UNIVERSITY OF THE WEST INDIES, CAVE HILL CAMPUS
Department of Computer Science, Mathematics & Physics
COMP3375 Software Testing and Quality
Assignment
Due Dates:

Friday April 14th 2022 11:59pm for Documentation and Web App

Face-to-Face Presentations will be April 11th and April 13th

Car Rental Management System (CRMS) - Web Application

For this project your team has been contracted to design and implement a fully functioning web application for a Car Rental Management System (CRMS). This software will be used by the car rental company to manage their fleet of vehicles, customer bookings, and rental and returns of the vehicles.

The client have given you some of the basic requirements of the application, however seeing that your team is the best of the best, you don't have to stop at the basic requirements you can make your application the best it can be, and include features that the client did not think about, but would surely appreciate and use.

The client requested that you use a MySql database as your storage media, that way the CRMS could be easily integrated into the already existing MySql database that the client use for the other operations of the business such as payroll.

Below is a list of the basic information you got from the client about what your application should be able to do at a minimum. Note that this is information from the client, so you would have to think about the best way to have this information implemented into a usable system.

Vehicles
Your application should have a screen that allows you to enter and store information on the various vehicles that make up the rental fleet, information such as:

- **Make and Model**: This refers to the brand name of the vehicle (e.g. Toyota, Ford, etc.) and the specific model name (e.g. Camry, Mustang, etc.). This information is important for identifying the vehicle and determining its rental rates.
- **Year**: The year the vehicle was manufactured. This is important for determining the vehicle's age, depreciation, and potential maintenance needs.
- **VIN** (Vehicle Identification Number): A unique 17-digit code assigned to each vehicle by the manufacturer. This code includes information about the vehicle's year, make, model, engine type, and other identifying features. The VIN is used to track the vehicle's

history, and may be used by law enforcement or insurance companies to identify the vehicle in the event of theft or accident.

- **Color**: The color of the vehicle's exterior and interior. This information is helpful for customers who want to choose a specific color or style of vehicle.
- **License Plate Number**: The unique identifier assigned to the vehicle by the DMV. This is important for tracking the vehicle's registration status and any outstanding fees or tickets.
- **Odometer Reading**: The number of miles or kilometers that the vehicle has traveled. This is important for determining the vehicle's maintenance needs and rental rates.
- **Availability**: States weather the car is currently rented out or not, if it is currently rented the due date for its return will be visible.

Overall, Vehicle Identification Information is critical for accurately identifying and tracking each vehicle in a car rental company's fleet, and for ensuring that the company can efficiently manage its inventory and provide accurate information to customers.

Customers

Your application should have a screen that allows you to enter and store information on the Customers, such as:

- **Contact Information**: Basic contact details for the customer, including their name, address, email address, and phone number. This information is important for communicating with the customer regarding their rental, and for maintaining accurate records.
- **Driver's License Information**: The customer's driver's license number, state or province of issue, and expiration date. This information is necessary for verifying the customer's identity and ensuring that they have a valid driver's license.
- **Payment Information**: The customer's payment details, including credit card or debit card number, billing address, and expiration date. This information is necessary for processing rental payments and any additional charges.
- **Rental Preferences:** Information about the customer's rental preferences, such as preferred vehicle type, rental duration, and pickup/drop-off locations. This information can be used to personalize the customer's rental experience and offer targeted promotions.

Overall, a CRMS would hold a comprehensive profile of each customer who rents a car from the rental company, enabling the company to efficiently manage rentals, personalize the rental experience, and provide accurate and timely information to customers.

Rentals and Returns

Your application would have a Rental/Return screen that allows users to manage the rental process and track the return of rental vehicles. Some examples of the types of information that might be displayed on the Rental/Return screen include:

- **Customer Information**: Basic information on the customer renting the vehicle, including their name, contact information, and driver's license number.
- **Vehicle Information**: Information on the vehicle being rented or returned, including the make, model, year, color, and license plate number.
- **Rental Agreement**: The terms of the rental agreement, including the rental period, rental rate, any additional charges or fees.
- **Rental Status**: Information on the rental status of the vehicle, including when it will be rented out, when it is due to be returned, and any outstanding fees or charges.
- **Vehicle Condition**: Information on the condition of the vehicle, including any existing damage or issues, and any new damage or issues noted at the time of rental or return.
- **Payment Information**: Details on the payment for the rental, including the amount charged, the payment method, and any outstanding balances or credits.

