CO567

Haroon, Hassan, Mauro

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# Section A - Design

Diagram

Description automatically generatedUse Cases and Descriptions

Customer - The Customer will be able to access the Online Ticket System to buy a ticket for an event or show  
  
Access System - The consumer must be able to access the ticket system via the world wide web from any device that can access the Internet, in this ticket system they will be allowed to buy tickets for any shows present or future given a limited date range

Provide Username and Password - To get into the ticket system the Consumer must Provide their Details such as a unique username and password that will authenticate that it is the specific customer who wishes to access the system.  
  
Add Payment Details - The Customer must Add their Payment Details such as their credit or debit card details, as this will be the only form of payment for the purchases on the system  
  
Provide Billing Details - The Customer must provide a billing address when they first access the online ticket system, this address will be used to deliver the tickets to the correct address.

See Events List - When the Consumer chooses an Event they will be given a list that is compiled of Events from random dates they can choose from or The Consumer can give a specific date range such as next week Tuesday and a new list will be complied giving the events going from the present day to the data given in order.  
  
See Shows List - When the Customer chooses a show they will be given a list that is compiled of shows from random dates they can choose from or The Customer can give a specific date range such as next week Tuesday and a new list will be complied giving the shows going from the present day to the data given in order.  
  
Select Event - The Customer will be able to Select an Event they wish to see given from the lists  
  
Select Show - The Customer will be able to Select a Show they wish to see given from the lists  
  
Pay For Ticket - After the Show or Event has been chosen, the Customer must Pay for the Ticket  
  
Pay for Multiple Tickets - If the Customer chooses to buy multiple Tickets they must first identify the limit set by the venue manager for how many Tickets can be bought by one Customer.  
  
Choose Seat - After Paying for the Tickets the customer must choose a seat that they will be able to see from a list that will show which seats are available. The Consumer can choose their seat manually this means being able to see what seats are on hold, have been sold and which ones are available. When the seats have been chosen by the Consumer they will be on hold so no other Consumer could choose that exact seat or seats. The Consumer can choose to allow the Online Ticket System to choose a seat for them, if they wish for this process to take place, they must first input a price range such as what is the minimum they can spend and the maximum they can spend.

Diagram, schematic

Description automatically generated  
Choose Multiple Seats - If the Customer chooses to buy multiple seats, they must first identify the limit set by the venue manager for how many seats can be chosen by one consumer.   
  
Look at Promotion - On the Tickets and Seats there could be a Promotion, as if the Customer buys this many Tickets they could get a certain amount off, and sometimes the Seats will have price differences such as for Child, Student or Adult   
Venue Manager - The Venue Manager manages everything about the location of the event or show such as the tickets, prices, seats and layout of the event  
  
Access System - The Venue Manager will be able to Access the System to make sure everything is ready for the Events and Shows.  
  
Add Event - The Venue Manager will be allowed to add an event to the Venue such as what the event, the time of the event, who is performing and how many people are allowed in the venue  
  
Add Show - The Venue Manager will be allowed to add an Show to the Venue such as what is the show, the time of the show, who is performing and how many people are allowed in the venue  
  
Set Show - A Venue Manager can Set a Show this means to be able to Set a date and time for a performer to be seen by the Customer.  
  
Set Event - A Venue Manager can Set an Event this means to be able to Set a date and time for a performer to be seen by the Customer.  
  
Reschedule Show - A Venue Manager can Reschedule a Show this could be caused by shows clashing such as the next booking will be overlapped by the previous performer so they will be rescheduled to the next available time or maybe the weather is not so good so the performer will want to perform in better conditions  
  
Reschedule Event - A Venue Manager can Reschedule an Event this could be caused by events clashing such as the next booking will be overlapped by the previous performer so they will be rescheduled to the next available time or maybe the weather is not so good so the performer will want to perform in better conditions  
  
Cancel Show - The Venue Manager will be allowed to Cancel a Show this could be caused by payment issues, not enough audience, weather or disagreements  
  
Cancel Event - The Venue Manager will be allowed to Cancel an Event this could be caused by payment issues, not enough audience, weather or disagreements  
  
Designate Number Of Seats - A Venue manager must designate the number of seats in an event this must be done so the tickets will have a sale limit as if the tickets sold have gone over the capacity for the number of people allowed in the event this will cause issues and the venue manager will have to sort out refunds  
  
Increase Seat Limit - The Venue manager could choose to increase the seat limit for the event this could be due to the reason that the performer is worldwide known and the Venue Manager knows that many people would come to see this person. In addition, the seat limit for one customer could be increased to allow promotions as one consumer may buy tickets for family and friends.  
  
