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Group: CEN 3.1 A

## **Web Applications Design – Orchestra Booking Tickets**

Year: 3

Date: 09.06.2020

## **1. Describe the role and objectives of your application. Specify detailed requirements for your application.**

The objective of my application is that to encourage more peoples to spend their free time at the local orchestras, making the booking system more efficient and in handy for the most of the users.

Orchestras and cultural movements are fading away because the majority of the peoples think that are outdated and no more in trend, but making the booking system online and promoting the Philharmonic's in the online environment can give significant results and revive this domain.

Therefore, this web application serves to drive more traffic to the public Philharmonic market by convincing more people to book their tickets online, from the comfort of their homes.

In the following section will be presented the fundamental actions and functional requirements of this application:

The application has 3 main roles: Admin, User and Guest:

### **User role:**

- It is considered a user when a person registered an account in the web application and logged in successfully
- The user can see all the available orchestras and also the location, lead artist, instruments and more details about a specific orchestra
- the user is allowed to choose a seat in the building where the orchestra will take place
- after the user book a seat successfully, then the entry is added in the history orchestras page where he can track the progress of the orchestra and when will take place
- after an orchestra was done, on the status column form that specific orchestra, will be set to "Completed"

- when an orchestra event was completed the user can leave a rating also, stars in the range of 1 to 5
- the user can also check some gallery photos of past orchestra events and make an impression
- The user can contact the administrator by sending an email through the Contact page area

**Guest role:**

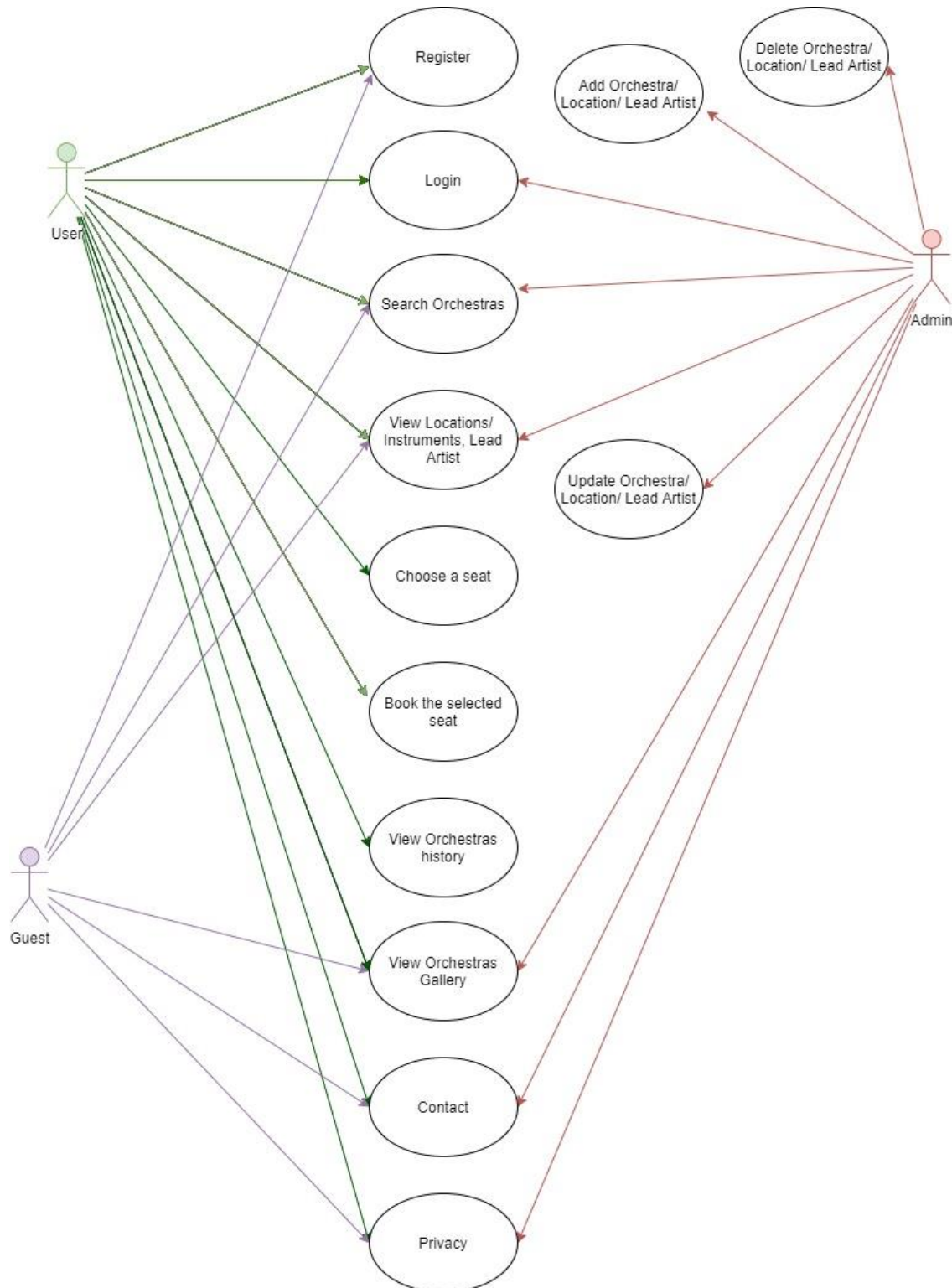
- The guest has limited restrictions on the site because he/she does not have an account
- The guest can search and explore the available orchestras and check the details of some specific orchestra events but they can't make a booking
- the guest can also see the gallery with past orchestra events
- the guest can contact the admin and ask some questions or to get some solutions related to registering or logging in

**Admin role:**

- This role is designed to control the entries in the database and is allowed to make changes like Create/Update/Delete
- The admin can add a new orchestra entry with specific locations, lead artists, instruments and more
- The admin can answer or communicate with the users through the contact page area
- The admin can post new gallery photos with the past orchestra events

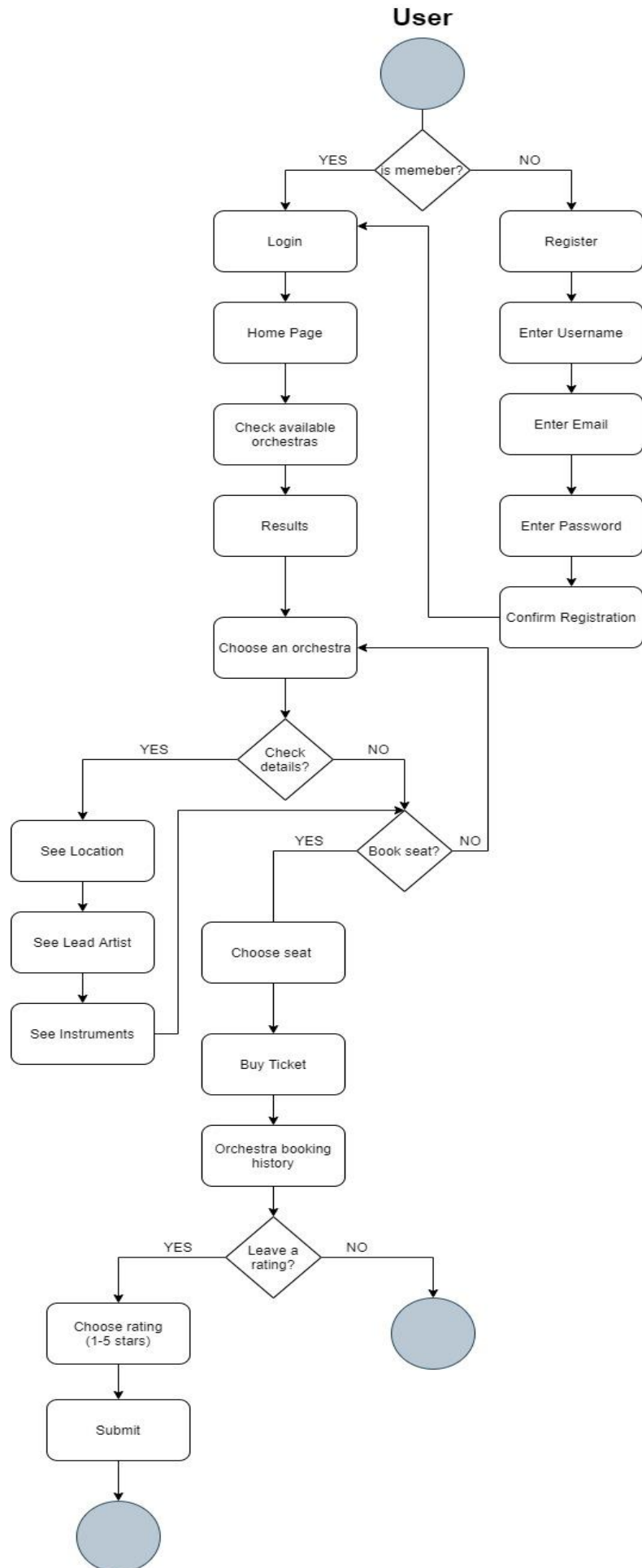
**2. Model your application by means of UML diagrams (Use case diagrams, Activity diagrams, Class diagrams, State machine diagrams, Hypertext structure models, Access models, Presentation pages, Interaction overview diagrams, Sequence diagrams)**

- Use case diagram:**

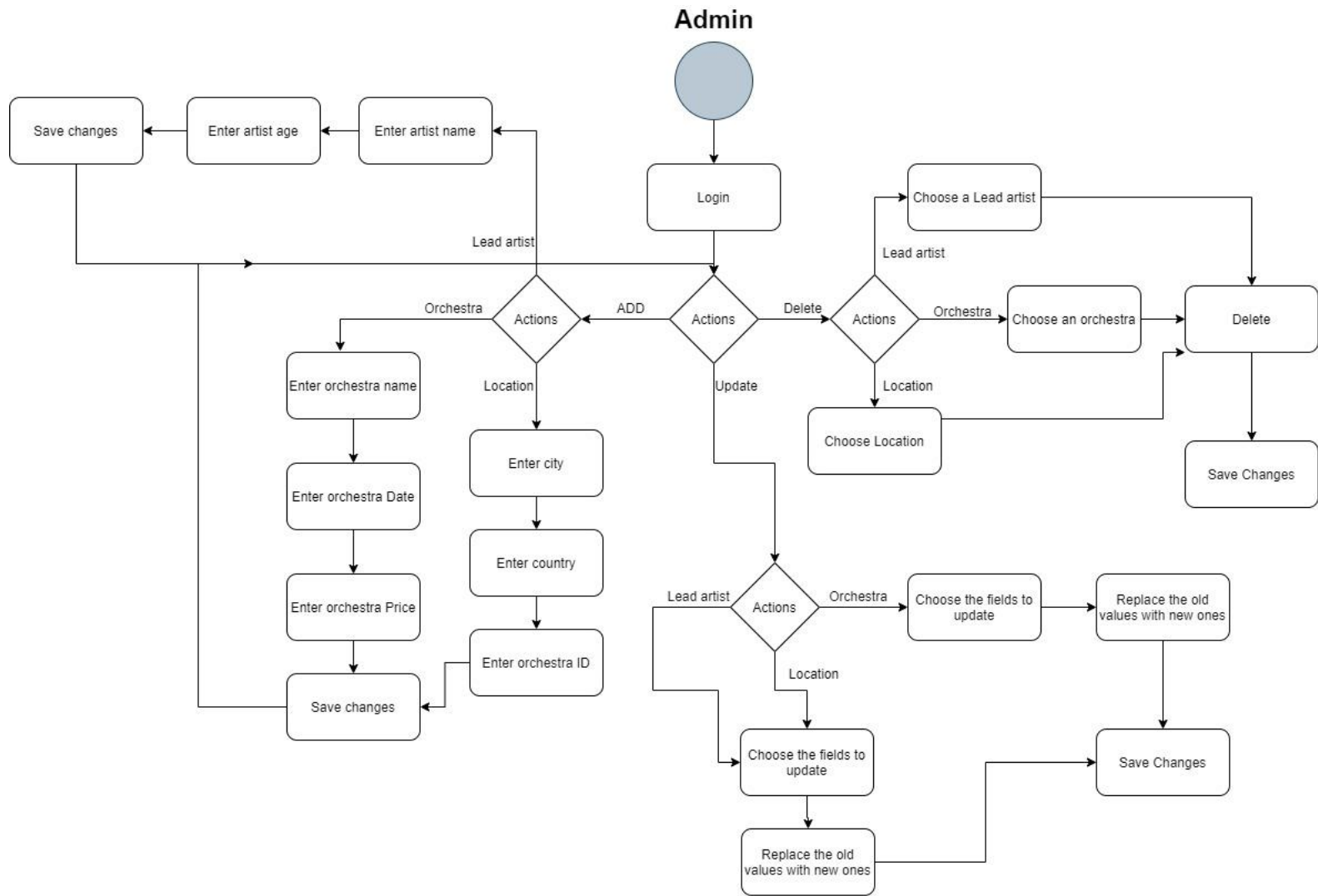


- Activity Diagrams:

