**CS631-103 Term Project  
  
Car Rental System**

|  |  |
| --- | --- |
| **Phase 3** | |
| **Group 26:** | Jairo A. Perez  Manavkumar  Patel |
| **Date:** | 12/16/2022 |

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# **PART 1 – Business Requirements:**

The Following are the business requirements for the Car Rental system. These requirements will be grouped into sections to provide a better understanding from each component.

## Customer requirements:

1. A customer must make a reservation prior to rent a car.
2. If customer decides to proceed with the rental, she/he will get a rental agreement.
3. The customer must provide name, address, and phone at reservation time.
4. Lastly, the customer must provide a valid driver’s License and credit card if she/he gets a rental agreement.

## Reservation requirements:

1. The reservation must specify a type of class car.
2. The reservation will be made for a specific pick-up and drop-off location.
3. Pick-up and drop-off location do not have to be the same but can.
4. The reservation will include a rental period. This period consists of the start date and time and end date and time.
5. Reservation will have a type. To know if customer reserved by phone, walk-in or online. \*
6. The reservation will have a status. \*
7. Status will be active if customer shows up at pick-up location on start date.
8. Reservation will be cancelled if customer does not appear on start date and/or calls to cancel.

## Location requirements:

1. A location can hold several cars.
2. Not all locations will have the same number of cars or classes of cars.
3. Each location is associated with a reservation either in pick-up or drop-off form.

## Car requirements:

1. A car must be either at a location or with a customer (under a rental agreement).
2. If a car is rented it must be associated with a rental agreement.
3. Once a car is returned it becomes available for a new rental agreement.
4. A car is associated with a specific model

## Model Requirements:

1. A model has several cars associated to it.
2. A model is associated with a single car class.

## Car Class Requirements:

1. A class car has several models associated to it.
2. A class car has several cars associated to it.
3. Each reservation has a car class specified.

## Agreement Requirements:

1. Getting a rental agreement is only possible if there is a reservation.
2. Agreements can only be made to one person.
3. Agreements can only be associated with one specific car.
4. An agreement’s rental period is based on reservation rental period.
5. If a car is returned earlier, the Agreement will still base its rental period of the reservation.
6. If a car is returned late (after reservation rental period) the Agreement will save its new return date and time.
7. The agreement specifies the car’s initial odometer reading.
8. Once the car is return the agreement will store the ending or returning odometer reading.

## Invoice Requirements:

1. An invoice must be associated with a rental agreement.
2. Invoices will have a status. This indicate if it has been paid or not.
3. The invoice will calculate its amount due based on:
   1. Comparing Reservation’s rental period and Agreement’s return date.
      1. If return dates are equal no extra fees are applied
      2. If Agreement’s return date is less than Reservation’s, amount is based on Reservation’s period.
      3. If Agreement’s return date is older than Reservation’s, amount is based on Reservation’s period, extra days, and late fees.
   2. Extra days:
      1. Extra days are solely charge on daily rate
   3. Rates:
      1. Car rates are based on the car class selected
      2. If a reservation period is a week period, the weekly rate is applied.
      3. If a reservation period is less than a week period, the daily rate is applied.
      4. If a reservation period is more than a week period:
         1. A 7-day period will have a weekly rate
         2. Days outside of a week period will be charge with a daily rate.
   4. Late Fee:
      1. A late fee is 15% of a daily rate for a type of class car.
      2. A late fee will be applied to every single extra day.

## Decision Design

As mentioned before the business requirements for the Car Rental System are grouped into sections or categories. This decision was taken to portrait a better understanding of what is required from each business component. This saved us time and clarify the path for the creation of the database specially when wrijating the SQL statements.

# **PART 2 – ER Diagram:**

Below you can find the Entity Relationship diagram based on the business requirements.

Diagram

Description automatically generated

# **PART 3 – Rational Schema Diagram:**

Diagram

Description automatically generatedBelow you can find the Relational Schema based on the ER diagram.

