Requirements Document

HumbleAbode

ABC Digital Technologies

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Revision History

Name	Date	Reason for Changes	Version
Brendan Wadey	Feb. 1, 2022	Creation	0.1
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Kruti Wani, Nanami Momi, Elisabeth Klassen, Brendan Wadey	Feb. 9, 2022	Further Refinement of Various Sections	0.3
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1 Introduction

1.1 Purpose

This requirement document is for the new extension of Airbnb Inc.'s (Airbnb) web and mobile based rental platform. The extension will be targeted at post-secondary students. Airbnb currently provides a general rental platform where landlords and potential renters can make deals. The new extension, called HumbleAbode, will provide a tailored interface for potential landlords of post-secondary students and post-secondary students. In this document, the software requirements of the first release, release number 1.0, are detailed. This document describes the functions, desired system qualities, interactions with external systems, and constraints of the new HumbleAbode platform. This document is intended for the client organization, HumbleAbode, and the project managers at ABC Digital Technologies's contracting division.

1.2 Project Scope

The project scope covers a rental platform targeted at the lodging of post-secondary students. This rental platform will include website and mobile interfaces that provide a rental marketplace, forum, payment process, and application process for renting while integrating with Airbnb's account, messaging and rental marketplace systems. The rental platform will not include handling the legalities around rental contracts between landlords and renters.
The project will address the pain points for landlords and post-secondary students caused by the unique rental circumstances of post-secondary students.

1.3 Glossary of Terms

User	An entity that uses the Airbnb services through signing up for an account
Student	A user who has verified themselves as a post-secondary student through authentication services, enabling them access to HumbleAbode services
Host	A user who is renting out property, and has posted the listing for their property on either Airbnb or HumbleAbode marketplaces
Listing	A rental property listed on either Airbnb or HumbleAbode marketplaces.

1.4 References

A description of AirCover by Airbnb:
https://www.Airbnb.ca/aircover

Which internet browsers work best for Airbnb by Airbnb:
https://www.Airbnb.ca/help/article/446/which-internet-browsers-work-best-on-Airbnb

A Deep Dive into Airbnb's Server-Driven UI System by Ryan Brooks:
https://medium.com/Airbnb-engineering/a-deep-dive-into-Airbnbs-server-driven-ui-system-842244c5f5

Airbnb's tech stack provided by HumbleAbode:
https://stackshare.io/Airbnb/Airbnb

1.5 Overview

This document details the requirement for the product in the following manner

- Section 2: Overall Description
    - This section includes the product perspective, features, user classes and characteristics, operating environment, design implementation, constraints, assumptions, and dependencies.
- Section 3: System Features
    - This section includes the system features and their functional requirements.
- Section 4: External Interface Requirements
    - This section includes the requirements around external user, hardware, software and communication interfaces.
- Section 5: Other Non-Functional Requirements
    - This section includes the performance, safety and security requirements, and the software quality attributes
- Section 6: Other Requirements
    - This section includes the legal requirements.
- Section 7: Appendix
    - This section includes the list of the open requirements issues that remain to be resolved.

2 Overall Description

2.1 Product Perspective

HumbleAbode is a follow-on member of the Airbnb, Inc. line of products. HumbleAbode will exist in parallel with the existing Airbnb marketplace, building on and utilizing much of the existing infrastructure of the Airbnb marketplace.

There are three major features shared between the Airbnb and HumbleAbode marketplaces:

- Airbnb's existing user interfaces, including
    - Website, app, and direct messaging interfaces
- Airbnb's existing databases and servers, including
    - User profile, message history and rental listing storage
- Airbnb's AirCover insurance service

The Airbnb marketplace shares many requirements with those defined with the RFP, such as a simplified user experience, optional authentication via government issued ID, and accurate insurance coverage. By sharing the above features between Airbnb and HumbleAbode, HumbleAbode will be able to satisfy the same requirements in the same way. HumbleAbode will be designed as an unobtrusive add-on with the express intention to not hinder the requirements of Airbnb.

2.2 Product Features

There are several features that HumbleAbode will provide:

- An authentication service for users to become classified as students
- An authentication service for hosts to be enabled to list properties
- A rental marketplace exclusive to students
    - Including listing search UI and pages for individual listings, similar to Airbnb.
- Student quality of life features including listings organized in terms of school terms, and filtering options
- A Student-to-Student networking service in the form of a forum
- HumbleAbode listing service for hosts, which allows them to seamlessly switch a listing from the Airbnb marketplace to the HumbleAbode marketplace
- Host quality of life features that include guaranteed payments at the end of every month, and an insurance coverage notification system

2.3 User Classes and Characteristics

HumbleAbode will focus exclusively on two user classes.

