Software Requirements Specification

for

Reservation and Ordering System for Restaurants

Version 1.0 approved

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Revision History

Name	Date	Reason For Changes	Version

1. Introduction

1.1 Purpose

The purpose of this document is to present a detailed description of *Reservation and Ordering System for Restaurants (henceforth referred to as ROS)* developed as part of ECE651 course project at University of Waterloo. It will illustrate the purpose, features and interfaces of the software, what the software will do and the constraints under which it must operate. This document is intended for users of the software and also potential developers.

1.2 Document Conventions

This document was created based on the IEEE template for System Requirement Specification Documents.

1.3 Intended Audience and Reading Suggestions

- Restaurant managers interested in using this web app as a tool to manage user profiles and reservation requests
- Restaurant customers interested in applying for membership and registering to a temporary wait list when the restaurant in this web application
- Restaurant members interested in editing their profiles, making reservations and ordering dishes in this web application

1.4 Project Scope

ROS is a tool that restaurant manager can use to manage all the customer profiles, staff profiles and reservations in the database. Customers can browse the menu, register to a temporary wait list when the restaurant is full, and apply for membership. Members can access and cancel their own member profiles, book a table for a specified date and order dishes.

1.5 References

[1] ROS GitLab page
[2] IEEE Software Requirements Specifications Template
[3] IEEE Software Requirements Specifications Example

2. Overall Description

2.1 Product Perspective

ROS was developed for restaurant managers and staff who are interested in processing reservations, orders, and profiles of customers, and provided better experiences for their

customers via allowing registering membership, browsing the menu, ordering dishes and making a reservation online.
This is a stand-alone product that is not meant to be combined with other software tools providing similar capabilities.

2.2 Product Features

2.2.1 Restaurant Manager

When opening the Django administration, a form will appear for the restaurant managers to enter their unique login credentials, consisting of a unique username and password created by themselves. Filling out these forms with the appropriate credentials and pressing the Login button would bring the user to a page showing the site administration information consisting of the following:

- Authentication and authorization
  - Groups
  - Users
    - Username
    - Email Address
    - First name
    - Last name
    - Staff status
- Login
  - User
    - Name
    - First name
    - Last name
    - Password
    - Email
- Reservation
  - Reservation
    - RSV Number
    - Table ID
    - User
    - Date
    - RSV Time
    - Expired
  - Table
    - Table ID
    - Capacity
    - Occupied

2.2.2 Restaurant Staff

When navigating to the web app, a form will appear for the staff to enter their unique login credentials, consisting of a unique username and password created by themselves. Filling out these forms with the appropriate credentials and pressing the Login button would bring the user to the homepage. When navigating to the Profile page, the profile information of the staff showing as the following:

- User ID
- Username
- First Name

- Last Name
- E-mail Address

When clicking the Delete Account button, the membership of the member would be canceled, and the profile would be deleted in database.

When navigating to the Change Password page, the staff can change the password through filling out correct old password and appropriate new password, and confirm new password through re-enter new password in the Confirm New Password field.

When navigating to Manage Tables page, the information of all tables showing as the following:

- ID
- Capacity
- State
- Action

When clicking the Make Occupied or Make Vacant button in the Action column, the staff can switch the state of specific table between vacant and occupied.

When navigating to Manage Wait List page, the information of small, medium and large size of tables showing in the each tab as the following:

- Number
- Diners
- Last Name
- TB Type

When the state of a specific table in restaurant turns into vacant, the staff can click the Next>> button to call the next customer in wait list.

When navigating to Manage Reservations page, the information of all reservations showing as the following:

- Reserv. No
- Num of Diners
- Username
- Dining Date
- Request Time
- Expired

2.2.3 Customer

When navigating to the web application, the customer can browse the menu in the Menu page, and register to a temporary wait list when the restaurant.

When navigating to the Menu page, all types of dishes will be displayed in related tabs.

When navigating to the Sign Up page, a form will appear for the customer to enter their unique login credentials, consisting of the following:

- User Name
- First Name
- Last Name
- Password
- Confirm Password
- Email Address

The customer would then be able to navigate to Sign in page to log in as a member.

2.2.4 Member

When navigating to the web app, a form will appear for the customer to enter their unique login credentials, consisting of a unique username and password created by themselves. Filling out these forms with the appropriate credentials and pressing the Login button would bring the user to the homepage. When navigating to the Profile page, the profile information of the member showing as the following:

- User ID
- Username
- First Name
- Last Name
- E-mail Address

When clicking the Delete Account button, the membership of the member would be canceled, and the profile would be deleted in database.

When navigating to the Change Password page, the member can change the password through filling out correct old password and appropriate new password,then confirm new password through re-enter new password in the Confirm New Password field.

When navigating to Book a Table page, a form will appear for the member to submit a reservation request, the form consisting as the following:

- Number of Guests
- Pick a Date

The Submit button would be available only when the number of guests was valid and at least a table of enough capacity was vacant on selected date. When clicking the Submit button, the data would be sent to database.

When navigating to My Reservations page, the member can browse all reservation records, consisting as the following:

- Reservation No.
- Num of Diners
- Username
- Dining Date
- Request Time
- Expired

2.3 User Classes and Characteristics

There are five types of users that are intended to interact with the system: superuser, restaurant manger, restaurant staff, customers and restaurant members. Each of the four types of users have a different use characteristic of the system and therefore will have separate requirements.

A superuser, also called an administrator, is a user who has all privileges available on the site, they can access to all information stored on the site. Some sensitive information like other users' password should be hidden from the superuser.

A restaurant manager can manage customer profiles and staff profiles. They can also manipulate the data of restaurant tables and reservations, and check the current status of all restaurant tables as well.

A restaurant staff have the authority to manage wait list, manage all the tables, and check all the reservations. They can manage their profiles as well.

Customers, as unregistered site users, can only read public information on the site. They can browser the menu, register to become a restaurant member.

Restaurant members, as registered site users, have the privilege of reading their own private data and some selected information available only to members. They can manage their member profiles, order food online, and book tables for a specific date. When all restaurant tables are fully booked or occupied, they can register into a temporary wait list using their registered account.

2.4 Operating Environment

ROS is designed to run on personal computers and mobile devices.

It will be designed to operate in the latest version of the following web browsers: Firefox, Google Chrome, Microsoft Edge and Safari.

It shall be made compatible with all currently supported versions of Windows, Android and MacOS Operating System.

2.5 Design and Implementation Constraints

Agile software development techniques and project management should be implemented on the ROS project.

Django, a Python web framework, is preferred but not mandatory to be adapted in ROS development.

MySQL should be used in backend database.

The computers and mobile devices using ROS must have an internet connection when in use.

ROS must implement, at the very least, a user authentication process that keeps the user's credentials hidden at all times.

All modules using the same programming language shall follow the same coding style guide. Python code should be compatible with version 3 and follow PEP8 style guide.

All documentation shall be written in English.

2.6 User Documentation

Short instructions are provided when an action is required, for example, the expected username format is displayed during the login session. A precise line of explanation and possible solution is also listed on the user interface when an error occurs.

2.7 Assumptions and Dependencies

For the correct display and smooth experience, this web application is assumed to be run on computers or smartphones with adequate hardware. Internet connection is crucial and a browser accepting cache, such as Firefox, is essential for the application to perform as expected.

3. System Features

The system features are designed with the purpose of addressing the features highlighted in the user stories.

User	User story
Restaurant Manager	As a restaurant manager using the web application, I want to manage all the customer profiles and reservations in the database, which includes creating, editing, or deleting any customer's reservation and review details of his/her profile.
Restaurant Staff	As a restaurant staff using the web application, I want to manage the wait list, status of all the tables and reservations.
Customer	As a customer using the web application, I want to see the menu, register to a temporary wait list when the restaurant is full, sign up to be a member.
Members	As a member using the web application, I want to book a table for a specified date, order dishes and manage my account on this website.

Initially, the system is decomposed into multiple features which in turn are further decomposed into functional requirements. Every feature is graded according to two criteria: business importance and ease of realization. Where one (1) means low and ten (10) means high. The minimum viable product (MVP) for this system will include any features with business importance equal to ten (10). Only the features with high priority will be considered in detail at this stage. Additional features with lower business importance will be considered for future releases of the system depending on available resources.

Feature	Business importance	Ease of realization	Priority
(1) A restaurant manager manages user profiles and reservations in the system	10	7	High
(2) Customers register to a temporary wait list when the restaurant is full	10	8	High
(3) Members are able to manage their profiles in the system	10	7	High
(4) Members are able to reserve a table by the system	10	8	High
(5) Staff are able to manage state of all the tables	10	7	High
(6) Staff are able to manage the wait list	10	8	High
(7) Staff are able to check all the reservations	10	6	High
(8) Customers check the dishes in menu	7	5	Medium
(9) Members add dishes to the shopping cart and place their orders in the system	5	8	Medium

3.1 System Feature 1: A restaurant manager manages user profiles and reservations in the system

3.1.1 Description and Priority

Feature 1 is of high priority for the business. Before any customer accesses or uses the system, restaurant manager should be able to create all the tables in the restaurant and set their initial state, including the capacity and whether it is occupied. The restaurant manager also has to be granted privilege to view and modify customer profile and reservation status as system administrator if necessary. The manager also need privilege to maintain a wait list queue. The profile information related to the system administrator and the customers should be preserved in a long-term storage system.

This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled. Its risk rate would be 9 (from a low of 1 to a high of 9).