Decrease Seat Limit - The venue manager could choose to decrease the number of seats this would be done to allow 2 meters distance between the audience in case of a pandemic. In addition, the seat limit for one consumer could be decreased as sometimes consumers could buy many tickets to sell outside and gain profit.  
  
Set Price Range For Ticket And Seats - There has to be a Price Range for the Seats and Tickets this includes, different prices for an adult, student, child and senior citizen.  
  
Set Promotions And Discounts - Seats and Tickets can have promotions on such as if you buy 10 Tickets at once you will receive 10% off your total. For the Seats there will usually be different prices for a Child, Student or Adult  
  
Assign Ticket Agent - The Venue Manager must Assign a Ticket Agent when adding an Event or Show, this individual will help with promotions, discounts, seat and ticket pricing and much more.

Diagram

Description automatically generated

Ticket Agent - The Ticket Agent is the individual who is in charge of the buying and selling of the tickets as when the consumers buy a ticket, the agent must verify the purchase by using the OTS(Online Ticket System)  
  
Access System - Once the Customers have purchased a ticket(s) the ticket agent must verify this by using the Online Ticket System.  
  
Provide Consumer Information - Providing the customer information will able the ticket agent to verify the tickets on the correct Customer  
  
Assign Seat to Customer - After the Customer has bought the Ticket or Tickets the Ticket Agent must assign that Ticket(s) to the Customer who has bought it  
  
Confirm Ticket Purchase - After assigning the Ticket(s) to the Customer the Ticket Agent will need to confirm the purchase of the Ticket(s) that the Customer has chosen, this will provide on the system that the Customer has bought a ticket and has been confirmed/validated by a Ticket Agent

Diagram

Description automatically generated

## Class Diagram

A picture containing diagram

Description automatically generated

A picture containing diagram

Description automatically generated

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Description automatically generated  
  
  
  
A picture containing diagram

Description automatically generated

## Data Dictionary

|  |  |  |
| --- | --- | --- |
| **ConcessionTypes** | | |
| **Attribute** | **Data Type** | **Description** |
| ID | integer | Unique discount ID |
| child | integer | Child discount ID |
| student | integer | Student discount ID |
| senior | integer | Senior discount ID |

|  |  |  |
| --- | --- | --- |
| **Events** | | |
| ID | integer | Unique event ID |
| title | string | Name of event |
| description | string | Description of what a given event entails |
| date | string | Date and time of a given event |

|  |  |  |
| --- | --- | --- |
| **Shows** | | |
| ID | integer | Unique Show ID |
| showID | integer | Foreign Key |
| eventID | integer | Foreign Key |
| title | string | Show’s title identifier |
| description | string | Brief description of a show’s plot |
| maxSeats | integer | Maximum number of seats for a given viewing of a show |
| time | string | Show’s runtime |
| tier1 | integer | First tier pricing |
| tier2 | integer | Second tier pricing |
| tier3 | integer | Third tier pricing |

|  |  |  |
| --- | --- | --- |
| **Discounts** | | |
| ID | integer | Unique promotion ID |
| code | string | Activation code |
| rules | string | Set of rules for promotions |
| discount | string | Percentage of promotion discount |
| expiry | string | Final date permitted for use of promotion |
| description | string | Informative text about promotion |
| concessionID | integer | Unique concession ID |
| child | integer | Child discount ID |
| student | integer | Student discount ID |
| senior | integer | Senior discount ID |

|  |  |  |
| --- | --- | --- |
| **BookingSystem** | | |
| ID | integer | Unique booking ID |
| userID | Integer | Foreign Key |
| showID | Integer | Foreign Key |
| ticketAgentID | Integer | Foreign Key |
| promotionID | integer | Foreign Key |
| salePrice | integer | Baseline cost of a booking |
| dateTime | string | Date and time of a given booking |
| bought | boolean | Status of a given booking |