The Student user class is expected to have the highest frequency of use. Consisting of post-secondary students searching for a place to rent while continuing their studies. Every

Student has a regular Airbnb user profile that they have converted into a HumbleAbode student profile.

Hosts are the second most frequent user class. As land is expensive and houses can have multiple bedrooms, it is unlikely the HumbleAbode marketplace would have more Hosts than Students. Hosts are characterized by their government verified listing of a rental within the market; they seek tenants to rent to. Their presence within the HumbleAbode marketplace rather than the regular Airbnb marketplace will ideally be because of the added features and benefits of listing in the HumbleAbode marketplace.

We do not anticipate anyone other than post-secondary students to be using HumbleAbode; that class of users will remain with Airbnb and efforts will be in place to ensure this.

2.4 Operating Environment

As HumbleAbode will be added onto the existing Airbnb website, HumbleAbode software must coexist with the current Airbnb website's architecture. Airbnb is not hosted on in-house servers and databases, instead, a majority of the infrastructure is held by Amazon Web Services, including cloud storage, hosting and databases. As such, HumbleAbode must be on the same cloud-based infrastructure. Additionally, HumbleAbode must be developed using the same software tools (outlined in Section 2.5) as Airbnb in order to coexist with the existing website.

2.5 Design and Implementation Constraints

HumbleAbode software will run on the same web servers as Airbnb, which use NGINX. HumbleAbode will exist within the same website as Airbnb, meaning it will be developed via Rails on the Ghost Platform, using React to develop UI and Java to serve as underlying structure. Additionally, HumbleAbode will share Airbnb's databases, which use MySQL.

For more detailed information on each named software tool, see Appendix B: Software Tool Definitions.

2.6 Assumptions and dependencies

It is assumed that as an add-on to the regular Airbnb website, Airbnb is responsible for management and maintenance of the servers and databases which are to be shared with HumbleAbode. If HumbleAbode requires more resources than the current Airbnb architecture can provide, it is assumed that it is not within the scope of this project to identify and implement possible additional servers and databases. Airbnb will secure and allocate additional resources as needed.

It is assumed that HumbleAbode and its services fall under the legal responsibilities of Airbnb.

3 System Features

3.1 Listing Search

3.1.1 Description and Priority

A student can browse the portal for listings. This is a high-priority feature.

3.1.2 Functional Requirements

REQ-1-1: There is a search page for HumbleAbode listings.

REQ-1-2: A student searching for HumbleAbode listings can filter by the following criteria:

1. Location
2. Price
3. Included utilities and amenities
4. Square footage
5. Accessibility
6. Occupancy
7. Pet policy

REQ-1-3: When a student clicks on a listing on the search page, that student is redirected to the listing's HumbleAbode page.

3.2 Listing Pages

3.2.1 Description and Priority

A HumbleAbode listing has its own page providing all information about it. This is a high-priority feature.

3.2.2 Functional Requirements

REQ-2-1: A HumbleAbode listing page provides the following information:

1. Approximate location
2. Photos
3. Contact information
4. Price
5. Description
6. Included utilities and amenities
7. Square footage
8. Accessibility
9. Occupancy

10. Pet policy

REQ-2-2: From a HumbleAbode listing page, a student can apply to rent that listing.

3.3 Host Access

3.3.1 Description and Priority

A host can list their property on HumbleAbode and modify its information. This is a high-priority feature.

3.3.2 Functional Requirements

REQ-3-1: A host can provide information on their property and add it to HumbleAbode to be available for students to rent.

REQ-3-2: A host must provide the following property information:

1. An address (Street name and number, city, province or state, country, and postal code)
2. Photos (At least one exterior and one interior photo of the property listed)
3. Contact information (At least one of: telephone number, email address)
4. Rental price of the property to be listed
5. Included utilities and amenities
6. Occupancy

REQ-3-3: A host can additionally provide the following property information:

1. A description
2. Square footage
3. Accessibility policy
4. Pet policy

A property will be considered to not be accessible and to not be pet-friendly unless otherwise specified.

REQ-3-4: A host can transfer their property from Airbnb to HumbleAbode.

REQ-3-5: A host can configure an application form that the student will use when they apply to rent. This form can include

1. Open-ended questions
2. Checkbox elements (single- and multi-select)
3. Document uploads

3.4 Student Features

3.4.1 Description and Priority

A student at a post-secondary institution can create a HumbleAbode account to search for properties. This is a high-priority feature.