3.1.2 Stimulus/Response Sequences

- Restaurant manager visits a website to access the system in a web browser
- Restaurant manager logs into the system by entering his/her credentials
- Restaurant manager sees an interface with three different options of object: users, reservations and tables. Items under each of the object can be created, edited and deleted.
- Restaurant manager creates tables and initialize the table status.
- Restaurant manager edits attributes of tables.
- Restaurant manager deletes tables, except those related with a reservation.
- Restaurant manager creates customer profiles, including credentials.
- Restaurant manager edits customer profiles, including credentials.
- Restaurant manager deletes customer profiles, including credentials.
- Restaurant manager creates reservations.
- Restaurant manager edits attributes of reservations.
- Restaurant manager deletes reservations.
- Restaurant manager remove the first number from a wait list queue

3.1.3 Functional Requirements

Req-ID	Functional requirement
1.1	A storage system is required to preserve all user, table and reservation information
1.2	The system will consist of an application that allows the manager to log in using credentials
1.3	The system will offer the manager an interface to create a customer profile with specific credentials
1.4	The system will offer the manager an interface to edit a customer profile
1.5	The system will offer the manager an interface to delete a customer profile
1.6	The system will offer the manager an interface to create a table
1.7	The system will offer the manager an interface to edit a table
1.8	The system will offer the manager an interface to delete a table
1.9	The system will offer the manager an interface to create a reservation
1.10	The system will offer the manager an interface to edit a reservation
1.11	The system will offer the manager an interface to delete a reservation
1.12	The system will offer the manager an interface to remove the first number from a wait list queue

3.2 System Feature 2: Customers register to a temporary wait list when the restaurant is full

3.2.1 Description and Priority

Feature 2 is of high priority for the business. A customer should log into the system as guest to check all the dishes in the menu. Also the customer should be able to request a number as temporary proof to wait for vacant table when the restaurant is full.
This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.2.2 Stimulus/Response Sequences

- Customer visits a website by a web browser
- Customer views the menu on the website without logging in
- Customer logs into the system as guest
- Customer request a number as temporary proof to stay in a wait list queue
- Customer query the current progress of the wait queue
- Customer quit from the wait list

3.2.3 Functional Requirements

Req-ID	Functional requirement
2.1	The system will consist of an application that allows the customer to log in with a temporary identification
2.2	The system will offer the customer an interface to view menu
2.3	The system will offer the customer an interface to request a wait number
2.4	The system will offer the customer an interface to quit from a wait list
2.5	The system will offer the customer an interface to query the current state of wait list

3.3 System Feature 3: Members manage their profiles in the system

3.3.1 Description and Priority

Feature 3 is of high priority for the business. A customer should be able to register as a member. As being a member, he/she can log into the system, edit the user profile, log out the system and delete the personal account any time.
This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.3.2 Stimulus/Response Sequences

- Customer visits a website by a web browser
- Customer fills a form to sign up as a member, where the form contains following fields: username, first name, last name, password, email address
- Member logs into the system by entering his/her credentials
- Member views the user profile
- Member edits the user profile by clicking an edit button
- Member submits the change by clicking the submit button
- Member deletes the personal account by clicking the delete button and double confirm the action

3.3.3 Functional Requirements

Req-ID	Functional requirement
3.1	The system will offer the customer an interface to register as a member with following information: username, first name, last name, password, email address
3.2	The system will allow the member to log in using credentials
3.3	The system will offer the member an interface to view the user profile
3.4	The system will offer the member an interface to fill a form to edit profile; the form includes three fields: first name, last name and password
3.5	The system will offer the member an interface to delete user account and another interface for the member to confirm his/her action

3.4 System Feature 4: Members reserve a table with a specified date

3.4.1 Description and Priority

Feature 4 is of high priority for the business. A member should have the privilege to do all the operations that common customers can do, and also be able to log in into the system by using his/her credentials and check, edit user profile and delete the user account. Then the member fills a form to submit information related with the table reservation. The member can check all the successful reservations and cancel any of them.

This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.4.2 Stimulus/Response Sequences

- Members visit a website by a web browser
- Members log into the system by entering his/her credentials
- Members fill a form to reserve a table; the form includes two fields: number of guests and dining date
- Members submit the form by clicking the submit button
- Members check all the successful reservation and cancel any of them by click cancel button

3.4.3 Functional Requirements

Req-ID	Functional requirement
4.1	The system will offer the member an interface to fill a form to reserve a table; the form includes two fields: number of guests and dining date
4.2	The system will offer the member an interface to check all the successful reservations
4.3	The system will offer the member an interface to cancel successful reservations

3.5 System Feature 5: Staff are able to manage state of all the tables

3.5.1 Description and Priority

Feature 5 is of high priority for the business. Before any customer reserves a table or registers to a temporary wait list, restaurant staff should be able to view information of all the tables in the restaurant. The restaurant staff also have to be granted privilege to switch state of any table between occupied and vacant, which is prerequisite to modify the reservations and the wait list.

This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.5.2 Stimulus/Response Sequences

- Staff visit a website by a web browser
- Staff log into the system by entering his/her credentials
- Staff view information of all the tables in the restaurant
- Staff switch the state of a specific table by clicking the Make Occupied or Make Vacant button in the Action column

3.5.3 Functional Requirements

Req-ID	Functional requirement
5.1	The system will offer the staff an interface to check information of all the tables
5.2	The system will offer the staff an interface to switch the state of a specific table

3.6 System Feature 6: Staff are able to manage the wait list

3.6.1 Description and Priority

Feature 6 is of high priority for the business. After any customer registers to a temporary wait list, restaurant staff should be able to manage the wait list. The restaurant staff also have to be granted privilege to view the wait list for all types of table and call next customer

This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.6.2 Stimulus/Response Sequences

- Staff visit a website by a web browser
- Staff log into the system by entering his/her credentials
- Staff view the wait list of a specific types of the tables by clicking the tab for this type of tables
- Staff call next customer by clicking the Next>> button in the Action column

3.6.3 Functional Requirements

Req-ID	Functional requirement
6.1	The system will offer the staff an interface to view different types of wait list
6.2	The system will offer the staff an interface to call the next customer

3.7 System Feature 7: Staff are able to check all the reservations

3.7.1 Description and Priority

Feature 7 is of high priority for the business. Staff should have the privilege to check all the reservations to mark specific table as occupied, which is prerequisite to manage a temporary wait list.

This feature has a significant risk because if it is not implemented the entire system will not be viable and will, therefore, be cancelled.

3.7.2 Stimulus/Response Sequences

- Staff visit a website by a web browser
- Staff log into the system by entering his/her credentials
- Staff view information of all the reservations.

3.7.3 Functional Requirements

Req-ID	Functional requirement
7.1	The system will offer the staff an interface to view all the information of reservations

3.8 System Feature 8: Customers check the dishes in menu

3.8.1 Description and Priority

Feature 8 is of medium priority for the business. A customer can check the name and images of different types of dishes.
This feature has a risk because it provides a better service to all customers and contribute to attract potential customers.

3.8.2 Stimulus/Response Sequences

- Customers visit a website by a web browser
- Customers browse a specific type of dishes by clicking related tab

3.8.3 Functional Requirements

Req-ID	Functional requirement
8.1	The system will offer the customer an interface to view different types of dishes in different tabs

4. External Interface Requirements

4.1 User Interfaces

4.1.1 User Interfaces For Customers

The website provides users the following functions, including sign in, sign up, book a table, view menu and check my reservation. These functions can be accessed by pressing the corresponding buttons on the webpage. Figure 1 shows the main page of the website, on which some the functional buttons are presented.
There are a few standard buttons located on the top-right corner of each webpage. When a user is not logged in, there are four buttons including Waitlist, Menu, About, Sign in and Sign Up. When a user is logged in, the buttons are changed to Menu, Book a Table, My Reservations, profile, shopping cart and sign out, as shown in Figure 2. Users can browse the different types pf dishes in related tab in the Menu page (Figure 3). Users can register to a temporary wait list in the Wait list page by filling the Number of Guests and Last Name fields and clicking the Submit button to submit (Figure 4). After registering to the wait list successfully, the user will see his/her number (Figure 5), and the user can check his/her current waiting state by inputting his/her number (Figure 6). The result will be illustrated as Figure 7.
Figure 8 shows the Sign Up page. Users need to input their Username, First Name, Last Name, Password and Email Address. Users need to input username or email, and password to log in as shown in Figure 9. Users can check their profile information and delete the account (Figure 10). When making a reservation, users need to provide the information of the number of guests and the dinning date, as shown in Figure 11. They can also check their reservation records (Figure 12).

Figure 1. Main page when the user is not logged in.

Figure 2. Main page when the user is logged in.

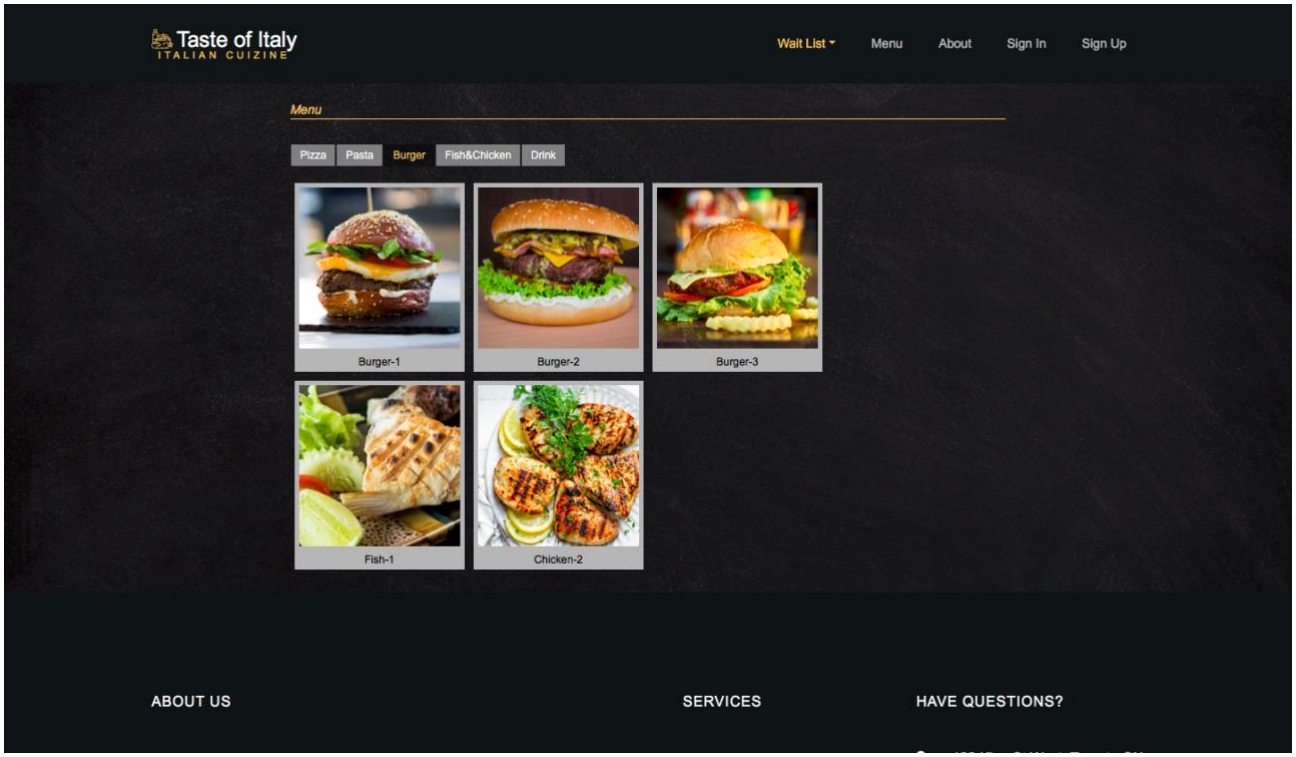

Figure 3. Menu page.

