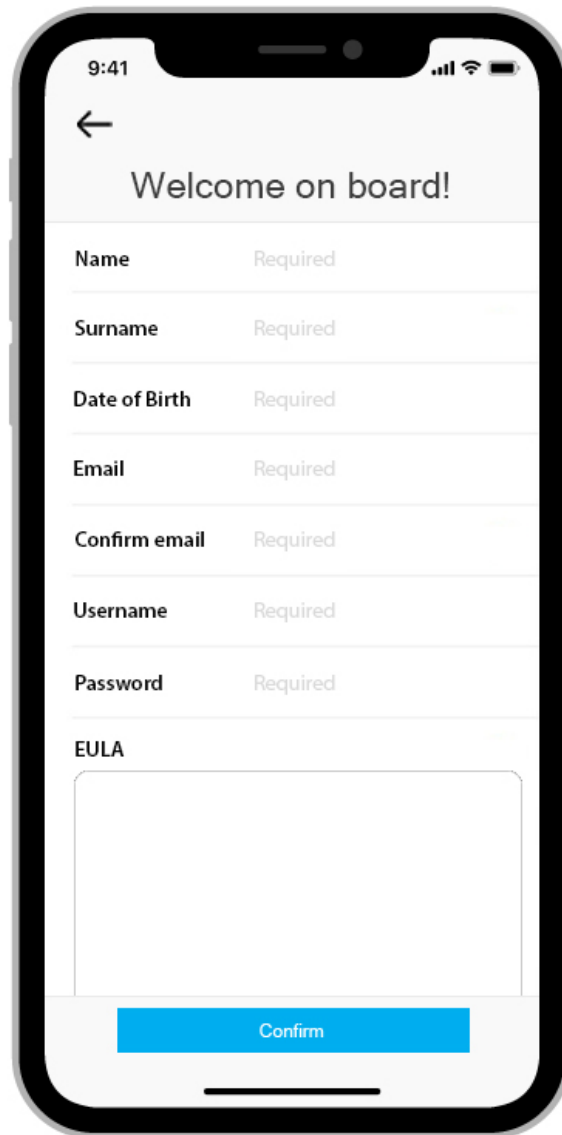
Algorithm Design

Chapter 4

User Interface Design

This section is a recapitulation of the section 3.B.1 (User Interfaces) of the Requirements Analysis and Specification Document and a deepening of design aspects of the user interface. The application will be developed as a mobile application for the main mobile operating systems (iOS and Android). As the system will appear the same for all the users, it will provide all the functionalities described in the RASD, in a unique user interface.

4.A   Mockups

Following some mockups will provide an idea of the user interface while the user interacts with it, making use of the functionalities of the application. It includes most of the main screen that the user will face.

Figure 4.1: Mockup of the login screen

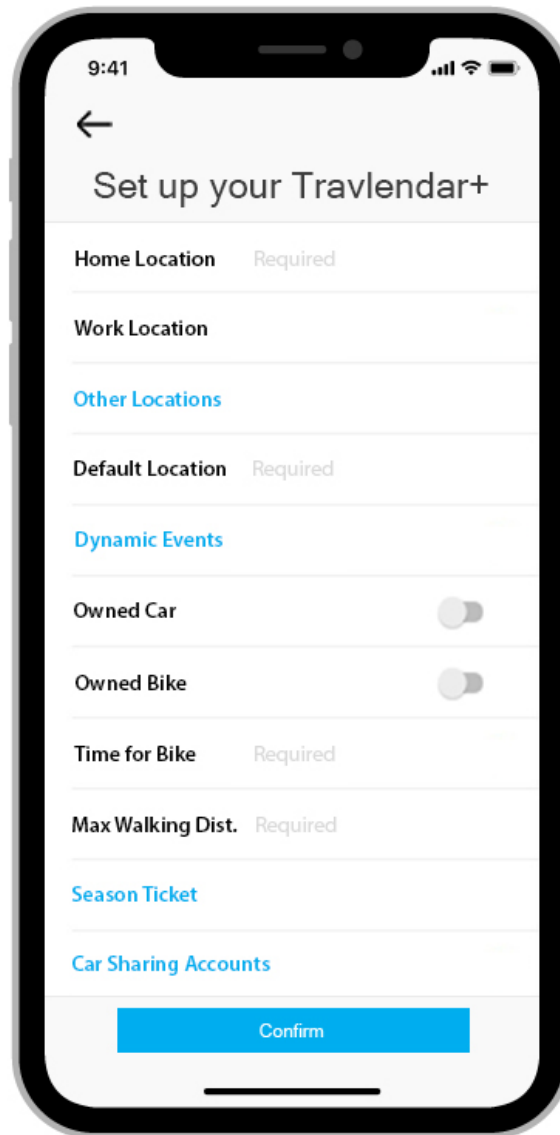Figure 4.2: Mockup of the registration screen