Overall, the Rental/Return screen is a critical component of a CRMS, providing rental agents with the information they need to efficiently manage the rental process and ensure the safe and timely return of rental vehicles.

Reports

You can generate a variety of reports that provide valuable insights into the rental company's operations and financial performance. Here are some examples of basic reports that one might expect from your CRMS:

- **Vehicle Rental History**: This report would provide a summary of all rentals made for a particular vehicle, including the rental dates, customers who rented the vehicle, rental rates, and any additional charges or fees.
- **Customer Rental History**: This report would provide a summary of all rentals made by the customer, including the rental dates, vehicle rented, rental rates, and any additional charges or fees.
- **Rental History Report**: A report that provides a summary of all rentals over a specific time period, including the number of rentals, rental duration, rental rates, and total revenue.
- **Vehicle Availability Report**: A report that shows the availability of each vehicle in the rental fleet, including which vehicles are currently rented out, which vehicles are available for rent, and which vehicles are reserved for future rentals.
- **Late Return Report**: A report that tracks late returns, including the number of late returns, the duration of the lateness, and any late fees charged.

- **Vehicle Turnover Report**: A report that tracks the frequency at which vehicles are rented out and returned, providing insights into which vehicles are most popular and which vehicles might need to be retired from the fleet.

These reports can help rental companies to better manage their operations, improve their financial performance, and provide a better rental experience for their customers.

Your Team's Tasks are:
1. Complete the above application from design to implementation, NO PRE-BUILT Car Rental Management System (CRMS) downloaded from the internet is allowed, you can use templates for the UX styling and themes however the core functionality should be done by your team.

2. Your pages should be well labeled so that simply looking at it would guide the user as to how to go about completing the task that they are there for.

3. All pages in your application should have a consistent look and feel.

4. Complete a written report, details shown below.

5. Complete a face-to-face presentation, details shown below.

What are the deliverables for the assignment?

1. A written report which should include sections on:
   - Software Requirements Specification (SRS) Document [Watch the video at this link https://youtu.be/PtJmjPkrSUE to get a guide as to some of the things you would need to have in your SRS]
   - Detailed Test Plan, ER-Diagrams, Database Schema Diagram and Flow Charts.
   - Details on your team's approaches to testing for the following three major testing levels:
     - Unit Testing
       - Equivalence classes
       - BVA Analysis
       - Sample test cases
     - Integration Testing
       - State transition diagram
       - Top-Down or Bottom-up which one will be used and why
     - System Testing
       - Defeats report
       - What debugging methods were used to find errors
   - User manual with screen shots
   - All sections should have a consistent format

2. All the source code for you application, include HTML, CSS and JavaScript files should be submitted. You should export your database to a sql file, so your application can be installed and ran on my system for marking. All these files could be placed in one zip file.

   The following link has a tutorial on how to export a database to a sql file:
   https://mediatemple.net/community/products/dv/204403864/export-and-import-mysql-databases

3. A 15 minute face-to-face presentation which includes:

   − Each team member should participate in the face-to-face presentation.
   − A working demonstration of the features of your web application.
   − PowerPoint presentation of the major parts of your written report; in part including the following:
      • Testing method and/or test cases used in the development of the application.
      • Any decision tables or control flow graphs used to help with the case test development.
      • Datable structure and technologies used, in the completion of this assignment

Marking Scheme:

Written report   30%
   1. Software Requirements Specification (SRS) Document – 5%
   2. Test Plan, Various Diagrams – 10%
   3. Test Approaches – 10%
   4. User Manual – 5%

Presentation   35%
   1. Organization, Clarity – 5%
   2. Quality of Presentation Materials – 10%
   3. Professionalism, Communication and Group Dynamics – 5%
   4. Coverage of paper and the program materials – 10%
   5. Overall flow of the presentation – 5%

Web Application   35%
   1. Vehicles page – 5%
   2. Customers page – 5%
   3. Rentals/Returns page – 7.5%
   4. Reports page – 7.5%
   5. Overall look and feel – 5%
   6. Additional features – 5%