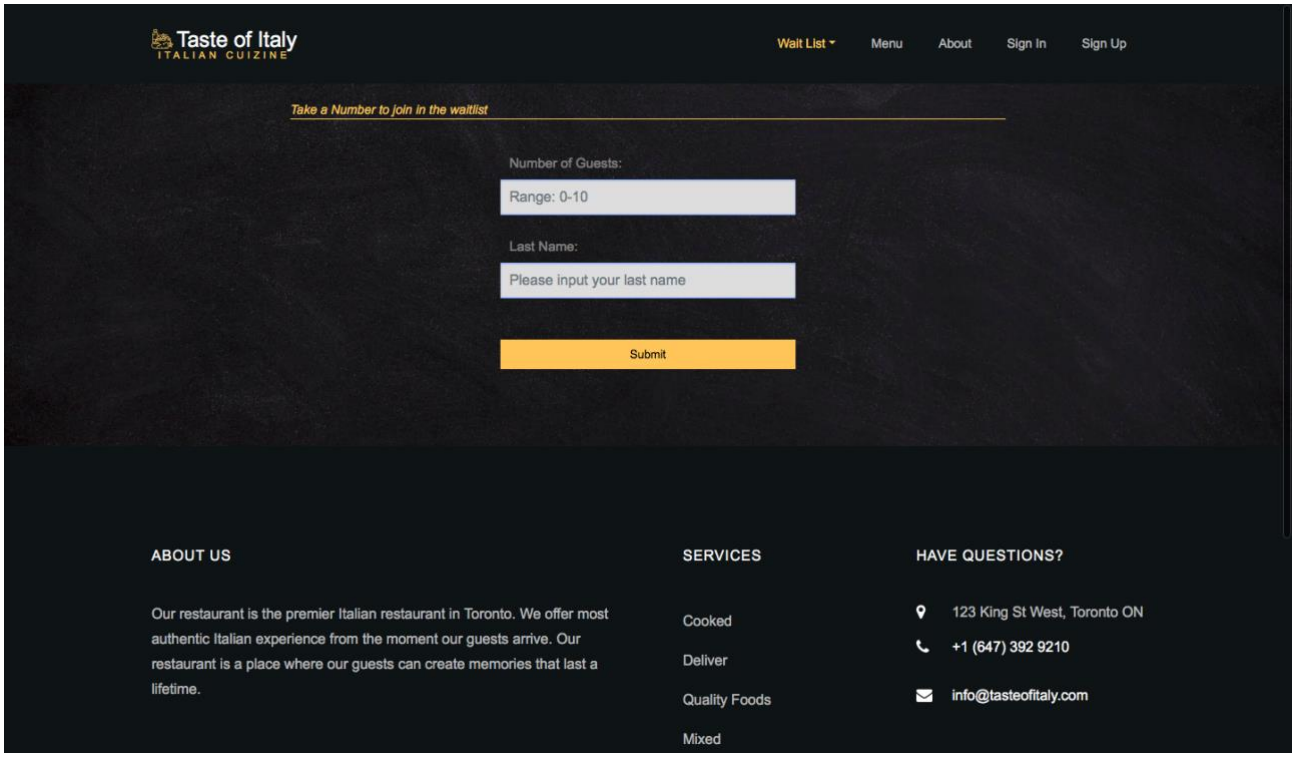

Figure 4. Wait list page when registering to the wait list.

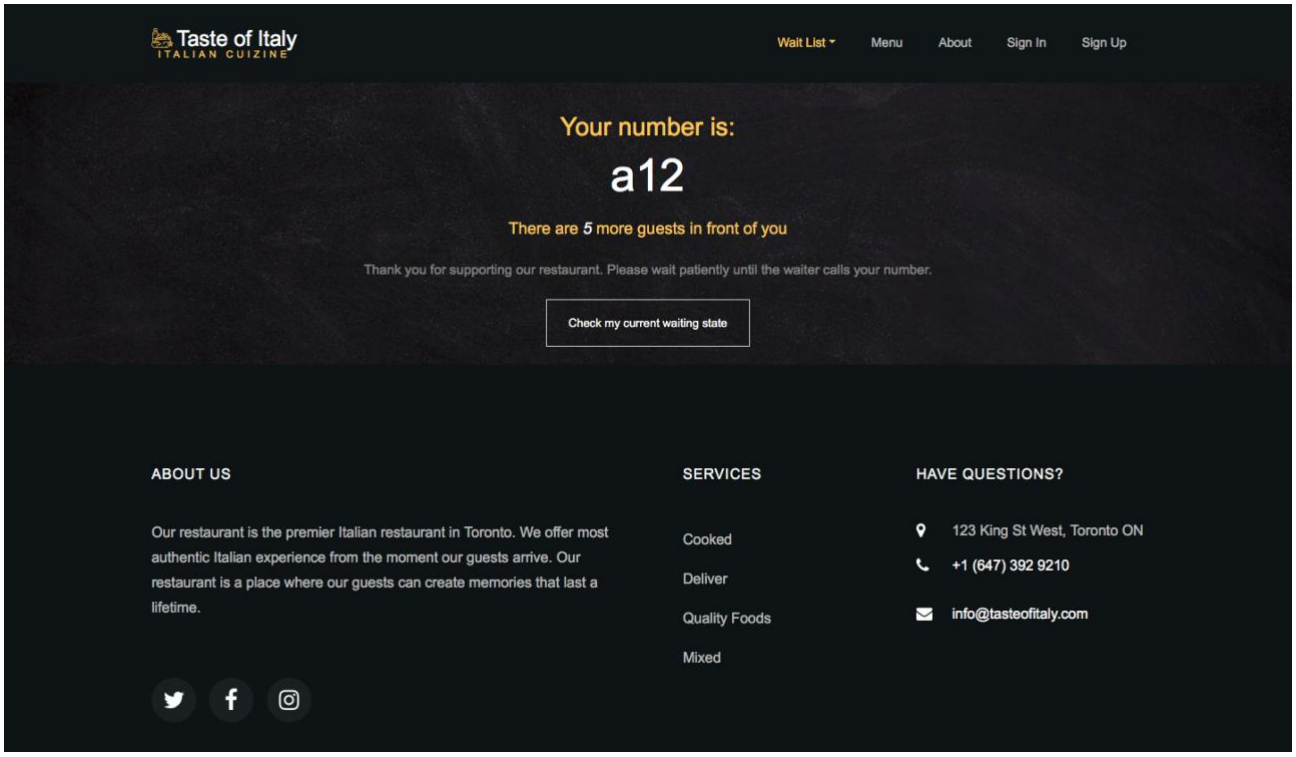

Figure 5. Wait list page after registering to the wait list successfully

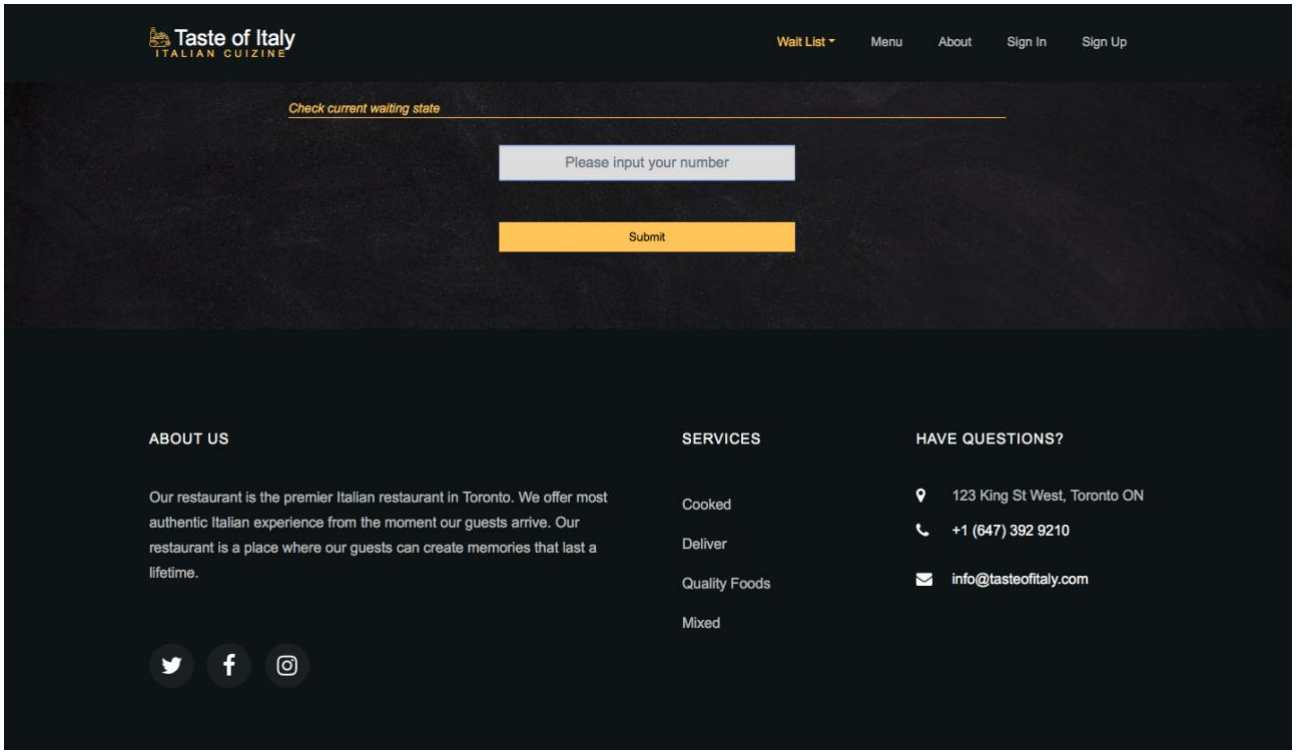

Figure 6. Wait list page when checking current waiting state.

