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**Graphical user interface

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**Name of Module Leader:** Dr Simon Powers

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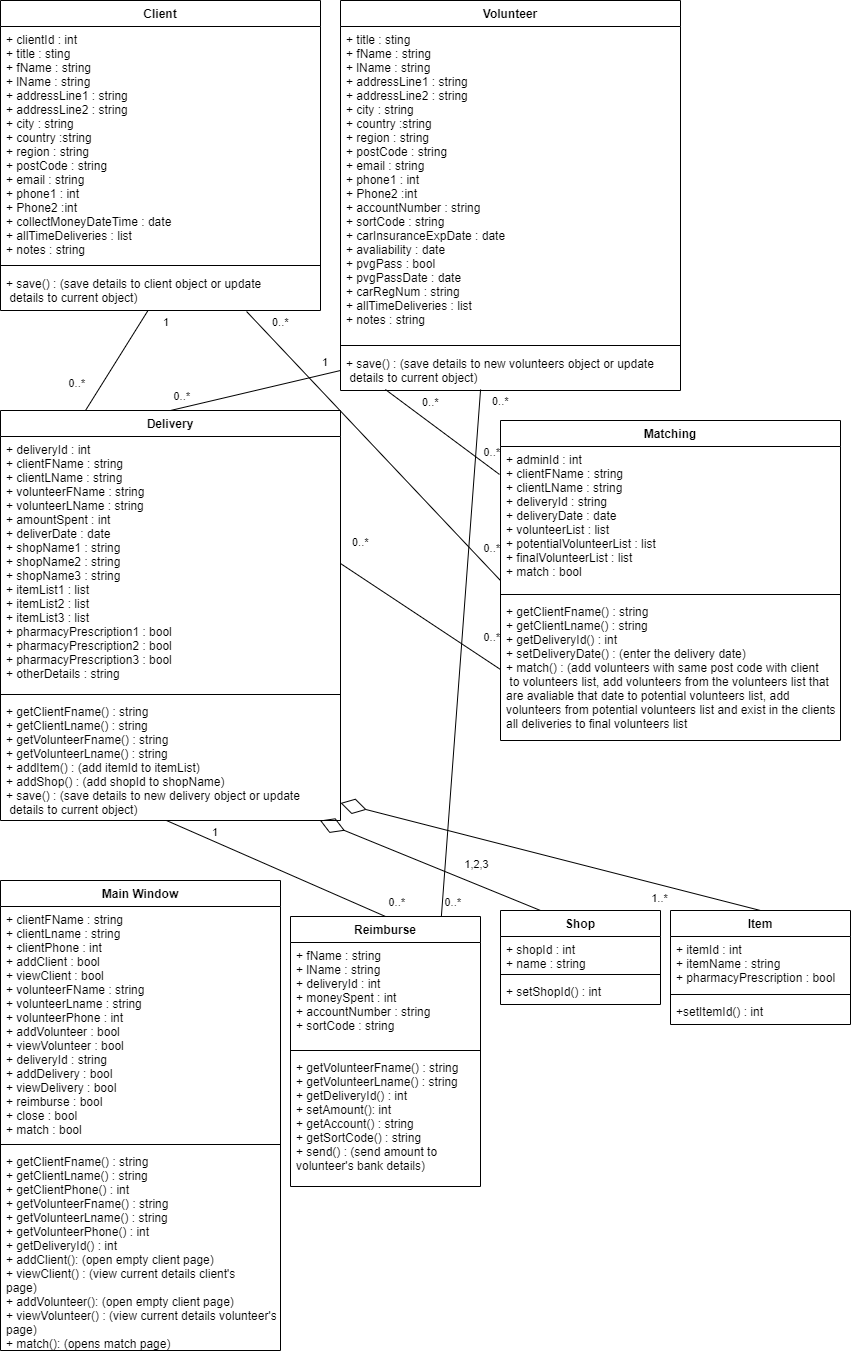
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# UML class diagram



The above class diagram represents the whole system that was built as minimum viable product. All the necessary classes, objects, attributes and operations can be found in the above class diagram.

