Pablo Fernández Alegre
Álvaro Zamanillo Sáez
Pablo Cuesta Sierra

pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

Requirements Analysis Document

Application: ARCH Theater Hall

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Pablo Fernández Alegre pablo.fernandezalegre@estudiante.uam.es
Álvaro Zamanillo Sáez alvaro.zamanillo@estudiante.uam.es
Pablo Cuesta Sierra pablo.cuestas@estudiante.uam.es

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1. Introduction

1.1 Purpose of the system

The proposed system consists of an application that allows the interaction between the administrator of a theater hall and the clients around the different events and performances taking place in the hall.

The system distinguishes two main kinds of users, clients and the manager. Broadly, the administrator is responsible for creating the events and scheduling performances, whereas the client's main use of the system is purchasing tickets. Apart from this, the system offers more functionalities that are discussed through this document.

1.2 Scope of the system

This system provides administrators the tools to configure the areas, events, performances and passes of the theater hall (among other characteristics). And it allows users to purchase and make reservations for the different scheduled performances.
There also needs to be a waiting list system, where clients can subscribe in case they want to be notified if available tickets for a performance are released; as well as a search engine with some filters for every (even unregistered) users of the system.

1.3 Objectives and success criteria of the project

The system needs to meet the following requirements:

- A search mechanism to look for events and performances.

For the clients:

- A purchase and reservation mechanism.
- An algorithm to select a given number of available seats within an area.
- A waiting list for each performance.

For managers:

- The possibility of configuring several areas within the theater. Also, making capacity restrictions in events and the possibility to disable only unsold seats.
- A mechanism to configure new events, and schedule performances for those events.
- Managers can also configure passes: annual passes and cycle passes; users can make use of them to pay for their tickets.

1.4 Definitions, Acronyms, and abbreviations

Event: a show that can be performed multiple times in the theater. There are three types of events in the theater: Musical Concert, Dance and Theater Play.

Performance: it is the representation of an event in a single date and time.

Cycle: a group of events, configured by the manager for the cycle pass.

Area: a part of the theater. It can be a **simple area** (either sitting or standing area, with a given capacity), or composite (made up of other areas). For every area of the theater, all performances of the same event have the same prices.

2. System Description

2.1 Functional Requirements

2.1.0 Any user

2.1.0.1 Searches

Any user, either registered or not, can search for an event, and for performances of each event (both past and future performances); as well as search for an event cycle. They will be able to use some filters in the search, like: search only for one specific type of event.

2.1.0.2 Register

Users who want to get a client account must provide a valid email address and a password.

2.1.0.3 Login

Users of the system that have an account can log in by entering their username and password. As it has been already mentioned, the system will distinguish two types of registered users: clients and managers.

2.1.1 Client (registered)

2.1.1.1 Purchase

The client can purchase for a performance, and area, a certain amount of tickets (block of tickets - maximum number of tickets per client is set by the manager). The process is the following: the client has to log in, search for an event, select the performance they are interested in, select an area and number of tickets to be bought. If the selected area is a sitting area, then choose between manual and automatic selection of the seats.

An algorithm has to be implemented for this automatic selection, for which the client can choose one of the following heuristics: centered in rows and columns, centered in lower rows, centered in upper rows, farthest from all sold seats.

The payment can be done with a credit card (extern service), or with a pass.

Finally, a pdf file has to be generated, with an authentication code that is unique for each purchase. The ticket must contain: name of the show, time of performance, price, area, and seat if it is a sitting area.

2.1.1.2 Reservation

This is exactly the same as a purchase, but the process ends before paying for the ticket(s). After making the reservation, the user can confirm the tickets, by paying (and

continuing the purchase as in the previous point) or by cancelling the reservation (the reserved tickets will become available for other clients).

A reservation can only be made and confirmed or cancelled before a deadline. This time limit is a parameter set by an administrator (the same parameter for every event and performance), it corresponds to the amount of time before the performance takes place.

If a user has neither cancelled nor confirmed a reservation before the deadline, then the tickets will be released automatically by the system as if the reservation had been cancelled.

Just like in the purchase, the manager must establish the maximum number of tickets that can be reserved per client.

2.1.1.3 Waiting list

When a client goes through the process of purchase/reservation until the step where they select the area and number of tickets, if there are no available tickets for the performance, the user can choose the option to subscribe to the waiting list.

Whenever tickets are available for a performance (because some reservation has been cancelled or the deadline has passed without confirmation), then all users in that waiting list will receive a notification.

2.1.1.4 Notifications

The clients can check notifications whenever they want. They can be notified of a waiting list they have subscribed to; also of a cancelation of a performance, or because a performance has been postponed, if they have tickets for that performance.

2.1.1.5 Passes

There are two types of passes; both of which have to be configured by the manager.

Annual pass

Can be bought at any time and is valid until the end of that natural year. The prices are set by the manager; each area has a different price, and the pass (while valid) can be used by its titular as a means of paying for a ticket in that area for any performance (without need of additional cost).

Cycle pass

The manager can set up cycles of events, configuring for each cycle the reduction of price associated with it. This way, the price of the pass in a given area would be a percentage of the price of buying one ticket for one performance of each event of the cycle in that same area. And the pass can be used to purchase (without any extra cost) one ticket for one performance of each event of the cycle, in that particular area.

2.1.2 Manager/Administrator

2.1.2.1 Configuration of areas (seat disabling)

The manager can configure the areas of the theater when there are no events scheduled. There are two types of areas: simple areas and composite areas. Composite areas are made up of other areas, and simple areas are either standing (non-numbered) or sitting (numbered) areas. Sitting areas have a number of rows and columns, and the tickets in those areas are assigned to a seat. Standing areas simply have a capacity, which is the maximum number of tickets that can be sold for the area.

Seats can be disabled by the manager at any time (as long as there are no sold tickets for any performance in that time already). When a seat is disabled, two dates are set up, and no tickets can be sold for that seat in any performance that takes place between those dates.

2.1.2.2 Creation of events and scheduling performances

At any time, a manager can configure a new event. They have to specify: title, type, description, duration, author and director.

There are three types, and for each type, a few more things have to be specified:

- Musical Concert: program, name of the orchestra, name of the soloists.
- Dance: name of the dancers, name of the conductor, name of the orchestra.
- Theater Play: name of the actors.

The manager has to also set the prices of the tickets of each area of the theater for this event, because the prices will be the same for every performance.

2.1.2.2.1 Schedule performances

At any time after the creation of an event, performances of the event can be scheduled. A new performance needs to have associated an event, as well as a time and date.

Performances can be cancelled or postponed, at any time before the scheduled date and time. In this last case, clients that have tickets for a performance that is cancelled, receive a notification to get their money back.

2.1.2.2.2 Restrictions

If no tickets have been sold for an event, the manager can set up a restriction for that event. A restriction is a percentage (of the restricted capacity), and is applied to the capacity of every single aera of the theater. The available seats (for sitting areas) have to be equally distributed through the area, by an algorithm that takes into account disabled seats, giving them a priority to be restricted (so as not to lose space). The restriction affects all the performances of the event.

2.1.2.3 Statistics

The manager has access to certain statistics, like the percentage of attendance or the revenue. These statistics can be grouped by event, performance and area. And they can be seen when searching for a particular event or a performance, or in a menu with all of the statistics (ordered: higher to lower).