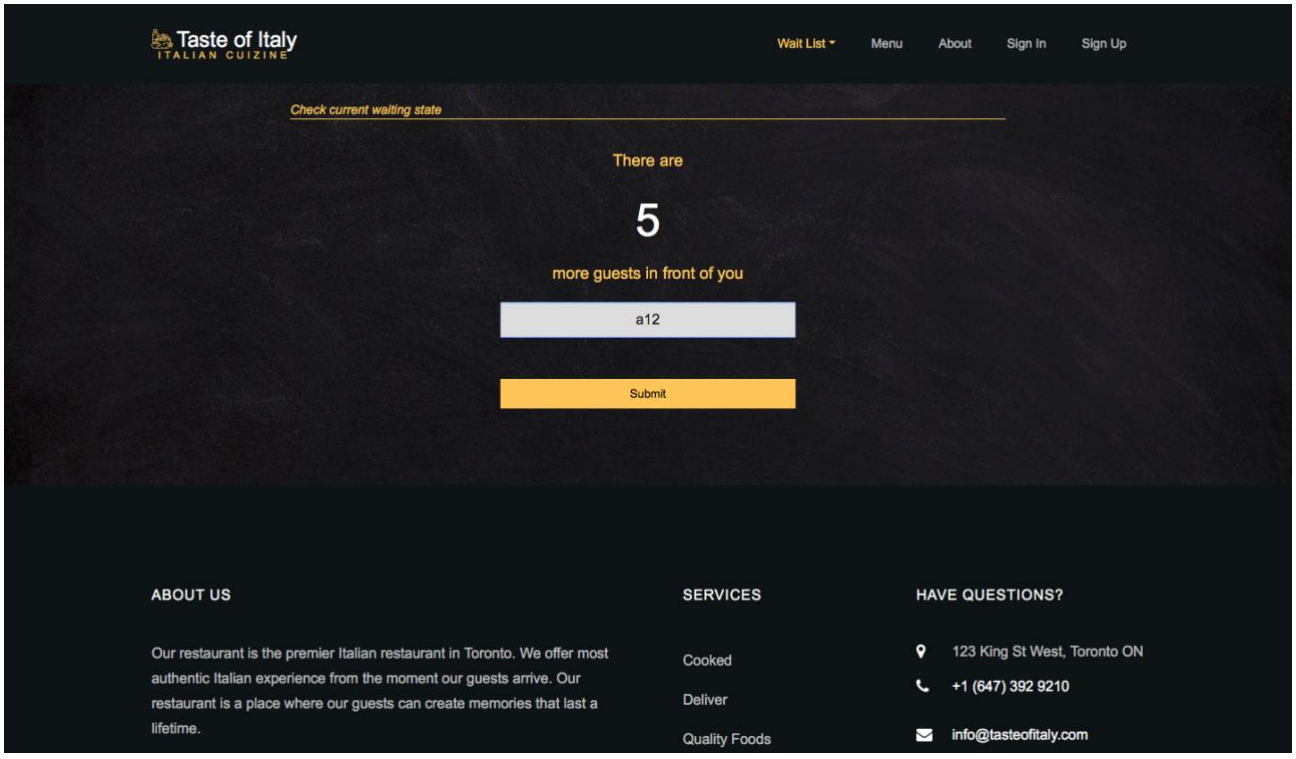

Figure 7. Wait list page when displaying the current waiting state.

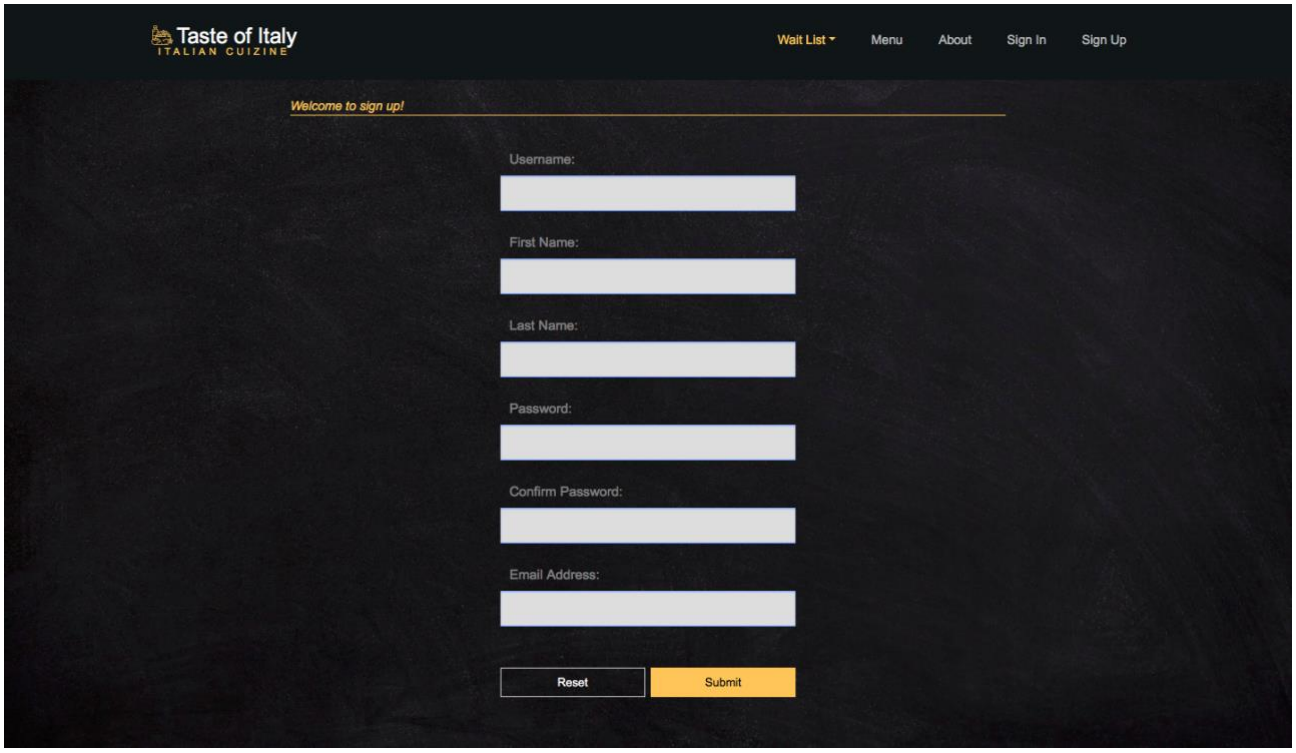

Figure 8. Sign up page.

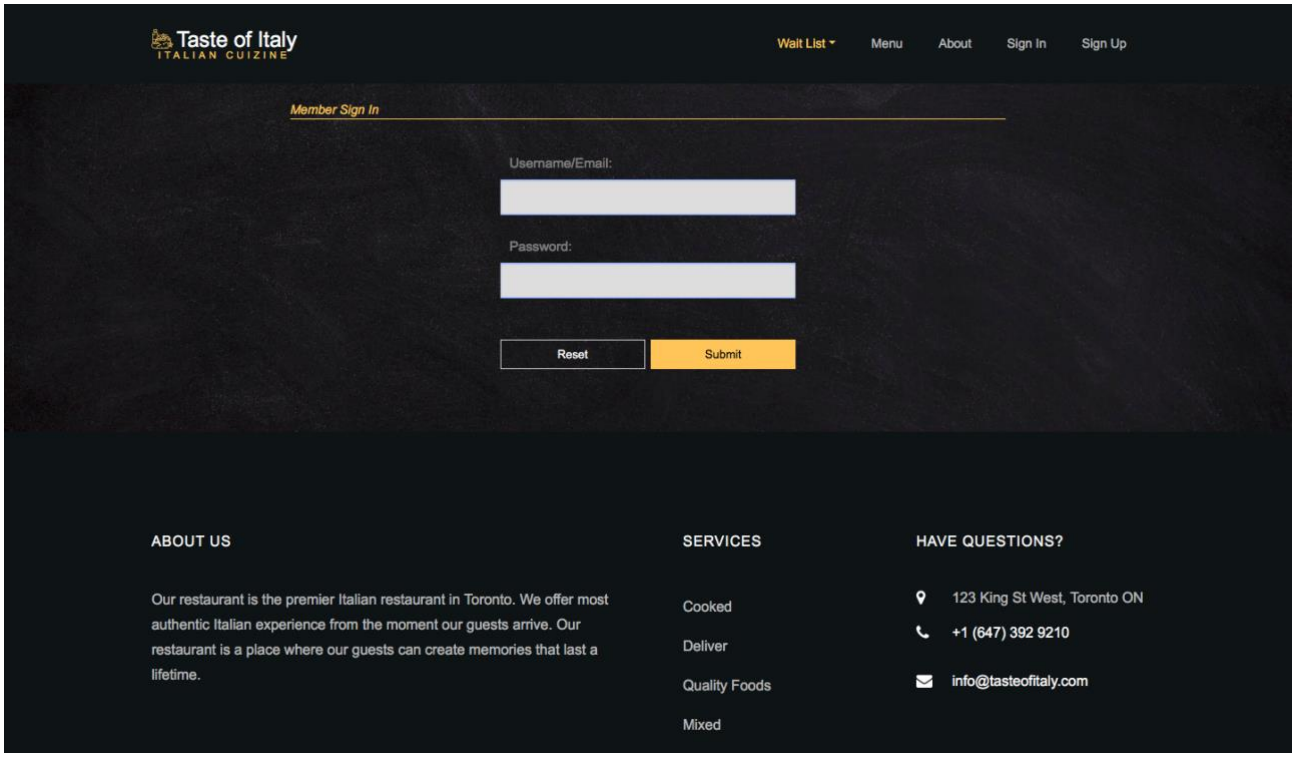

Figure 9. Sign in page.