# Prototype user interface screens

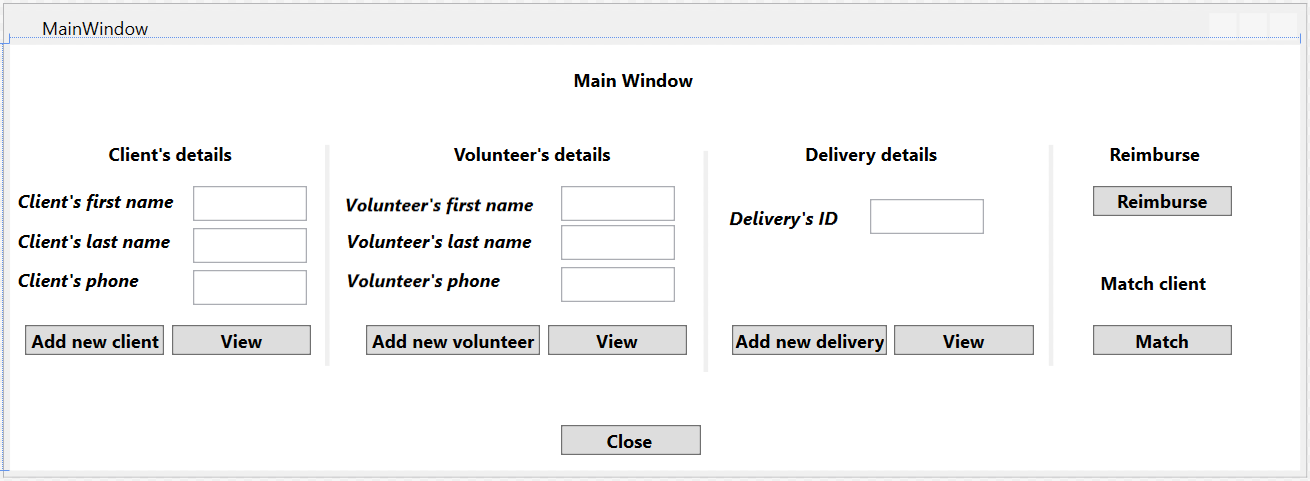


Figure 1 main page

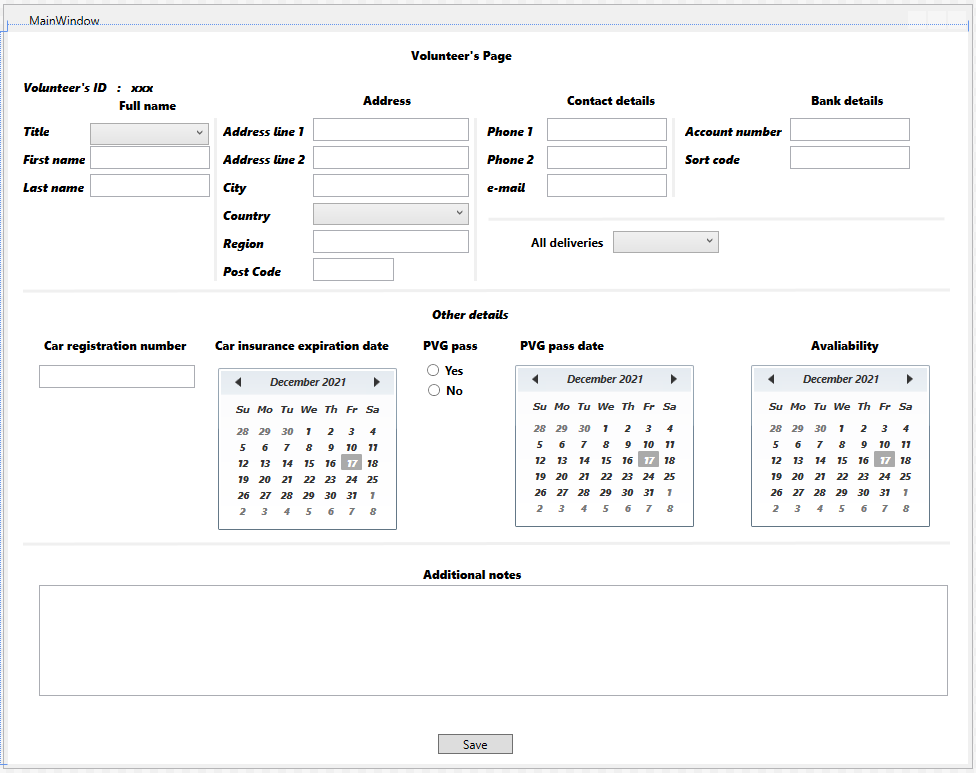
Figure 1 shows the main page of the system where the user can choose on what he wants to do. He can register a new client or volunteer, start a new delivery, reimburse money and match a client with a volunteer. Also, he can choose a register client or volunteer and go into his page in order to review some info or update them. Last, he can review the details of an old delivery.

Figure 2 Volunteer's page

In figure 2 the volunteer’s page is shown where the data of a registered user can reviewed or updated or a new user can registered.