# Graphical user interface, diagram Description automatically generated**PART 4 – Application Program Design**

A picture containing graphical user interface

Description automatically generated

**Top**: Overview of mini-app architecture.

**Right:** App folder structure.

**Source Code**: You can find the entire source code for the

application in Annex A, at the bottom of

this document.

# **PART 5 - SQL Queries**

## SQL Queries:

1. Group By

|  |  |
| --- | --- |
| Get a count of the classes of cars being rented out. | SELECT COUNT(ReservationID) AS Count , ClassCar\_Name  FROM Reservation  GROUP BY ClassCar\_Name; |

Graphical user interface, application

Description automatically generated

1. Group By & Having

|  |  |
| --- | --- |
| Get all reservations that have only 1 class of car reserved. | SELECT COUNT(ReservationID) AS Count , ClassCar\_Name  FROM Reservation  GROUP BY ClassCar\_Name  HAVING COUNT(ReservationID) < 2; |

Graphical user interface, text, application

Description automatically generated

1. In

|  |  |
| --- | --- |
| Get all the customer who have a current reservation with a luxury car. | SELECT \*  FROM Customer  WHERE Reservation\_ReservationID IN (  SELECT ReservationID  FROM Reservation  WHERE ClassCar\_Name="Luxury"); |

Table

Description automatically generated with medium confidence

1. All

|  |  |
| --- | --- |
| Get all the customer who have a current reservation with a luxury car. | SELECT CustomerID, FName, LName, Phone  FROM Customer  WHERE Reservation\_ReservationID = All (  SELECT ReservationID  FROM Reservation  GROUP BY ClassCar\_Name  HAVING ClassCar\_Name = "Sedan"); |

# Graphical user interface, text, application Description automatically generated

# **PART 6 – Narrative Conclusion**

## The group's experience with the project.

* I like the idea that the scenarios proposed for the project were geared towards real life situations. As a student and a person with some field experience, I can see how these situations could come up. The project prepares us for the different caveats we can encounter.

## Which steps were the most difficult?

* The most difficult step was simplifying the business requirements. It’s the part which takes the most attention and time to get down. Since understanding the requirements in a wrong way signifies that any work done from that point on will be wasted. To that end, the part with more time invested was on the analysis of the project.

## Which were the easiest?

* Creating and running the SQL statements and coding the application.

## What did you learn that you did not imagine you would have?

* Project management. I enjoyed the idea of being team lead. Laying out the different components we needed to accomplish the project.

## If you had to do it all over again, what would you have done differently?

* Set a task chart. Be more organized with the team.

# **PART 7 – Version Control**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Version | Amendment Number | Date | Requestor | Comment | Results |
| 1 | 1.1 | 11/2/2022 | Prof. Canan | MODEL is a separate entity, not just an attribute. CAR has MODEL, MODEL is associated with CLASS. Please revise your diagram. | ER diagram has been modified to reflect changes. Entity MODEL has been added.  Changes reflected on:  Part 2, page 5. |
| 2 | 2.1 | 11/16/2022 | Jairo A. Perez | Current “Relational Schema” diagram is difficult to read. Arrows are difficult to follow. | Switched from Microsoft Word to MySQL Workbench for relational schema diagram creation. |