|  |  |  |
| --- | --- | --- |
| **User** | | |
| ID | integer | Unique user ID |
| firstName | string | User’s first name |
| lastName | string | User’s last name |
| email | string | Email on user’s account |
| password | string | Secret user login password |
| userType | integer | Identifier for recognizing what the user likes |
| logoff | boolean | Status of user presence |

|  |  |  |
| --- | --- | --- |
| **Customer** | | |
| userID | integer | ForeignKey |
| tickets | Tickets | Data from class Tickets |
| address | BillingAddress | Data from class BillingAddress |
| card | BillingCard | Data from class Card |
| user | User | Data from class User |

|  |  |  |
| --- | --- | --- |
| **TicketAgent** | | |
| ID | integer | Unique ticket agent ID |
| userID | integer | Foreign Key |
| commission | integer | Monetary gain per sale |
| salary | integer | Baseline ticket agent wage |
| assignedSeats | string | Assigned seat range from Venue Manager |

|  |  |  |
| --- | --- | --- |
| **BillingCard** | | |
| ID | integer | Unique payment ID |
| cardholderName | string | Name on a customer’s payment card |
| cardNumber | string | Payment card number identifier |
| expirationDate | string | Expiration date of customer’s payment card |
| ccv | string | 3 digit number on back of customer’s payment card |

|  |  |  |
| --- | --- | --- |
| **Payment** | | |
| userID | integer | Foreign Key |
| billingCardID | integer | Foreign Key |
| billingAddressID | integer | Foreign Key |

|  |  |  |
| --- | --- | --- |
| **BillingAddress** | | |
| ID | integer | Unique billing address ID |
| addressLine1 | string | First line of customer’s billing address |
| addressLine2 | string | Second line of customer’s billing address |
| city | string | City of billing address |
| postcode | string | Postcode of billing address |

|  |  |  |
| --- | --- | --- |
| **Venue** | | |
| ID | integer | Unique venue ID |
| venueAddress | string | Location of venue |
| venueName | string | Venue’s current name |
| inUse | boolean | Status of venue usage |
| venueCapacity | integer | Maximum capacity of venue |
| venueContact | string | Preferred contact form of venue |

|  |  |  |
| --- | --- | --- |
| **DatabaseManager** | | |
| usersTable | string | Data table for Users |
| billingAddressTable | string | Data table for BillingAddress |
| paymentTable | string | Data table for Payment |
| eventsTable | string | Data table for Events |
| showsTable | string | Data table for Shows |
| concessionDiscountsTable | string | Data table for ConcessionDiscounts |
| seatPricingTable | string | Data table for SeatPricing |
| promotionsTable | string | Data table for Promotions |
| ticketAgentsTable | string | Data table for TicketAgents |
| bookingsTable | string | Data table for Bookings |

|  |  |  |
| --- | --- | --- |
| **InputReader** | | |
| reader | Scanner | Reader for searching details |

|  |  |  |
| --- | --- | --- |
| **Tickets** | | |
| ticketID | integer | Unique ticket ID |
| ticketTitle | string | Name identifier for purpose of ticket |
| ticketDescription | string | Descriptive information for a given ticket |
| ticketExpiry | string | Expiration date of a given ticket |

|  |  |  |
| --- | --- | --- |
| **LoginSystem** | | |
| customer | Customer | Data from class Customer |
| ticketAgent | TicketAgent | Data from class TicketAgent |
| venueManager | VenueManager | Data from class VenueManager |

|  |  |  |
| --- | --- | --- |
| **VenueManager** | | |
| venue | Venue | Data from class Venue |
| events | Events | Data from class Events |
| shows | Shows | Data from class Shows |
| months | string | String of months of the year |

## Report

In this report will contain information of how we designed the start of the BUCKS Centre for the Performing Arts (Design & Implementation). The first section we designed was the three use cases which were designed by Hassan Nisar (22011971). He used Visual Paradigm Community Edition, the reason he used the Community Edition was because he used the 16.3 Evaluation Edition for another module and the 30-day trial had run out also, the apps anywhere Visual Paradigm was not working so he chose to use the Community Edition. He started making the Use Cases by looking at the assignment brief and listing down what each Actor does such as the Consumer, Venue Manager, and the Ticket Agent. After he made the list for each Actor, he done implemented every action they had done into three different Use Cases. After each Use Case he had opened the specification for each one and wrote a description as the Use Cases contain 5 or less words, another individual looking at the Use Case will find it hard to understand so he made a description for each Use Case which he also put into a Word Document.

