CIS\*3750 Assignment 2

Veto Petition

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**Client Details**

Wellington-Dufferin-Guelph Public Health (WDGPH) is a public health unit in Ontario, providing various health services in the city of Guelph, and Dufferin and Wellington counties. The proliferation of ticks in Ontario has raised concerns among the citizens and public health officials as ticks, more particularly, the black-legged tick, could transmit a bacteria from the genus *Borrelia* in humans. Being bitten by such tick could start the onset of a serious illness, called Lyme disease. Lyme disease could negatively affect the overall health and quality of life of an infected human. The WDGPH is doing their best to educate and spread awareness about lyme disease and black-legged ticks.

Usually, people who want to report about ticks or being bitten by ticks will go to their respective public health unit to assess the situation. This includes identifying the species of the tick and the location of encountering such tick. The issue with this is that it is difficult for a person to bring a tick in alcohol and sometimes, the tick could still be alive. This process is inconvenient for both parties. Because of this, one of the WDGPH goals is to find a more convenient and faster way to identify ticks.

WDGP operates four offices in the region. They serve roughly 272,000 people (statsCan, 2019), the majority of whom are located in rural areas.WDGP is 1 of 35 public health units in Ontario(Lyme Disease Map, 2019). However, they are the only ones that deal with tick identification(Public Health WDP, 2019). Aside from tick identification, WDGH also runs immunization tests, sexual, travel, and dental health clinics in the area. They monitor environmental hazards and respond to public health emergencies. WDGPH is also responsible for monitoring food vendors, pools, spas, salons, tattoo parlors, and infection control practices of healthcare professionals(Public Health WDP, 2019).

**Project Goals & Users**

The goal of this project is to design a mobile application that identifies ticks that are known carriers of lyme disease. The application will comprise the following core functionalities: photographing a tick, submitting said tick, including relevant location and other information, and receiving a response that indicates whether the tick is a known carrier of lyme disease.

Relevant users include the student team who will design the application, the WDGPH staff who are the client and will be the administrators of the application, and the general public who will be the users of the application. The majority of the relevant demographic are between the ages of 15-64 with a slightly higher number of females than males (Statistics Canada, 2016).

Dufferin-Wellington-Guelph region, where the target audience is located, has a population of 272,000. The City of Guelph comprises 120,000 of this number, followed by the County of Wellington (without Guelph) at 95,000, and the county of Dufferin with 57,000 (WDGPH, n.d.).

People living near the border of Halton and Hamilton are most likely to use this app, as these regions are most at risk of encountering said ticks. However, it will not be uncommon for people everywhere in the region to use the app to report ticks (Public Health Canada, 2019).

This team project will be organized through the use of Google applications such as Google Docs and Google Sheets for writing and sharing documentation. Communication is being done through Discord, which allows us to communicate in multiple specific text channels and voice channels. This keeps each topic of our project separate from the others, for ease of finding relevant information during the development process.

The application will ideally be written with the Flutter framework (v1.9), a cross platform framework by Google that supports our supported versions of iOS and Android (Google, n.d.). It is written in the Dart language, and is cross-compiled to the target platforms, since Dart does not run natively on Android or iOS. This means that we can have a single codebase for both applications, rather than two codebases. On Wellington-Dufferin-Guelph Public Health’s end, we are designing around the assumption that a relational database will be used to store the data, such as PostgreSQL. This assumption means our data will most likely be provided in a form with the least amount of work needed for it to fit in a relational database. However, since the storage of the data on WDGPH’s end is not our responsibility, any data store would work, within reason.

**Definitions**

**AODA:** Accessibility for Ontarians with Disabilities Act, a statute designed to improve accessibility standards for those with physical and mental disabilities.

**Apache:** A popular HTTP web server used for serving HTML documents and other types of files to a user over the internet.