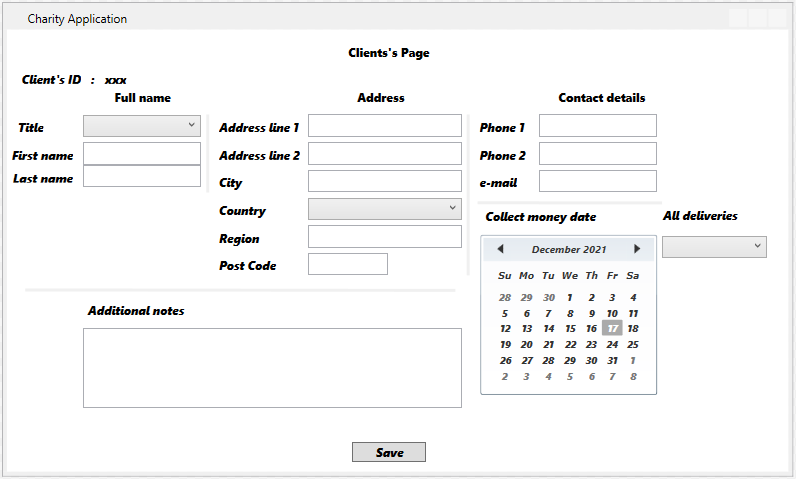


Figure 3 Client's page

In figure 3 to the client’s page is shown where the data of a registered user can reviewed or updated or a new user can registered.

Table

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Figure 4 Delivery page

Figure 4 represents the page where a new delivery can start or where the data of an old delivery can be reviewed.

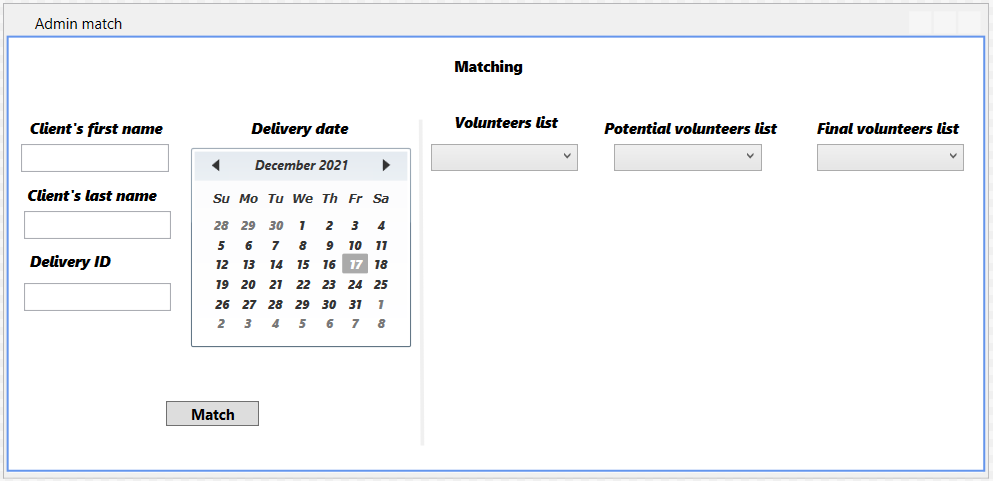


Figure 5 matching page

Figure 5 is one of the most important things in our system because in this page is where the admin can match the best volunteer for a specific client’s delivery