3.4.2 Functional Requirements

REQ-4-1: A student can create a free account on HumbleAbode.

REQ-4-2: In order to access the HumbleAbode listings, the student must provide proof of their enrollment at a post-secondary institution and long-term renter documentation. This will allow them to access all of the listings.

3.5 Host Features

3.5.1 Description and Priority

A host can have a HumbleAbode account to post their property for students to rent. This is a high-priority feature.

3.5.2 Functional Requirements

REQ-5-1: An existing Airbnb host can add HumbleAbode to an existing Airbnb account.

REQ-5-2: A host who has never hosted on Airbnb can create a HumbleAbode account.

REQ-5-3: A host can access their account as specified in Section 3.3: Host Access.

3.6 Student Application

3.6.1 Description and Priority

Students can fill out applications to rent on the platform. This is a high-priority feature.

3.6.2 Functional Requirements

REQ-6-1: When a student clicks on the button to apply to a rental, they are redirected to the application page configured by the host.

REQ-6-2: When a student submits all of the required questions, the application is sent to the host.

REQ-6-3: The host can approve or deny the request and can contact the student to discuss further details.

3.7 Payment

3.7.1 Description and Priority

Students have the ability to pay their hosts through the app. This is a high-priority feature.

3.7.2 Functional Requirements

REQ-7-1: Once a student's application has been accepted, they can pay their rent by uploading their credit card and/or Paypal information to the app. Once a month, they will be prompted to pay their rent.

REQ-7-2: Hosts receive the rent on the last day of each month.

3.8 Forum

3.8.1 Description and Priority

Hosts and students have forums where they can discuss rental agreements and roommates. This is a medium-priority feature.

3.8.2 Functional Requirements

REQ-8-1: Hosts can post on and view host discussion forums.

REQ-8-2: Students can post on and view student discussion forums and roommate search forums.

3.9 Coverage

3.9.1 Description and Priority

Hosts have rent coverage if the student does not pay their rent on time. This is a medium-priority feature.

3.9.2 Functional Requirements

REQ-9-1: If a student doesn't pay their rent on time, HumbleAbode will notify the host and cover the rent for the month.

REQ-9-2: Students can apply to have an extension for their rent payments. HumbleAbode will analyze these requests based on the student's prior renting history.

REQ-9-3: A host will be contacted regarding additional coverage on a month-by-month basis.

4 External Interface Requirements

4.1 User Interfaces

Humble Adobe user interface must be consistent with the existing Airbnb user interface. To comply with Airbnb's server driven UI system, HumbleAbode shall be built on the Ghost Platform. The image below is a screen capture of the Airbnb website. Standard buttons and functions that must be implemented on HumbleAbode are shown in Figure 1 below.