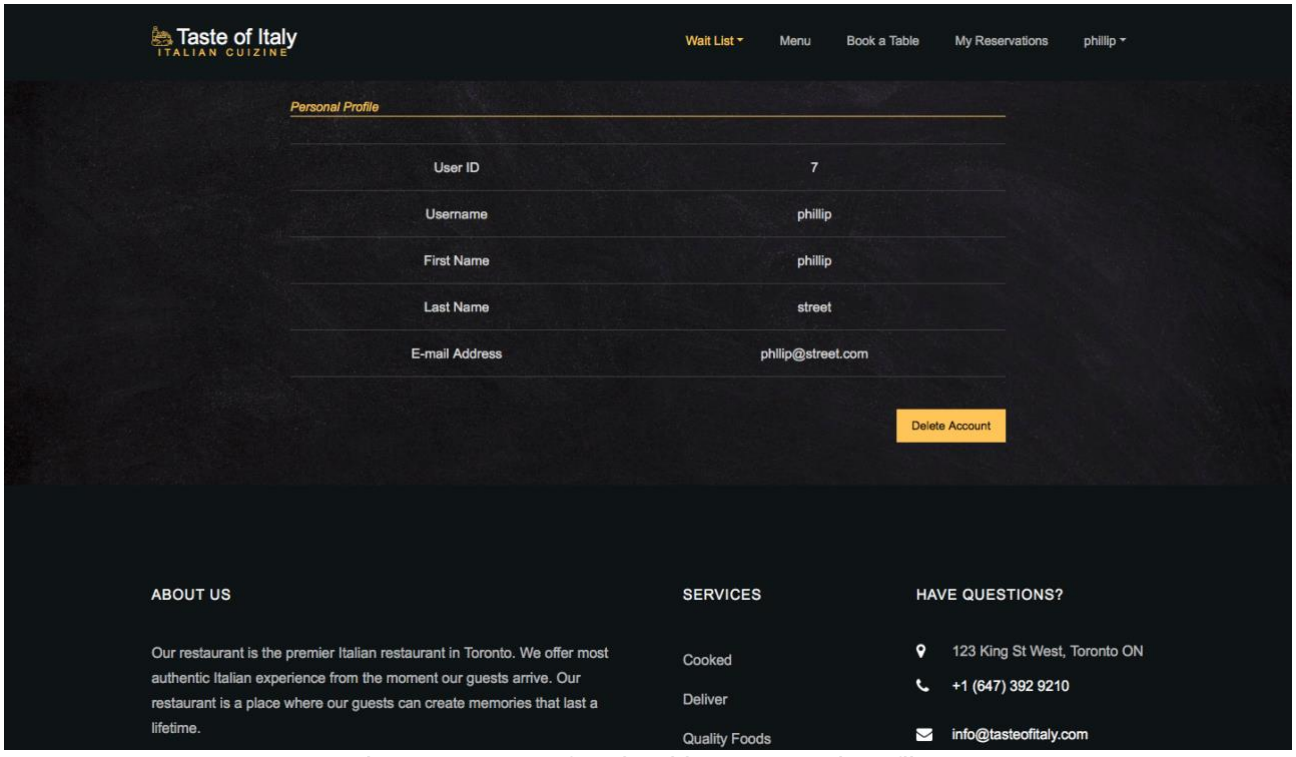

Figure 10. Page for checking personal profile.

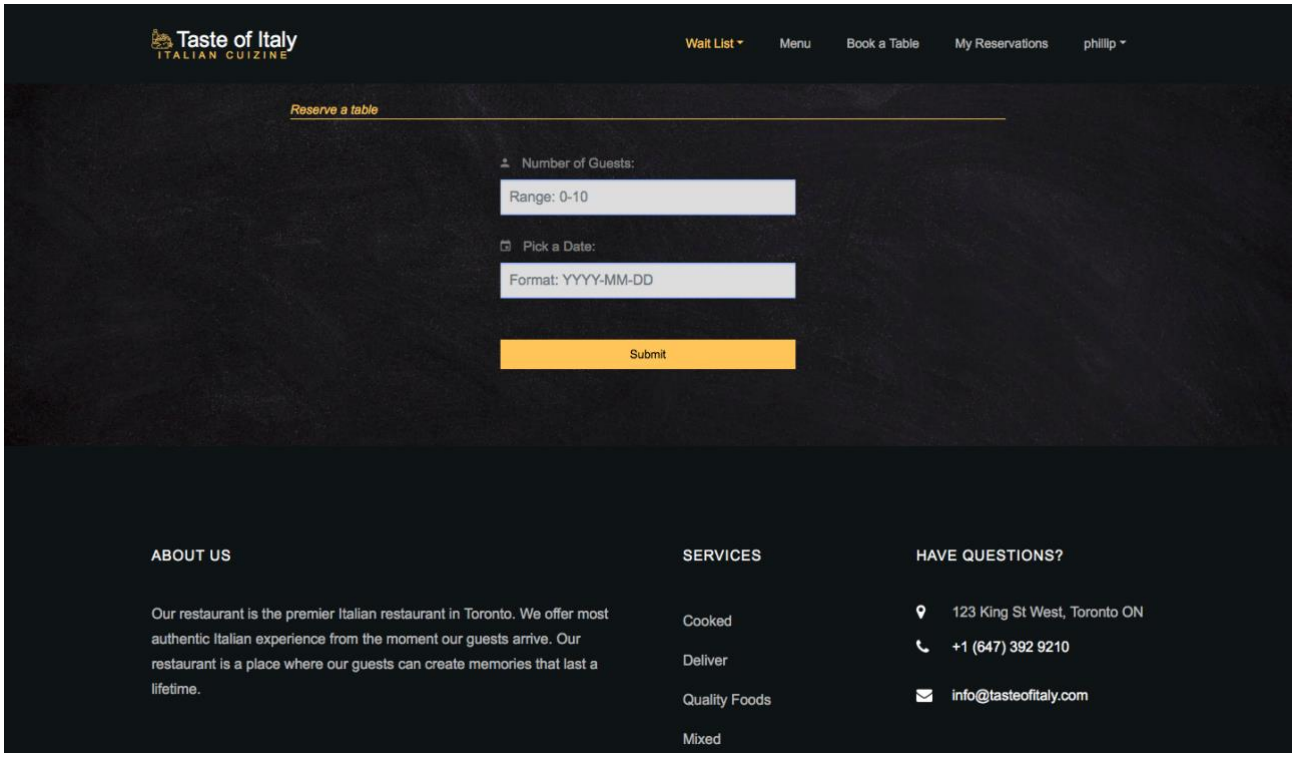

Figure 11. Page for reserving a table.

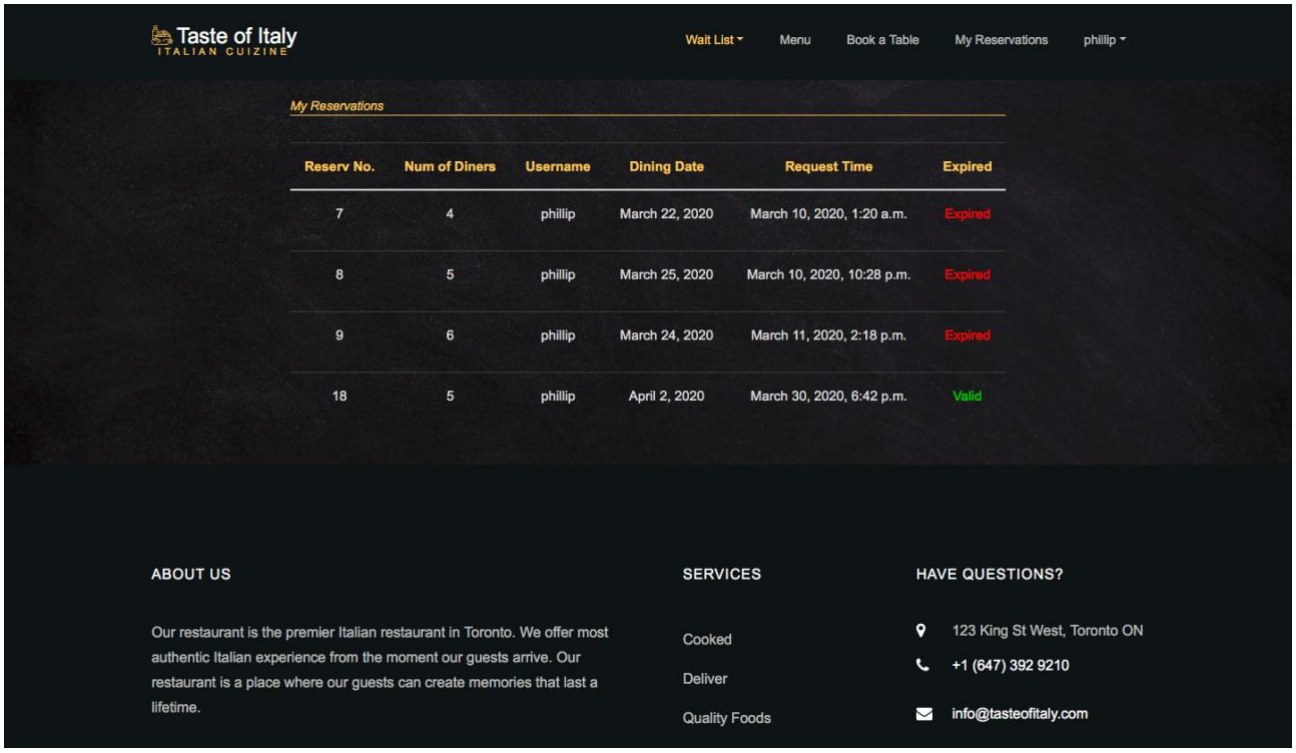

Figure 12. Page for checking private reservations.

4.1.2 User Interfaces for Restaurant Staff

The website provides users the following extra functions, including managing tables, managing wait list, managing reservations. These functions can be accessed by pressing the corresponding buttons on the webpage. Figure 13 shows page for managing all the tables. The users can swtich the state of a specific table by clicking the Make Vacant or Make Occupied in Action column, Figure 14 shows page for managing the wait list. The users can view the current wait list and call next customer by clicking the Next>> button.
Figure 15 shows page for managing all reservations. The users can view all the detailed information in the Manage Reservation page.