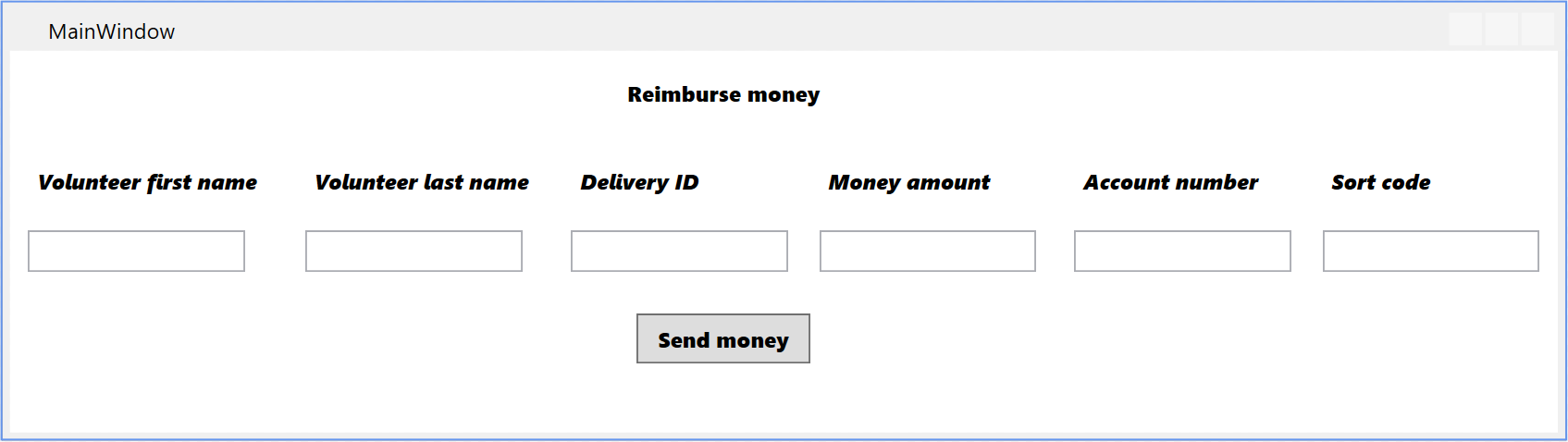


Figure 6 reimburse page

Last in figure 6 we see the page where the admin will reimburse the amount the volunteer paid for a delivery to his bank account.

# Event Action Test Tables

The event test below covers all the possible action that can happen in the system. The event table trigger actions with specific outputs on events from specific inputs.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Main page event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| buttonAddNewVolunteer click | Not opening Volunteer register page | Generate message something went wrong |  |  |
| buttonAddNewVolunteer click | Opening Volunteer register page | Open Volunteer register page |  |  |
| buttonView click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonView click | All information completed and in the correct format | Open clients page |  |  |
| buttonAddNewDelivery click | Not opening new Delivery page | Generate message something went wrong |  |  |
| buttonAddNewDeliveryclick | Opening new Delivery page | Open Volunteer register page |  |  |
| buttonView click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonView click | All information completed and in the correct format | Open clients page |  |  |
| buttonAddNewVolunteer click | Not opening Volunteer register page | Generate message something went wrong |  |  |
| buttonAddNewVolunteer click | Opening Volunteer register page | Open Volunteer register page |  |  |
| buttonView click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonView click | All information completed and in the correct format | Open clients page |  |  |
| buttonReimburse click | Not opening Reimburse page | Generate message something went wrong |  |  |
| buttonReimburse click | Opening Reimburse page | OpenReimburse page |  |  |
| buttonMatch click | Not opening Match client page | Generate message something went wrong |  |  |
| buttonMatch click | Opening match client page | Open match client page |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Client page event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| comboBoxTitle select | Title not selected, no listBoxItem selected | Generate message asking admin to select Title and change comboBox to red |  |  |
| comboBoxTitle select | Title selected | Turn comboBox to green |  |  |
| textBox FirstName type | No first name entered textBox ="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBox FirstName type | First name entered textBox = "Brad" | Turn textBox to green |  |  |
| textBox LastName type | No last name entered textBox= "" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBox FirstName type | Last name entered textBox="MCNicoll" | Turn textBox to green |  |  |
| textBox Address line 1 type | No address line 1 entered textBox="" | Generate message asking admin to enter address line 1 and change textBox to red |  |  |
| textBox Address line 1 type | Address line 1 entered textBox="4/14 Huntingdon Place" | Turn textBox to green |  |  |
| textBox Address line 2 type | No address line 2 entered textBox="" | Turn textBox to green |  |  |
| textBox Address line 2 type | Address line 2 entered textBox="4 Huntingdon Place" | Turn textBox to green |  |  |
| texBox City type | No city entered textBox="" | Generate message asking admin to enter city and change textBox to red |  |  |
| texBox City type | City entered textBox="Edinburgh" | Turn textBox to green |  |  |
| comboBoxCountry select | Country not selected, no listBoxItem selected | Generate message asking admin to select country and change comboBox to red |  |  |
| comboBoxCountry select | Country selected | Turn textBox to green |  |  |
| texBoxRegion type | No region entered textBox="" | Generate message asking admin to select region and change comboBox to red |  |  |
| texBox Region type | Region entered textBox= "Lothian" | Turn textBox to green |  |  |
| textBoxPostCode type | No post code entered textBox="" or entered with wrong format textBox="eh74at" | Generate message asking admin to enter a correct post code and change comboBox to red |  |  |
| textBoxPostCode type | Post code entered correctly textBox="EH7 4AT" | Turn textBox to green |  |  |
| textBoxPhone 1 type | No phone 1 entered textBox="" or entered in wrong format textBox = "759354" | Generate message asking admin to enter a correct phone and change comboBox to red |  |  |
| textBoxPhone 1 type | Phone entered correctly textBox="07629764019" | Turn textBox to green |  |  |
| textBoxPhone 2 type | No phone 1 entered textBox="" or entered in wrong format textBox = "759354" | Turn textBox to green |  |  |
| textBoxPhone 2 type | Phone entered correctly textBox="07629764019" | Turn textBox to green |  |  |
| textBoxEmail type | No e-mail entered textBox="" or entered in wrong format textBox = "brad.mcnicoll2gmail.com" | Generate message asking admin to enter a correct e-mail and change comboBox to red |  |  |
| textBoxEmail type | e-mail entered correctly textBox="brad.mcnicoll@gmail.com" | Turn textBox to green |  |  |
| comboBoxAllDeliveries click | List click | List expanded and all deliveries appear in the list |  |  |
| textBoxAdditionalNotes type | No notes entered textBox="" | Turn textBox to green |  |  |
| textBoxAdditionalNotes type | Notes entered textBox=" Hearing problems" | Turn textBox to green |  |  |
| buttonSave click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonSave click | All information completed and in the correct format | Hide register window and display user window |  |  |