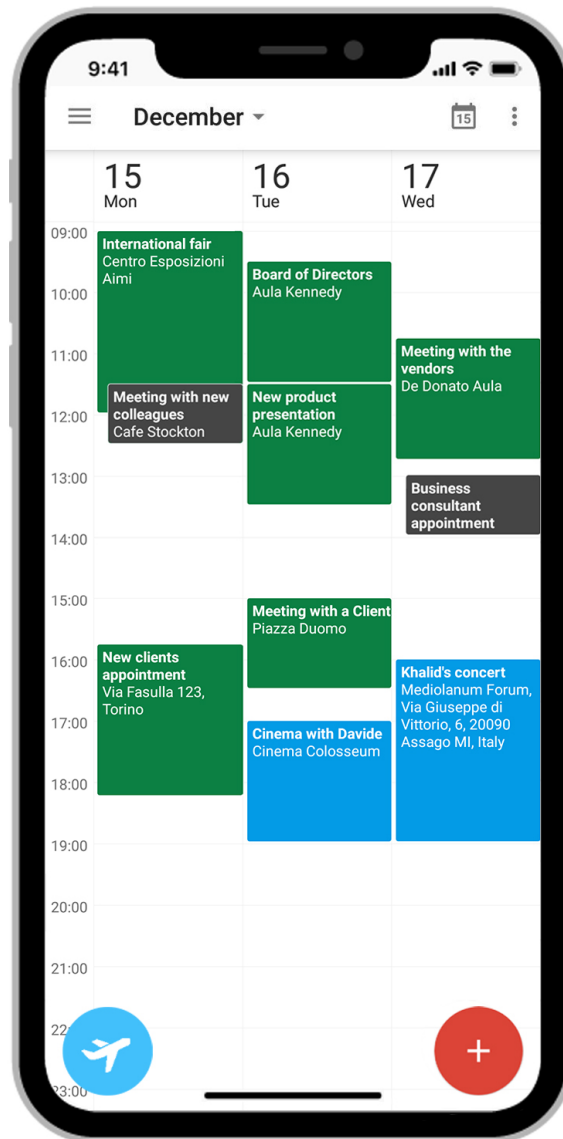Figure 4.3: Mockup of the screen where the user can set his preferences