# **PART 8 – Annex A: Source Code**

|  |  |
| --- | --- |
| **Index.php** | <!doctype html>  <html lang="en" style="height:100%;">    <head>      <!-- Required meta tags -->      <meta charset="utf-8">      <meta name="viewport" content="width=device-width, initial-scale=1">      <!-- Bootstrap CSS -->      <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.2/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-EVSTQN3/azprG1Anm3QDgpJLIm9Nao0Yz1ztcQTwFspd3yD65VohhpuuCOmLASjC" crossorigin="anonymous">      <title>Car Rental</title>    </head>    <body style="height:100%;">      <?php        include\_once "./titleSection.php";        echo "<p>&nbsp</p>";        include\_once "./loginForm.php";        echo "<p>&nbsp</p>";        include\_once "./footerSection.php"      ?>      <!-- Option 1: Bootstrap Bundle with Popper -->      <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.0.2/dist/js/bootstrap.bundle.min.js" integrity="sha384-MrcW6ZMFYlzcLA8Nl+NtUVF0sA7MsXsP1UyJoMp4YLEuNSfAP+JcXn/tWtIaxVXM" crossorigin="anonymous"></script>    </body>    </html> |
| **LoginForm.php** | <?php  ?>  <div class="container" style="height:70%; border-style:solid">    <div class="row">    <div class="col" style="display: flex; justify-content: center;"></div>      <div class="col" style="display: flex; justify-content: center;">      <form id="loginForm" action="./routs/router.php" method="POST">        <label for="loginID"> ID: </lable>        <br>        <input type="text" name="loginID" id="loginID">        <br>        <label for="passwdID"> Password:</label>        <br>        <input type="password" name="loginPWD" id="loginPWD">        <input type="hidden" name="pageID" value="1">        <br>        <br>        <input type="submit">      </form>      </div>    <div class="col" style="display: flex; justify-content: center;"></div>    </div>  </div> |
| **Utils.php** | <?php  require\_once "/var/www/html2/DB/dbconnect.php";  function vettUser($user, $password){      $conn = new mysqli($databasehost, $user, $password, $databasename);      $connStatus = mysqli\_connect\_errno();      if ($connStatus){          //die("Connection failed: " . mysqli\_connect\_error());          return "F";      }      $conn->close();      return "T";  }  ?> |
| **Router.php** | <?php  $user=$\_POST["loginID"];  $pwd=$\_POST["loginPWD"];  $idPage=$\_POST["pageID"];  require\_once "/var/www/html2/DB/dbconnect.php";  require\_once "/var/www/html2/utils/utils.php";  switch ($idPage) {    case "1":      //echo vettUser($user,$pwd);      if(vettUser($user,$pwd) == 0){        header("Location: http://63.209.35.111/Internal/dashbord.php");      }      else{        header("Location: http://63.209.35.111/");      }      break;    default:      //header("Location: http://63.209.35.111/");  }  ?> |
| **Dbconnect.php** | <?php  require\_once "dbinfo.php";  function connect($user, $password){      $conn = new mysqli($databasehost, $user, $password, $databasename);      if (!$conn){          return false;      }      return $conn;  }  ?> |
| **Dbinfo.php** | <?php  $username="carappuser";  $userpasswd="Th0th60DSc1ence\*";  $databasename="NJIT\_cs631103\_carproject";  $databasehost="njit-cs631-database-carproject.cjr2sl238paw.us-east-1.rds.amazonaws.com";  $databaseport=3306;  ?> |
| **Dashboard.php** | <!doctype html>  <html lang="en" style="height:100%;">    <head>      <!-- Required meta tags -->      <meta charset="utf-8">      <meta name="viewport" content="width=device-width, initial-scale=1">      <!-- Bootstrap CSS -->      <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.0.2/dist/css/bootstrap.min.css" rel="stylesheet" integrity="sha384-EVSTQN3/azprG1Anm3QDgpJLIm9Nao0Yz1ztcQTwFspd3yD65VohhpuuCOmLASjC" crossorigin="anonymous">        <title>Router</title>    </head>    <body style="height:100%;">        <div class="container" style="height:5%; border-style:solid">          <div class="row">                  <div class="col" style="display: flex; justify-content: center;">                      <?php                      echo "<H3> ADMIN DASHBOARD </H3>";                      ?>                  </div>          </div>      </div>      <?php          echo "<p>&nbsp</p>";          include\_once "customer\_board.php";          echo "<p>&nbsp</p>";          include\_once "reservations\_board.php";          echo "<p>&nbsp</p>";          include\_once "cars\_board.php";          echo "<p>&nbsp</p>";          include\_once "../Internal/footerInternal.php";      ?>      <!-- Option 1: Bootstrap Bundle with Popper -->      <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.0.2/dist/js/bootstrap.bundle.min.js" integrity="sha384-MrcW6ZMFYlzcLA8Nl+NtUVF0sA7MsXsP1UyJoMp4YLEuNSfAP+JcXn/tWtIaxVXM" crossorigin="anonymous"></script>    </body>    </html> |