**API:** Application programming interface, typically used to communicate with other software.

**App Permissions**: Android and IOS each have unique protocols for accessing specific data on devices.

From Apple (IOS):

“Users must grant permission for an app to access personal information, including the current location, calendar, contact information, reminders, and photos. Although people appreciate the convenience of using an app that has access to this information, they also expect to have control over their private data.” (Apple, 2019)

From Google (Android):

“The purpose of a *permission* is to protect the privacy of an Android user. Android apps must request permission to access sensitive user data (such as contacts and SMS), as well as certain system features (such as camera and internet). Depending on the feature, the system might grant the permission automatically or might prompt the user to approve the request.” (Google, 2019)

**Apple’s Human Interface Guidelines**: design principles and themes described by Apple for iOS. See<https://developer.apple.com/design/human-interface-guidelines/ios/overview/themes/> for more information.

**Bandwidth**: Bandwidth is the amount of information transmitted from a user’s device to their telecommunications provider and eventually the internet.  
**Buffer Area**: This would be an area around the Wellington Dufferin Guelph

**CAPTCHA**: “A test to prevent spamming software from accessing a website by requiring visitors to the site to solve a simple puzzle (typically by reading and transcribing a series of numbers or letters from a distorted image) in order to gain access” (Grossman, 2019).

**Colour-based cues:** A colour-based cue is when colour is the only changing factor to signal the user.

**Compress**: Compression is the process of reducing the overall number of bits needed to represent information by representing it more efficiently. In this way, we can reduce the size of information so that it can take less space when being stored or less bandwidth when being transmitted.

**Database**: A structured set of data held within a software system that is accessible in various ways.

**Dynamic Map**: A dynamic map is one that allows the user to change the area the map displays and the zoom level within that area. These maps update to include more detail as the user zooms in and less when the user zooms out. These maps also allow the user to place a pin and can convert that pin into location information. In our case, this map will be provided by the Google Maps API.

**Educational Material**: This is a set of materials that provides basic information about ticks and the diseases they can cause in layman terms. This material will be provided by the community partner at a later date. Please speak to the community partner for additional details.

**Equivalent Web Portal**: A website that is associated with the app that can be used to update information within the app. This would be used by WDGPH staff only.

**EXIF Data**: Exchangeable Image File Format is a standard that specifies formats for image, sound, and other tags to contain things such as composers, image GPS location, etc. ("Exif", ("Exif", 2019)2019).

**Good Tick Photo**: (“INSTRUCTIONS FOR TAKING PHOTOS…”, n.d.) A good tick photo has the following requirements:

* The photo should be taken in a brightly lit area (e.g. in direct sunlight, under a bright lamp).
* The dorsal shield, head and palps of the tick are clearly visible.
* The photo should include a ruler or common object so that the scale of the image can be determined.
* The photo should be taken from 7cm to 15cm away from the tick.
* The photo should be clear and in focus.
* At least 25% of the photo should be of the tick.
* The photo should not be larger than 10 megabytes in size.

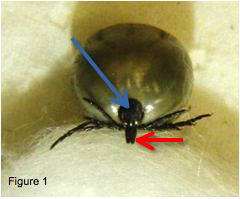


Figure 3.2: An image to illustrate the various parts of a tick. The dorsal shield (blue) and palps (red) are clearly identified. ("INSTRUCTIONS FOR TAKING PHOTOS...", n.d.)

* **Dorsal Shield, Head, and Palps of a Tick**: (Ruppert, Fox, and Barnes, 2004) The dorsal shield of a tick is the hard shell-like structure that covers part of the tick’s body. The head of the tick is found at the front and is attached to the palps. The palps are a sensory organ that appears to be part of the mouth. This structure can be seen in figure 3.2.

**Geofenced area:** The area in which WDGPH provides their tick identification service.

**Google Maps API**: The Google Maps API is a set of tools that can be used by an application to get dynamic maps and location information from Google’s mapping database.

**Google’s Material Design Guidelines**: a visual language designed by Google to ensure a familiar and intuitive experience across Android apps. See<https://material.io/design/> for more information.

**HTML:** HyperText Markup Language (Language most websites are written in).

**HTTP:** HyperText Transfer Protocol (The protocol that the internet uses).

**ID tag:** A number associated with data that is used by the system as a unique way to identify that piece of data.

**Location Information**: Location information is a latitude and longitude as a number of degrees to at least 1 decimal place.