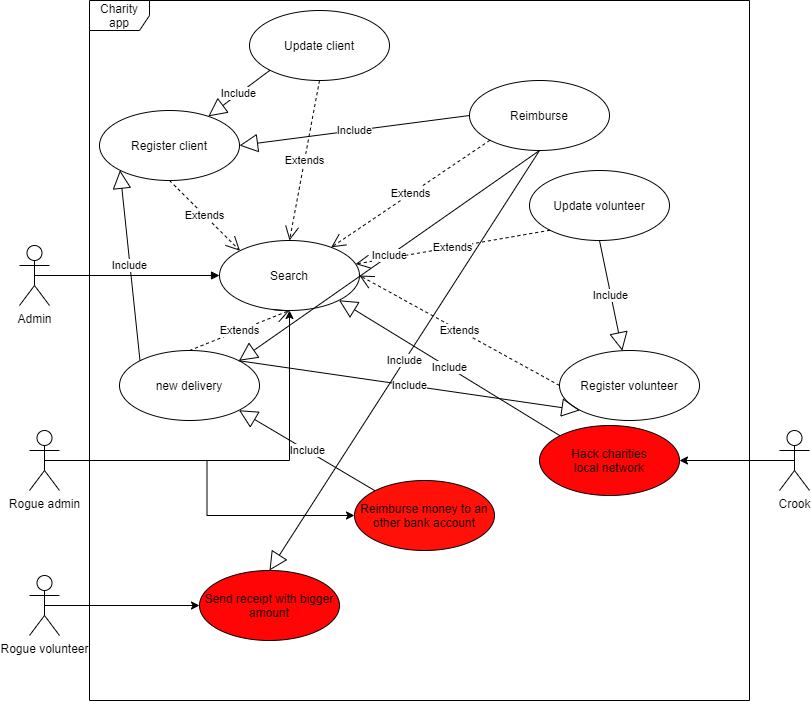
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Volunteer page event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| comboBoxTitle select | Title not selected, no listBoxItem selected | Generate message asking admin to select Title and change comboBox to red |  |  |
| comboBoxTitle select | Title selected | Turn comboBox to green |  |  |
| textBox FirstName type | No first name entered textBox ="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBox FirstName type | First name entered textBox = "Brad" | Turn textBox to green |  |  |
| textBox LastName type | No last name entered textBox= "" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBox FirstName type | Last name entered textBox="MCNicoll" | Turn textBox to green |  |  |
| textBox Address line 1 type | No address line 1 entered textBox="" | Generate message asking admin to enter address line 1 and change textBox to red |  |  |
| textBox Address line 1 type | Address line 1 entered textBox="4/14 Huntingdon Place" | Turn textBox to green |  |  |
| textBox Address line 2 type | No address line 2 entered textBox="" | Turn textBox to green |  |  |
| textBox Address line 2 type | Address line 2 entered textBox="4 Huntingdon Place" | Turn textBox to green |  |  |
| texBox City type | No city entered textBox="" | Generate message asking admin to enter city and change textBox to red |  |  |
| texBox City type | City entered textBox="Edinburgh" | Turn textBox to green |  |  |
| comboBoxCountry select | Country not selected, no listBoxItem selected | Generate message asking admin to select country and change comboBox to red |  |  |
| comboBoxCountry select | Country selected | Turn textBox to green |  |  |
| texBoxRegion type | No region entered textBox="" | Generate message asking admin to select region and change comboBox to red |  |  |
| texBox Region type | Region entered textBox= "Lothian" | Turn textBox to green |  |  |
| textBoxPostCode type | No post code entered textBox="" or entered with wrong format textBox="eh74at" | Generate message asking admin to enter a correct post code and change comboBox to red |  |  |
| textBoxPostCode type | Post code entered correctly textBox="EH7 4AT" | Turn textBox to green |  |  |
| textBoxPhone 1 type | No phone 1 entered textBox="" or entered in wrong format textBox = "759354" | Generate message asking admin to enter a correct phone and change comboBox to red |  |  |
| textBoxPhone 1 type | Phone entered correctly textBox="07629764019" | Turn textBox to green |  |  |
| textBoxPhone 2 type | No phone 1 entered textBox="" or entered in wrong format textBox = "759354" | Turn textBox to green |  |  |
| textBoxPhone 2 type | Phone entered correctly textBox="07629764019" | Turn textBox to green |  |  |
| textBoxEmail type | No e-mail entered textBox="" or entered in wrong format textBox = "brad.mcnicoll2gmail.com" | Generate message asking admin to enter a correct e-mail and change comboBox to red |  |  |
| textBoxEmail type | e-mail entered correctly textBox="brad.mcnicoll@gmail.com" | Turn textBox to green |  |  |
| textBoxAccountNumber type | No accountNumber entered textBox="" | Generate message asking admin to enter account number and change comboBox to red |  |  |
| textBoxAccountNumber type | Account number entered textBox="014784563" | Turn textBox to green |  |  |
| textBoxSortCode type | No sort code entered textBox="" or entered in the wrong format textBox="001122" | Generate message asking admin to enter a correct sort code and change comboBox to red |  |  |
| textBoxSortCode type | Sort code entered in the correct format textBox="00-11-22" | Turn textBox to green |  |  |
| textBoxCarRegistrationNumber type | No car registration number entered textBox="" | Generate message asking admin to enter car registration number and change comboBox to red |  |  |
| textBoxCarRegistrationNumber type | Car registration number entered textBox="458AD521S" | Turn textBox to green |  |  |
| calendarCarInsuranceExpirationDate select | Date not selected | Generate message asking admin to select date and change comboBox to red |  |  |
| calendarCarInsuranceExpirationDate select | Date entered has passed | Generate message asking admin to inform the volunteer to update his car insurance and that this volunteers can not registered, turn calendar to red deactivate register button |  |  |
| calendarCarInsuranceExpirationDate select | Date entered andhas not passed | Turn textBox to green |  |  |
| radioButtonPvgPass select | No button selected | Generate message asking admin toselect and option and change butons to red |  |  |
| radioButtonPvgPass select | Option no selected | Generate message saying that this volunteers can not registered and deactivate register button |  |  |
| radioButtonPvgPass select | Option yes selected | Turn radio button to green |  |  |
| calendarPvgPassDate select | No date selected | Generate message asking admin to select date and change calendar to red |  |  |
| calendarPvgPassDate select | Future date selected | Generate message asking admin to select a valid date and change calendar to red |  |  |
| calendarPvgPassDate select | Date selected and is not a future date | Turn radio button to green |  |  |
| calendarAvaliability select | No dates selected | Generate message asking admin to select dates and change calendar to red |  |  |