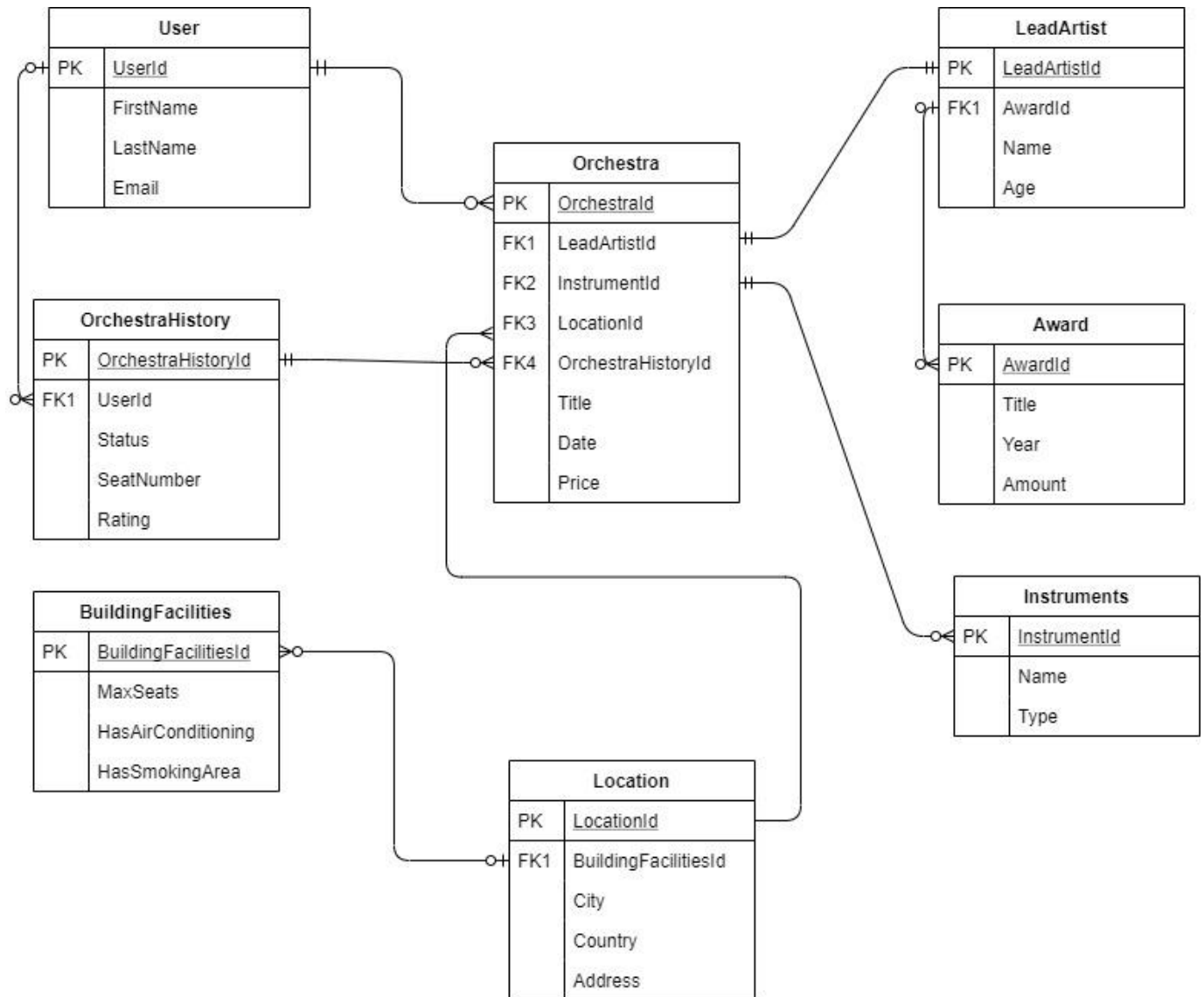
- User:



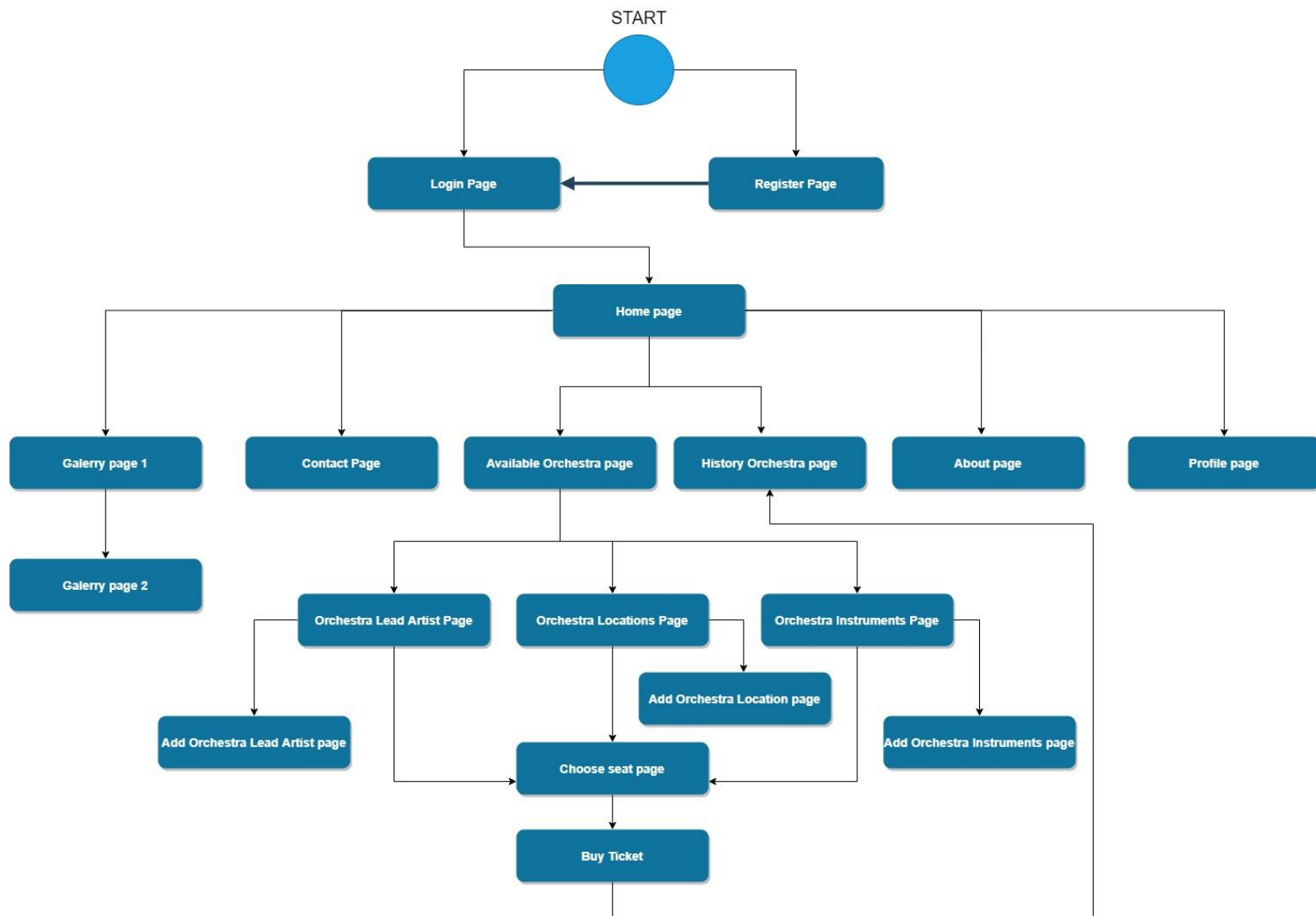
## - Admin:



- Access models diagram

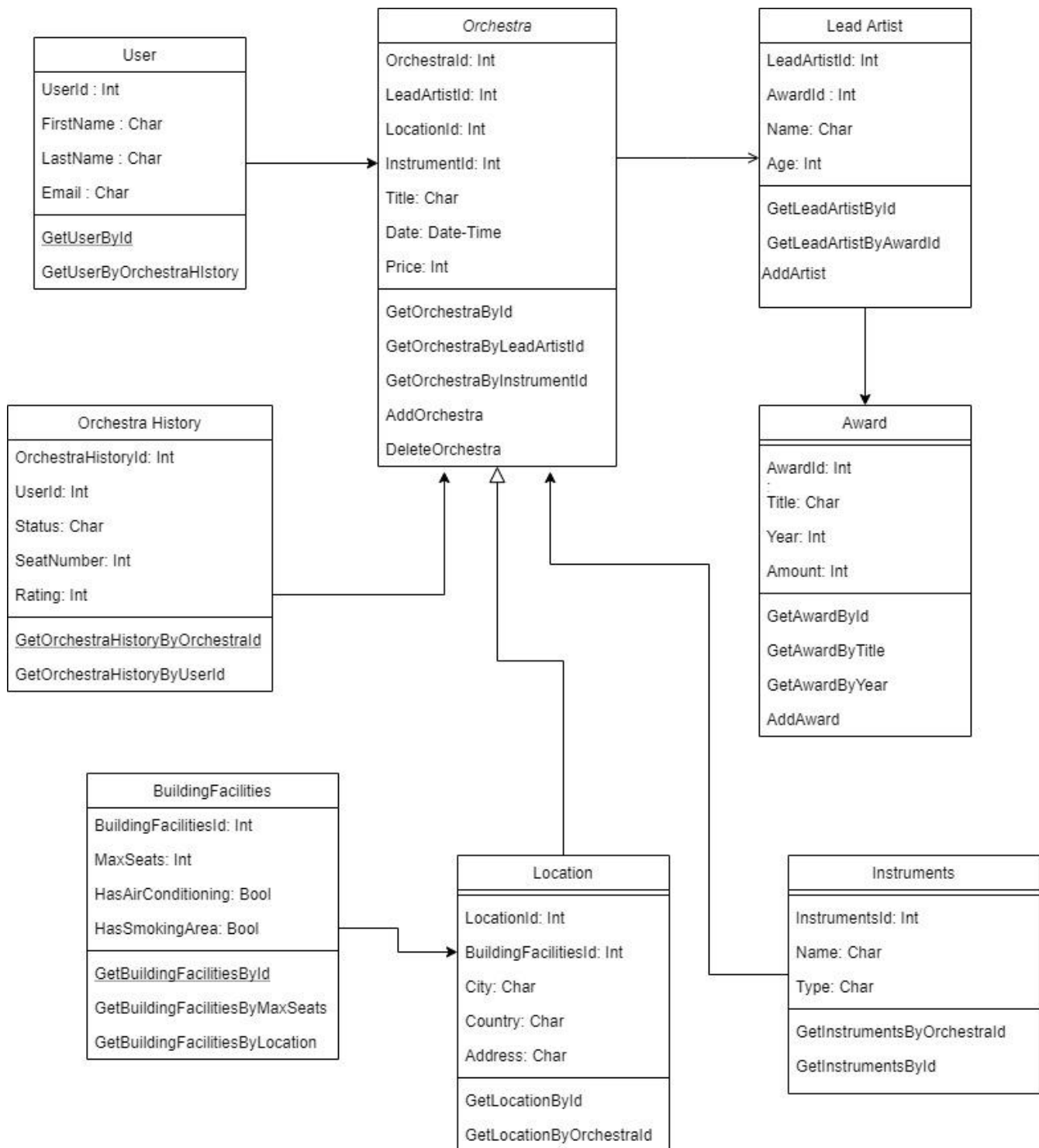


- **Presentation pages diagram**



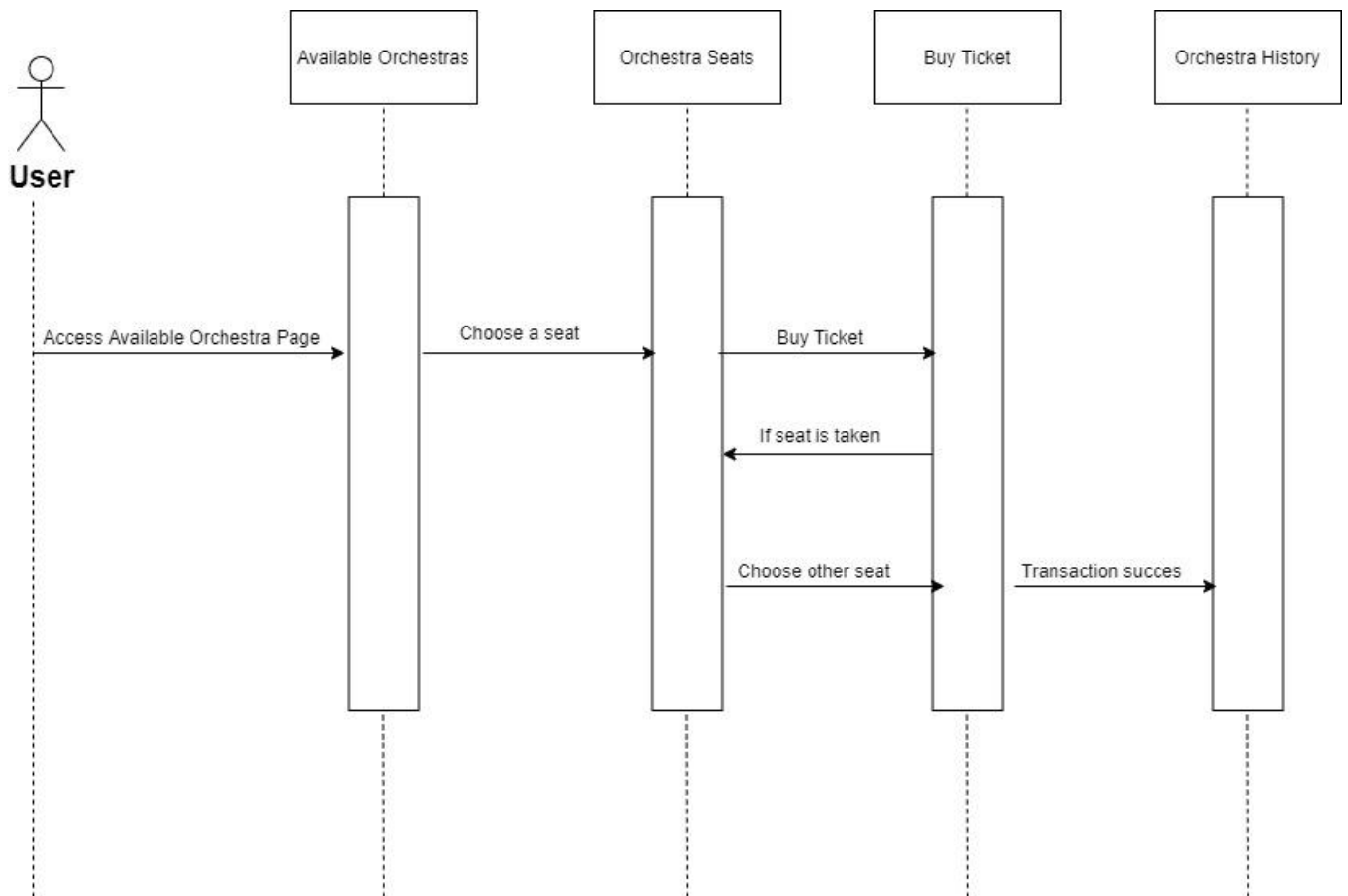


- **Class diagram:**

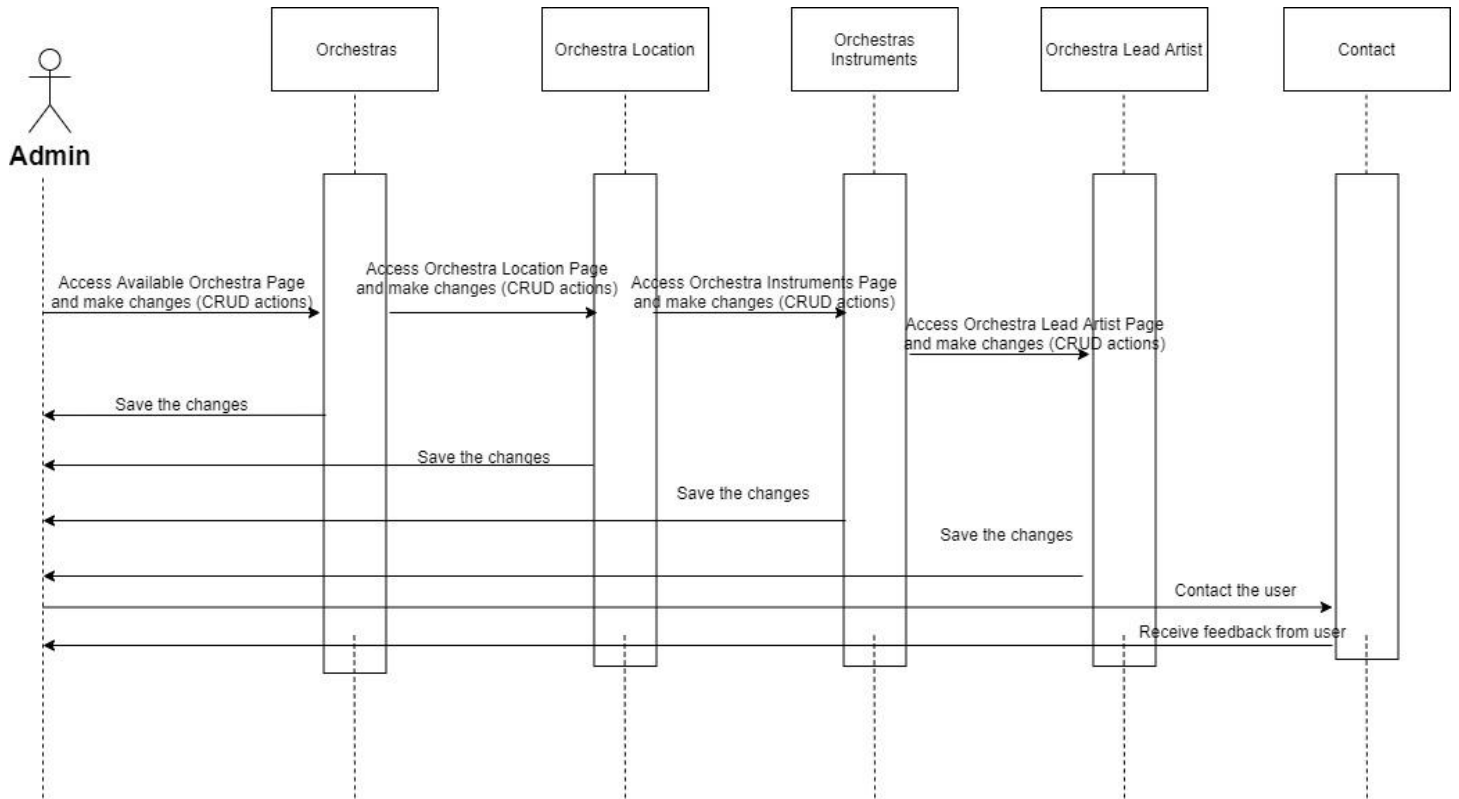


- **Sequence diagram:**

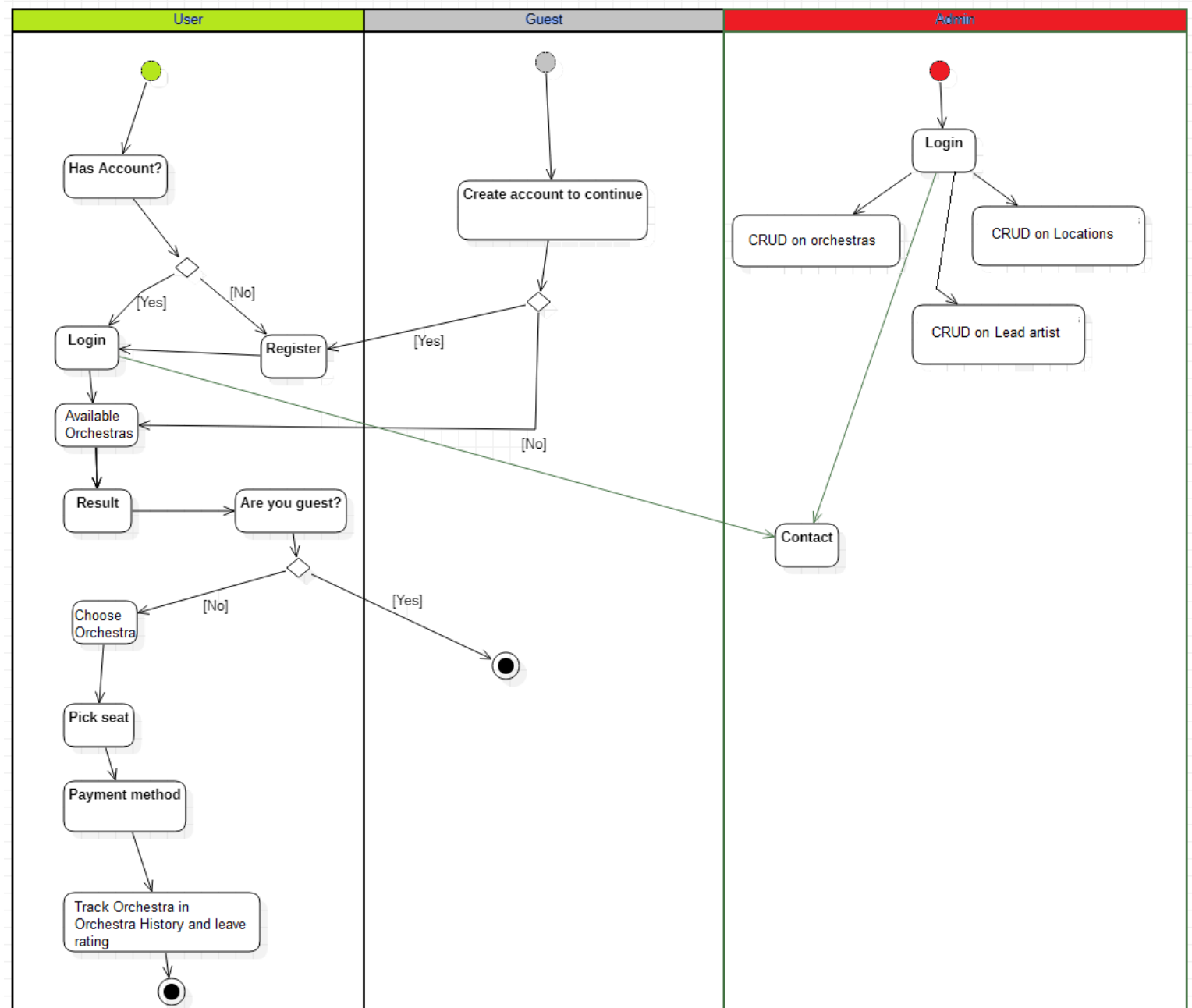
**- User:**



## - Admin:



- Interaction overview diagram:



### **3. Describe the system architecture and database structure for your application (including diagrams).**

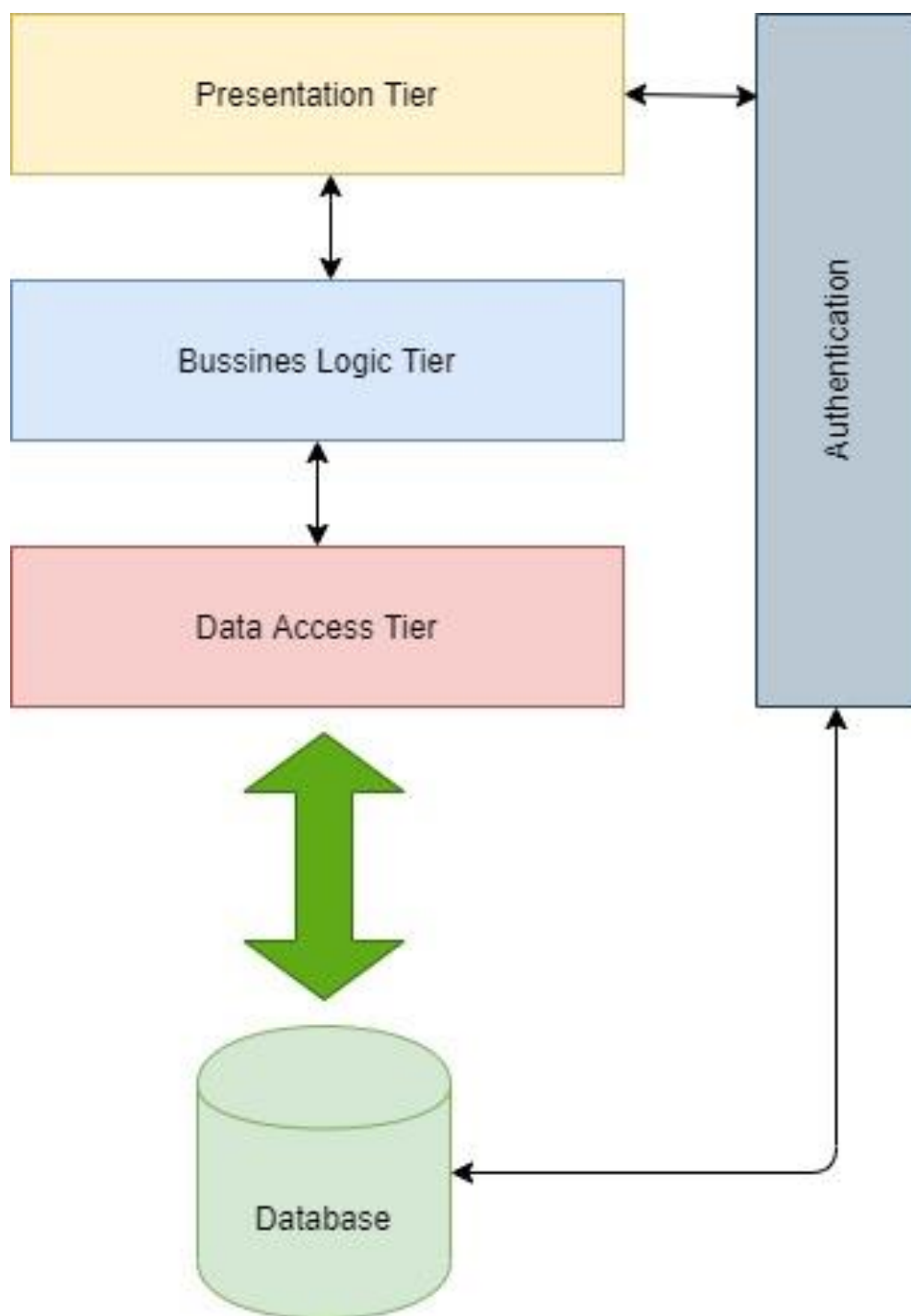
The layered architecture pattern manages the system into 3 main layers with related functionality for every layer. These layers are represented by the Presentation layer that represents the computer program, which the users interact with an application and contains the Shared UI code, used to represent information to the user.

Business logic Tier is principally working as a connection between Data Access Tier and Presentation Tier. All the knowledge passes through the Business Logic Tier before passing to the presentation Tier. Business Tier is that, the sum of Business Logic Layer, Data Access Layer and Value Object and also other components accustomed to be added at the business logic.

The business logic uses the Repository pattern that permits better further modifications and an excellent application maintenance over time because the functionalities are modular, using interfaces to create the implementation more efficient.

Data Access Tier is that the server which stores all the application's data. Data access tier contents Database Tables, XML Files and other means of storing Application Data. Authentication is formed using the ASP.net Identity system that's pretty safe and encrypts the user password using hashing.

The authentication system filters the Presentation tier counting on the role of the customer, there may be 3 roles: Admin, User and Guest and provides different access type to the database. For example, the user can only see the retrieved data from the database but the Admin may modify the data from the database using the C.R.U.D actions.

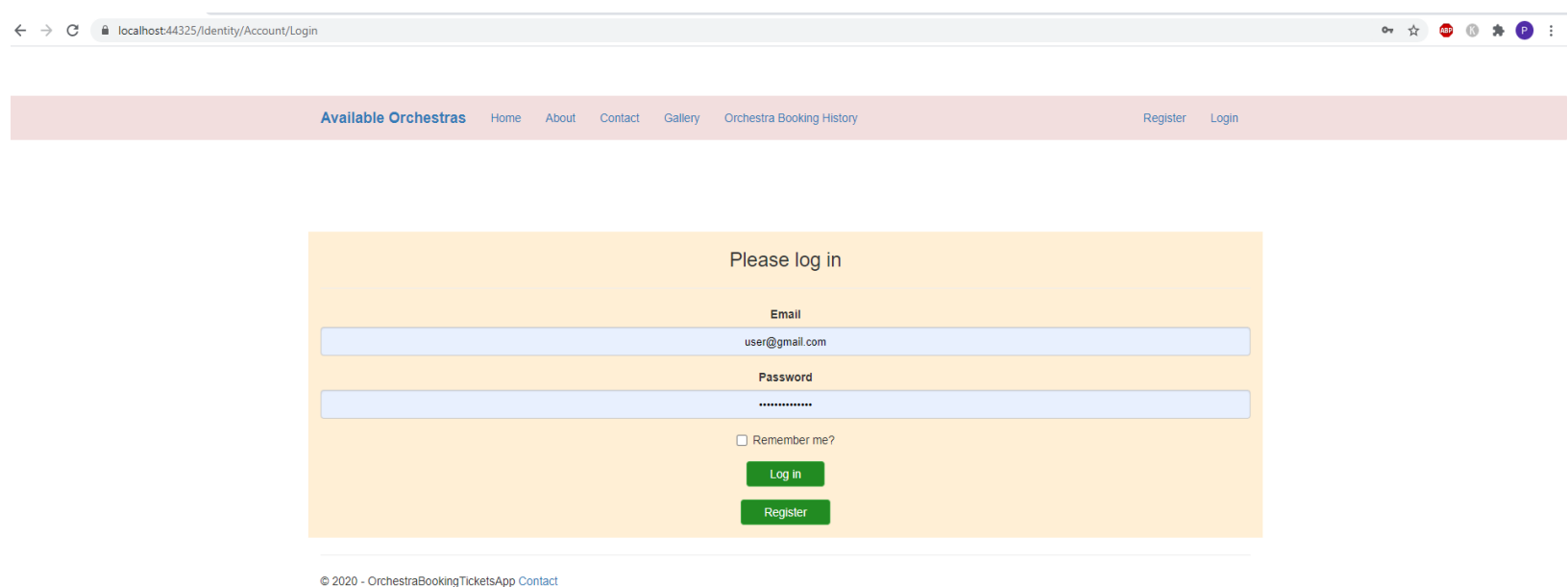


#### 4. Describe the implemented functionalities of your application and illustrate them with screenshots.

The implemented functionalities will be represented by the 3 roles:

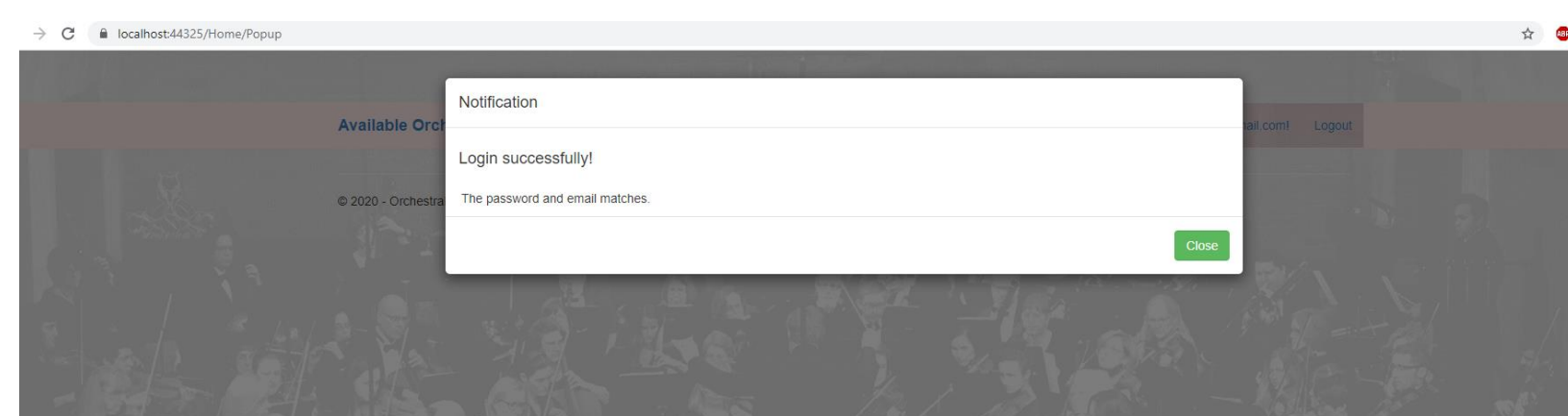
##### User:

A person that is present on the website is considered a user when it is registered and can enter in its account successfully