**Machine Learning Algorithm or AI**: An algorithm that can be used to identify whether a picture contains a tick or not. This algorithm is being worked on by WDGPH and if completed will be provided by WDGPH.

**Primary Key**: An SQL term used to distinguish the main identifier of an SQL row.

**Push Notification**: A notification that can appear to the user at any time, rather than only appearing when the application is active.

**Questionnaire**: The questionnaire is a set of questions that WDGPH requires to properly analyze a submission. This set of questions will be provided by the community partner at a later date. Please contact the community partner for additional details.

**Reskin / Reskinnable:** Reskinning an application involves updating the visual style without necessarily updating the system's form. A reskinable app is one which has been designed from the start to be easily adapted to different styles.

**Response**: A response is the result of WDGPH’s analysis of a submission. The response should be in the form of text no longer than 500 characters.

**REST:** Representational State Transfer (Common protocol that is used when transferring data over the web).

**RSA 256 Encryption**: Information that is encrypted is changed into an unreadable format. Encrypted information can only be read by users that know the appropriate key. Only the key can be used to convert the information back into its original form. The key is extremely difficult to derive or guess. RSA 256 is a particular way of encrypting information as described.

**Service Region**: (“Region of Wellington, Dufferin and Guelph”, n.d.) WDGPH only operates within a specific region of southern Ontario. Moreover, WDGPH only provides its services within this area. The area covers 4200 square kilometres of the Wellington Dufferin Guelph area. A map of the region can be seen in figure 3.1. The area is further defined below.  
This area includes the following municipalities of Wellington:

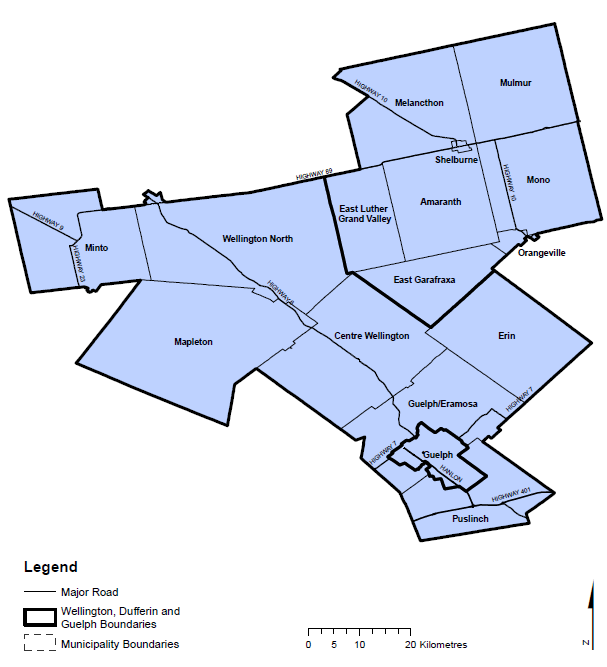


Figure 3.1: A map of the service region of WDGPH (“Region of Wellington, Dufferin and Guelph”, n.d.)

* Town of Minto
* Town of Erin
* Township of Wellington North
* Township of Mapleton
* Township of Centre Wellington
* Township of Guelph/Eramosa
* Township of Puslinch

This area includes the following municipalities of Dufferin:

* Town of Orangeville
* Township of Amaranth
* Township of East Garafraxa
* Town of Grand Valley
* Township of Mono
* Township of Mulmur
* Township of Melancthon
* Village of Shelburne

Finally, this area includes the City of Guelph.  
  
**Session on the system**: The process of using the app start to finish. This would include opening the app, taking a picture of the tick, filling out the WDGPH information form and providing contact information.

**Session Token**: Unique ID used to identify a user making HTTP requests.

**Sound-based cues:** A sound-based cue is when audio that is used to signal the user.

**SQL Injection**: An SQL query existing in input text which allows arbitrary SQL code execution in vulnerable applications.

**Submission**: A submission is all of the information required by WDGPH to identify a tick and contact the user with a response. A submission consists of a photo of the tick, the user’s answers to the questionnaire, location information, and potentially contact information.