Figure 4.4: Mockup of the calendar screen with primary and secondary events
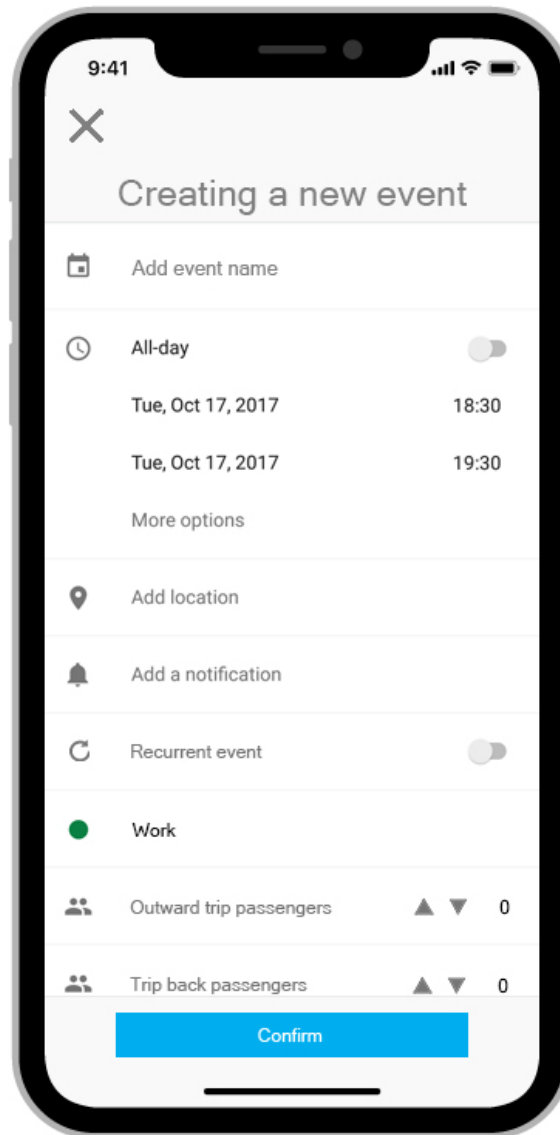
Figure 4.5: Mockup of the screen that allows to add an event

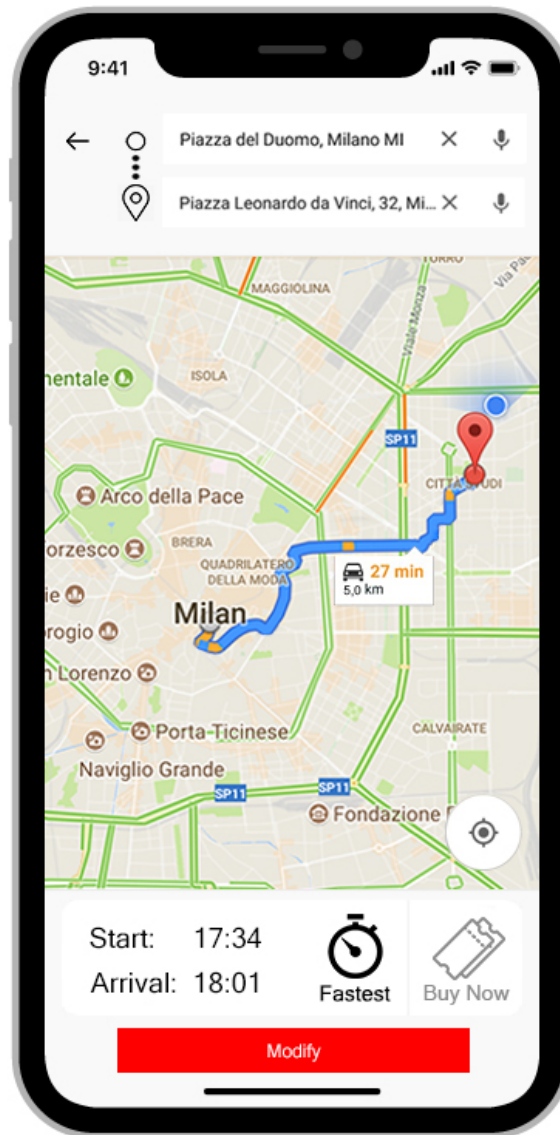Figure 4.6: Mockup of the screen with the trips shown
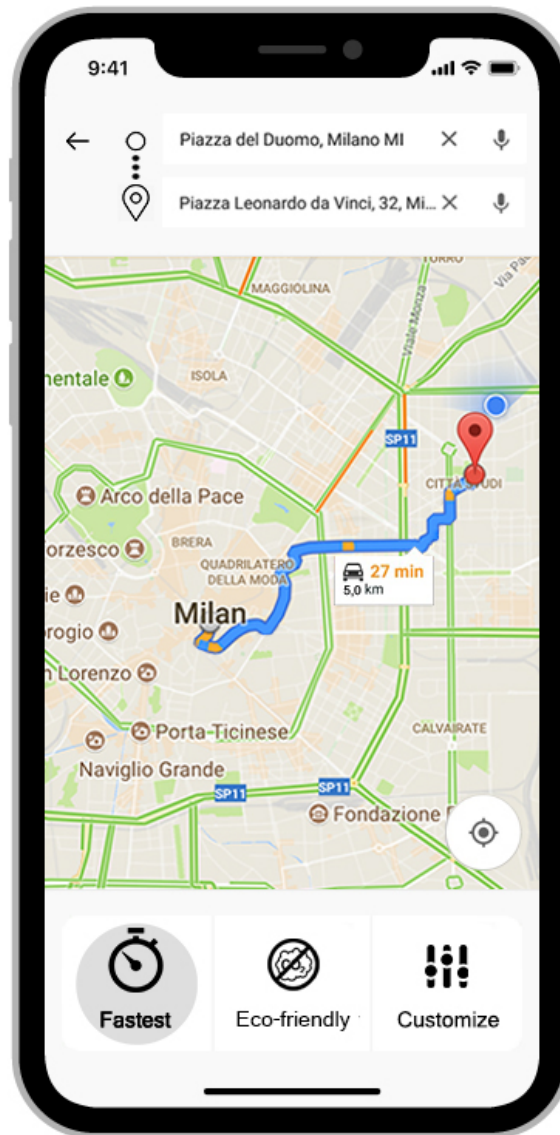
Figure 4.7: Mockup of the trip details screen