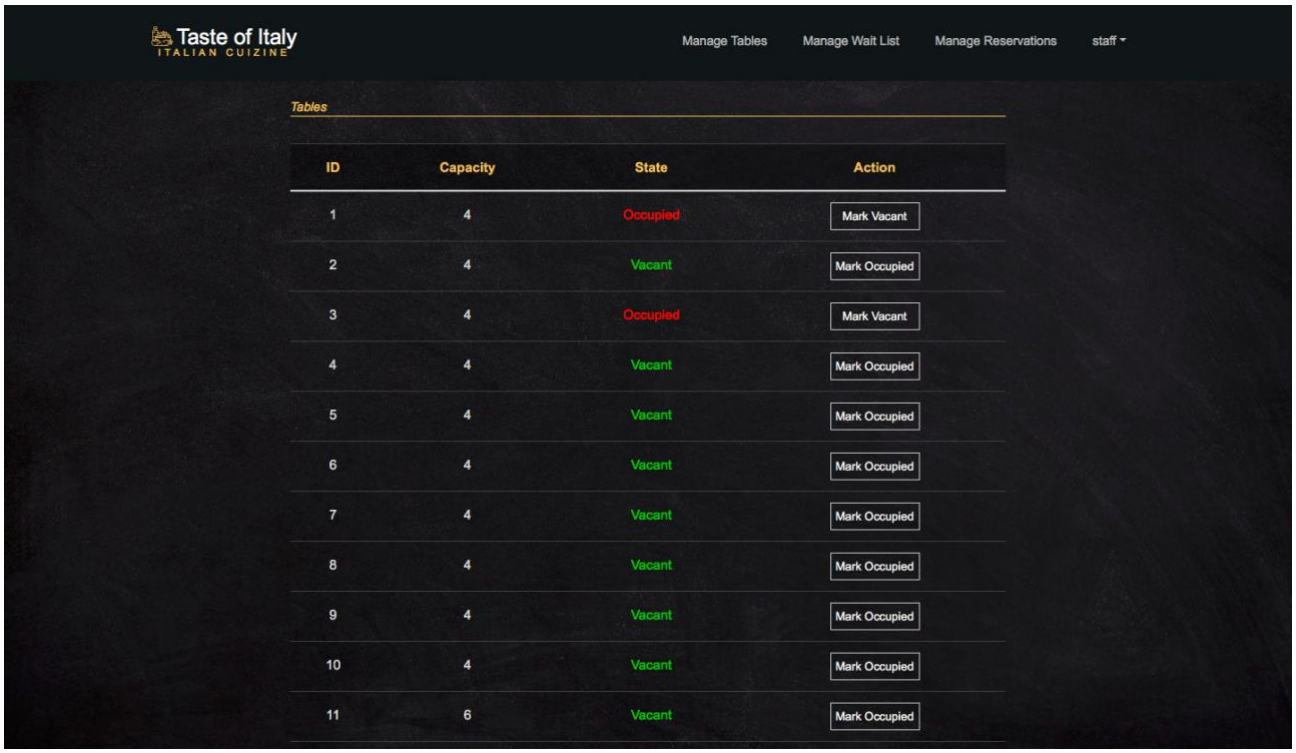

Figure 13. Page for managing all tables.

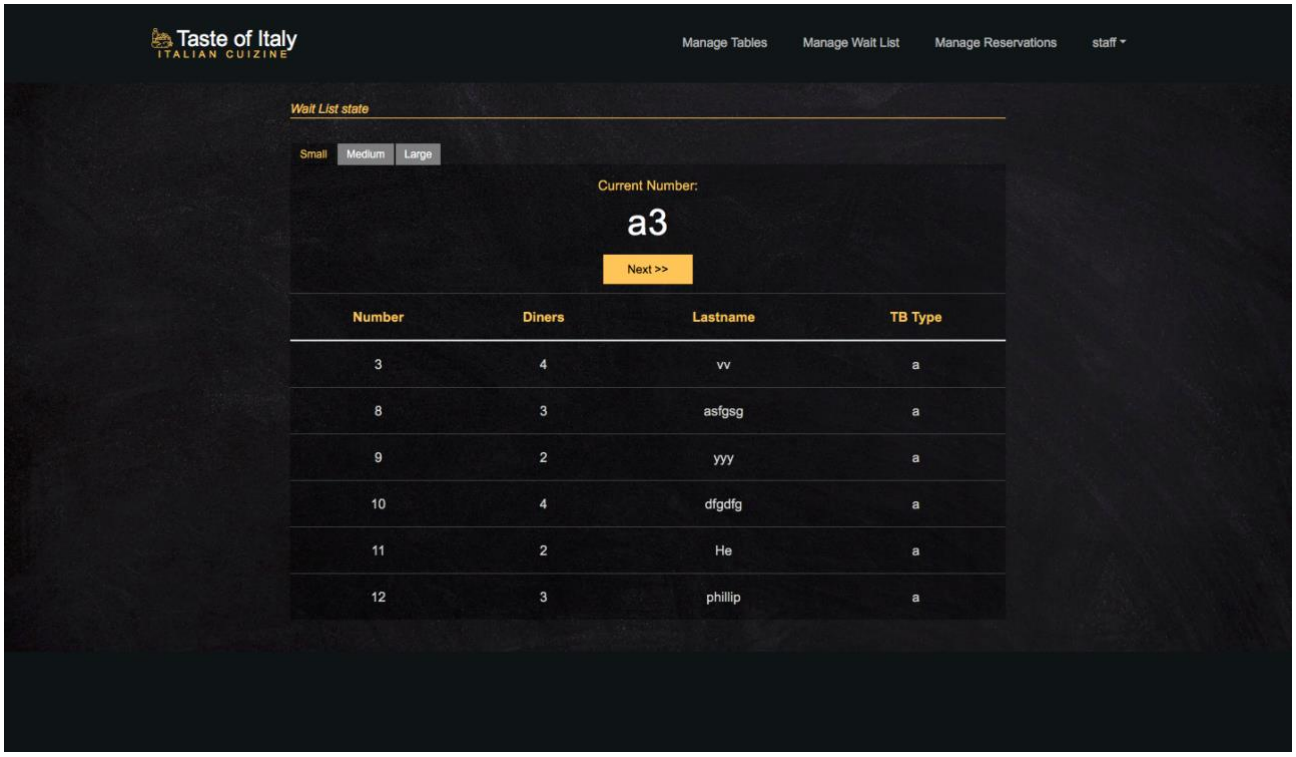

Figure 14. Page for managing the wait list.

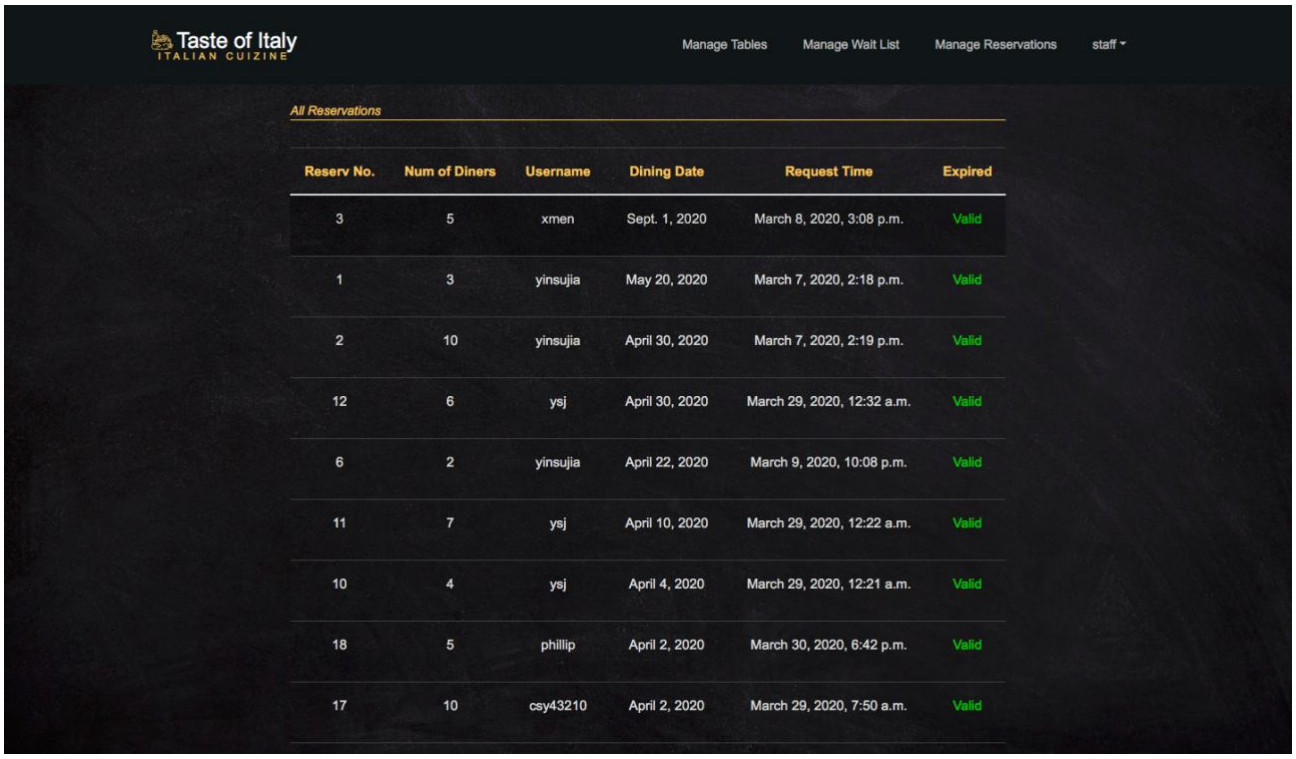

Figure 14. Page for managing all the reservations.

4.1.3 User Interfaces for Restaurant Manager

The website provides users as a restaurant manager with the following functions, including managing tables, managing wait list, managing reservations.
Figure 15 shows the log in page for the superuser. The superuser needs to enter his/her unique login credentials to log in. After the superuser logging in successfully, the superuser will be navigated to the Site Administration page (Figure 16).
The superuser can manage the authority of other superusers (Figure 17).
The superuser can manage other users in Users page (Figure 18). Clicking a specific user, the superuser can edit his/her profile, including username, first name, last name, password, email an category (Figure 19). The superuser can also delete this user and view the history profile.
The superuser can manage all the reservations (Figure 20). The superuser can view the rsv number, table ID, user, date and rsv time. And the superuser can change the state, id of the reserved table, number of guests, user who made this reservation, and the reservation date. The superuser can also delete any reservation (Figure 21).
The superuser can manage all the tables (Figure 22), including viewing and editing the id, capacity and state.