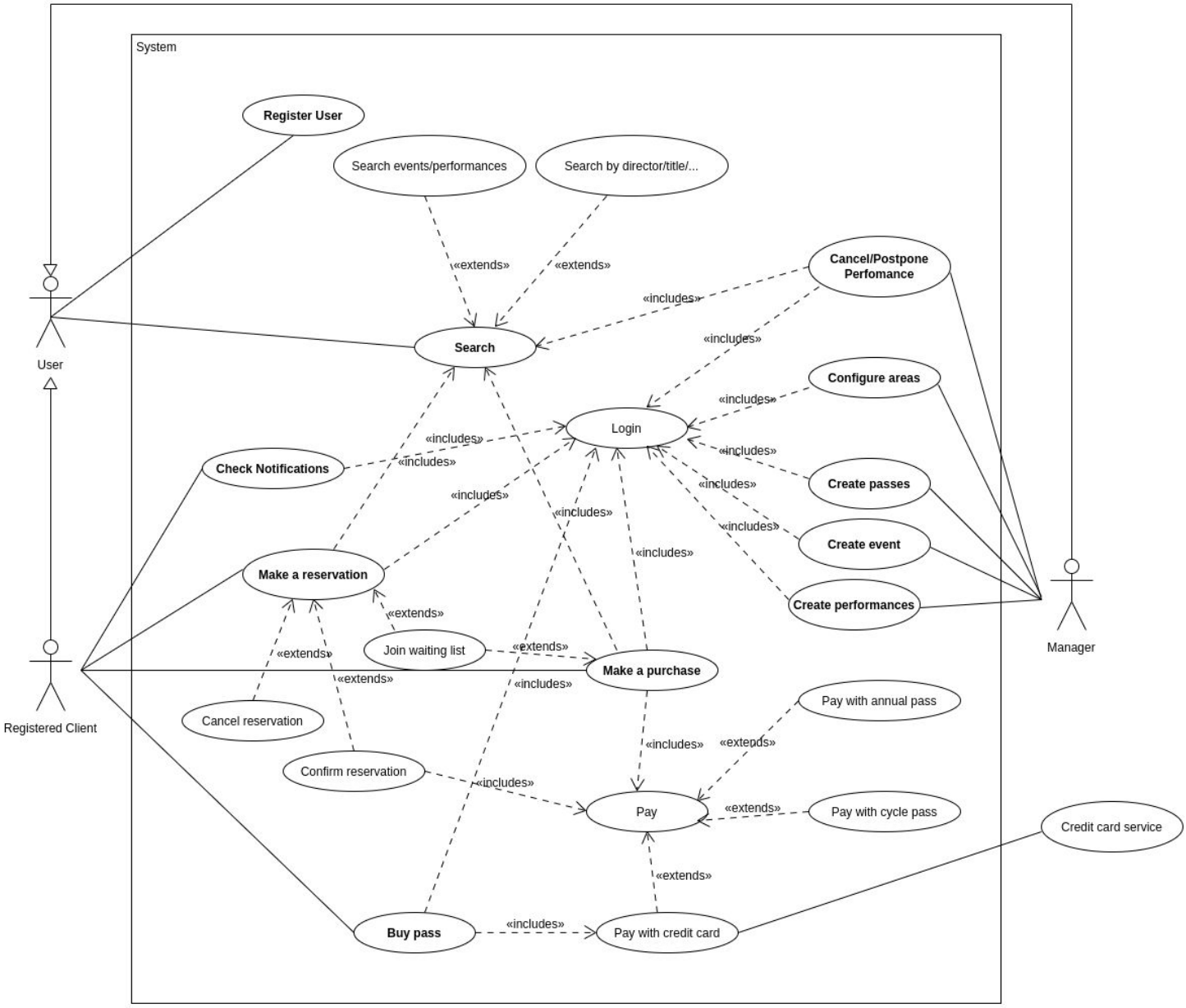
2.2 Non-functional Requirements

The application will be designed using Java with all the features it implies (inheritance, encapsulation…) and also its limitations (for instance, multiple inheritance is not allowed so it will have to be “translated” into singular inheritance).

On the other hand, there will not be a concurrent use of the system; only one computer will be used to access the system. Therefore, only one user will be logged at the same time.

3. Use Cases

3.1 Use Case diagram



3.2 Use case descriptions

3.2.1 Use Case 1: Purchase/Reservation

Primary Actor: Registered user

Stakeholders and Goals:

Registered user: to make a reservation or a purchase for a scheduled performance.

Manager: has previously created an event and scheduled a performance to offer tickets for it.

Preconditions:

1. At least one performance of an event has already been scheduled by the manager
2. The user who wants to purchase/reserve is registered in the application.
3. If it's a reserve operation, the limit time for doing reservations hasn't been surpassed.
4. In order to pay with a pass, the user must have purchased it before, and the areas/cycle parameters must match between the pass and the ticket.

Success guarantee (Post-conditions):

1. If it is a purchase operation the user will get:
   a. The amount of tickets he has purchased with the name of the show, time of the performance, price, area, and seat if it is a sitting area on them
   b. A file with format .pdf with a unique identifier code.
2. If it is a reserve operation, the reservation will be saved on the system until it is confirmed or cancelled before the expiration time, after which it will be automatically cancelled.
3. The amount of tickets purchased or reserved won't be longer available for the rest of users.

Main Success Scenario:

1. User logs in the system.
2. Searches for the event.
3. Selects a performance of that event.
4. Selects an area.
5. Chooses automatic or manual purchase
   a. Automatic: the customer selects the number of tickets and one of the following options:
      i. centered in rows and columns
      ii. centered in lower rows
      iii. centered in upper rows
      iv. farthest from all sold seats
   b. Manual: Customer specifies the number of tickets and selects an area, and seats if it's a sitting area.
6. The user selects purchase or reservation.
   a. Purchase:

i. Paying:
   1. With credit card (extern service).
   2. With an annual pass.
   3. Applying the price reduction of a cycle pass and then paying with a credit card.

ii. The ticket(s) and the pdf assigned to the purchase are created.

b. Reservation: The reservation is saved in the system.

Extensions (Alternative paths):

6c. If there are not enough tickets, the user can sign up for the waiting list in order to get a notification when he logs in whenever there are available tickets.

Technology and Data Variations List:

The ticket will be generated as a pdf document, including the authentication code of the purchase.

Frequency:

This is one of the most frequent actions in the system (only less frequent than searching); it will be performed, at least, tens of times for each scheduled performance.

Open Issues:

We have yet to specify how the authentication code is generated and whether the user gets any sort of ticket or pdf when they make a reservation, or if the reservation is just in the system.

3.2.2 Use Case 2: Area Configuration

Primary Actor : Manager

Stakeholders and Goals:

Manager: To establish a new configuration of the theater hall based on a list of areas that can be composite.

Preconditions:

1. The manager has logged in the system.
2. There are no scheduled events in the theater hall.

Success guarantee (Post-conditions):

1. If a new area has been created, it has been configured with all its data specified and is ready to be selected when creating an event

Main Success Scenario:

1. The manager selects the option to configure the areas of the hall.
2. The manager selects the option to create a new area.
   a1. The area can be created outside every other area.
   a2. The area can be created inside another area
   b. Select between composite area or simple area.
      i. If it is a simple area, configure: sitting/standing and seat configuration/capacity.

3. Go back to step 2 or end.

Special Requirements:

At the end, there can not be any composite area without any areas inside.

Frequency:

Low frequency based on the restriction of no events planned. The area configuration can only be done during periods of low activity when there are no performances planned yet.

Open Issues:

Does it make sense to have a composite area with only one other area inside of it?

3.2.3 Use Case 3: Event Creation

Primary Actor : Manager

Stakeholders and Goals:

Manager: to create a new event or update the values of an existing event as well as assigning new performances to that event

Preconditions:

1. Manager has logged in the system.
2. Manager has configured the areas of the theater.

Success guarantee (Post-conditions):

A new event has been created with all its data specified and it has been recorded in the system.