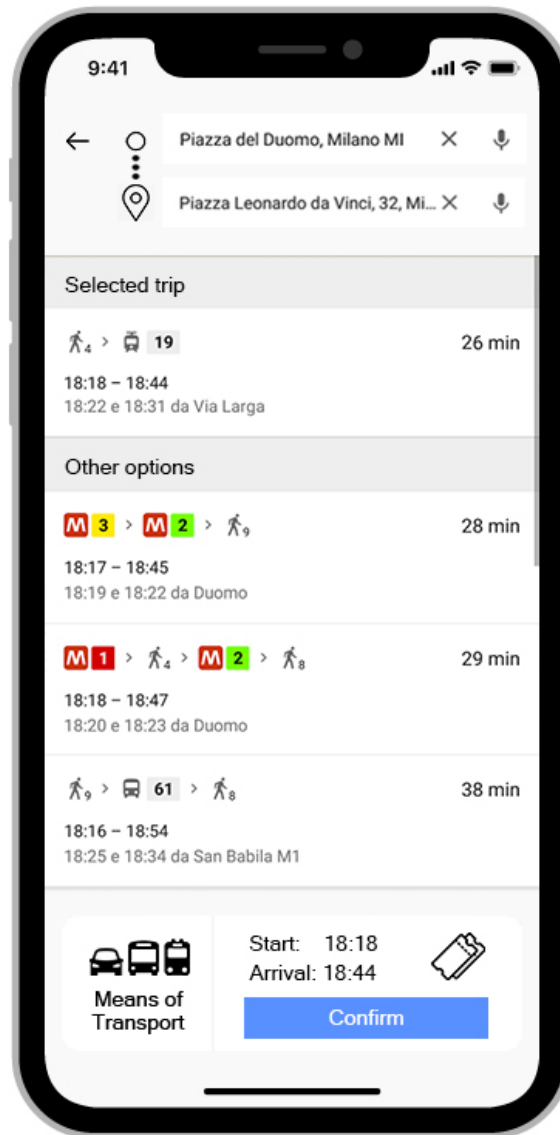Figure 4.8: Mockup of the screen that allows the user to modify a trip

