**System Requirements Specification (SRS) – Vehicle Selling by Escrow**

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**1. Introduction**

This document details the system requirements and scope for developing the Vehicle Selling by Escrow system. The system facilitates secure vehicle transactions by holding the payment in escrow until the transaction conditions are met, ensuring the security and satisfaction of both buyers and sellers.

**2. Functional Requirements**

The system is divided into three main modules:

|  |  |  |
| --- | --- | --- |
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**2.1 Buyer Module**

**2.1.1 Account Creation**

* **Description:** Buyers must create an account to use the system.
* **Inputs:** Username, Password, First Name, Last Name, Email, Address, Phone Number.
* **Constraints:** Unique Username, Password (8-16 characters, including numbers, uppercase and lowercase letters, and special characters).

**2.1.2 Dealer Verification Process As Buyers**

* **Description:** Verify if the buyer is a business (dealer) and then make them a user of the system.
* **Inputs:** Business registration details (business name, registration number, tax ID), business contact information (address, phone number, email), and supporting documents.
* **Outputs:** User verification status and account activation.

**2.1.3 Login Process**

* **Description:** Buyers log in using their credentials.
* **Inputs:** Username, Password.
* **Checks:** Validity of Username and Password, User Type (Buyer).

**2.1.4 Forgot Password Process**

* **Description:** Allows buyers to reset their password.
* **Inputs:** Username, Security Question Answer.
* **Outputs:** New password sent via email.

**2.1.4 Change Password Process**

* **Description:** Buyers can change their password to ensure account security.
* **Inputs:** Current password, new password, confirmation of new password.
* **Outputs:** Password change confirmation.

**2.1.5 Search Vehicles**

* **Description:** Buyers can search for available vehicles.
* **Inputs:** Vehicle Category, Price Range, Make, Model.
* **Outputs:** List of vehicles matching search criteria.

**2.1.6 Purchase Vehicle**

* **Description:** Buyers can initiate a vehicle purchase.
* **Inputs:** Vehicle ID, Payment Details.
* **Outputs:** Confirmation of payment initiation.

**2.1.7 Make Deal**

**2.1.8 Transaction Under Escrow**

**2.1.9 Feedback Option Process**

* **Description:** Buyers can provide feedback about their experience with the dealer.
* **Inputs:** Dealer ID, feedback rating (1-5 stars), feedback comments.
* **Outputs:** Feedback submission confirmation.

**2.2 Seller Module**

**2.2.1 Account Creation**

* **Description:** Sellers must create an account to list vehicles. Sellers can be Individual
* **Inputs:** Username, Password, First Name, Last Name, Email, Address, Phone Number.
* **Constraints:** Unique Username, Password (8-16 characters, including numbers, uppercase and lowercase letters, and special characters).

**1. Initialize**

**Usernames List:**

* Create a list called existing\_usernames which holds all the usernames that are already taken. This ensures we can check the uniqueness of a new username.

**Password Validation Function:**

* Define a function is\_valid\_password(password) that checks whether the password meets the specified constraints. This function will return True if the password is valid and False otherwise.

**Username Uniqueness Function:**

* Define a function is\_unique\_username(username) that checks if the provided username is unique by comparing it against the existing\_usernames list. It returns True if the username is unique and False if it is already taken.

**2. Get Input**

**Seller Category:**

* Prompt the user to select the Seller Category: Individual Owner or Vehicle Dealership.

**Username:**

* Prompt the user to enter a Username.
* This input will be checked for uniqueness.

**Password:**

* Prompt the user to enter a Password.
* This input will be validated to ensure it meets the constraints.

**Other Details:**

* For Individual Owners: Prompt the user to enter First Name, Last Name, Email, Address, and Phone Number.
* For Vehicle Dealerships: Prompt the user to enter Email, Address, Phone Number, Store Name, and GST Number (ensure GST Number is 15 characters long).