Main Success Scenario

1. The manager enters the title, description, duration, author and director
2. The manager configures the type of the event: musical concert, theater play or a dance.
   a. Musical concert: the manager introduces the information of the orchestra, the soloists and the program.
   b. Theater play: the manager introduces the name of the actors.
   c. Dance: the manager introduces the name of the dancers, the conductor and the information of the orchestra.
3. For each area of the theater hall, the manager must specify a price for the event (which will be the same for all the performances).
4. Configure restrictions (if any). This can later be modified if there are no sold tickets. (option 1B)
5. The system saves the new event and adds it to the list of existing events.

Open Issues:

- We could discuss the possibility of adding an image per event (the event's billboard).
- How many events should be allowed to be active at the same time before one of them has to be deleted from the system.

3.2.4 Use Case 4: Buying a Cycle/Annual Pass

Primary Actor: Registered user

Stakeholders and Goals:

Register user: to get a pass that will be used as a payment method.

Manager: has created a pass to put it on sale.

Preconditions:

1. The user is registered in the system.
2. Areas have already been created by the manager.
3. If it's a cycle pass, at least a cycle of events has been scheduled by the manager.
4. The manager has created the pass and establish the events/areas

Success guarantee (Post-conditions):

1. The possibility of the user paying with the pass he bought will be saved in the system.

Main Success Scenario:

1. User logs in the system.
2. Searches for passes.
3. Selects the area he wants to buy the pass for.
4. Selects the type of pass he wants:
    a. Annual pass.
    b. Cycle pass.
        i. Selects the cycle of events he wants to assist to.
5. Pays with credit card (extern service).

Open Issues:

The system should prevent a client from buying another pass from a kind that he already has purchased (for instance, two annual passes for the same area).

3.2.5 Use Case 5: Cancel & Postpone events

Primary Actor : Manager

Stakeholders and Goals:

Manager: To call off an existing performance or redeschuling it.

Registered user: To get notified about the cancelation or postponed performance.

Preconditions:

1. The manager has logged in the system.
2. There is a performance scheduled for a specific event.

Success guarantee (Post-conditions):

1. The performance date has been correctly modified if it was postponed or the performance has been removed from the list of performances of the event.
2. All the clients who had purchased a ticket for the modified performance get the appropriate notification.

Main Success Scenario:

1. The manager selects a performance of an event.
2. The manager selects between the two options:
    a. Modified the scheduled date.
    b. Cancel the performance.
3. The system saves the changes

Frequency:

Expected to be considerably less frequent than the creation of performances: that is to say the ratio performanced canceled (or postponed)/performance created will be low.

Open Issues:

The notifications must be saved until the user logs in and checks his notification. Once that has happened, there should be a method (manual or automatic) to delete the read notifications.

3.2.6 Use Case 6: Add restrictions to events

Primary Actor : Manager

Stakeholders and Goals:

Manager: To add a restriction to an event.

Preconditions:

- The manager has logged in the system.
- There is an event that has been created.
- There are no sold tickets for any performance of the event.

Success guarantee (Post-conditions):

1. An algorithm puts a restriction in all of the areas of all the performances of the event. If the areas are sitting, then the restriction disables some seats for this event as a result. If the areas are standing, the restriction is applied to the capacity.

Main Success Scenario:

1. Manager logs in the system.
2. Searches for events.
3. Selects the option to restrict event.
4. The manager modifies the restriction parameter of the event (Writing the restricted percentage of the theater).
5. Parameter is saved by the system.

Frequency:

Expected to be used once for each event, maximum.

Open Issues:

If there are no sold tickets for future performances, but there were sold tickets for past performances of the event, can there be a modification of the restrictions?

3.2.7 Use Case 7: Add a performance of an event

Primary Actor: Manager

Stakeholders and Goals:

Manager: To add a new performance of an event.

Preconditions:

- The manager has logged in the system.
- There is an event that has been created.

Success guarantee (Post-conditions):

1. There is a new performance available and clients can purchase or make reservations for that new performance.

Main Success Scenario:

1. Manager logs in the system.
2. Searches for events.
3. Selects the option to create new performance.
4. The manager selects a date and time for the performance.
5. Performance is saved by the system.

Frequency:

Normally all of the performances of the event will be created right after the creation of the event, but there is the possibility of adding new performances later.

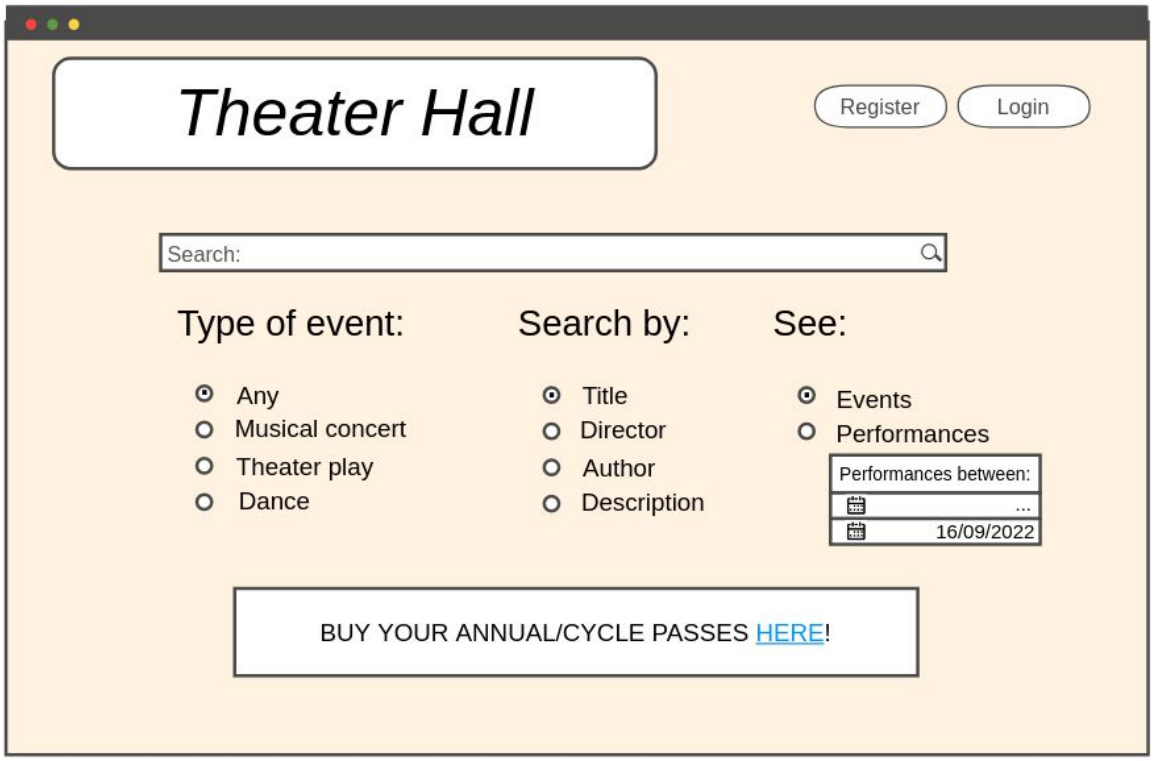
pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

4. Mockups

The following mockups show the functionalities mentioned through the document as well as the navigation. There are some common features to all windows:

- The home button takes the user back to the home page.
- Actions that have several steps like searching and event or buying tickets, include two buttons (*previous* and *next*) to navigate through the different steps.
- Lists (search results for instance) have a bar that allows users to scroll down and see all the elements.
- Clicking on the button of the user when users are logged in will take them to their user profiles