The next segment that was looked and was a part of the Use Cases was the merging of the Use Cases, this was done by Hassan Nisar. Hassan first took all three Use Cases and laid them all out on a new Diagram, he came across an issue when merging the Use Cases as he could not simply import and export the already made Use Cases on to another diagram, he had to remake all the Use Cases again on to one diagram, this was not his fault as the software the team was using was not very helpful for this task. After, laying out all the Use Cases he then looked at each Use Case and found which Use Cases were similar, could be changed to be similar and the ones that were completely different. The ones that were similar was all Actors had to access the Online Ticket System this could be normalized and instead of three Use Cases for accessing the Online Ticket System it was normalized into one where all three Actors were related to. Some use cases could be seen as similar as the Ticket Agent had to confirm the seat as purchased and the Consumer had to purchase the seat, Hassan tried to make the Use Cases as similar as they could to allow normalization but was unable, so he normalized as many Use Cases as he could.

The Second feature which Haroon Sadiq took responsibility for was the Class diagrams, this task had a bit of everyone’s hand in it as the classes found in the study case was done by Hassan, the diagrams were generated by Haroon and the data inside the classes was described by Mauro which is another task in itself. To start of making the classes Hassan done a process called Noun Identifying this allowed Hassan to look through the Case Study and Identify the Main Nouns that were used to construct the BUCKS Centre for the Performing Arts. He ended up with nine nouns that were made into classes to begin with and was handed onto Haroon. Haroon generated the classes through the noun identifier that Hassan had completed, with this Haroon then created a full database schema in Visual Paradigm to augment the way the classes will communicate with each other and bring to light the multiplicity of such entities. Using this, Haroon then created a class diagram incorporating all of the client’s needs, with the by-product of this being having a full database design which would be used in the implementation for a robust and professional execution of the case study concerned.

At the halfway point of making the Class Diagrams, Mauro Nunes took the responsibility of generating a Data Dictionary for the Attributes in each class, he had the idea of doing it in between as if he had taken the responsibility at the end, it would have taken him a long time to complete so if he had started it all he needed to be doing was updating it with the new attributes. He decided to generate the Data Dictionary in Word as making a Table is simple in Word and he included the attribute, the type such as integer or string and lastly, the actual definition of the Attribute.

The team met up with each other every Monday from 2pm to 3pm and then every Friday from 3pm to 4pm. Those timings would be affected depending on availability. But, varying on work consumption as if less work was being done more meetings would be set up, if the work was being completed on time the team would have 30-minute meetings just letting each other know what has been completed and what must be completed next. Hassan Nisar took the role as Team Leader, so he oversaw roles and deadlines which were mostly met. The team would mostly keep communications via social media such as letting the group know what has been done and what needs to be done.

# Section B - Implementation

## Statement of Requirements

1. Sign up system will not allow new accounts with the same email to avoid conflicts
2. Verify if email is correct with “@” symbol and a TLD (e.g. .com or .co.uk)
3. Customer will be able to sign up on the login system
4. Ticket Agents will be able to sign up via the ticket manager
5. Venue Manager will be able to login successfully with a user type dependant UI
6. Ticket Agent will be able to login successfully with a user type dependant UI
7. Venue Manager will be able to log in successfully with a user type dependant UI
8. Venue Manager will be able to add events
9. Venue Manager will be able to add shows corresponding to events
10. Customer will be able to view events
11. Customer will be able to view shows corresponding to events
12. Customers will be able to hold tickets
13. Customers will require first time billing signup on login, all other user types do not.
14. Input reader will catch invalid data types
15. Database manager will create a fully capable database allowing all data to be stored and read

## Class Diagram

Diagram

Description automatically generated

Sequence Model

Chart

Description automatically generated

Pseudo – Code Detailed Designs

A) Login System: Sign up

String variables: *first name, last name, email, password, error message*

Integer Variables: *user type*

function signup(*user type*)

1. Get userinput for *first name*, *last name*, *email*, *password*

2. Check if userinput is valid data

2i. ***if:*** *first name* and *last name* is: ascii letters only, not null, 20-character max length