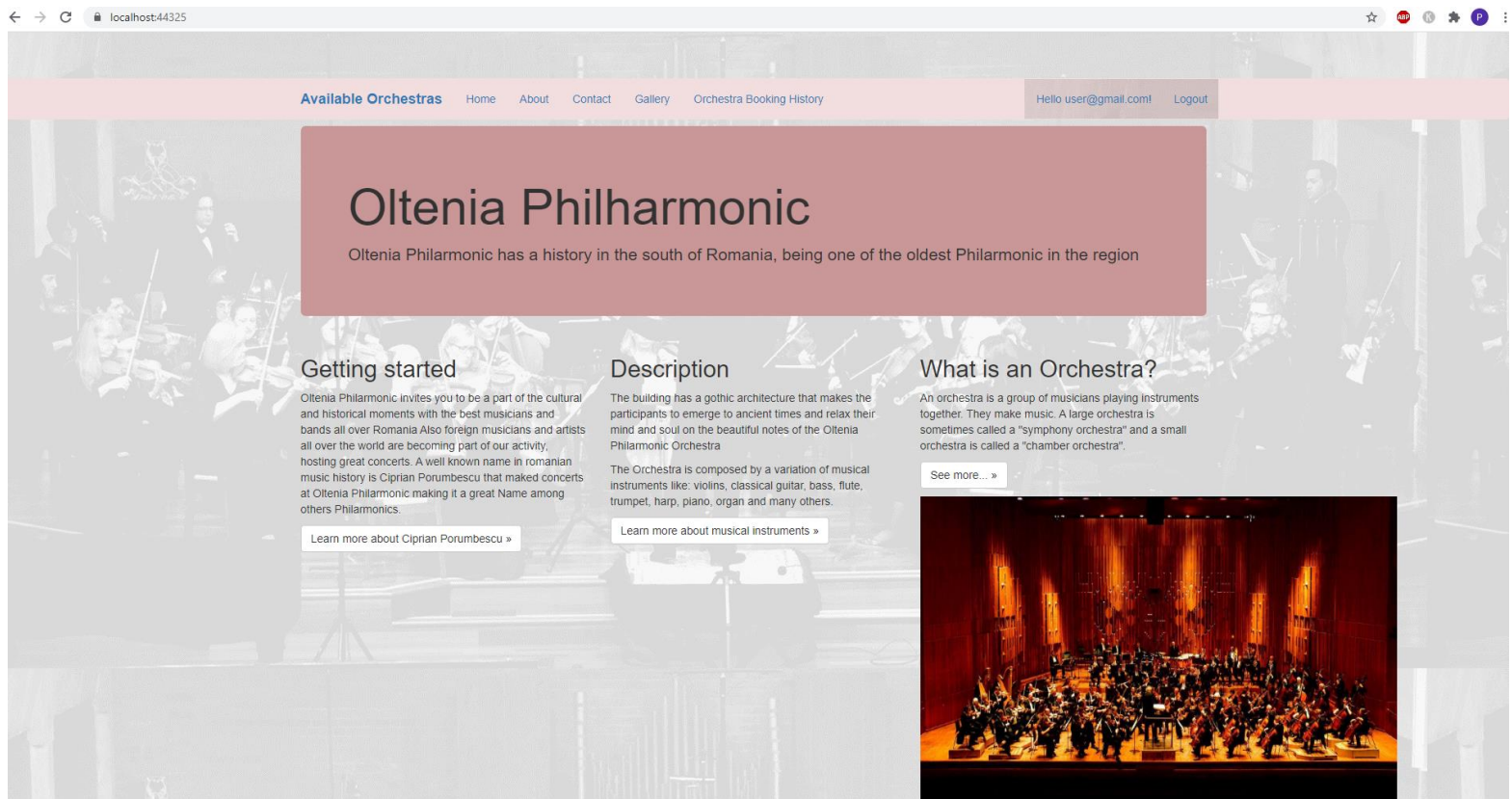


The screenshot shows a web browser window with the address bar displaying 'localhost:44325/Identity/Account/Login'. The page has a navigation bar with links: 'Available Orchestras', 'Home', 'About', 'Contact', 'Gallery', 'Orchestra Booking History', 'Register', and 'Login'. The main content area is a light orange box titled 'Please log in'. It contains two input fields: 'Email' with the value 'user@gmail.com' and 'Password' with masked characters '\*\*\*\*\*'. Below the password field is a checkbox labeled 'Remember me?'. There are two green buttons: 'Log in' and 'Register'. At the bottom of the page, there is a footer that reads '© 2020 - OrchestraBookingTicketsApp Contact'.

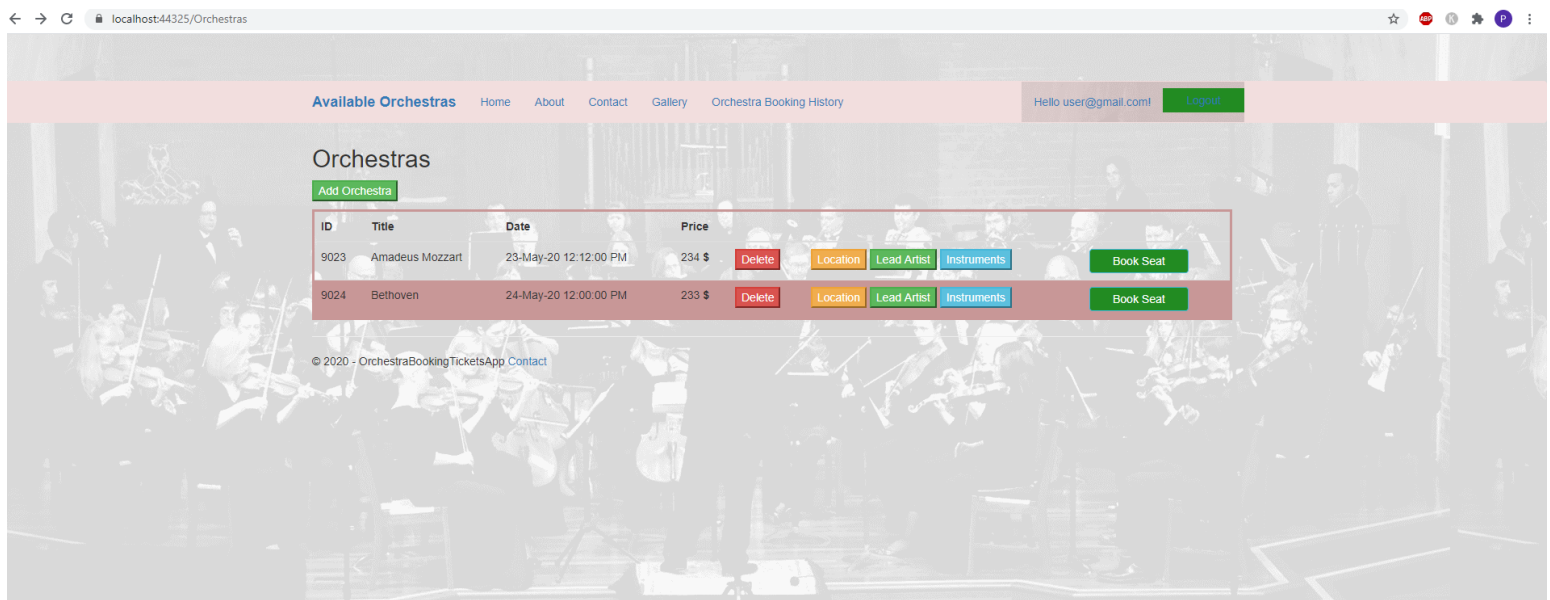
A pop up will appear that will notify the user that the login was successfully.



The user is logged in the account and can explore the homepage:



If the user presses the “Available Orchestras” tab a page like this will appear:





- He can see all the available orchestras until now and can see detailed information about a specific orchestra by clicking the three buttons:

- “Locations” – to see the actual location where the orchestra event will take place

This is an example of the location for the “Amadeus Mozart” Orchestra.

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

## Orchestra location

[Create New](#)

City	Country	Address	
Craiova	Romania	Bd Nicolae	<a href="#">Create New</a>

[Back](#)

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- “Lead Artist” - to see the lead artist of that specific orchestra

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

## The lead artist in the Orchestra

[Create New](#)

Name	Age	Orchestra Title
Matei	56	Amadeus Mozzart

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The lead artist Age, Name and also the Orchestra title is specified here to remember the user at which orchestra corresponds this Lead artist.

- “Instruments” – to see the instruments that will be used at that respective orchestra event to make the user more excited about the experience

#### Available Orchestras

[Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#)

Hello user@gmail.com!

[Logout](#)

### Instruments in the orchestra

[Create New](#)

Name	Type	Orchestra
Drums	Percussion	<a href="#">Edit</a>   <a href="#">Details</a>   <a href="#">Delete</a>
Violin	Strings	<a href="#">Edit</a>   <a href="#">Details</a>   <a href="#">Delete</a>
Harp	Strings	<a href="#">Edit</a>   <a href="#">Details</a>   <a href="#">Delete</a>
Flute	Aerophone	<a href="#">Edit</a>   <a href="#">Details</a>   <a href="#">Delete</a>

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- The user is **NOT** allowed to Add/Delete/Update a new Orchestra, Location, Lead Artist or Instruments (I displayed with an X on the buttons), the following message will appear if he/she try to hit the “Create new” or the following buttons in the application:

#### Available Orchestras

[Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#)

Hello user@gmail.com!

[Logout](#)

### Orchestras

[Add Orchestra](#)

ID	Title	Date	Price				
9023	Amadeus Mozart	23-May-20 12:12:00 PM	234 \$	<a href="#">Delete</a>	<a href="#">Location</a>	<a href="#">Lead Artist</a>	<a href="#">Instruments</a>
9024	Bethoven	24-May-20 12:00:00 PM	233 \$	<a href="#">Delete</a>	<a href="#">Location</a>	<a href="#">Lead Artist</a>	<a href="#">Instruments</a>

[Book Seat](#)

[Book Seat](#)

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#### Available Orchestras

[Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#)

Hello user@gmail.com!

[Logout](#)

### Orchestra location

[Create New](#)

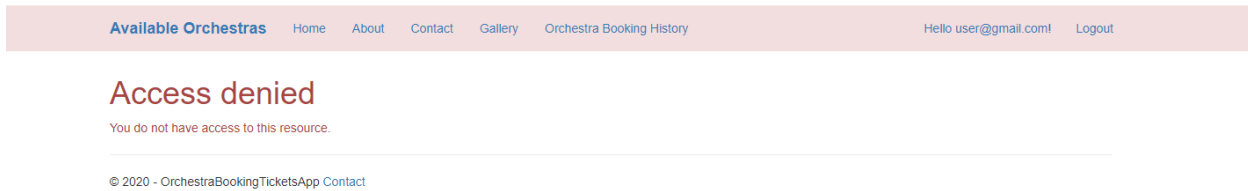
City	Country	Address
Craiova	Romania	Bd Nicolae

[Create New](#)

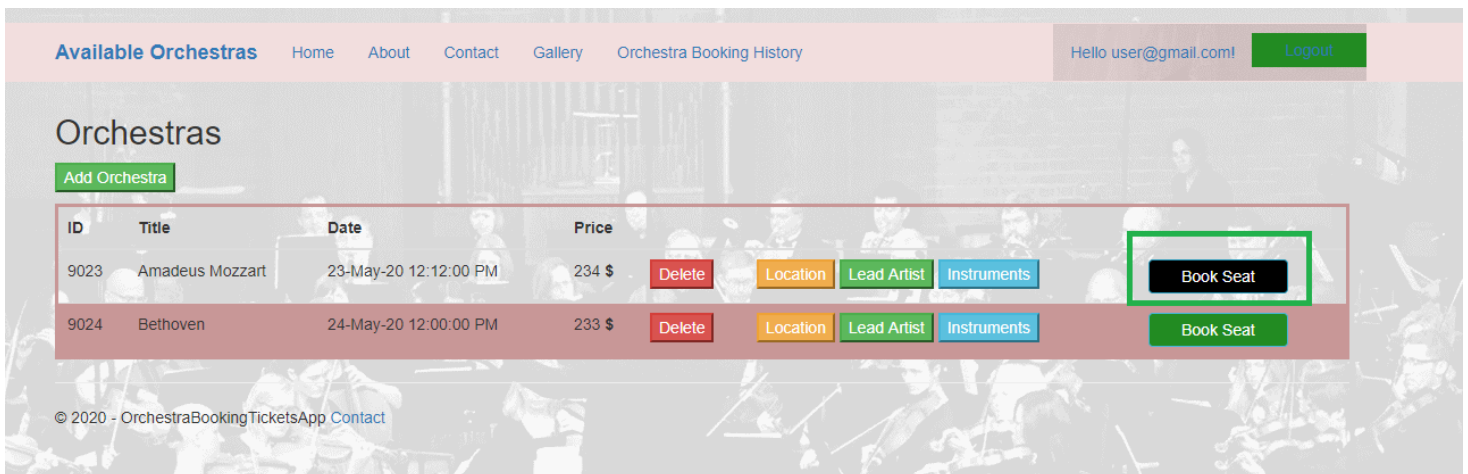
[Back](#)

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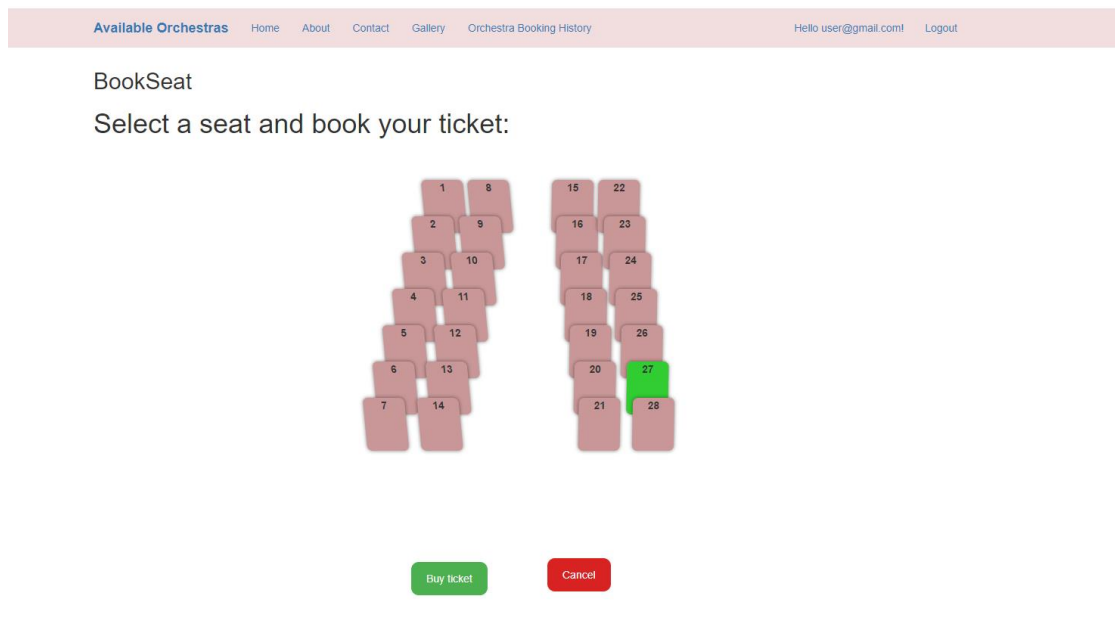
The following message will appear:



- Let's make a new booking, let's say the user choose the "Amadeus Mozart" orchestra and he must press the "Book Seat" button in order to proceed further to the seat selection:



After that the seat selection page will be displayed and the user must choose a seat and press the "Buy ticket" button.