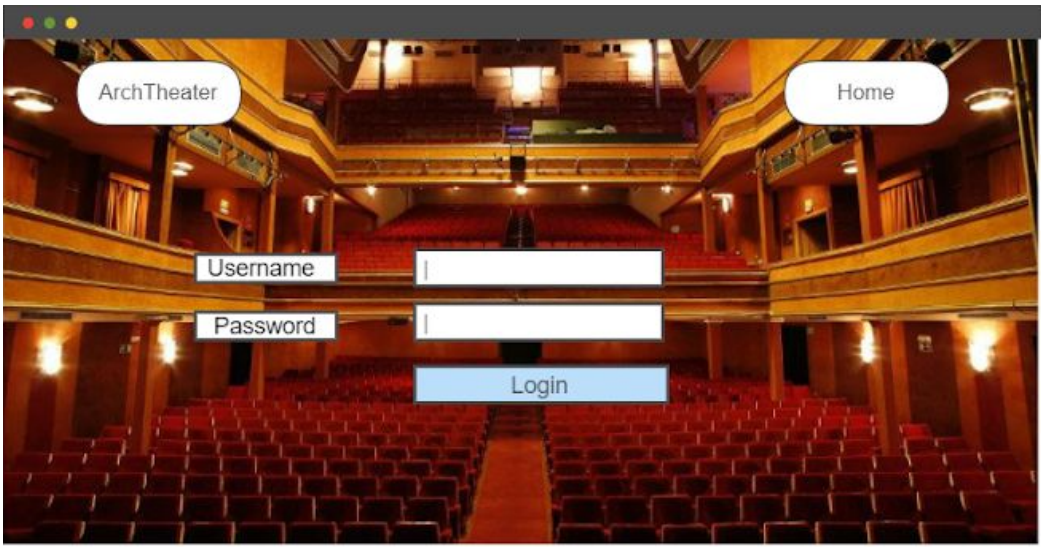
4.1 Home page



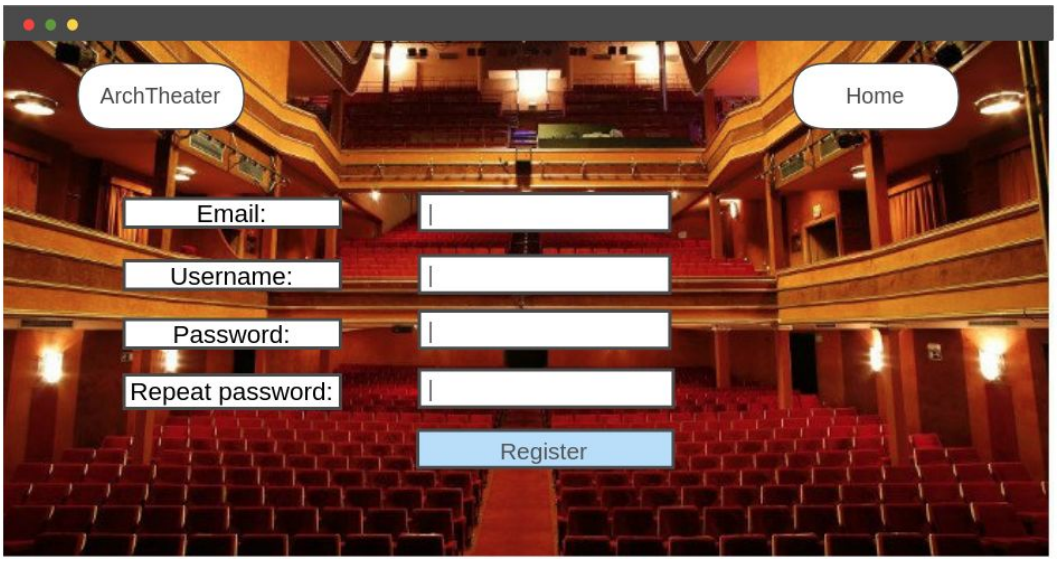
First window that appears on the app. To select a search option we should click on the circle next to the option. We can select to search performances between two dates by clicking on the calendar icons, which will display a little calendar in which we could select the desired date; or by event. To write we should click on the search bar and then write on it. By clicking on the register or login buttons we will access the register or login pages. By clicking on the blue 'HERE', we will access the page to buy the passes (although the client has to log in first to be able to purchase any pass).

pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

4.2 Login and Register

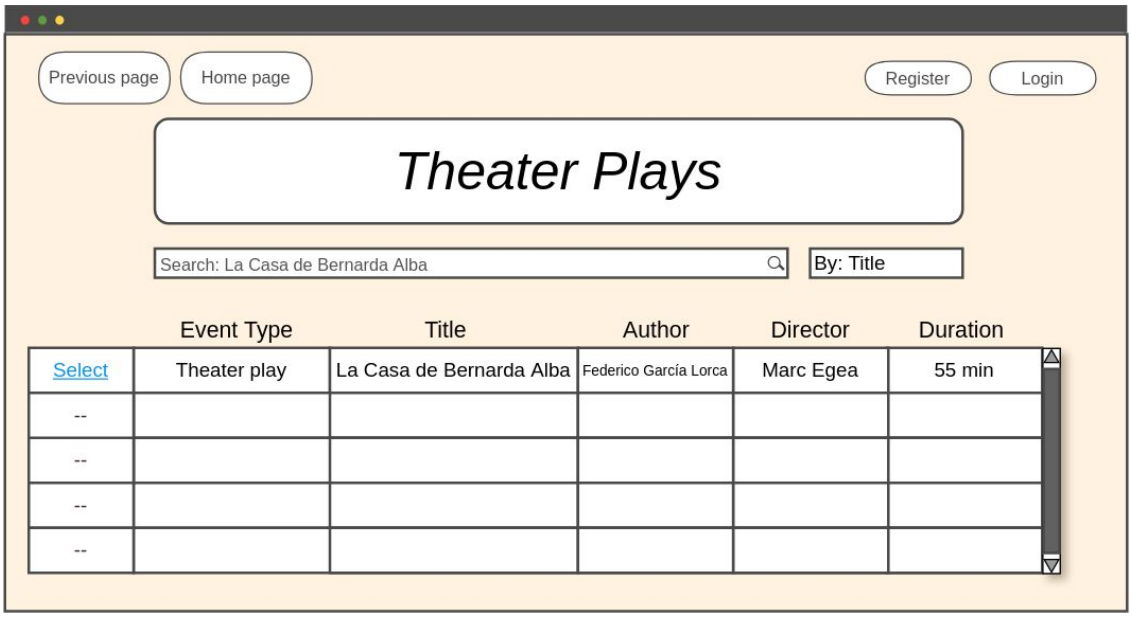


Window that will be accessed by clicking on one of the login buttons. Here, registered users will access their accounts by writing their username and password and clicking on the login button.



This window can also be accessed from the home page, where unregistered clients can make an account.