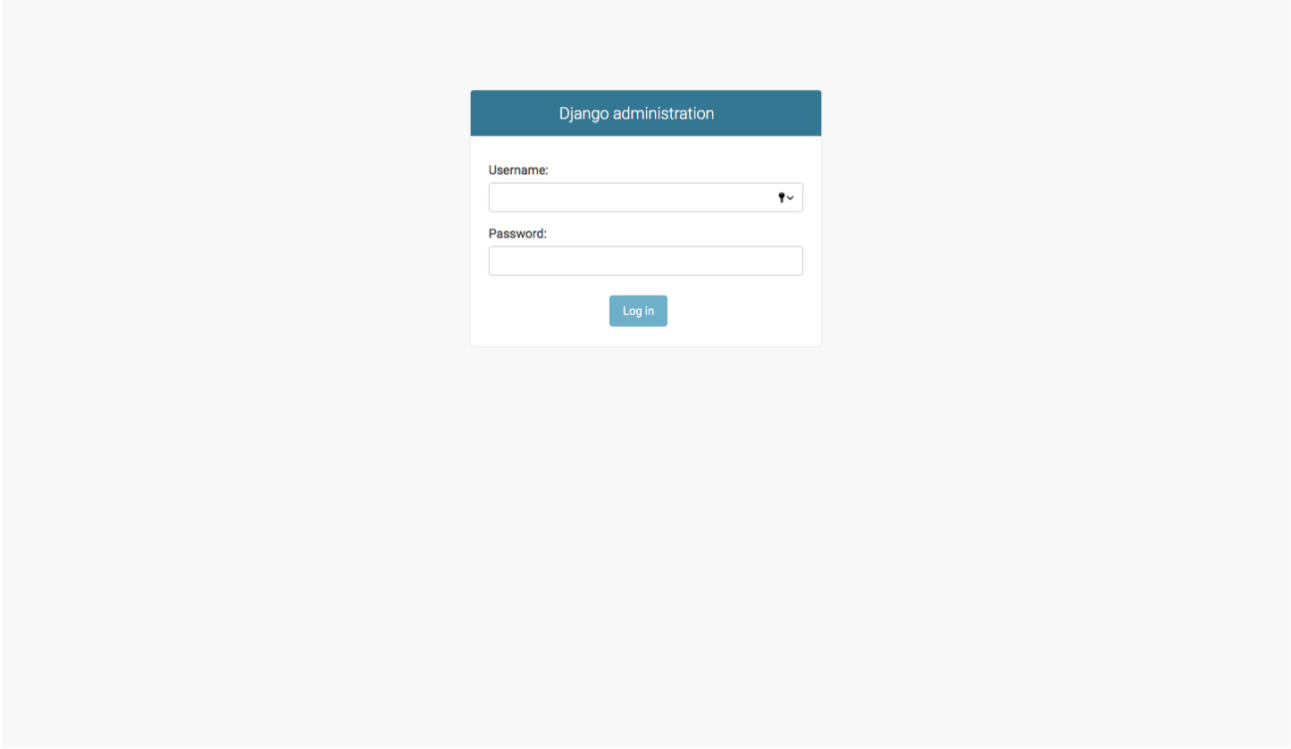

Figure 15. Page for managing all the reservations

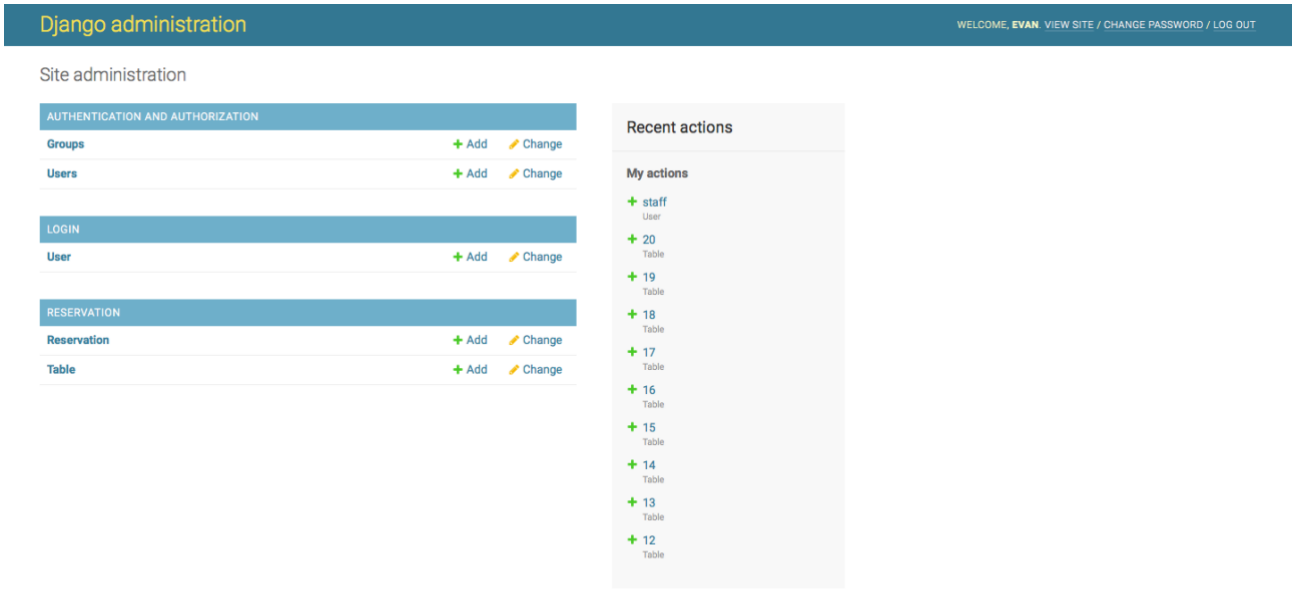

Figure 16. Page for site administration

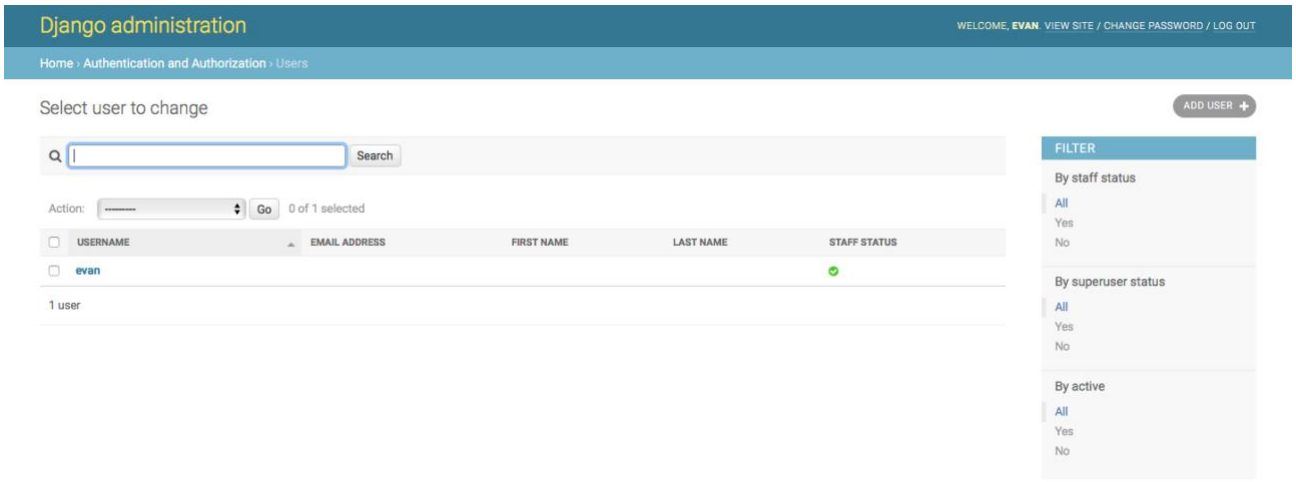

Figure 17. Page for managing superuser

Figure 18. Page for managing all the users

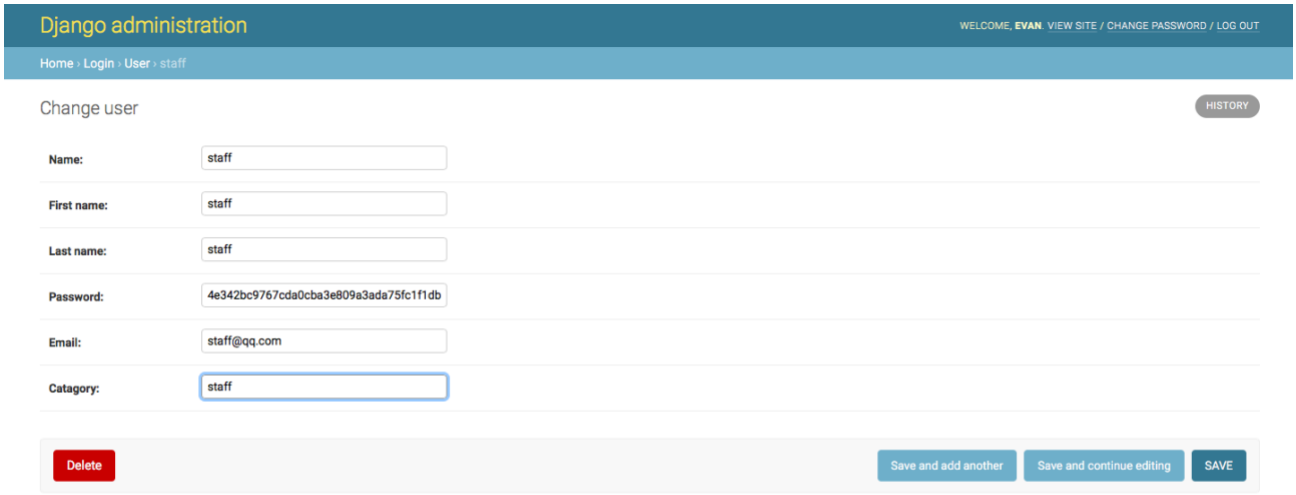

Figure 19. Page for managing a specific user

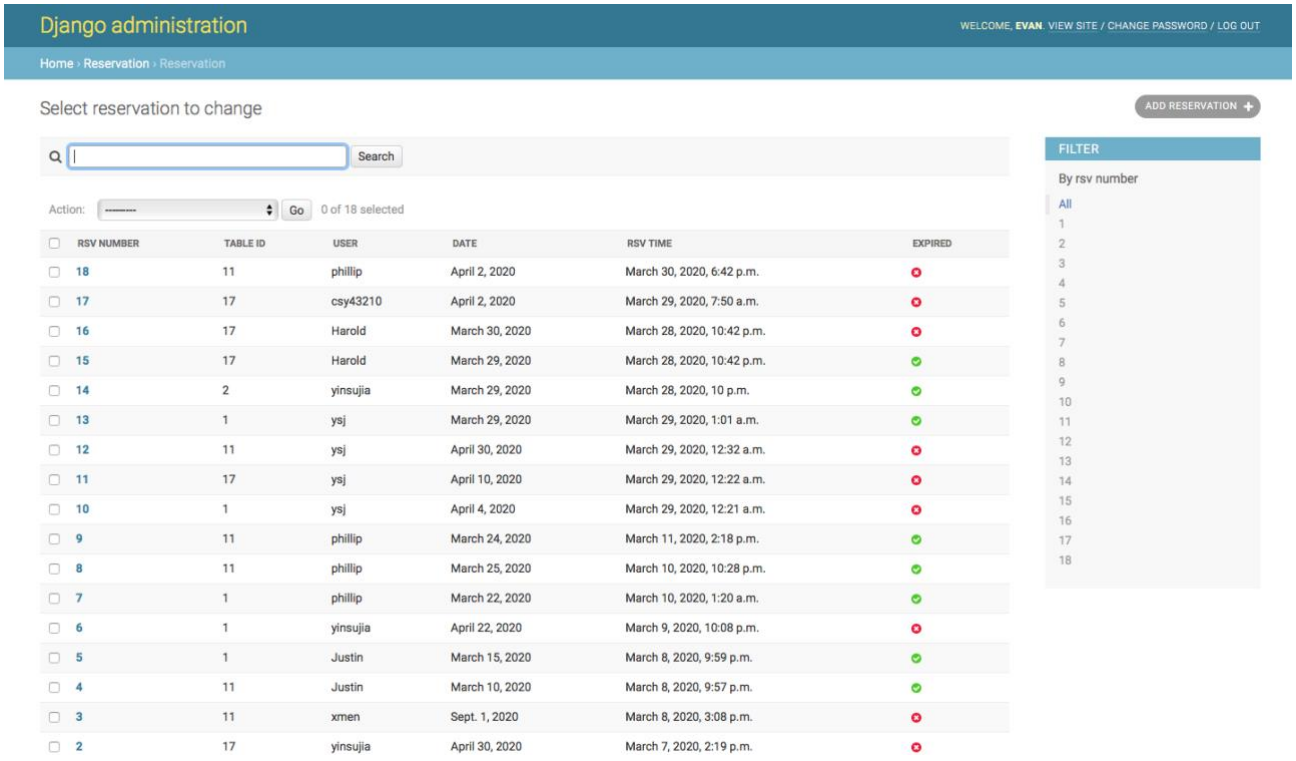

Figure 20. Page for managing all reservations

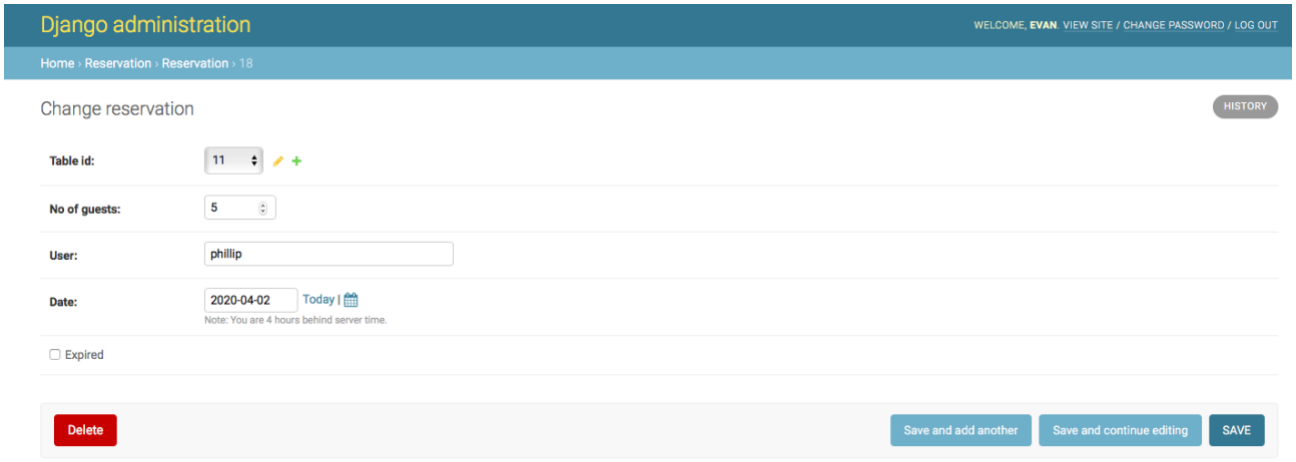

Figure 21. Page for managing a specific reservation

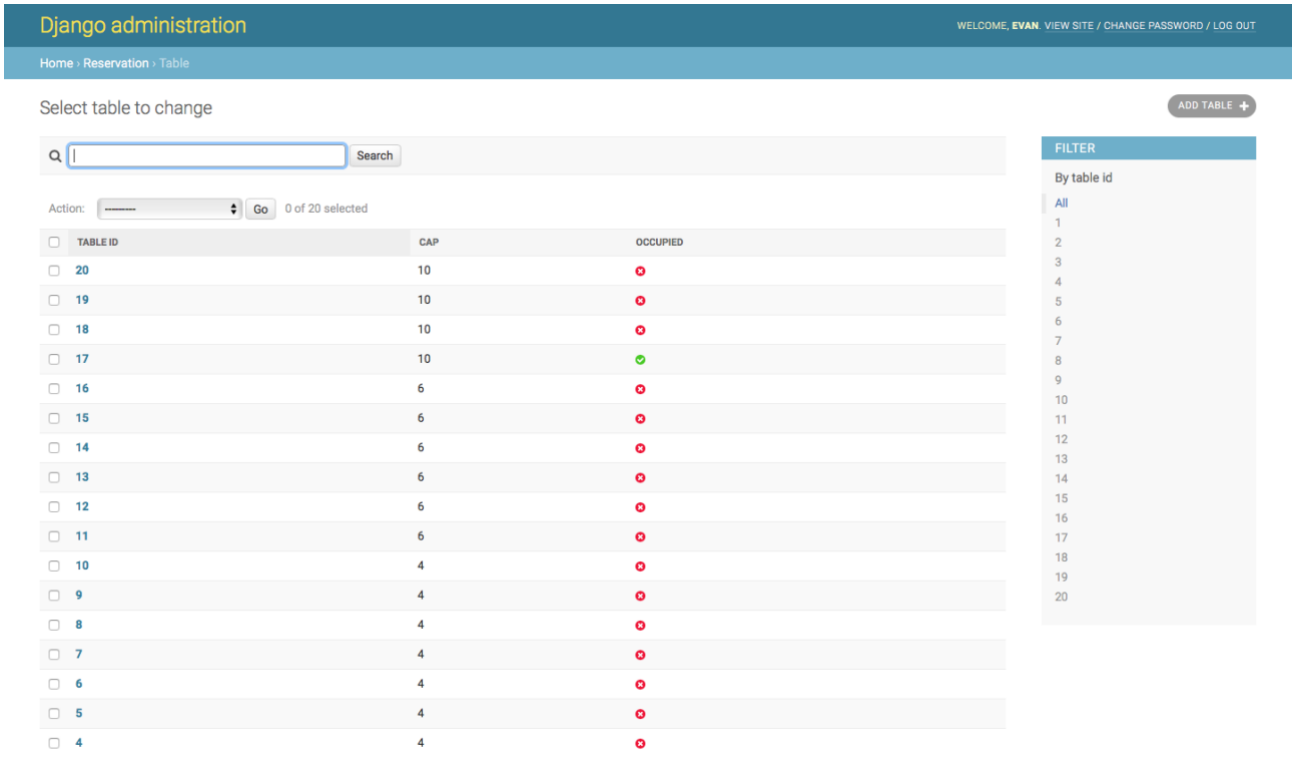

Figure 22. Page for managing all tables

4.2 Hardware Interfaces

There is no hardware involved in this system, so no requirements on hardware interfaces need to be specified.

4.3 Software Interfaces

A relational database is used to store data like user information, menu, reservation records, orders and guest wait lists. The database is implemented and runs on a remote server.
In terms of implementation, a flexible framework and tools are utilized to assist the development of the software interaction module.

4.4 Communications Interfaces

HTTP is used as the communication protocol for data transmission. We will implement different semantics such as GET, POST, PUT, DELETE and PATCH.
For security purposes, user information will be protected with encryption.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

- Speed - The system will have a response time of less than 1 second for any given operation, including those performed by the system admin, the doctor, or the patient
- Availability - The system will not be unavailable for more than 10 minutes per month
- Throughput - The system will handle transactions of up to 2000 users without reduction in the speed

5.2 Safety Requirements

TBD

5.3 Security Requirements

- Authentication - Only authorized users can access data and the level of access must be controlled by assigning credentials to user profiles
- Confidentiality - All the data must be encrypted to prevent unauthorized use in case of a data leak

5.4 Software Quality Attributes

All of the software that makes the product must follow software engineering principles in the following preference:

- Availability
- Correctness
- Testability
- Maintainability
- Usability

Other principles that should be observed are: adaptability, flexibility, interoperability, portability, reliability, reusability, and robustness. Specific details on these requirements will be added soon.

6. Other Requirements

TBD

Appendix A: Glossary

TBD

Appendix B: Analysis Models

TBD

Appendix C: Issues List

TBD