**3. Validate Inputs**

**Username Validation:**

* Check if the entered Username is unique by using the is\_unique\_username function.
* If the username is not unique, prompt the user to enter a different Username and repeat the check until a unique username is provided.

**Password Validation:**

* Validate the entered Password using the is\_valid\_password function.
* If the password does not meet the constraints, prompt the user to enter a valid Password and repeat the validation until a valid password is provided.

**GST Number Validation (for Vehicle Dealerships):**

* Ensure the GST Number is exactly 15 characters long.
* If the GST Number is invalid, prompt the user to enter a valid GST Number.

**4. Store Inputs**

**Account Storage:**

* If all inputs (Username, Password, and relevant details) are valid, store the user's details in a user account database or list.

**5. Output**

**Confirmation:**

* Once the account is successfully created, provide a confirmation message to the user indicating that the account creation was successful.

**Detailed Steps**

**Step-by-Step Process:**

**1. Initialization:**

* Prepare a list of existing usernames.
* Define functions to validate the password and check username uniqueness.

**2. Getting Inputs:**

* Prompt the user to select the Seller Category (Individual Owner or Vehicle Dealership).
* Prompt the user to enter each required piece of information based on the selected category.

**3. Username Validation:**

* Use the is\_unique\_username function to ensure the username is not already taken.
* If the username is not unique, inform the user and prompt them to choose another.

**4. Password Validation:**

* Use the is\_valid\_password function to ensure the password meets the constraints:
  + Length between 8 and 16 characters.
  + Includes at least one lowercase letter.
  + Includes at least one uppercase letter.
  + Includes at least one number.
  + Includes at least one special character.
* If the password is invalid, inform the user and prompt them to enter a new one.

**5. GST Number Validation (for Vehicle Dealerships):**

* Ensure the GST Number is exactly 15 characters long.
* If the GST Number is invalid, inform the user and prompt them to enter a valid one.

**6. Input Storage:**

* Once all inputs are validated, store them in the system's user database.

**7. Confirmation:**

* Provide feedback to the user that their account has been created successfully.

**Key Considerations**

**Data Validation:**

* Ensuring that each piece of user input meets the required criteria is crucial for security and data integrity.

**User Feedback:**

* Informing the user of any errors and providing clear instructions on how to correct them enhances the user experience.

**Security:**

* Password constraints help in creating strong passwords, protecting user accounts from potential breaches.

**Uniqueness:**

* Ensuring unique usernames prevents user confusion and potential conflicts in the system.

**GST Number Verification:**

* Verifying the GST Number for Vehicle Dealerships ensures compliance with regulatory requirements and enhances credibility.

**2.2.2 Dealer Verification as Sellers**

**Description:**

* Verify if the seller is a business (dealer) and then make them a user of the system.

**Inputs:**

* **Business Registration Details:**
  + Store Name
  + GST Number (15 characters long)
* **Business Contact Information:**
  + Address
  + Phone Number
  + Email
* **Supporting Document:**
  + A document verifying the business registration (e.g., business license, tax registration document)

**Outputs:**

* **User Verification Status:**
  + Status indicating whether the business verification was successful or not.
* **Account Activation:**
  + If the verification is successful, the dealer's account is activated, and they are notified of their active status.

**Detailed Steps**

**Step-by-Step Process:**

**1. Input Collection:**

* Prompt the user to enter the following business registration details:
  + Store Name
  + GST Number (ensure it is 15 characters long)
* Prompt the user to enter the following business contact information:
  + Address
  + Phone Number
  + Email
* Prompt the user to upload a supporting document verifying the business registration.

**2. Validation and Verification:**

* **GST Number Validation:**
  + Ensure the GST Number is exactly 15 characters long.
  + If the GST Number is invalid, inform the user and prompt them to enter a valid GST Number.
* **Supporting Document Verification:**
  + Validate the uploaded document to confirm it is a legitimate business registration document.
  + This may involve manual verification by an administrator or automated checks against a business registry.