The entry will be found on the Orchestra history page as can be seen below:

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

### Orchestra history

Status	Seat Number	Rating		
In Progress	17	5	5 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	7	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	25	5	5 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
In progress	26	3	3 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	26	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	27	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>

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Initially the rating is 0 but it can be updated using the dropdown near the “Rate” button. Let’s try to give a rating to this new booking:

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

### Orchestra history

Status	Seat Number	Rating		
In Progress	17	5	5 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	7	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	25	5	5 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
In progress	26	3	3 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	26	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>
Completed	27	0	0 ▾ ★ <a href="#">Rate</a>	<a href="#">Delete</a>

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After we hit that “Rate” button the rating will be changed to 5, as we selected in the dropdown menu:

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

### Orchestra history

Status	Seat Number	Rating		
In Progress	17	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	7	0	<div>0★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	25	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>
In progress	26	3	<div>3★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	26	0	<div>0★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	27	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>

[Back](#)

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Let’s try to delete this entry, so it will appear like this:

[Available Orchestras](#) [Home](#) [About](#) [Contact](#) [Gallery](#) [Orchestra Booking History](#) Hello user@gmail.com! [Logout](#)

### Orchestra history

Status	Seat Number	Rating		
In Progress	17	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	7	0	<div>0★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	25	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>
In progress	26	3	<div>3★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	26	0	<div>0★<a href="#">Rate</a></div>	<a href="#">Delete</a>
Completed	27	5	<div>5★<a href="#">Rate</a></div>	<a href="#">Delete</a>

[Back](#)

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## Delete

Are you sure you want to delete this?

OrchestraHistory

[Delete](#) | [Back to List](#)



As we can see, the entry was deleted and there are 5 entries now instead of 6:

Available Orchestras Home About Contact Gallery Orchestra Booking History Hello user@gmail.com Logout

### Orchestra history

Status	Seat Number	Rating		
In Progress	17	5	5 ▼ ★ Rate	Delete
Completed	7	0	0 ▼ ★ Rate	Delete
Completed	25	5	5 ▼ ★ Rate	Delete
In progress	26	3	3 ▼ ★ Rate	Delete
Completed	26	0	0 ▼ ★ Rate	Delete

Back

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- The user can access the Orchestra Gallery of the website and enjoy beautiful pictures of the past orchestra event:

Available Orchestras Home About Contact Gallery Orchestra Booking History Hello user@gmail.com Logout

### Gallery

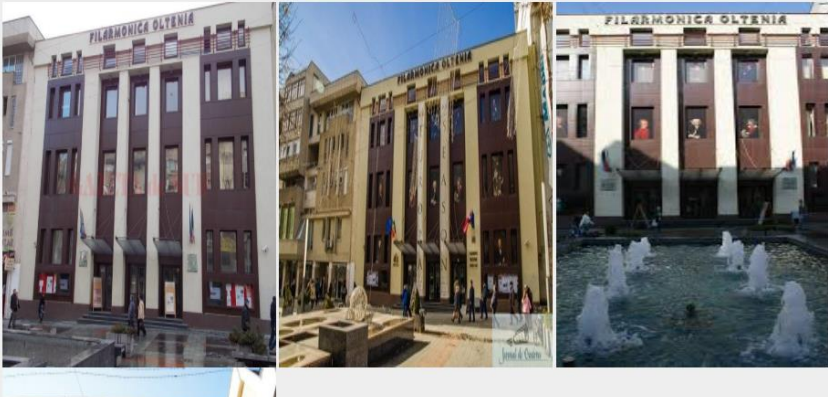
Some of the pictures with Important Philharmonics that hosted our Orchestras

### Gallery

Back Next

## Oltenia Philharmonic exterior

Oltenia Philharmonic exterior was improved and redecorated with brown and beige columns, keeping the original architecture and design



# Oltenia Philharmonic interior

Oltenia Philharmonic has a classic decoration, with an unique echo and a capacity of 500 persons



Back

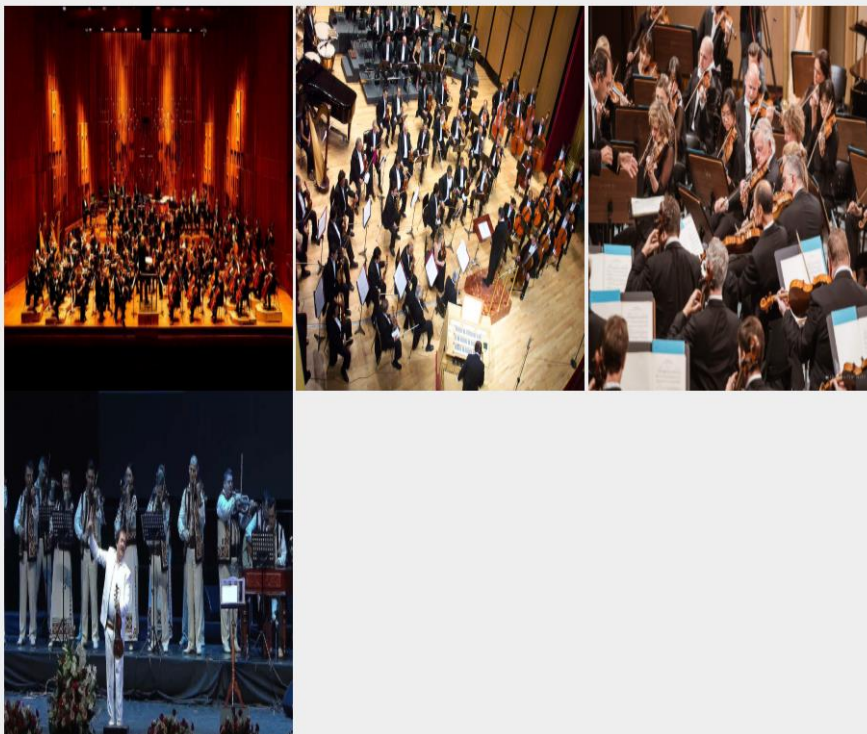
Next

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There are 2 pages, so if the user hit “Next” the second page of photos will appear:

## Oltenia Philharmonic exterior

Oltenia Philharmonic exterior was improved and redecorated with brown and beige columns, keeping the original architecture and design





# Oltenia Philharmonic interior

Oltenia Philharmonic has a classic decoration, with an unique echo and a capacity of 500 persons



[Back](#)

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- The user can also access the **Contact** page and send an email to the admin filling the following form:

**Available Orchestras**   [Home](#)   [About](#)   [Contact](#)   [Gallery](#)   [Orchestra Booking History](#)   [Hello user@gmail.com!](#)   [Logout](#)

## Contact

Send e-mail to Admin Anghel Paul:

First Name:

Last Name:

Reply E-mail:

Country:

State:

Comment:

[Send](#)   [Reset](#)   [Back](#)

© 2020 - OrchestraBookingTicketsApp [Contact](#)



The country dropdown menu has all the countries in the world and also all the states within the selected country, because it is used an external library that contains this data.

The user can press 3 buttons:

“Send”- the form will be submitted and an email will automatically be filled with all the data provided in this form, so the user must only hit again send and the admin will receive its message.

Available Orchestras Home About Contact Gallery Orchestra Booking History Hello user@gmail.com! Logout

## Contact

Send e-mail to Admin Anghel Paul:

First Name: Marius

Last Name: Mitrache

Reply E-mail: marius@student.ucv.ro

Country: Romania

State: Dambovită

Comment: I like your application!

Send Reset Back

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After pressing send the following email will be generated outside the app, so the user must only hit that highlighted send button.

Format Insert Draw Options Discard Send

From: apauldavid@yahoo.ro

To: apauldavid1@gmail.com; apauldavid2@gmail.com; Cc & Bcc

Subject

First Name=Marius  
Last Name=Mitrache  
Reply E-mail=marius@student.ucv.ro  
country=Romania  
state=Dambovită  
comment=I like your application!

Sent from Mail for Windows 10

The “Reset” button will clear all the fields that were filled by the user, and the “Back” button will take the user to the previous page.

- Another page that the user can access is the About page where he/she will read about the Privacy Policy and how its data are collected or used.

**Available Orchestras** Home About Contact Gallery Orchestra Booking History Hello user@gmail.com! Logout

## Privacy Policy

### What personal information do we collect from the people that visit our blog, website or app?

When ordering or registering on our site, as appropriate, you may be asked to enter your name, email address, mailing address, credit card information or other details so that we can provide our services to you.

### When do we collect information?

We collect information from you when you register on our site, place an order, subscribe to a newsletter, fill out a form or enter information on our site.

### How do we use your information?

We may use such information in the following ways: To personalize your experience on our site and to allow us to deliver the type of content and product offerings in which you are most interested. To improve our website in order to better serve you. To allow us to better service you in responding to your customer service requests. To administer a contest, promotion, survey or other site feature.

### Do we use "cookies"?

Yes. Cookies are small files that a site or its service provider transfers to your computer's hard drive through your Web browser (if you allow) that enables the site's or service provider's systems to recognize your browser and capture and remember certain information. For instance, we use cookies to help us remember and process the items in your shopping cart. They are also used to help us understand your preferences based on previous or current site activity, which enables us to provide you with improved services. We also use cookies to help us compile aggregate data about site traffic and site interaction so that we can offer better site experiences and tools in the future. We use cookies to: Help remember and process the items in the shopping cart. Understand and save user's preferences for future visits. Compile aggregate data about site traffic and site interactions in order to offer better site experiences and tools in the future. We may also use trusted third party services that track this information on our behalf. If you disable cookies off, some features will be disabled It will turn off some of the features that make your site experience more efficient and some of our services will not function properly.

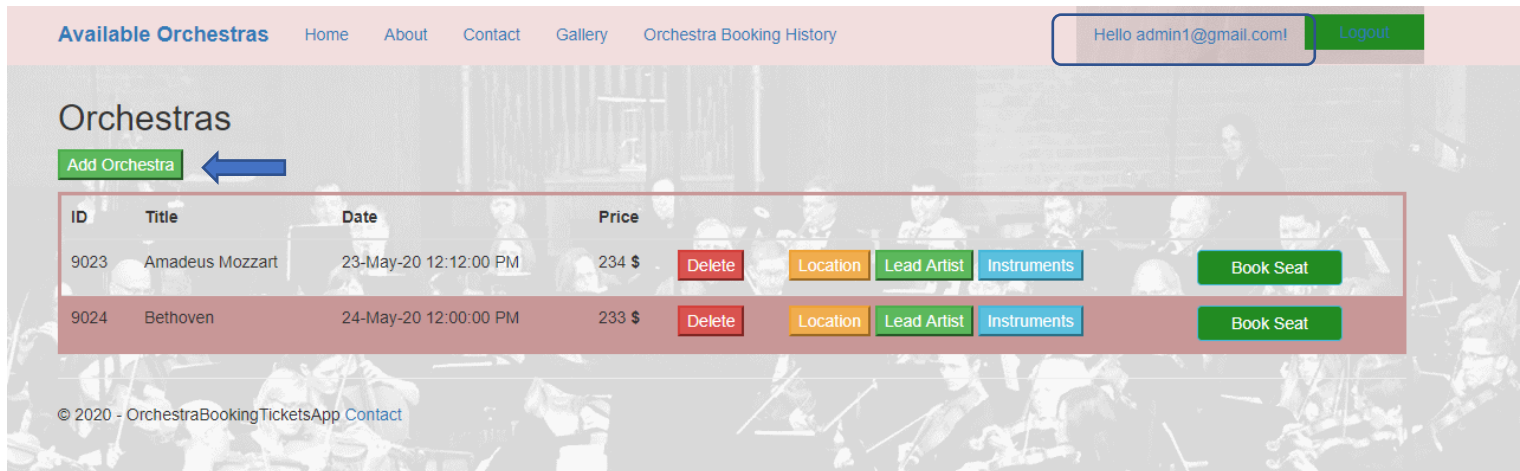
### How can you opt out, remove or modify information you have provided to us?