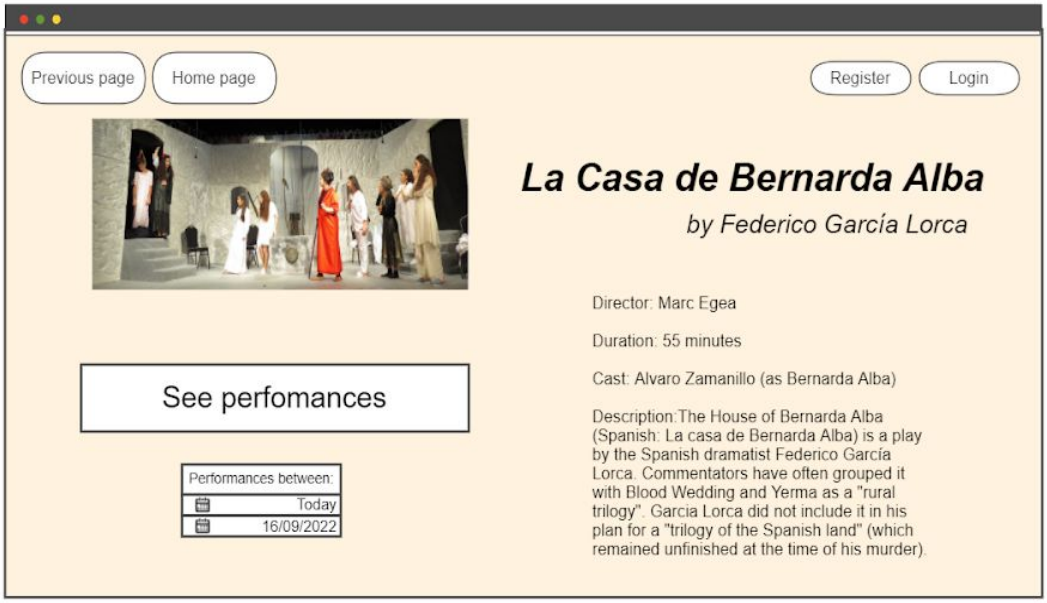
4.3 Event search



Page accessed when we search for events. We can search for other events by changing the search parameter and writing in the search bar.

We can access each of the events' pages by clicking on the blue 'Select' next to the event information.

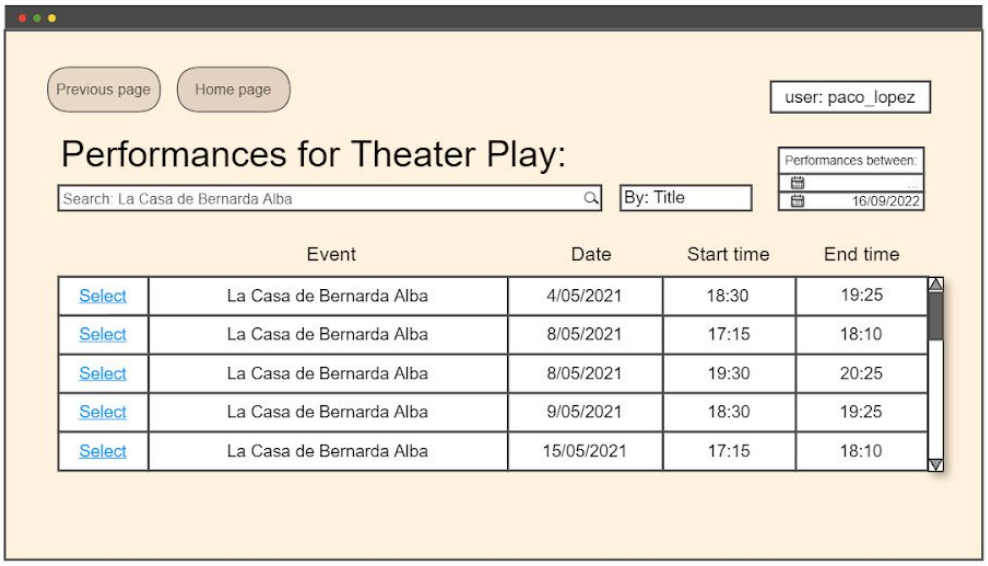
4.4 Event window



pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

Window accessed by selecting one of the events in the previous page. By clicking on the 'See performances' button we could see the performances of that event between the dates selected (as in the home page).

4.5 Performance search



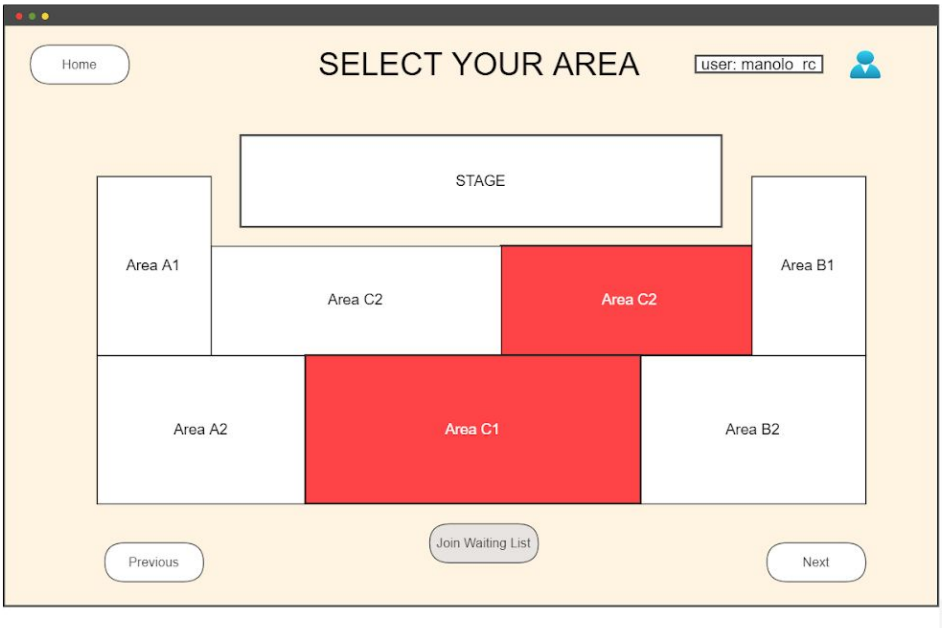
Page accessed when we search for performances. We can search for other performances by changing the search parameters and writing in the search bar. We could access each of the performances buying process (firstly, area selection) by clicking on the blue 'Select' next to the performance information.

pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

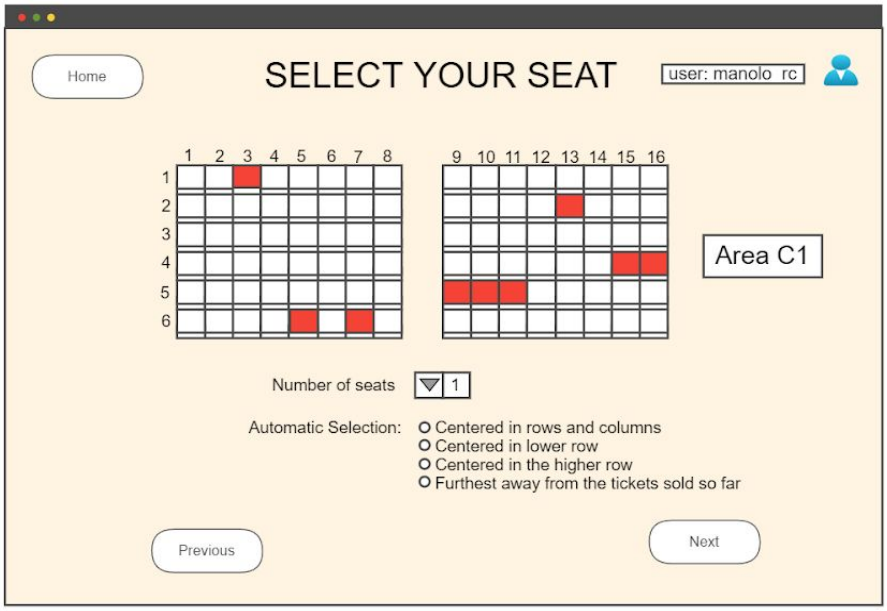
4.6 Buy & Reserve

4.6.1 Area selection

Accessed by selecting a performance in the previous page. Areas which are in red mean they are full. By clicking on a non-full area, we will access another area selection window if it's a composite area. If it is a sitting area, to the seating selection and if it is a standing area to a window in which the amount of tickets to be purchased is selected.
If all areas were full, we could click on the button "Join Waiting list" (and the purchase process would stop in that step).