| calendarAvaliability select | Dates selected | Turn calendar to green |  |  |
| comboBoxAllDeliveries click | List click | List expanded and all deliveries appear in the list |  |  |
| textBoxAdditionalNotes type | No notes entered textBox="" | Turn textBox to green |  |  |
| textBoxAdditionalNotes type | Notes entered textBox=" Hearing problems" | Turn textBox to green |  |  |
| buttonSave click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonSave click | All information completed and in the correct format | Hide register window and display user window |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Delivery details event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| textBoxVolunteerFirstName type | No volunteer first name entered textBox="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBoxVolunteerFirstName type | A non registered volunteer first name entered textBox="Asdka" | Generate message asking admin to enter a registered first name and change textBox to red |  |  |
| textBoxVolunteerFirstName type | Registered volunteer's name entered textBox ="Brad" | Turns textBox to green |  |  |
| textBoxVolunteerLastName type | No volunteer last name entered textBox="" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBoxVolunteerLastName type | A non registered volunteer last name entered or last name doesn’t match volunteer's name textBox="Asdka" | Generate message asking admin to enter a registered last name that matches volunteer's name and change textBox to red |  |  |
| textBoxVolunteerLastName type | Registered Volunteer last name entered and matches volunteer's name textBox="McNicoll" | Turns textBox to green |  |  |
| textBoxClientFirstName type | No client's first name entered textBox="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBoxClientFirstName type | A non registered client's first name entered textBox="Asdka" | Generate message asking admin to enter a registered first name and change textBox to red |  |  |
| textBoxClientFirstName type | Registered client's name entered textBox ="Brad" | Turns textBox to green |  |  |
| textBoxClientLastName type | Noclient's last name entered textBox="" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBoxClientLastName type | A non registered client's last name entered or last name doesn’t match volunteer's name textBox="Asdka" | Generate message asking admin to enter a registered last name that matches client's name and change textBox to red |  |  |
| textBoxClientLastName type | Registered client's last name entered and matches volunteer's name textBox="McNicoll" | Turns textBox to green |  |  |
| calendarDeliveryDate select | No dates selected | Generate message asking admin to select dates and change calendar to red |  |  |
| calendarDeliveryDate select | Dates selected | Turn calendar to green |  |  |
| textBoxShop1 type | Shop 1 not entered textBox="" | Generate message asking admin to enter shop and turn textBox to red |  |  |
| textBoxShop1 type | Shop 1 entered | Turn textBox green |  |  |
| textBoxItemList1 | No item entered textBox ="" | Generate message asking admin to enter item and turn textBox to red |  |  |
| textBoxItemList1 | At least 1 item entered | Turn textBox green |  |  |
| radioButtonPharmacyPerscription | No button selected | Generate message asking admin toselecte an option and turn textBox to red |  |  |
| radioButtonPharmacyPerscription | Yes/no selected | Turn textBox green |  |  |
| textBoxShop2 type | Shop 2 not entered textBox="" | Turn textBox green |  |  |
| textBoxShop2 type | Shop 2 entered | Turn textBox green |  |  |
| textBoxItemList2 | No item entered textBox ="" | Turn textBox green |  |  |
| textBoxItemList2 | At least 2 item entered | Turn textBox green |  |  |
| radioButtonPharmacyPerscription | No button selected | Turn textBox green |  |  |
| radioButtonPharmacyPerscription | Yes/no selected | Turn textBox green |  |  |
| textBoxShop3 type | Shop 3 not entered textBox="" | Turn textBox green |  |  |
| textBoxShop3 type | Shop 3 entered | Turn textBox green |  |  |
| textBoxItemList3 | No item entered textBox ="" | Turn textBox green |  |  |
| textBoxItemList3 | At least 3 item entered | Turn textBox green |  |  |
| radioButtonPharmacyPerscription | No button selected | Turn textBox green |  |  |
| radioButtonPharmacyPerscription | Yes/no selected | Turn textBox green |  |  |
| textBoxAmountSpend | No amount entered textBox ="" | Turn textBox green |  |  |
| textBoxAmountSpend | Amount entered textBox="59.37" | Turn textBox green |  |  |
| textBoxOtherDetails type | No notes entered textBox="" | Turn textBox to green |  |  |
| textBoxOtherDetails type | Notes entered textBox=" Hearing problems" | Turn textBox to green |  |  |
| buttonAddDelivery click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonAddDelivery click | All information completed and in the correct format | Hide register window and display user window |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Matching event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| textBoxClientFirstName type | No client's first name entered textBox="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBoxClientFirstName type | A non registered client's first name entered textBox="Asdka" | Generate message asking admin to enter a registered first name and change textBox to red |  |  |