Figure 4.9: Mockup of the screen with the customization of a trip

4.B UX Diagrams

UX diagrams provide information about the user interface of the system and how the user interacts with it. For the diagram comprehension purposes, additional screens used to add specific information (other locations, dynamic

events, season tickets, etc. . .) in the preferences setup are not considered.
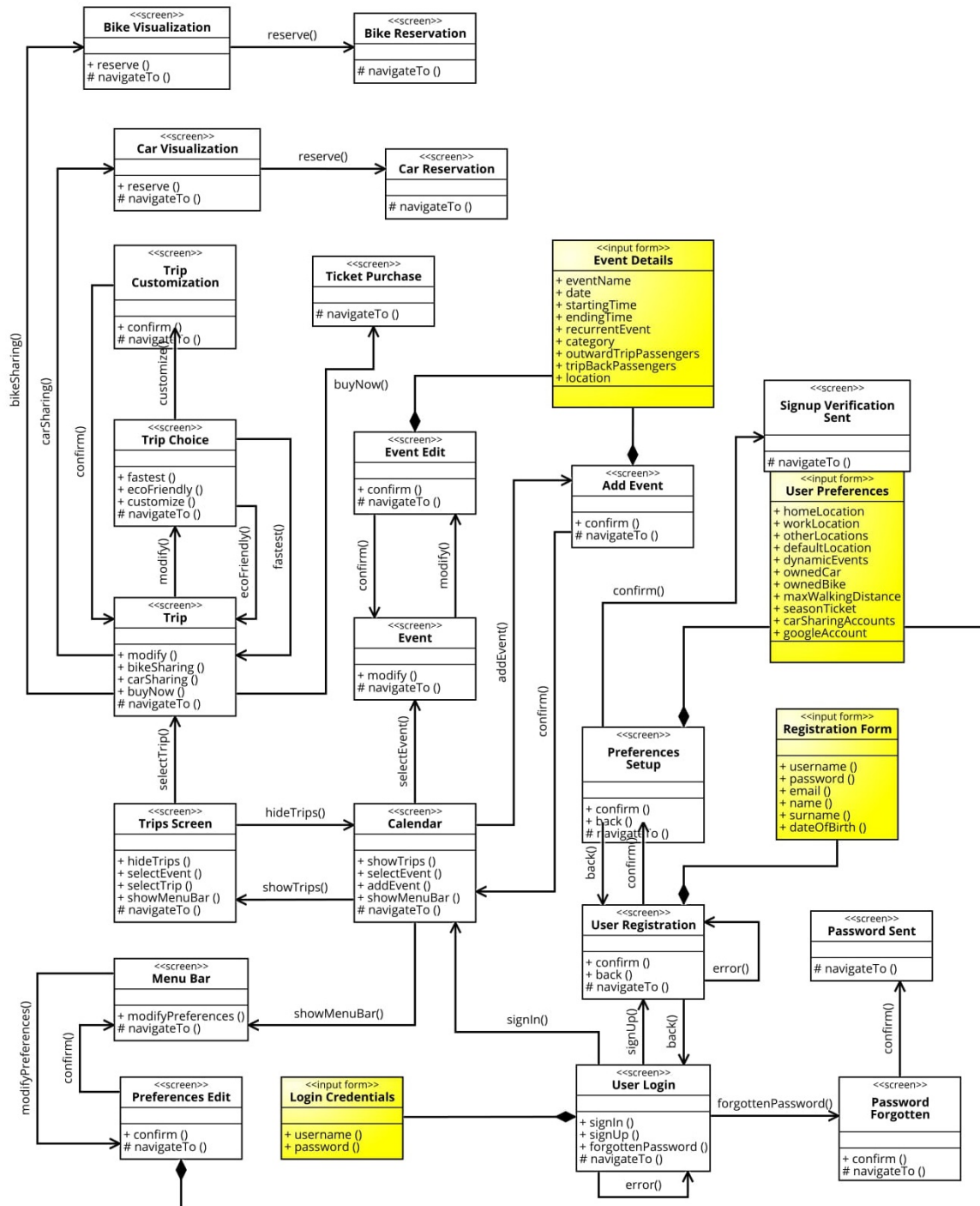