***else:***

- add error condition to *error message* string

2ii. ***if:*** *email* contains “@” and contains a known TLD (e.g. .com or .co.uk)

***if:*** *email* is taken in database – execute SQL database query

***else:***

- add error condition to *error message* string

***else:***

- add error condition to *error message* string

2iii. ***if:*** *password* is not null and 50 characters max length

***else:***

- add error condition to *error message* string

3. Attempt signup

3i. ***if:*** *error message* string is null

- Get Database Connection

- Create new row of data with ID (auto-increment, unique primary key), *first name*, . . *last name*, *email*, *password*, *user type* (default is 0 which is a customer account)

- Log into customer UI with details

***else:***

- Display *error message* string

- *error message* string set to null for next signup attempt

### B) Login System: Login

String variables: *email, password, error message*

Integer variables: *user ID*

function login()

1. Get userinput for *email*, *password*

2. Attempt login

2i. ***if:*** *email* is found in email row in database – execute SQL database query

***if:*** *password* == password column in email row in database – execute SQL database query

- AccountSelector(get *user ID* - execute SQL database query using email)

***else:***

- add error condition to *error message* string

***else:***

- add error condition to *error message* string

*error message* string set to null for next login attempt

### C) Login System: Account Selector

Integer variables: *user ID, user type*

function AccountSelector(integer *user ID*)

1. Use *user ID* to find *usertype* in the database – execute SQL database query

1i. get *usertype* variable - execute SQL database query using email

2. Select Account type

2i. ***if:*** *usertype* == 0

Customer()

***else if:*** *usertype* == 1

TicketAgent()

***else if:*** *usertype* == 2

VenueManager()

***else:***

display error

### D) Booking System: View Events

Integer variables: *event ID*

function viewEvents()

loop{

1. Display all available events

1i. Get all events – execute SQL database query

2. Let user choose event

1. 2ii. Userinput choose *event ID*,

2iii. ***if:*** *event ID* is found in database – execute SQL database query:

- viewShows()

- break loop

***else:***

- Display error message – “Invalid event ID”

} end loop

### E) Booking System: View Shows

Integer variables: *show ID*

function viewShows()

loop {

1. Display all available shows

1i. Display table with eventID conditional factor – execute SQL database query

2. Let user choose Show

1. 2ii. Userinput choose *show ID*,

2iii. ***if:*** *show ID* is found in database where eventID matches – execute SQL database query:

- viewShows()

- break loop

***else:***

- Display error message – “Invalid show ID”

} end loop

### F) Venue Manager: Add Event

Integer variables: *event ID*

String variables: *title, description, date*

function addEvent()

1. Get userinput for title, description and date of event

1i. check if *title* variable is a valid string

1ii. check if *description* variable is a valid string

1iii. check if *date* variable is a valid date format

loop{

2. Insert event into database

2i. ***if:*** *title, description, date* does not match database row – execute SQL database query

- break loop

***else:***

- Display “Duplicate data error”

} end loop

### G) Venue Manager: Add Show

Integer variables: *show ID, event ID*

String variables: *title, description, max seats, time range*

function addShow(*event ID*)

1. Get userinput for title, description and date of event

1i. check if *title* variable is a valid string

1ii. check if *description* variable is a valid string

1iii. check if *max seats* variable is a valid integer

1iv. check if *time range* variable is a valid time range format (start and end time)

*continued on next page*

loop {

2. Insert event into database

2i. ***if:*** *title, description, max seats, time range, event ID* does not match database row where – . execute SQL database query

- Create new row of data with ID (auto-increment, unique primary key), *title, description, max . seats, time range, eventID* (foreign key)

- break loop

***else:***

- Display “Duplicate data error”

} end loop

### H) Venue Manager: Add Ticket Agent

Integer variables: *user type, user ID, commission, seat start, seat end, salary*

String variables: *assigned seats*

function addTicketAgent()

1. Add basic user account

1i. signup(*user type* = 1)

1ii. Get *user ID*

2. Verify ticket agent data

2i. check userinput if *commission* variable is a valid string

2ii. check userinput if *seat start* variable is a valid string

2iii. check userinput if *seat end* variable is a valid integer

2iv. *assigned seats* equals: *seat start* combined with “-“ combined with *seat end*