**Screen Reader**: A screen reader is an assistive technology which helps the visually impaired (an others with disabilities) by reading text aloud, and by describing other elements presented on the screen.

**Third Party Trackers:** Third party trackers are systems outside of the application being built that to be used would require access to data within the app.

**Two-Factor Authentication**: Two-Factor Authentication is a security measure used to help confirm users. The user is granted access after they complete two forms of authentication; related to something only the user knows (like a password) or through something only the user has (like their cell phone).

**Valid submissions:** A submission form that contains all required information specified by WDGPH, a picture of a tick, and the user’s contact information.

**WCAG:** This is an acronym for Web Content Accessibility Guidelines

**WDGPH**: This is an acronym for Wellington Dufferin Guelph Public Health. WDGPH is the community partner and client for this project. A more detailed description of the community partner can be found in the Client Details section (page 3) of this document.

**References**

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Ebad Babar (0954164)

**Use case: Entering a location**

**Actors**:

· User: The person using the app

· System: The application

**Pre-condition**:

· The system must have location permissions on the iOS platform so that the system can automatically log the user’s location.

· The system must have location permissions on the Android platform so that the system can automatically log the user's location.

· The system must be available on iOS 10 to iOS 12.4.

· The system must be available on Android 5 to Android 10.

· The system must be compatible with Google Maps API for a simple and robust mapping system.

· The system must have access to local storage

**Main Flow:**

1. The user takes or uploads pictures of the tick.

2. The system opens a small map showing users current location using Google Maps API and the phone’s location settings.

The system asks the user to accept the default location jump to step 3 or manually insert location jump to step 4

3. The user accepts the default location. Jump to Step 6

4. The system opens a map with 2km by 2km area of the user’s current location

5. The user drags and drops a pin to set the location

6. The system ensures that the location is within the WDGPH accepted area.

7. The system check for internet connection

8. The user uploads the submission with the accepted location.

**Alternative Flows:**

\*. a At any time the System crashes the user must restart the app

\*.b The user exits out of the app

· The system saves the current status of application, to resume when the app relaunches

2.a The system does not have location access

· The system prompts the user to enable location

o Jump to main flow step 2 if the user accepts

o If the user declines jump to step 4 with WDGPH area

6.a The user location or the dropped location isn’t with the WDGPH area

· The user is prompted that their location isn’t within the accepted area

o Jump to step 4 with WDGPH area highlighted

7.a The user is offline

· The system prompts the user to connect to Wi-Fi or turn data on

o If connection found jump to step 8

o If a connection isn’t established the system saves the data until a connection is found

**Post Conditions:**

· The user’s pictures are uploaded, and their submission is sent to WDGPH.

**Must requirement**

35. The system must be able to store information for an in-progress questionnaire so that it can be later sent to WDGPH.

This requirement depends on the user completing the questionnaire with relevant data. The means that requirement 35 is a dependency or requirement 16.

Requirement 16 depends on the user being prompted to fill out all the required information. Requirement 8 prompts the user to input between 1 and 280 characters so that the system can collect written questionnaire responses (8).

Requirement 8 depends on the application being available to run on the user’s device. The means it is dependent on either requirement 3 or 4, depending on weather the user has Android or IOs installed.

James Burns (0976433)

**Use Case:** an administrator reskins the (mobile) application

**Actors:**

* Administrator
  + The administrator is the primary user in this use case.
  + They are an authorized user who has already been authenticated through the web portal.
  + They are expected to be one of the developers, a staff member from WDGPH, or someone granted permission to access the web portal by the two aforementioned groups.
* System
  + The system is the web portal accessed by the administrator.
  + The web portal is where the administrator can reskin the (mobile) application.
* User
  + The user is the secondary user in this use case.
  + They are the public who use the mobile application.
  + They can be anyone provided they have access to the mobile application.

**Pre-conditions:**

* The administrator has already been authenticated, and is logged into the web portal.
* The administrator is currently on the “Mobile Appearance” web page in the web portal, where the options to reskin the mobile application are able to be modified.