Figure 4.10: UX diagram of the application

4.C   BCE Diagrams

For the implementation of the system, a Model-View-Controller design pattern is adopted and BCE diagrams are useful to show how user interactions are managed internally by the system. Boundaries are objects that interface with the users of the application; Entities object model the access to data; Controls object manage the communication between boundaries and entities.
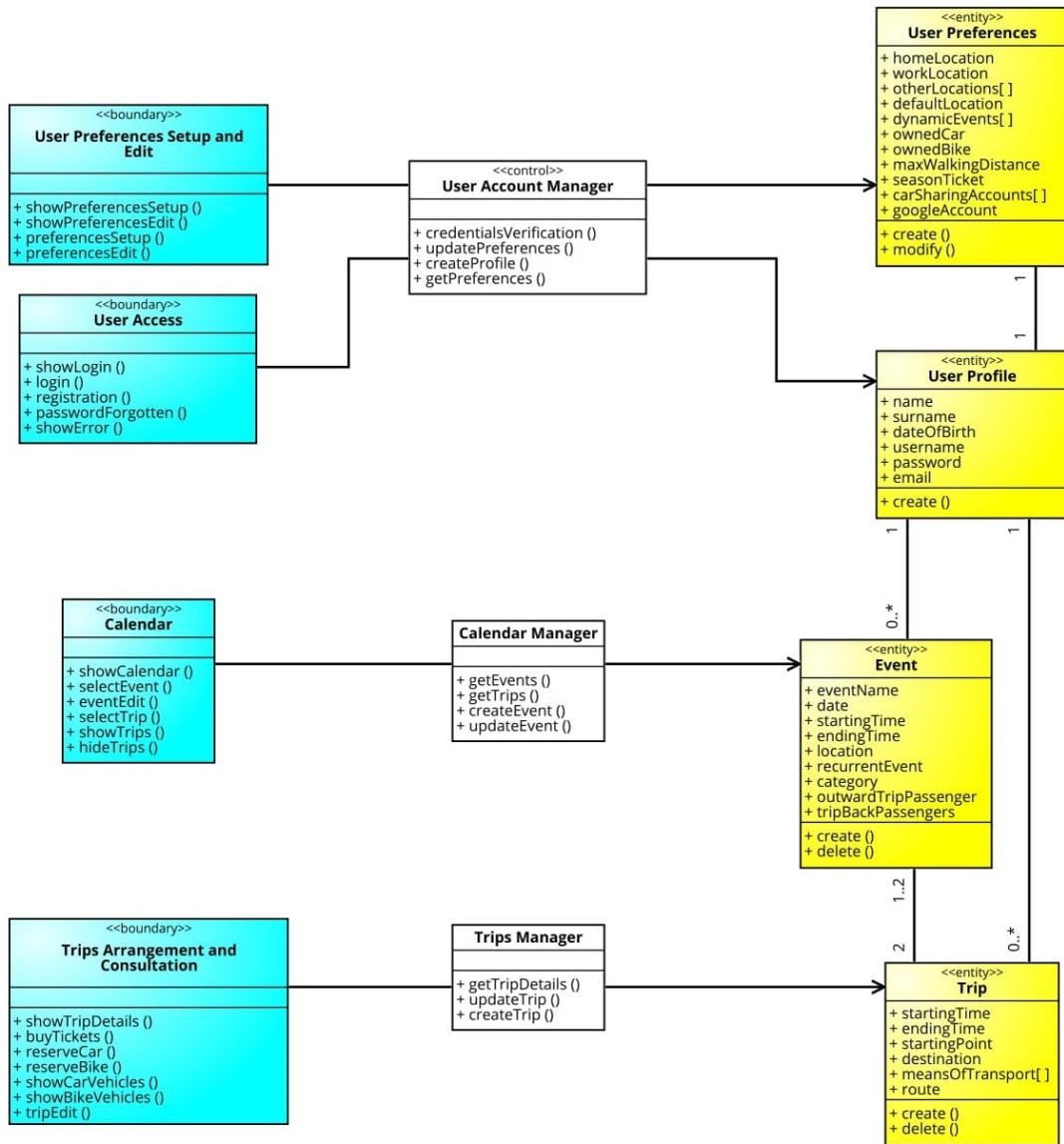

Figure 4.11: BCE diagram of the application

Chapter 5

Requirements Traceability

Chapter 6

Implementation, Integration and Test Plan

Chapter 7

Effort Spent