| **Customer\_board.php** | <?php  require\_once "/var/www/html2/DB/dbinfo.php";  $Custoemr\_conn = new mysqli($databasehost, $username, $userpasswd, $databasename);      // SQL QUERIES      $numCostumers = "SELECT count(\*) FROM Customer";      $CostumerWreservation ="SELECT count(\*) FROM Customer WHERE Reservation\_ReservationID IS NOT NULL";      $CostumerWOreservation ="SELECT count(\*) FROM Customer WHERE Reservation\_ReservationID IS NULL";  ?>    <div class="container" style="height:20%; border-style:solid">      <div class="row">          <div class="col" style="display: flex; justify-content: center;"> </div>              <div class="col" style="display: flex; justify-content: center;">                  <?php                  echo "<H3> Customers </H3>";                  ?>              </div>          <div class="col" style="display: flex; justify-content: center;"> </div>      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; "> Number of Customers </div>          <div class="col" style="display: flex; justify-content: center; "> Customers with Reservartion </div>          <div class="col" style="display: flex; justify-content: center; "> Customers without a Reservation </div>      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; background-color:lightblue">              <?php                  if ($r1 = $Custoemr\_conn->query($numCostumers)){                      echo "<h2>".$r1->fetch\_row()[0]."</h2>";                  }                  $r1->free\_result();                ?>          </div>          <div class="col" style="display: flex; justify-content: center; background-color:lightblue">              <?php                  if ($r2 = $Custoemr\_conn->query($CostumerWreservation)){                      echo "<h2>".$r2->fetch\_row()[0]."</h2>";                  }                  $r2->free\_result();              ?>          </div>          <div class="col" style="display: flex; justify-content: center; background-color:lightblue">              <?php                  if ($r3 = $Custoemr\_conn->query($CostumerWOreservation)){                      echo "<h2>".$r3->fetch\_row()[0]."</h2>";                  }                  $r3->free\_result();              ?>          </div>      </div>  </div>  <?php      $Custoemr\_conn->close();  ?> |
| **Reservartions\_board.php** | <?php  require\_once "/var/www/html2/DB/dbinfo.php";  $Reservation\_conn = new mysqli($databasehost, $username, $userpasswd, $databasename);  // SQL QUERIES  $resWalkin = "SELECT COUNT(\*) FROM Reservation WHERE Type='walkin'";  $resPhone = "SELECT COUNT(\*) FROM Reservation WHERE Type='Phone'";  $groupsOfCarsinResv ="SELECT ClassCar\_Name, Count(\*) AS Num from Reservation GROUP BY ClassCar\_Name";  $CostumerWreservation ="SELECT count(\*) FROM Customer WHERE Reservation\_ReservationID IS NOT NULL";  $CostumerWOreservation ="SELECT count(\*) FROM Customer WHERE Reservation\_ReservationID IS NULL";  ?>  <div class="container" style="height:25%; border-style:solid;">      <div class="row">          <div class="col" style="display: flex; justify-content: center;"> </div>              <div class="col" style="display: flex; justify-content: center;">                  <?php                  echo "<H3> Reservations </H3>";                  ?>              </div>          <div class="col" style="display: flex; justify-content: center;"> </div>      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; "> Type of Reservation </div>          <div class="col" style="display: flex; justify-content: center; "> Class of Cars in active Reservation </div>          <div class="col" style="display: flex; justify-content: center; "> Customers without a Reservation </div>      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; background-color:pink">              <div class="row">                  <div class="row">                      <div class="col" style="display: flex; justify-content: center;"> Walkins </div>                      <div class="col" style="display: flex; justify-content: center;"> Phone </div>                  </div>                  <div class="col" style="display: flex; justify-content: center;">                      <?php                          if ($r1 = $Reservation\_conn->query($resWalkin)){                              echo "<h2>".