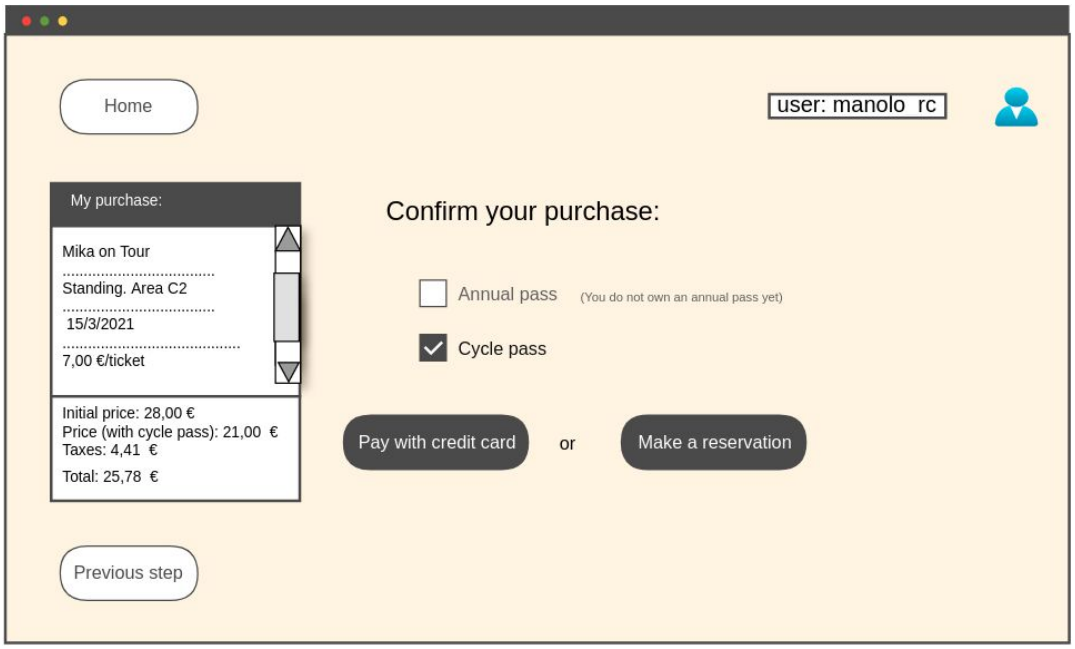


4.6.2 Seat selection



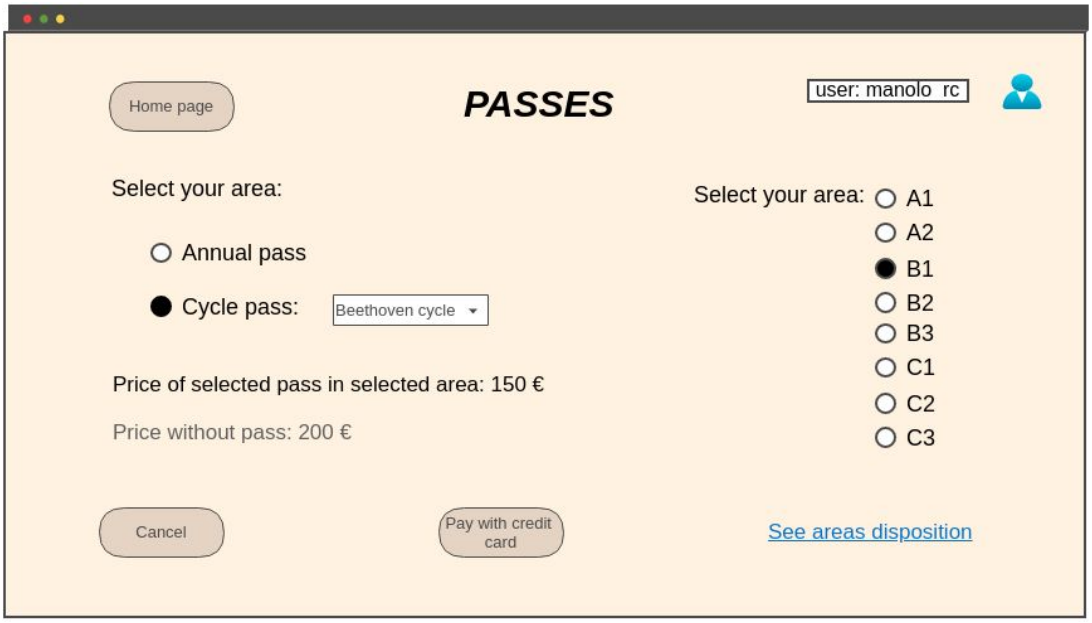
In this window, users can select their seats. Red seats mean they are occupied (or disabled). By clicking on the grey arrow next to 'Number of seats', we can select the amount of seats we want (from 1 to the maximum set by the manager). Users can choose the seats one by one by clicking on them, or automatically by clicking on one of the four options.

4.6.3 Purchase/reservation confirmation



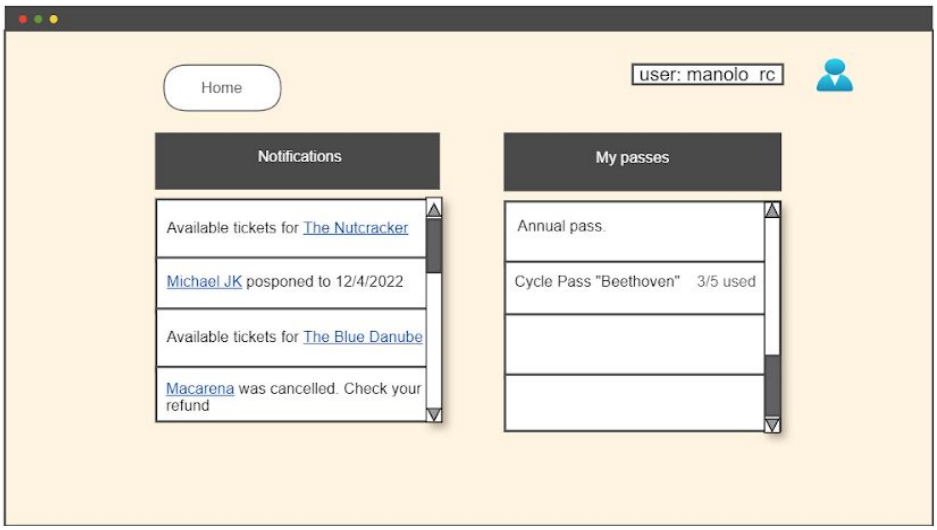
In this window, users can see their purchase in detail. They can select to pay with passes (when possible) and the rest will be paid with a credit card. Paying with a credit card is an extern service. Along to the option of buying, there is the reservation button.

4.7 Purchase passes



A registered user can buy one of the passes from the list. For the cycle pass, there is a drop down list, and for both, a list to select the area. Clicking on 'See areas disposition' will show a window similar to the area selection one.