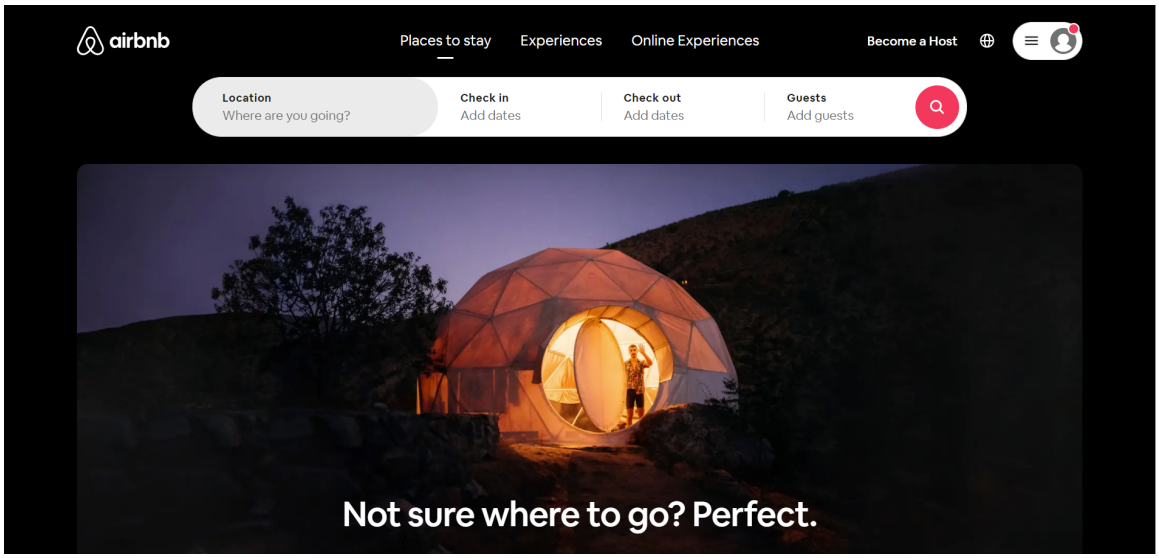

Figure 1: Airbnb's UI layout

On the right-top corner, there is a button with a user icon. When the button is clicked, it expands a dropdown with actions related to accounts, such as login, logout, notifications and messages. The search bar accepts user inputs and shows rental listings filtered by the search fields. The rental listings can be filtered further by selecting the tags below the search bar, as shown in Figure 2 below.

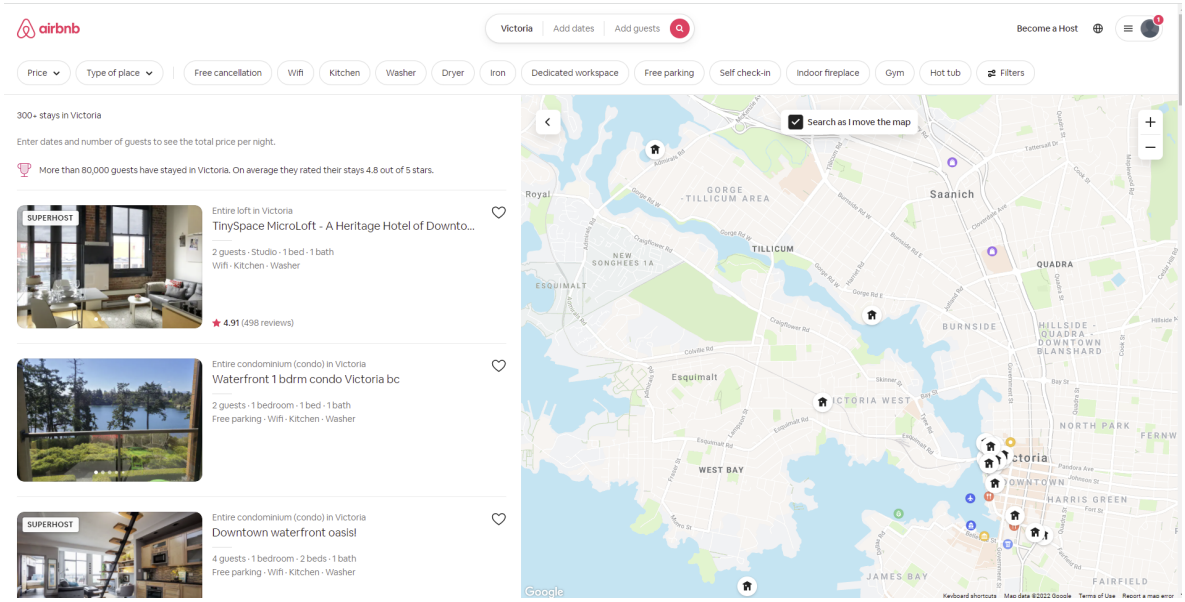

Figure 2: Airbnb's listing search system

When the list element is clicked, a page with more information about the house is shown. There must be a component that handles reservations. With the component, a student can either check availability or select check-in/check-out dates and make a reservation. The sample image of the component is shown in Figure 3 below.