**3. Verification Status Determination:**

* If all inputs are valid and the supporting document is verified:
  + Set the user verification status to "Verified."
  + Activate the dealer's account in the system.
* If any inputs are invalid or the supporting document cannot be verified:
  + Set the user verification status to "Not Verified."
  + Provide feedback to the user on why the verification failed and what steps to take next.

**4. Account Activation and Notification:**

* If the verification is successful:
  + Activate the dealer's account.
  + Send a confirmation email to the user notifying them that their account is active.
* If the verification is not successful:
  + Send an email to the user notifying them of the verification failure and providing instructions for resubmission or further action.

**Key Considerations**

**Data Validation:**

* Ensuring that each piece of business information meets the required criteria is crucial for security and data integrity.

**Document Verification:**

* Verifying the legitimacy of the supporting document is essential to prevent fraudulent businesses from accessing the system.

**User Feedback:**

* Informing the user of any errors or verification outcomes and providing clear instructions on how to correct issues enhances the user experience.

**Security:**

* Implementing robust validation and verification processes helps protect the system from unauthorized access and ensures that only legitimate businesses can operate as dealers.

**Compliance:**

* Ensuring GST numbers and supporting documents meet regulatory requirements is essential for legal and operational compliance.

**2.2.3 Login Process**

**Description:**

* Sellers log in using their credentials.

**Inputs:**

* Username
* Password

**Checks:**

* Validity of Username and Password
* User Type (Seller)

**Detailed Steps**

**Step-by-Step Process:**

**1. Input Collection:**

* Prompt the seller to enter their Username.
* Prompt the seller to enter their Password.

**2. Credential Validation:**

* **Username Validation:**
  + Check if the entered Username exists in the system.
  + If the Username does not exist, inform the user and prompt them to enter a valid Username.
* **Password Validation:**
  + Check if the entered Password matches the stored password for the given Username.
  + If the Password is incorrect, inform the user and prompt them to enter the correct Password.

**3. User Type Check:**

* Verify that the user type associated with the entered credentials is "Seller."
* If the user type is not "Seller," inform the user that they do not have the appropriate permissions to log in as a seller.

**4. Authentication and Access:**

* If the Username, Password, and User Type are all valid:
  + Authenticate the seller.
  + Grant access to the seller's account and the seller-specific dashboard or functionalities.

**5. Error Handling:**

* If the Username, Password, or User Type is invalid:
  + Display an appropriate error message to the user.
  + Provide instructions or options for password recovery or contacting support if needed.

**Key Considerations**

**Data Validation:**

* Ensuring that the entered Username and Password match the stored credentials is crucial for security and data integrity.

**User Feedback:**

* Providing clear and informative error messages helps users understand what went wrong and how to correct it, enhancing the user experience.

**Security:**

* Implementing strong password validation and user type checks helps protect the system from unauthorized access and ensures that only sellers can access seller-specific functionalities.

**Authentication:**

* Securely authenticating users and managing sessions is essential to maintaining the integrity and security of the system.

**Support:**

* Offering options for password recovery and support helps users regain access to their accounts and ensures a smooth login experience.

**2.2.4 Forgot Password Process**

**Description:**

* Allows sellers to reset their password.

**Inputs:**

* Username
* Security Question Answer

**Outputs:**

* Email sent to the user with a link to the change password page

**Detailed Steps**

**Step-by-Step Process:**

**1. Input Collection:**

* Prompt the seller to enter their Username.
* Prompt the seller to answer their pre-set Security Question.

**2. Username Validation:**

* Check if the entered Username exists in the system.
* If the Username does not exist, inform the user and prompt them to enter a valid Username.

**3. Security Question Answer Validation:**

* Retrieve the stored answer for the security question associated with the entered Username.
* Compare the provided answer with the stored answer.
* If the answer is incorrect, inform the user and prompt them to provide the correct answer.