| textBoxClientFirstName type | Registered client's name entered textBox ="Brad" | Turns textBox to green |  |  |
| textBoxClientLastName type | Noclient's last name entered textBox="" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBoxClientLastName type | A non registered client's last name entered or last name doesn’t match volunteer's name textBox="Asdka" | Generate message asking admin to enter a registered last name that matches client's name and change textBox to red |  |  |
| textBoxClientLastName type | Registered client's last name entered and matches volunteer's name textBox="McNicoll" | Turns textBox to green |  |  |
| textBoxDeliveryId type | Delivery ID not entered textBox="" | Generate message asking admin to enter delivery ID and change textBox to red |  |  |
| textBoxDeliveryId type | Delivery ID entered but not matches clients deliveries | Generate message asking admin to enter a valid delivery ID for the specific client and change textBox to red |  |  |
| textBoxDeliveryId type | Delivery ID entered, matches client's delivery but delivery has been completed | Generate message asking admin to enter a delivery ID for the specific client that has not been completed and change textBox to red |  |  |
| textBoxDeliveryId type | Delivery ID entered, matches client's delivery and has not been completed | Turns textBox to green |  |  |
| calendarDeliveryDate select | No dates selected or date not match the delivery ID | Generate message asking admin to select dates that matches the delivery ID and change calendar to red |  |  |
| calendarDeliveryDate select | Dates selected | Turn calendar to green |  |  |
| buttonMatch click | Some information are missing or are in the wrong format | Generate message asking admin to complete the missing information and change missing information boxes to red |  |  |
| buttonMatch click | All information completed and in the correct format | Shows volunteers to the volunteer's lists so the admin can pick the volunteer |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reimbruse money event test | | | | |
| Event | Condition | Expected Action | Actual Action | Comments |
| textBoxVolunteerFirstName type | No volunteer first name entered textBox="" | Generate message asking admin to enter first name and change textBox to red |  |  |
| textBoxVolunteerFirstName type | A non registered volunteer first name entered textBox="Asdka" | Generate message asking admin to enter a registered first name and change textBox to red |  |  |
| textBoxVolunteerFirstName type | Registered volunteer's name entered textBox ="Brad" | Turns textBox to green |  |  |
| textBoxVolunteerLastName type | No volunteer last name entered textBox="" | Generate message asking admin to enter last name and change textBox to red |  |  |
| textBoxVolunteerLastName type | A non registered volunteer last name entered or last name doesn’t match volunteer's name textBox="Asdka" | Generate message asking admin to enter a registered last name that matches volunteer's name and change textBox to red |  |  |
| textBoxVolunteerLastName type | Registered Volunteer last name entered and matches volunteer's name textBox="McNicoll" | Turns textBox to green |  |  |
| textBoxDeliveryId type | No delivery id entered textBox="" | Generate message asking admin to enter delivery ID and change textBox to red |  |  |
| textBoxDeliveryId type | Invalid delivery id entered or doesn't match volunteer's name | Generate message asking admin to enter a valid delivery ID that matches volunteers's name and change textBox to red |  |  |
| textBoxDeliveryId type | Delivery ID that matches volunteer's name entered but money has already reimburse for this delivery | Generate message that the money for this delivery have already reimbursed and change textBox to red |  |  |
| textBoxDeliveryId type | Delivery ID that matches volunteer's name entered | Turns textBox to green |  |  |
| textBoxMoneyAmount type | Amount doesn't match the amount in the delivery ID | Generate message that the amount doesn’t match the mount in the delivery ID and change textBox to red |  |  |
| textBoxMoneyAmount type | Correct amount entered that matches the delivery's ID amount | Turns textBox to green |  |  |
| textBoxAccountNumber type | No account number entered or it doesn’t match volunteer's account number | Generate message that the account number doesn’t match the volunteer's account number and change textBox to red |  |  |
| textBoxAccountNumber type | Account number entered and match volunteer's account number | Turns textBox to green |  |  |
| textBoxSortCode type | Sort code not entered or doesn't match account | Generate message that the sort code doesn’t match the volunteer's sort code and change textBox to red |  |  |
| textBoxSortCode type | Sort code entered and matches volunteer's short code | Turns textBox to green |  |  |
| buttonSendMoney click | Some information are missing or are not matching | Generate message asking admin to complete the missing or not matching information and change missing information boxes to red |  |  |
| buttonSendMoney click | All information completed and match format | Hide reimburse money window and display a message that the transfer has been completed |  |  |