3. Add ticket agent account linked to *user ID*

3i. Create new row of data in TicketAgent table with ID (auto-increment, unique primary key), *commission, seat start, seat end, salary* (default 0)*, user ID* (foreign key)

Implemented Code

<https://github.com/hsadiq32/CO567-OOSD/tree/main/Code/CO567>Diagram

Description automatically generated

Testing Regime

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Requirement | Test | Input | Expected outcome | Outcome | Changes Made | Pass |
| 1 | Sign up system will not allow new accounts with the same email to avoid conflicts | Stored Email: “email@email.com”  Inputted email:  “email@email.com” | Email taken error message |  | N/A | ✓ |
| 2 | Verify if email is correct with “@” symbol and a TLD (e.g. .com or .co.uk) | Email: “test”  Email: “test@”  Email: “test@email”  Email: “email.com”  Email = “test@email.com” | Reject string without an @ symbol or TLD |  | N/A | ✓ |
| 3 | Customer will be able to sign up on the login system | Stored Email: [email2@gmail.com](mailto:email2@gmail.com)  Stored Password : “1234”  Email: [email2@gmail.com](mailto:email2@gmail.com)  Password : “1234” | Login with customer string, identifying account type |  | N/A | ✓ |
| 4 | Ticket Agents will be able to sign up via the ticket manager | Firstname: Harry  Lastname: Red  Email: [red@email.com](mailto:red@email.com)  Password: abcd | Create a user account in user table, then reference userID for ticket agent account and create new row of data properly referenced. |  | N/A | ✓ |
| 5 | Customer will be able to login successfully with a user type dependant UI | Stored Email: [email2@gmail.com](mailto:email2@gmail.com)  Stored Password : “1234” | Login with customer string, identifying account type |  | Remove user dependant methods from constructor avoiding subclass references - fixed | ✓ |
| 6 | Ticket Agent will be able to login successfully with a user type dependant UI | Stored Email: [email2@gmail.com](mailto:email2@gmail.com)  Stored Password : “abcd” | Login with ticket agent string, identifying account type |  | Remove user dependant methods from constructor avoiding subclass references - fixed | ✓ |
| 7 | Venue Manager will be able to log in successfully with a user type dependant UI | Stored Email: [email@gmail.com](mailto:email@gmail.com)  Stored Password : “1234” | Login with venue manager string, identifying account type |  | Remove user dependant methods from constructor avoiding subclass references - fixed | ✓ |
| 8 | Venue Manager will be able to add events | Event title: “Grand Event”  Event Description: “Amazing!”  Event year: 2022  Event month: 7  Event day: 20 | Add event to database for global viewing |  | SQL error or missing database (table Events has no column named dateTime) – fixed changed “dateTime” to “date” | ✓ |
| 9 | Venue Manager will be able to add shows corresponding to events | Title: “Show1”  Description:”the first show”  Max seats: 30  Start hour: 8  Start Hour: 30  End hour: 10  End minutes: 50 | Add shows to database for global viewing |  | N/A | ✓ |
| 10 | Customer will be able to view events | Email: [email2@email.com](mailto:email2@email.com)  Password:1234 | Display events created by the venue manager |  | N/A | ✓ |
| 11 | Customer will be able to view shows corresponding to events | Event ID: 1 | Display shows corresponding to the event ID |  | N/A | ✓ |
| 12 | Customers will be able to hold tickets | Event ID: 1  Show ID: 1 | Tickets are stored but the descriptor bought should be false to indicate the ticket is on hold |  | N/A | ✓ |
| 13 | Customers will require first time billing signup on login, all other user types do not. | Addressline1: “10 Pine”  Addressline2: “Green Lane”  City: ”Oak Town”  Postcode: “JE53FT”  Cardholder Name: “Mark Green”  Card Number: “3876894567812986”  Expiration Date: 2205  ccv: 555 | Customer billing data should be stored and inputted on the first login |  | N/A | ✓ |
| 14 | Input reader will catch invalid data types | Invalid integer, email formats and nulls | Stop null inputs, wrong email formats, and out of bound integer ranges |  | N/A | ✓ |
| 15 | Database manager will create a fully capable database allowing all data to be stored and read | User Accounts:  Events:    Shows:    Customer billing details    Customer booking ticket details | | | | ✓ |

Report

Not done