**4. Password Reset Link Generation:**

* If the Username and Security Question Answer are valid:
  + Generate a secure, unique link to the change password page.
  + The link should have a limited validity period to ensure security.

**5. Email Notification:**

* Send an email to the seller's registered email address containing the link to the change password page.
* Include instructions on how to use the link to reset the password.

**6. Error Handling:**

* If the Username or Security Question Answer is invalid:
  + Display an appropriate error message to the user.
  + Provide options for retrying or contacting support if needed.

**Key Considerations**

**Data Validation:**

* Ensuring that the entered Username and Security Question Answer match the stored credentials is crucial for security and data integrity.

**User Feedback:**

* Providing clear and informative error messages helps users understand what went wrong and how to correct it, enhancing the user experience.

**Security:**

* Implementing strong validation and secure handling of password reset links helps protect the system from unauthorized access and ensures that only authorized users can reset their passwords.
* The password reset link should be unique and have a limited validity period.

**Email Communication:**

* Sending the password reset link via email ensures that the user can regain access to their account securely.
* Including instructions on how to use the link to reset the password enhances the user experience.

**Support:**

* Offering options for contacting support helps users resolve issues and ensures a smooth password reset experience.

**2.2.5 Change Password Process**

**Description:**

* Sellers can change their password to ensure account security.

**Inputs:**

* Current Password
* New Password
* Confirmation of New Password

**Outputs:**

* Password change confirmation

**Detailed Steps**

**Step-by-Step Process:**

**1. Input Collection:**

* Prompt the seller to enter their Current Password.
* Prompt the seller to enter their New Password.
* Prompt the seller to confirm their New Password by entering it again.

**2. Current Password Validation:**

* Verify that the entered Current Password matches the stored password for the seller.
* If the Current Password is incorrect, inform the user and prompt them to enter the correct Current Password.

**3. New Password Validation:**

* Ensure the New Password meets the following constraints:
  + Length between 8 and 16 characters.
  + Includes at least one lowercase letter.
  + Includes at least one uppercase letter.
  + Includes at least one number.
  + Includes at least one special character.
* Compare the New Password and the Confirmation of New Password to ensure they match.
* If the New Password does not meet the constraints or does not match the confirmation, inform the user and prompt them to enter a valid New Password and confirmation.

**4. Password Update:**

* If the Current Password is valid and the New Password is valid and matches the confirmation:
  + Update the stored password to the New Password.
  + Ensure the new password is securely stored in the system.

**5. Confirmation:**

* Send a confirmation message to the seller indicating that their password has been successfully changed.
* Optionally, send a confirmation email to the seller notifying them of the password change for additional security.

**6. Error Handling:**

* If any of the inputs are invalid, display an appropriate error message to the user and provide options for retrying or contacting support if needed.

**Key Considerations**

**Data Validation:**

* Ensuring that the Current Password matches the stored password and that the New Password meets security constraints is crucial for account security and data integrity.

**User Feedback:**

* Providing clear and informative error messages helps users understand what went wrong and how to correct it, enhancing the user experience.

**Security:**

* Implementing strong password validation and secure handling of passwords helps protect the system from unauthorized access and ensures that only authorized users can change their passwords.
* Sending a confirmation email adds an additional layer of security by notifying users of changes to their account.

**Password Storage:**

* Ensure that passwords are securely stored using industry-standard encryption methods to protect user data.

**Support:**

* Offering options for contacting support helps users resolve issues and ensures a smooth password change experience.

**2.2.6 List Vehicle for Sale**

**Description:**

* Sellers can list their vehicles for sale.

**Inputs:**

* Vehicle Details:
  + Category (e.g., Car, Truck, Motorcycle, etc.)
  + Make
  + Model
  + Year
  + Price
  + Photos

**Outputs:**

* Vehicle listing confirmation

**Detailed Steps**

**Step-by-Step Process:**

**1. Input Collection:**

* Prompt the seller to enter the following vehicle details:
  + Category (select from predefined options such as Car, Truck, Motorcycle, etc.)
  + Make (e.g., Toyota, Ford, Honda)
  + Model (e.g., Camry, F-150, Civic)
  + Year (e.g., 2020, 2019)
  + Price (in local currency)
* Prompt the seller to upload Photos of the vehicle.