4.8 User profile and notifications

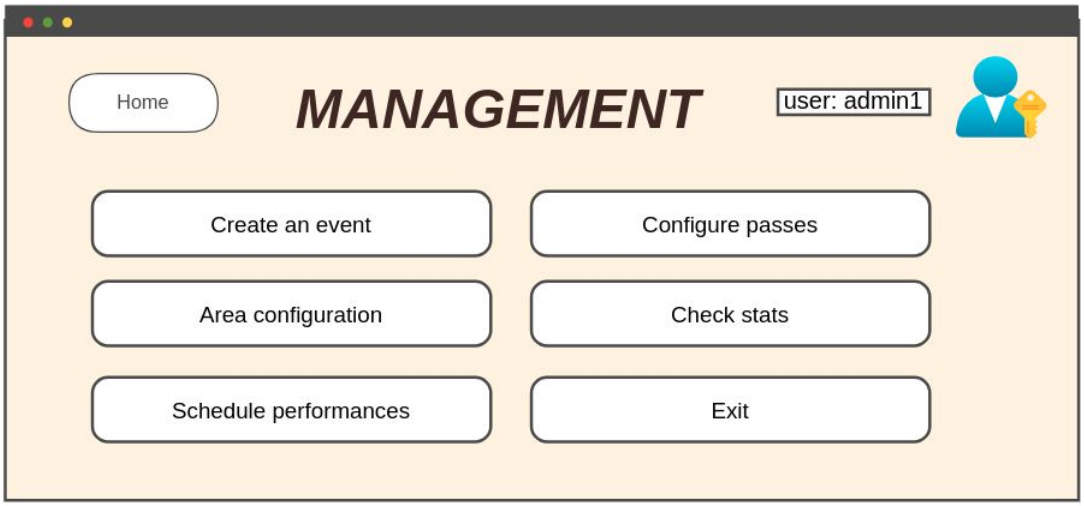


In this window users can see their passes and their notifications. Clicking on top of the names of the events (in blue) will take users to that event window.

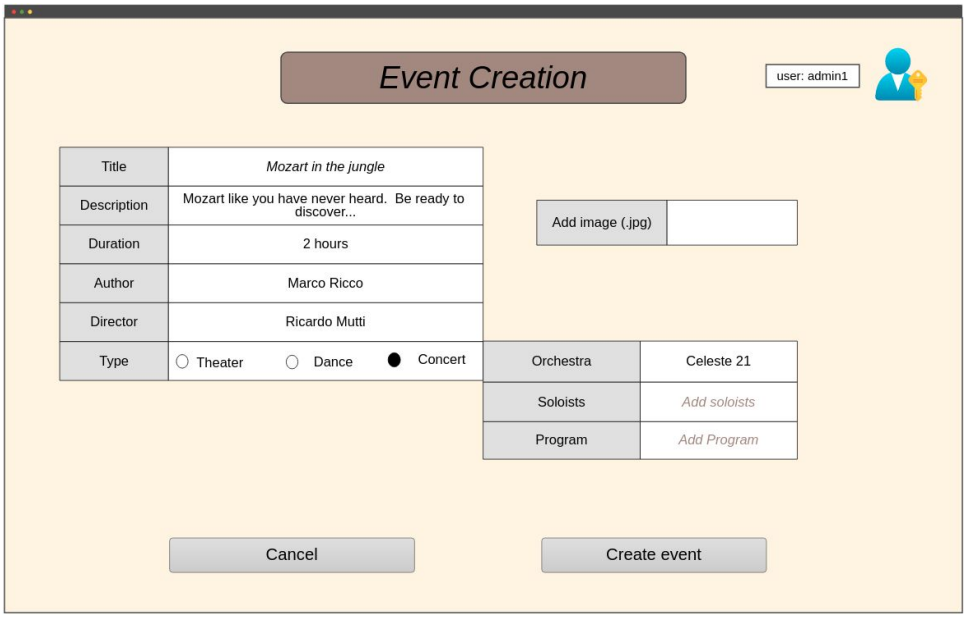
pablo.fernandezalegre@estudiante.uam.es
alvaro.zamanillo@estudiante.uam.es
pablo.cuestas@estudiante.uam.es

4.9 Management options

Accessed when the manager logs in. From here, the manager can access the event creation, the area configuration, the performance scheduling, the pass configuration or the stats checking windows with the respective buttons. Also he can exit the system with the 'Exit' button.



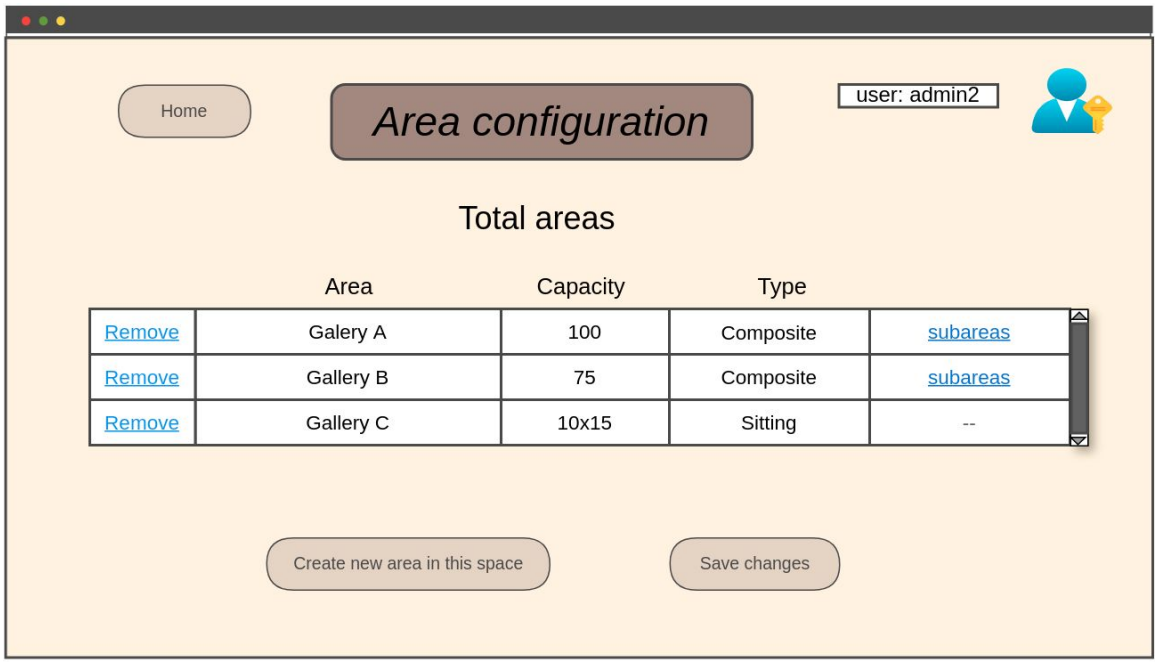
4.10 Event creation



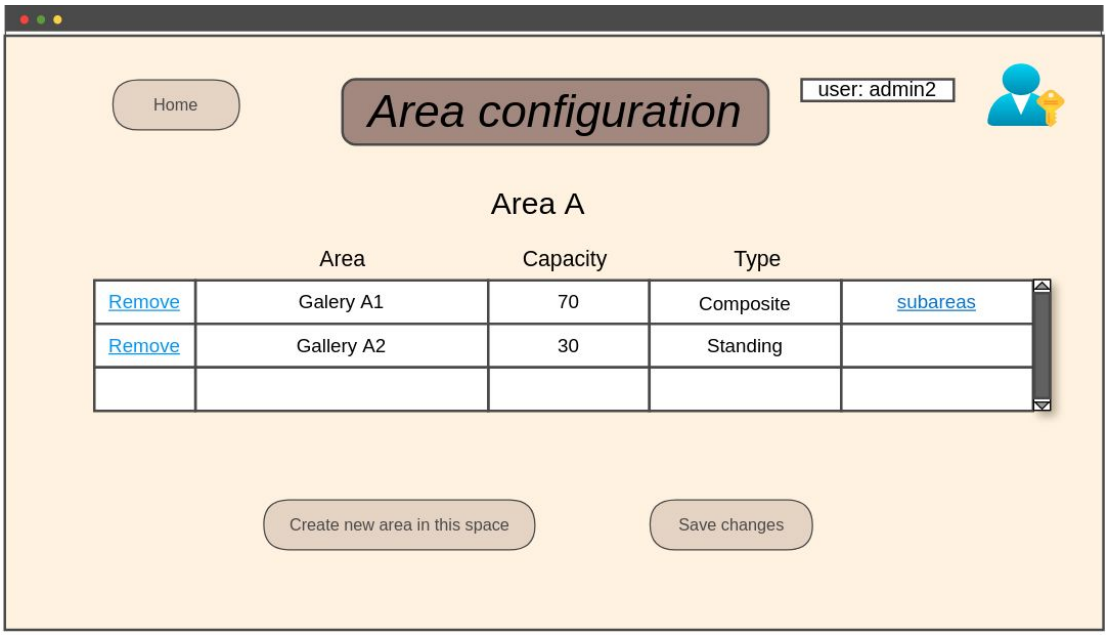
In this window the manager will write the event features on each field. Based on the event type selected, a new chart is displayed with the specific attributes of that event

type. When clicking on the create event button, he will be redirected to the performance scheduling window where he can set performances for the created event or leave.