$r1->fetch\_row()[0]."</h2>";                          }                          $r1->free\_result();                      ?>                  </div>                  <div class="col" style="display: flex; justify-content: center;">                      <?php                          if ($r2 = $Reservation\_conn->query($resPhone)){                              echo "<h2>".$r2->fetch\_row()[0]."</h2>";                          }                          $r2->free\_result();                      ?>                  </div>              </div>          </div>          <div class="col" style="display: flex; justify-content: center; background-color:pink">                <table>                  <tr>                      <th> Class Car</th>                      <th> &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; </td>                      <th> Count </th>                  </tr>              <?php                  if ($r3 = $Reservation\_conn->query($groupsOfCarsinResv)){                      while($gcars = $r3->fetch\_assoc()){                          echo "                              <tr> <td>".$gcars['ClassCar\_Name']."</td>                              <th> &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; </td>                              <td>".$gcars['Num']."</td> </tr>";                      }                  }                  $r3->free\_result();              ?>              </table>          </div>          <div class="col" style="display: flex; justify-content: center; background-color:pink">              <?php                  if ($r3 = $Reservation\_conn->query($CostumerWOreservation)){                      echo "<h2>".$r3->fetch\_row()[0]."</h2>";                  }                  $r3->free\_result();              ?>          </div>      </div>  </div>  <?php      $Reservation\_conn->close();?> |
| **Cars\_baord.php** | <?php  require\_once "/var/www/html2/DB/dbinfo.php";  $Car\_conn = new mysqli($databasehost, $username, $userpasswd, $databasename);  // SQL QUERIES  $numCar = "SELECT COUNT(\*) FROM Car";  $CarsWcustomer ="SELECT ContractNumber AS AgreementID, Car\_VIM AS VIM from Agreement";  ?>  <div class="container" style="height:20%; border-style:solid">      <div class="row">          <div class="col" style="display: flex; justify-content: center;"> </div>              <div class="col" style="display: flex; justify-content: center;">                  <?php                  echo "<H3> Cars </H3>";                  ?>              </div>          <div class="col" style="display: flex; justify-content: center;"> </div>      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; "> Total number of Cars </div>          <div class="col" style="display: flex; justify-content: center; "> Cars in a Reservartion </div>          <!-- <div class="col" style="display: flex; justify-content: center; "> Cars in Customer Hands </div> -->      </div>      <div class="row">          <div class="col" style="display: flex; justify-content: center; background-color:lightgreen">              <?php                  if ($r1 = $Car\_conn->query($numCar)){                      echo "<h2>".$r1->fetch\_row()[0]."</h2>";                  }                  $r1->free\_result();                ?>          </div>          <!-- <div class="col" style="display: flex; justify-content: center; background-color:lightgreen">          </div> -->          <div class="col" style="display: flex; justify-content: center; background-color:lightgreen">          <table>                  <tr>                      <th> ID </th>                      <th> &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; </td>                      <th> Car </th>                  </tr>                    <?php                    if ($r3 = $Car\_conn->query($CarsWcustomer)){                      while($gcars = $r3->fetch\_assoc()){                          echo "                              <tr> <td>".$gcars['AgreementID']."</td>                              <th> &nbsp; &nbsp; &nbsp; &nbsp; &nbsp; </td>                              <td>".$gcars['VIM']."</td> </tr>";                      }                  }                  $r3->free\_result();              ?>              </table>          </div>      </div>  </div>  <?php      $Custoemr\_conn->close();  ?> |