**2. Data Validation:**

* Validate that all required fields (Category, Make, Model, Year, Price) are filled in.
* Ensure that the Year is a valid four-digit year and not in the future.
* Ensure that the Price is a positive number.
* Validate that at least one photo has been uploaded.
* If any inputs are invalid, inform the user and prompt them to provide valid details.

**3. Store Vehicle Details:**

* If all inputs are valid, store the vehicle details in the system's vehicle listings database.

**4. Listing Confirmation:**

* Send a confirmation message to the seller indicating that their vehicle has been successfully listed for sale.
* Optionally, send a confirmation email to the seller with details of the vehicle listing.

**5. Error Handling:**

* If any of the inputs are invalid or if there is an issue with storing the details, display an appropriate error message to the user.
* Provide options for retrying or contacting support if needed.

**Key Considerations**

**Data Validation:**

* Ensuring that all vehicle details are valid and complete is crucial for accurate listings and user satisfaction.

**User Feedback:**

* Providing clear and informative error messages helps users understand what went wrong and how to correct it, enhancing the user experience.

**Security:**

* Implementing secure handling and storage of vehicle details and photos helps protect the system from unauthorized access and ensures data integrity.

**Support:**

* Offering options for contacting support helps users resolve issues and ensures a smooth vehicle listing experience.

**Confirmation:**

* Sending a confirmation message or email adds an additional layer of assurance for the seller, confirming that their vehicle is listed for sale.

**2.2.7 List of Interested Buyers For Sellers**

* **Description:** Sellers can view a list of buyers who have expressed interest in their listed vehicles.
* **Inputs:** Vehicle ID (identifier for the specific vehicle listing) and Seller authentication details (credentials to verify the seller's identity).
* **Outputs:** List of interested buyers including Buyer Name, Buyer Contact Information (email or phone number), Date of Interest, and Comments or Messages from Buyers.

**2.2.8 Update Vehicle Listing**

* **Description:** Sellers can update details of their listed vehicles.
* **Inputs:** Vehicle ID, Updated Details.
* **Outputs:** Confirmation of update.

**2.2.9 Remove Vehicle Listing**

* **Description:** Sellers can remove their vehicle listings.
* **Inputs:** Vehicle ID.
* **Outputs:** Confirmation of removal.

**2.3 Admin Module**

**2.4.1 Manage Users**

* **Description:** Admins manage user accounts (buyers, sellers, agents).
* **Inputs:** User Details (Create, Update, Delete).
* **Outputs:** Confirmation of user management actions.

**2.4.2 View Reports**

* **Description:** Admins can generate and view various system reports.
* **Inputs:** Report Criteria.
* **Outputs:** Generated reports.

**2.4.3 Manage System Settings**

* **Description:** Admins manage system settings and configurations.
* **Inputs:** System Settings Details.
* **Outputs:** Confirmation of settings update.

**3. Non-Functional Requirements**

**3.1 Security**

* Passwords must be encrypted.
* Sensitive data should be stored securely.
* Regular security audits must be performed.

**3.2 Performance**

* System should handle up to 10,000 concurrent users.
* Average response time should not exceed 2 seconds.

**3.3 Usability**

* User interface should be intuitive and user-friendly.
* Provide help and support documentation.

**4. Use Case Diagram**

(Work in progress)

**Changes to Be Made in SRS**

**4.Verification of User if it’s a Business(Dealer)**

**And then make them user of your System.**

**Added in SRS:**

* 1. **Add List of Interested Buyers for Sellers**
  2. **Registration can be done by**

**Individual person and Vehicle Dealers**

* 1. **Feedback Option for Buyer’s Experience**

**About the Dealer.**