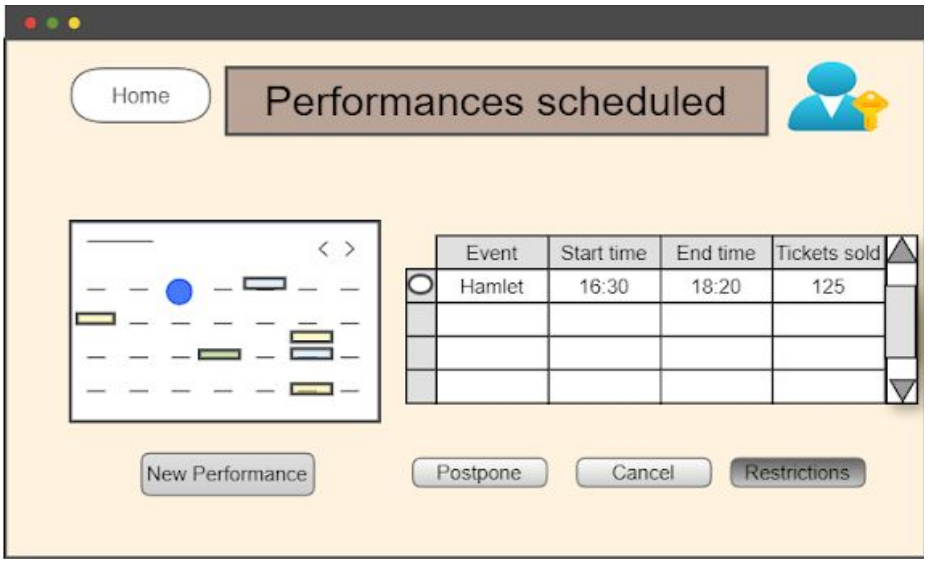
4.11 Area configuration



In this window the manager can configure the distribution of the hall by creating new areas or removing existing ones. Composite areas can be selected to see their subareas and edit them (add new ones or delete):

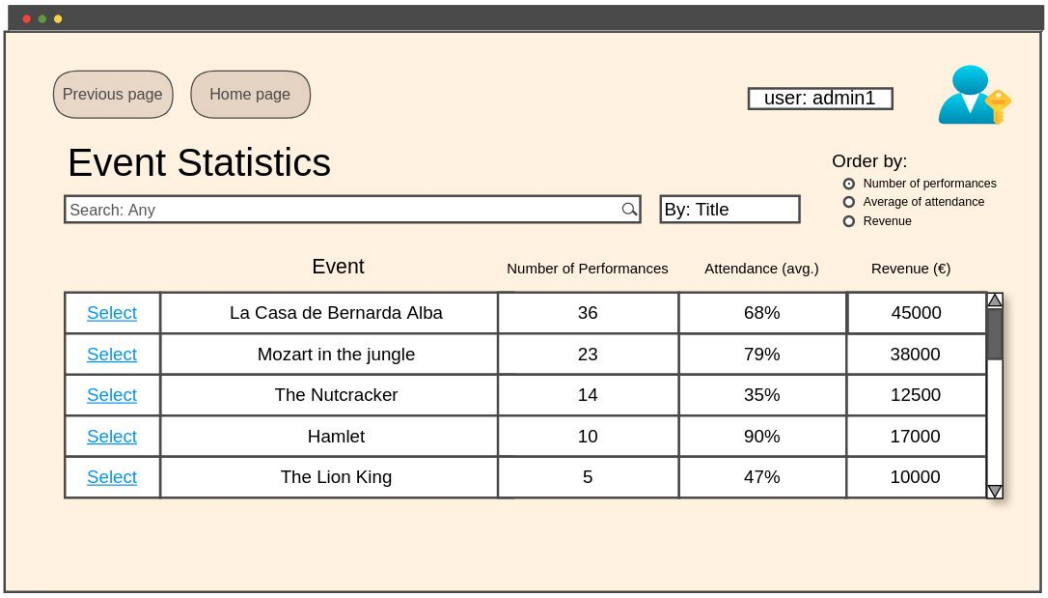


4.12 Performance scheduling



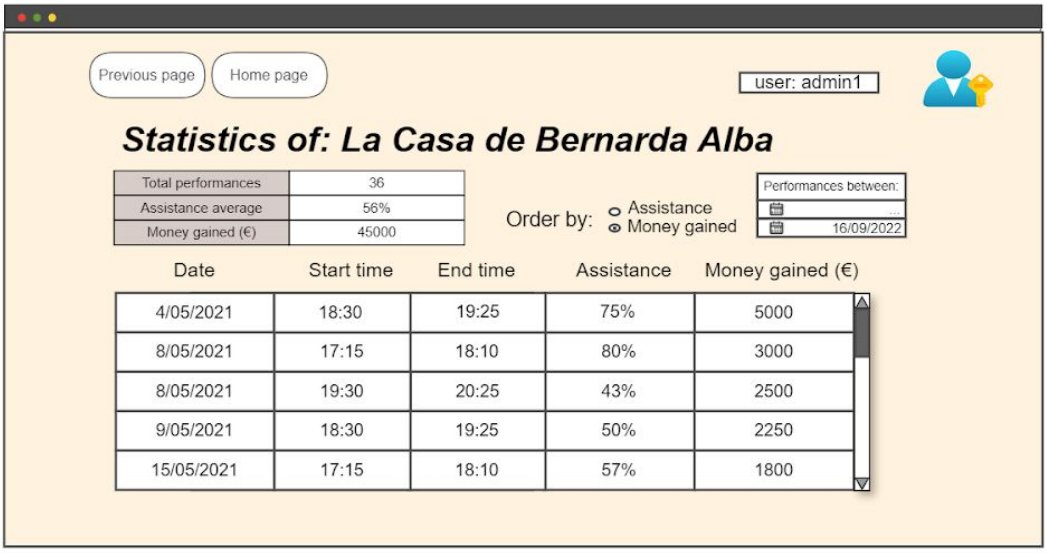
The manager can postpone or cancel performances as well as creating new ones. When clicking on a date of the calendar, scheduled performances for that date will be shown in the table. By clicking on the circle at the left of the performance, we will select it and then click on cancel or postpone. Also, when we click on a date, we can schedule a new performance on that date by then clicking on 'New performance'.

4.13 Stats search



Accessed only by the manager and similar to the generic search window. The manager can look for events statistics, ordering them by number of performances, assistance average or money gained. By clicking on the blue 'Select', he can access more specific stats of each event.

4.14 Event stats



In this window the manager can see stats for each performance of an event, and order them by assistance or money gained. Moreover he can add a date filter.