**Main flow:**

1. The administrator changes the organization title (currently: WDGPH).
   * This is a text field on the web page.
2. The administrator changes the logo image.
   * This is a file upload that only accepts image files on the web page.
3. The administrator changes the primary, secondary, and tertiary colours of the mobile application.
   * This is a text field/colour picker input, with the choice of either hex code or colour picker to select these colours.
4. The administrator saves the changes made.
   * This is done by clicking the “save” button.
5. The system syncs the changes with the user’s mobile application the next time the user accesses that application.
   * The mobile application checks for changes on startup.

**Alternative flows:**

1-4.A: The administrator is logged out in the middle of the process.

1. The administrator is prompted to login to the web portal.
2. Once the administrator logs back in, they are able to resume changing the mobile appearance page (continue from the current step).

3.A: The administrator wants to more fine-grained control over the colour combination.

1. Rather than selecting a primary, secondary, and tertiary colour, the administrator selects colours based on the element.
2. The administrator changes the button colours of the mobile application.
3. The administrator changes the link colours of the mobile application.
4. The administrator changes the menu colours of the mobile application.
5. The administrator changes the font colours of the mobile application.
6. Once completed, continue from step 3.

3.B: The administrator selects a colour combination that violates the WCAG 2.0 Contrast guidelines.

1. The administrator is prompted to change their colour selections until they no longer violate the WCAG 2.0 Contrast guidelines.
2. Once completed, continue from step 3.

4.A: The administrator saves the changes with a required field being left empty.

1. The administrator is prompted to complete the required field that is left empty.
2. Once completed, continue from step 4.

5.A: The user does not have internet connection on application startup.

1. The system does not sync the mobile appearance changes with the user.
2. The system waits until the next time the mobile application is launched.
3. If internet connection is available then, the changes are synced.
4. If internet connection is not available then, repeat from step 2 in 5.A.

**Post-conditions:**

* The administrator is still authenticated, and still logged into the web portal.
* The administrator is still on the “Mobile Appearance” web page in the web portal.
* If any changes were made and saved, a new notification is present on that web page, stating that the changes made were saved.
* The user has an updated, reskinned mobile application.

**Must requirement:**

#18: The system must be able to upload submissions to WDGPH, so that WDGPH can analyze it. (depends on #17)

#17: The system must have the ability to receive a new session token from the server, used to identify the user's outbound requests.

#13: The system must be able to connect to a WDGPH server so that it can send data, so long that the user has internet access.

#4: The system must be available on Android 5 to Android 10 to support the majority of Android users.

Requirement #18 depends on requirement #17 because the server at WDGPH needs to be able to differentiate users of the application. Otherwise, each submission could appear as the same user or the same session, when they are from different users or different sessions.

Requirement #17 depends on requirement #13 because the system must be able to connect to a WDGPH server in order to receive a new session token. If WDGPH servers are the issuers of the session tokens, a connection must be made to receive a new token.

Requirement #13 depends on requirement #4 because the mobile application has to run on the mobile platform first to be able to connect to a WDGPH server. The system in all of these requirements is defined as the mobile application. If it cannot be run, it cannot access the internet, and it cannot connect to a WDGPH server.

Mitchell Coakley (1013103):

***Use Case:***

**Use Case Name**: WDGPHInfo.

**Scope**: A tick identification application produced by Wellington Dufferin Guelph Public Health.

**Primary Actor**: An end user of the tick identification application.

**Scenario**: The user tries to access information relating to WDGPH in the application.

**Preconditions**: The user must be in the application, and in the context of the home menu.

**Postconditions**: The user has gained some amount of knowledge on WDGPH.

**Main Success Scenario**:  
  
1.0 The user clicks on the information tab located in the top left of the main menu.

1.1 The user views general information on Wellington Dufferin Guelph Public Health, as well as general information on ticks.

1.2 The user decides they want to know more about WDGPH and clicks on the links at the bottom of the information tab.

1.3 The links open in the users system prefered web-browser, and the user obtains further information on WDGPH.

1.4 (Optional) The user returns from the web browser back into the application.