You can request to have your information removed by clicking on the Contact Us/Live Chat button on this or the home page. Please note that we may maintain information about an individual sales transaction in order to complete that transaction and for record keeping purposes. Disclosure Of Your Personal Information We will retain your personal information only for as long as is necessary for the purposes set out in this Privacy Policy. We will retain and use your information to the extent necessary to comply with our legal obligations (for example, if we are required to retain your data to comply with applicable laws), resolve disputes, and enforce our legal agreements and policies.

## Admin:

The Admin has an automatically generated account with username and password using the database seeder.

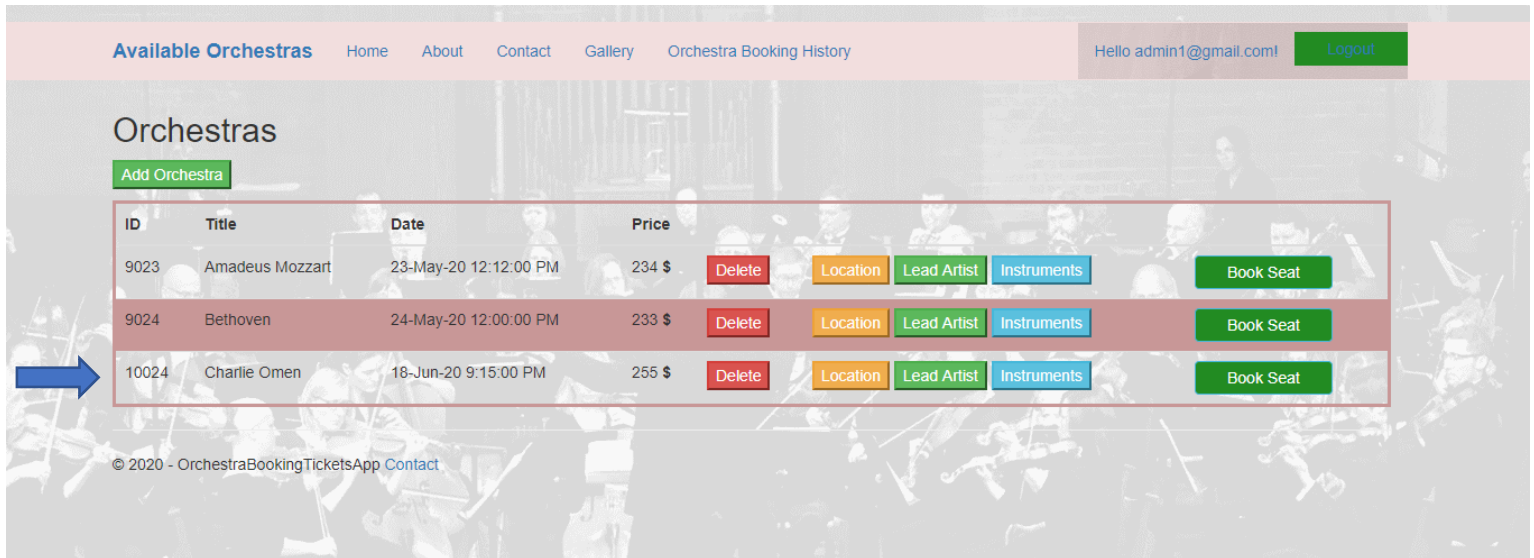
The admin can add an orchestra by pressing the “Add Orchestra button”



In this screenshot can see that we are currently in the admin account and after he/she presses the “Add orchestra” button the following form will be displayed:

The screenshot shows the 'Add Orchestra' form. The form has a title 'Add Orchestra' and a subtitle 'Orchestra Title'. Below the subtitle is a text input field containing 'Charlie Omen'. Below the text input field is a label 'Orchestra Date' and a date-time picker showing '18-Jun-2020 21:15'. Below the date-time picker is a label 'Orchestra ticket price' and a text input field containing '255'. At the bottom of the form, there are two buttons: 'Save' and 'Back'. At the bottom of the page, there is a footer with the text '© 2020 - OrchestraBookingTicketsApp' and a 'Contact' link.

I filled the boxes with some random orchestra and chose a date for it from the date time form and after the admin hits “Save” button then the new entry will be added to the available orchestras with a new generated unique ID:

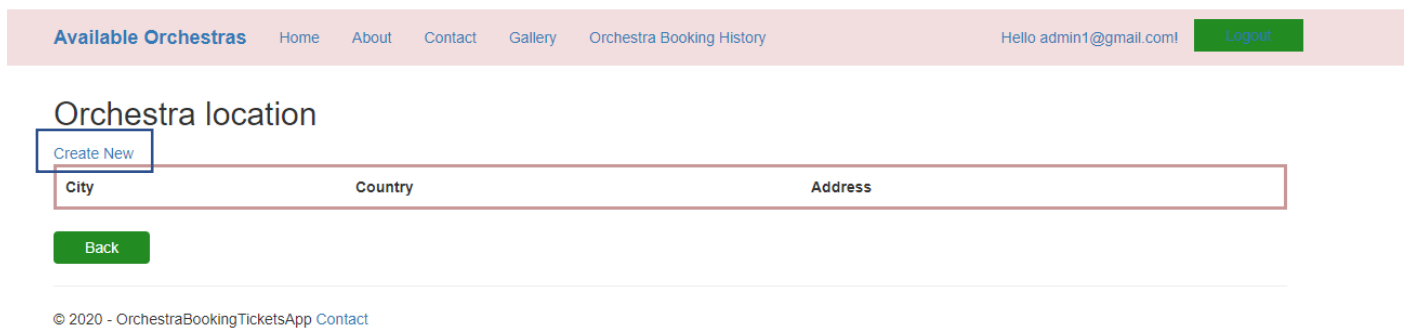


The screenshot shows the 'Available Orchestras' page. At the top, there is a navigation bar with links: Available Orchestras, Home, About, Contact, Gallery, and Orchestra Booking History. On the right, it says 'Hello admin1@gmail.com!' and has a 'Logout' button. Below the navigation bar, the page title is 'Orchestras'. There is a green 'Add Orchestra' button. A table lists the available orchestras:

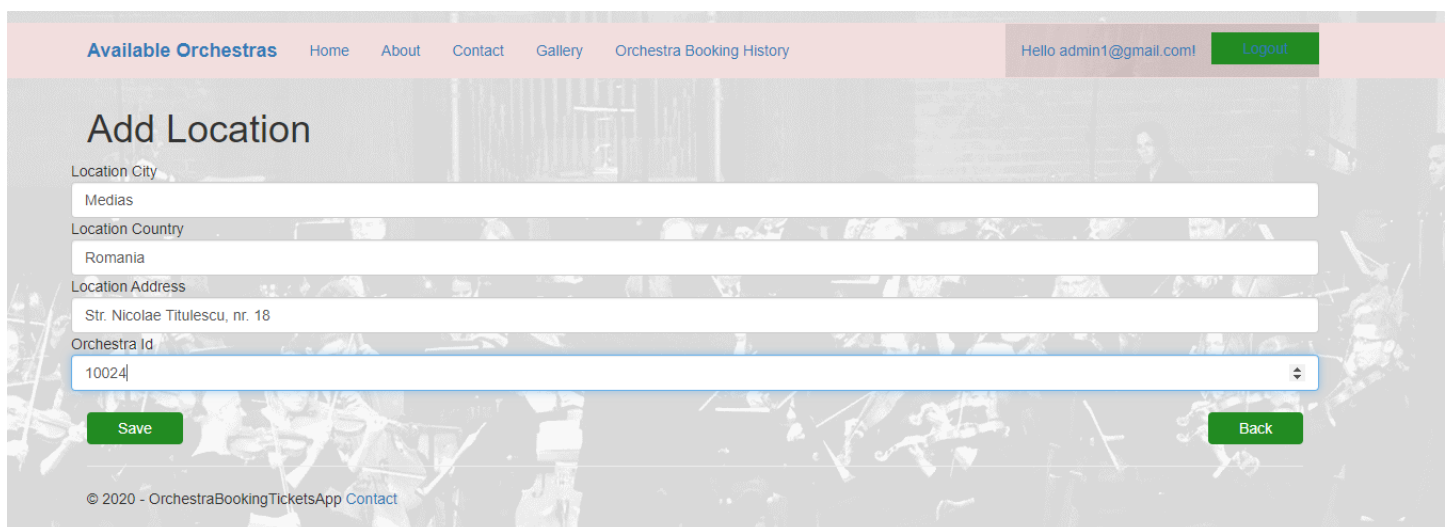
ID	Title	Date	Price	Delete	Location	Lead Artist	Instruments	Book Seat
9023	Amadeus Mozart	23-May-20 12:12:00 PM	234 \$	Delete	Location	Lead Artist	Instruments	Book Seat
9024	Bethoven	24-May-20 12:00:00 PM	233 \$	Delete	Location	Lead Artist	Instruments	Book Seat
10024	Charlie Omen	18-Jun-20 9:15:00 PM	255 \$	Delete	Location	Lead Artist	Instruments	Book Seat

A blue arrow points to the entry with ID 10024. At the bottom, there is a footer: '© 2020 - OrchestraBookingTicketsApp Contact'.

On this new entry the admin can also add a location/lead artist/instruments by pressing the “Create new” from the Location/lead artist/ instruments pages initially being blank on a new entry:



The screenshot shows the 'Orchestra location' page. At the top, there is a navigation bar with links: Available Orchestras, Home, About, Contact, Gallery, and Orchestra Booking History. On the right, it says 'Hello admin1@gmail.com!' and has a 'Logout' button. Below the navigation bar, the page title is 'Orchestra location'. There is a blue 'Create New' button. Below it, there are three input fields: 'City', 'Country', and 'Address'. At the bottom, there is a green 'Back' button. At the bottom, there is a footer: '© 2020 - OrchestraBookingTicketsApp Contact'.



The screenshot shows the 'Add Location' page. At the top, there is a navigation bar with links: Available Orchestras, Home, About, Contact, Gallery, and Orchestra Booking History. On the right, it says 'Hello admin1@gmail.com!' and has a 'Logout' button. Below the navigation bar, the page title is 'Add Location'. There are four input fields: 'Location City' (with 'Medias' entered), 'Location Country' (with 'Romania' entered), 'Location Address' (with 'Str. Nicolae Titulescu, nr. 18' entered), and 'Orchestra Id' (with '10024' entered). At the bottom, there are two green buttons: 'Save' and 'Back'. At the bottom, there is a footer: '© 2020 - OrchestraBookingTicketsApp Contact'.