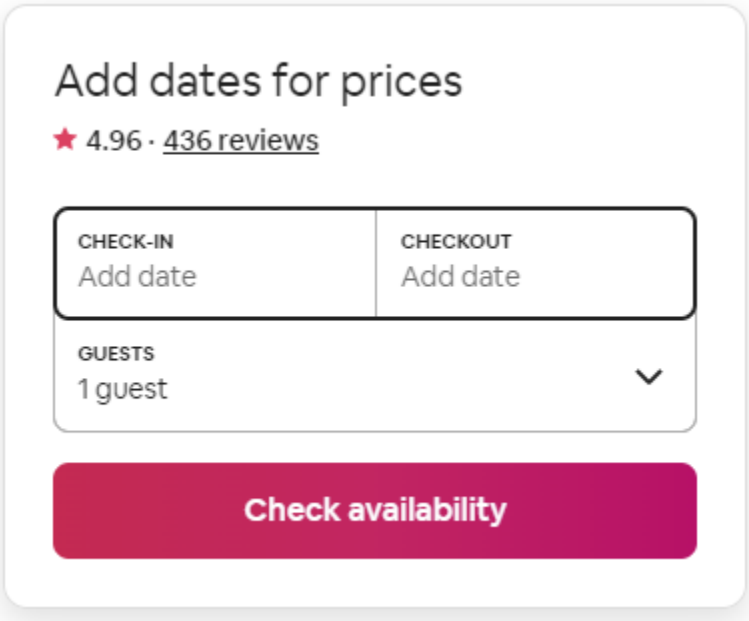

Figure 3: Airbnb's listing availability checker

4.2 Hardware Interfaces

The system shall be implemented on a web application and mobile application. Any hardware device that can access the supported browsers or application platforms must be able to use the system. These hardware devices include but are not limited to: laptops and desktop computers, mobile devices such as Apple and Android smartphones and tablets. Other smart devices such as Apple watch are also considered, because Airbnb is implemented on the Apple Watch in the form of an app. The system must accept users' touch, click, and keyboard inputs. Any functionality (such as navigation or typing letters) must be usable with the supported hardware devices.

4.3 Software Interfaces

The supported browsers for the web application are the most up-to-date versions of Google Chrome, Mozilla Firefox, Microsoft Edge, and Opera, as they are recommended browsers for Airbnb. The mobile applications will be distributed on major application platforms, including the Apple App Store, Google PlayStore, and Samsung Galaxy Store. To be consistent with Airbnb, HumbleAbode shall use Amazon S3, EC2, and RDS for cloud storage, hosting and database. Data such as user accounts and rental listings will be shared with Airbnb's existing database.

4.4 Communications Interfaces

The HumbleAbode web application must use the HTTPS protocol for client-server communication. In addition, the system must interact with the existing Airbnb database - that is, Amazon RDS. This communication is required as the system must share its user accounts and some rental listings with Airbnb. The details of this communication, such as protocols to be used, are to be determined.

5 Other Non-Functional Requirements

5.1 Performance Requirements

Performance requirements constitute low latency and low failure rates. This is all the more imperative as HumbleAbode, like Airbnb, will follow a completely digital channel. The system must accommodate users all through the year and maintenance must be scheduled between midnight and 6am PST, during low-traffic hours. Third-party services must not affect the runtime of the system; data must be transmitted within two minutes at most. Synchronization in terms of updating listings should occur and complete within a minute at most. The system should be able to finalize a booking within a minute. Concurrency must be handled such that no two students end up booking the same room.

5.2 Safety Requirements

Hosts must have the ability to request damage and liability costs through a form with an option to add images. Students should have the ability to report a host and/or fellow renters in case of misbehavior.

5.3 Security Requirements

Privacy must be considered; HumbleAbode's listings must not be visible on Airbnb for students' safety. Regional privacy laws must be followed. Students must be able to communicate any complaints or concerns to HumbleAbode via a secure form. Student status must be verified before they can view listings and forums. Information about students already living at a place must not be visible or shared until they choose to do so themselves on forums. Encryption must be enabled to ensure bookings are not done by bots.

5.4 Software Quality Attributes

HumbleAbode will start operating in British Columbia, Canada, but plans to eventually expand operations nationally and then globally. The system must be scalable, as well as extensible to accommodate its regional counterparts. Maintainability must also be strongly considered to ensure that the new system can be easily updated and enhanced as required.

6 Other Requirements

6.1 Legal Requirements

Tenancy laws applicable to the region must be abided by. These will be included in the Terms and Conditions, and the signature will be legally binding. The Terms and Conditions must be modified accordingly when the system will be extended to a different region.

Appendix A: Issues List

The network protocols for communicating with the Airbnb database are yet to be determined.
The user interface requirement of HumbleAbode is determined based on current Airbnb design. However, the design may be modified upon feedback from the client.

Appendix B: Software Tool Definitions

To avoid confusion and simplify the paragraph structure of Section 2.5, brief explanations of the various names given are explained in this appendix.

NGINX	Free, open-source web server software, used to handle many of the functions of web servers.
Rails	A framework for web application development, designed to make web application development much easier.
JavaScript	A programming language that is widely known and used, and can be applied to web page development.
React	A free, open-source JavaScript library for building user interfaces.
MySQL	Database management language for querying databases.
Sass	A preprocessor scripting language used for styling web applications.
Ghost Platform	A free, open source blogging platform which has expanded to general online publication.
Amazon RDS	A distributed relational database service by Amazon Web Services
Amazon EC2	A virtual server for running applications on Amazon Web Services.
Amazon S3	An object storage service that stores data as objects within buckets, provided by Amazon Web Services.