**Alternate Scenarios**:

**A - The user does not have any internet**:

2.0 The user clicks on the information tab located in the top left of the main menu.

2.1 The user views general information on Wellington Dufferin Guelph Public Health, as well as general information on ticks.

2.2 The user decides they want to know more about WDGPH after scrolling through all the in-app information.

2.3 The application detects that no internet is present, and does not display the links.

**B - The user does not want to see further information beyond the information tab**:

3.0 The user clicks on the information tab located in the top left of the main menu.

3.1 The user views general information on Wellington Dufferin Guelph Public Health, as well as general information on ticks.

3.2 The user decides they are satisfied, and returns back to the main menu by hitting the in app back button at the top left, or by pressing the Android back button.

3.4 The user returns to the main menu.

**C - The user is outside the jurisdiction area of WDGPH**:

4.0 The user tries to load into the app for the first time.

4.1 Immediately, the app asks for location.

4.2 As the user is outside the area of jurisdiction, the app only displays an appropriate error message, as well as the WDGPH information tab.

4.3 The user either exits the application and does not feel a need for the information anymore, or uses the information tab without access to the rest of the application.

**D - The user cannot see the text in the information tab because of bad eyesight**:

5.0 The user clicks on the information tab located in the top left of the main menu.

5.1 The user cannot see any information text because of bad eyesight.

5.2 The user returns to the main menu by hitting the well sized back button at the top left, or by hitting the Android back button.

5.3 The user goes into application settings by clicking the settings icon at the top right of the main menu.

5.3 The user adjusts the “Text Size” setting from the settings menu to get larger font.

5.4 The user returns to the main menu and continues from step 1.0

**E - The user only wants contact information for WDGPH**:

6.0 The user clicks on the information tab located in the top left of the main menu.

6.1 The user skims through the “useless” information on WDGPH, and finds contact info above the “extra links” at the bottom of the tab.

6.2 The user is satisfied, closes the application, and contacts WDGPH.

***Must Requirement:***

**Requirement**: 33: The admin must be able to update their account information from the admin web portal so that if their account information needs to be updated they are able to.

This requirement assumes that,

1. A web portal has been made for the system.
2. Admins can be created for said web portal.
3. Admins have permission to edit their own account information.
4. Admins want to, at some point, edit their own account permissions.

To fulfill requirement 33, these tasks should therefore be completed beforehand,

1. A web portal is made.
2. An admin login system is made.
3. In the created web portal system, all admin have permissions set to be able to edit their own account.

Joshua Guenther (0979470)

**Use Case:** The User takes a picture.

Actors:

- User: Driver of the application with the intent to submit a picture of a tick.

- System: The application that the user is interacting with.

Pre-conditions:

- The system must have camera permissions on the Android platform so that the camera can be used within the system.

- The system must have camera permissions on the iOS platform so that the camera can be used within the system.

- The system must be available on Android 5 to Android 10 to support the majority of Android users.

- The system must be available on iOS 10 to iOS 12.4 to support the majority of iOS users.

Main flow:

1. The User chooses to click on the “take a photo” option when prompted.

2. The System opens the camera application on the phone successfully.

3. The User focuses on the tick with the camera and takes a picture.

4. The System deems the photo to be a high quality photo.

5. The System prompts the user to either take another photo or upload the submission with the pictures already taken.

6. If the User decides to upload multiple photos, go to step 2.

Alternate flows:

\*. The System crashes at any point.

\*.1. The Application restarts and resumes where the user left off.

\*.2. If the System had taken any photos, it will add them to the list of photos to upload.

2. The System has not received the proper permissions for Android or iOS and cannot open the camera application on the phone.

2.1. The System prompts the User to provide the required camera permissions.

2.2. The System returns to the completed application.

2.3. The System provides the option to take a photo or use one from the gallery.

3. The User closes the camera application before taking a photo.

3.1. The System returns the main application.

3.2 Go to step 1 and prompt the user to upload or take a photo.

4. The System deems the photo of too low of quality to submit to WDGPH.

4.1. The System deletes the photo from the list of photos to be submitted.

4.2. The System prompts the User to take another photo of high quality.

4.3. The System displays assistance for the User to aid in taking a high quality photo.

6. The User has chosen to take another photo which would exceed the maximum number of photos uploaded.

6.1. The System prompts the User that taking another photo would exceed the maximum number of pictures uploaded.

6.2. The System removes the User’s option to add any more photos and moves on.

Post-conditions:

- The User has successfully taken at least one high photo of the tick to be attached to the submission to WDGPH.