# Misuse Case Diagram



The misuse case diagram above gives some possible vulnerabilities of the minimum viable product that has been built according to the managers instructions. Below we explain 4 misuse cases and what the manager can do in order to mitigate them.

## 1st Misuse case

In the first case a rogue volunteer after he has completed his delivery, he sends a fake receipt with a higher amount than the amount he actually paid in order to get reimbursed with more money. This can happen easily as there is no cross check on the amount the volunteer if it is the real one.

Mitigation in such case can be achieved by checking the prices written in the receipts with the prices that are in the store site and request the volunteers to pay by cards so the amount in the receipt can crossed with the amount the subtracted from the volunteer’s bank account. (Case studies of insider fraud in charities, 2021)

## 2nd Misuse case

A crook hacks the local network that the charity’s computers are connected, and he gain access to all clients’ and volunteers’ information. The crook also has the charity’s bank account details and is easy from now on to steal form the charity or a client.

Mitigation can be accomplished with the implementation of SDL methodology like any organization. Also is very important to have multiple layers of protection in place to make difficult to external users to enter the charity system.

## 3rd Misuse case

A rogue admin reimburse money to his personal bank account or an account that he has access be making a false volunteer profile and sending false receipts.

This kind of internal misuse case can be mitigated by sudden checks in to the administrator manager and a check in all the records must happen at least once a month to avoid this kind of misuse cases.

## 4th Misuse case

A rogue admin or any employee that has access to the charity files can find the date and time that the money collection will happen from a client and go to pick the money before the actual collection happen.

The mitigation for this case can happen if there is different access for each admin so if something like this happen it will be easy to find who was the last one checking data that maybe was not supposed to and also different employees should be appointed to have different responsibilities and not one person to do everything from the register up to money collections and money reimburse. (Insider threats, 2021)

# References

*Case studies of insider fraud in charities*. (2021, 12). Retrieved from Gov: https://www.gov.uk/government/case-studies/case-studies-of-insider-fraud-in-charities

*Insider threats*. (2021, 12). Retrieved from Varonis: https://www.varonis.com/blog/insider-threats/