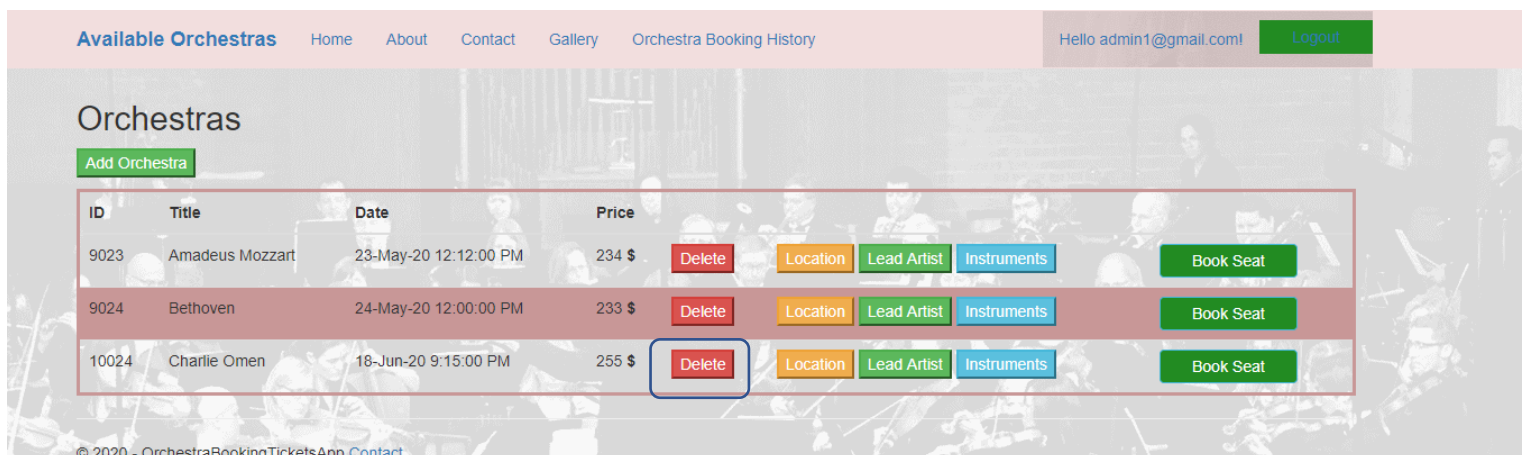
After hitting “Save” the entry will be added on that specified orchestra using the orchestra ID to choose in what orchestra the Location should be added.

An orchestra can have multiple locations because the same orchestra team can travel to the other cities:



The same can be done for the other Orchestra details as the Lead Artist or Instruments.

- The admin can also delete an orchestra, let's try to delete the added orchestra pressing the “Delete” button as an admin:



The following page will appear that will ask for the confirmation:



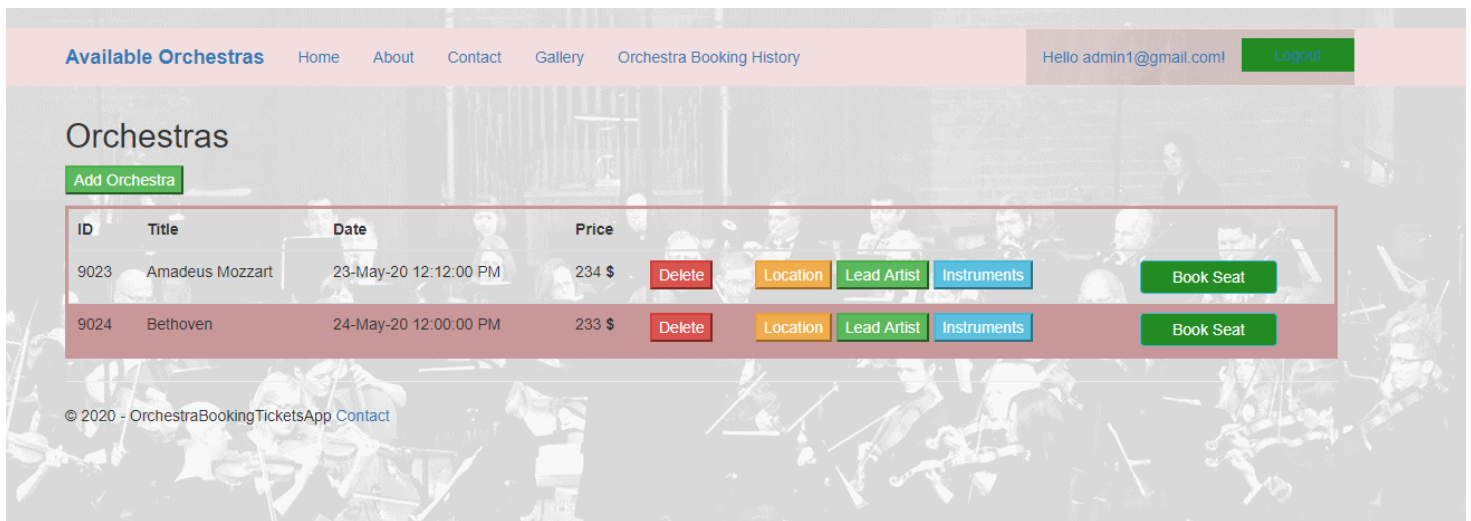
## Delete

Are you sure you want to delete this item?

Orchestra

[Delete](#) | [Back to List](#)

And after we press the delete again, then we are redirected to the available orchestras page with the updated database:



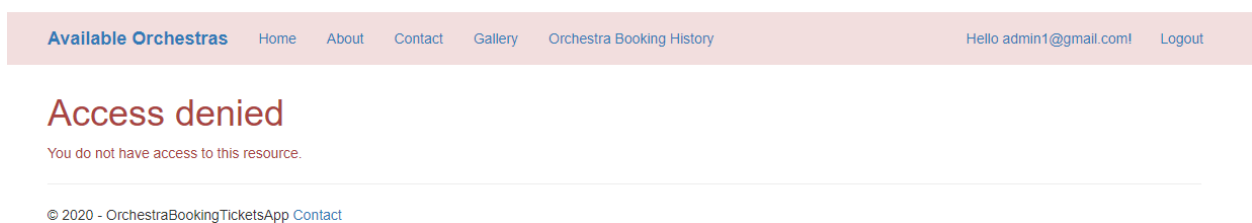
The screenshot shows the 'Available Orchestras' page. The header includes navigation links and a user profile. Below the header, there is a section titled 'Orchestras' with an 'Add Orchestra' button. A table lists two orchestras:

ID	Title	Date	Price					
9023	Amadeus Mozart	23-May-20 12:12:00 PM	234 \$	<a href="#">Delete</a>	<a href="#">Location</a>	<a href="#">Lead Artist</a>	<a href="#">Instruments</a>	<a href="#">Book Seat</a>
9024	Bethoven	24-May-20 12:00:00 PM	233 \$	<a href="#">Delete</a>	<a href="#">Location</a>	<a href="#">Lead Artist</a>	<a href="#">Instruments</a>	<a href="#">Book Seat</a>

The footer shows the copyright notice and a contact link.

There is no more that added entry, so is completely removed from the database.

- The admin can't access the Orchestra history because he can't make a reservation so the following message will appear:



The screenshot shows an 'Access denied' message. The header is the same as the previous page. Below the header, the text 'Access denied' is displayed in a large, bold font, followed by the message 'You do not have access to this resource.' in a smaller font. The footer shows the copyright notice and a contact link.

- The admin can also access the contact, gallery, home, about page freely.

## Guest:

A person is considered being a guest if he/she doesn't have an account yet

- The guest can only view freely the available orchestras and the details about them but he/she can't make a proper booking because the guest doesn't have an Orchestra History
- The guest can view also the gallery, about and can contact the admin through the Contact page because he/she can ask questions about issues that is experiencing when tries to login

ID	Title	Date	Price					
9023	Amadeus Mozart	23-May-20 12:12:00 PM	234 \$	Delete	Location	Lead Artist	Instruments	Book Seat
9024	Beethoven	24-May-20 12:00:00 PM	233 \$	Delete	Location	Lead Artist	Instruments	Book Seat

If the guest tries to press the “Book Seat” button he/she will be redirected to the login page:

Please log in

Email

The Email field is required.

Password

The Password field is required.

☐ Remember me?

Log in

Register

## **5. Elaborate a plan for promoting your web application.**

My plan for promoting my Orchestra booking tickets application is to get sponsored by the City Hall of my city because is in the interest of the local Philharmonics to get more clients and keep the orchestras alive.

Being able to book tickets online is an advantage and more efficient, so integrating this system online can come in handy.

Another type of advertising can be done by posting some posters near all the cultural monuments or building to attract interested peoples in this niche, and being able to book tickets to local orchestras just using their mobile phones right away is really great and fast.

My web application can be promoted even online, using google AdSense for a specific type of peoples, that are interested in the cultural and musical niche, because can be more effective to post the ads for a group of peoples that match my web application domain. Also, through YouTube, by creating a channel that promotes my web application and to be seen by many users, I can promote my videos by appearing on the regular searches using specific keywords.



## **6. Describe usability and accessibility issues that are relevant for your application; how could you integrate / implement them?**

Some accessibility issues relevant to my application are:

- Not having validation error messages that appear in the UI for the reader, for example if the admin wants to add a new orchestra, in the price field if he inputs any other characters besides numbers, will not validate and no error message is displayed, so the reader can be confused.

Some fixes for this issue can be done by implementing multiple error messages on every input validation or where is room for error or misleading for the user.

- Pretty bad contrast between Text and Background that can hide some buttons or important message text or labels that can be easily missed, or for bad sighted users can mix up the colors, for instance when a seat is taken it will become red and when a seat is selected will become green, this can be a serious issue for a color blind person.

Some fixes for this issue are that the user can be asked in the beginning if is color blind or not and apply some better contrast color instead of the default ones.

Some usability issues relevant to my web application are:

- The contact system of the application is kind of poor, making the connection with the supervisor or admin harder because is implemented using a basic function: "mail to" function that isn't that efficient and also the user must provide an email in the contact form in order to receive the response or the feedback instead of using automatically the email of the user which is logged in.

A fix for this can be done by implementing a more complex system for communication with the admin and more user friendly, for instance a built-in chat system directly with a supervisor or admin will be really efficient.

- There is not a possibility to search or filter the available orchestras that is making the user to find that specific orchestra pretty inefficient

A quick fix for this issue is to implement a search box on the available orchestras with multiple filter options

## **7. Describe security issues that are relevant for your application; how could you integrate / implement them?**

Some of the security issues for my web application are:

- The username and email of a user are stored in the database with exactly the same characters, a prevention of this can be fixed by adding a more complex register form, for instance asking for multiple data of the user: First Name, Last Name, Birthday, Country, City, Secret security question, email, and strong password.
- Another important security issue is that for the password field are not many validations, for example the password length can be minimum 7 characters, without uppercase letters or numerical, so the user can give a poor password and will be accepted.

For fixing this issue it is required to be implemented more validations and constraints for the password, and also an indicator that notifies the user if the password is weak / medium / strong.

- Currently the application has two roles admin and user, the user can see the add and delete buttons that add/delete/update an orchestra but if he click on it a message of “Access denied” will appear, but for an efficient experience, these buttons must be hidden for the user.

A fix for this can be by hiding the HTML and CSS elements that are not designed for the User role.

- A user can try to guess a password or email by trying an infinite combination because there is not a limitation on the number of incorrect validations

A quick fix for this security issue is to add a maximum count of the wrong tries on the email and password fields and also to suspend that account for a certain period of time if the maximum count is exceeded

## **8. Enumerate the current limitations and weaknesses of your application and potential future improvements / extensions.**

Some of the weaknesses of my web application are:

- When creating a new account, it will be automatically reserved as a user account, so there can be only one predefined admin account with a predefined password that can't be changed.

A quick fix for this can be done by making a more complex form when a new account is registered, for example a drop menu where the user can choose if this account will be an admin or a user account.

- If an orchestra is canceled or something came up, the users can still book tickets to that orchestra

A fix for this can be done by implementing a system that besides checking the availability but also if that specific orchestra will take place or was not canceled or deleted.

- Another weakness can be that every orchestra building has the same number of total seats, and that is not really accurate because in real life, the maximum number of seats can variate due the building size and space.

A fix for this can be more complicated to implement, because every building must come with their own size and seat numbers or position, but the trickier part is that the user interface for selecting the seats must be different for every building and to represent the exact of maximum seats number.

Some of the constraints (limitations) of my web application are:

- If a user stops to use this application, there is not a feature where the user can delete its account, so the account will remain in the database and won't be efficient.

A fix for this can be done by adding a feature that allows the user to delete the current account and all the personal data will be erased from the database.

- The admin role is limited that he can't see all the users or to manage a user history orchestra booking.

A feature for this must be implemented because if an orchestra is canceled or deleted, a user that already managed to book a ticket to that orchestra will still have an in progress booking that won't take place, so the admin must remove that from the user booking history, or at least notify him of the new changes.