**Must requirement:**  26: The system must be able to get photos taken from outside the system (such as device storage) to allow users to upload previously taken photos.

This requirement depends on the system having the proper file folder permissions such that it can access photos from the device’s internal storage or external storage. This is translates to either requirement 6 or requirement 7, depending on whether the application is installed on iOS or Android respectively.

These requirements will depend on the user having the proper version of their operating system installed on the device. If the user has an out of date version installed on the device, the System could potentially mis-use the file system architecture. This could potentially involve the System accessing files in the device’s system files. If these were to get messed up, it could wreak havoc for everything in the device. These concerns relate to our group’s requirements 3 and 4, depending on whether the application is installed on Android or iOS respectively.

De Castro, Ralph Arvin

Title: Fills a tick submission form

Actors:

* User - the person using the application
* System - the application used by the user

Pre-conditions

* User successfully took or uploaded a location-tagged photo/photos.
* User is connected to an internet access.
* System is connected to the WDGPH server.

Main flow

1. System shows the questionnaire form on the user's screen.
2. User inputs their first name on the First Name field.
3. System verifies validity of first name input
4. User inputs their last name on the Last Name field.
5. System verifies validity of the last name input.
6. User inputs their email address on the Email Address input.
7. System verifies validity of email address input.
8. User inputs their phone number on the Phone Number input.
9. System verifies validity of phone number input.
10. User picks a preference of response from a drop-down menu.
11. User enters more information about the tick incident.
12. User clicks the Terms and Conditions checkbox.
13. User clicks Submit.
14. System shows a pop-up box for confirmation.
15. User clicks Yes to confirm submission.
16. System assigns a unique ID tag to the submission.
17. System submits form and geo-tagged photos to the WDGPH servers.

Alternative flows

\*a. At any time, user exceeds the 5-minute idle time:

1. System stores the user questionnaire’s progress internally.
2. User reenters application.
3. System shows user’s previous questionnaire form.

\*b. At any time, user cancels a questionnaire form:

1. System displays a warning message about losing progress.
2. User clicks Yes to confirm cancellation.
3. System cancels the submission.

2a. User does not input 1-280 characters on the First Name field.

1. System verifies validity of the first name.

2. System displays a warning message beside the field.

3. User inputs right amount of characters on the First Name field.

4a. User does not input 1-280 characters on the Last Name field.

1. System verifies validity of the last name.

2. System displays a warning message beside the field.

3. User inputs right amount of characters on the Last Name field.

6a. User does not input 1-280 characters on the email address field.

1. System verifies validity of the email address.

2. System displays a warning message beside the field.

3. User inputs right amount of characters on the Email address field.

6b. User does not input an email address (\_\_\_\_\_@\_\_\_\_.com) on the email address field.

1. System verifies validity of the email address.

2. System displays a warning message beside the field.

3. User inputs an actual email address on the Email address field.

8a. User does not input a Canadian phone number on the Phone Number field.

1. System verifies validity of the phone number.

2. System displays a warning message beside the field.

3. User inputs a Canadian phone number on the Phone Number field.

12. User does not check the Terms and Conditions checkbox.

1. User clicks submit.
2. System displays a warning message about accepting the Terms and Conditions.
3. User checks the Terms and Conditions checkbox.

Post-conditions: The questionnaire form and geo-tagged photos are submitted to the WDGPH servers.

**Tasks for a requirement**

The system must prompt the user to complete a questionnaire to provide the submission with relevant data.

Title: Questionnaire layout design

Description: Design a layout for the tick questionnaire form which includes the order of the fields and input type for each field (textfield, checkbox, dropdown).

Time Estimate: 4 hours

Title: Questionnaire layout implementation

Description: Develop code focusing on the layout of the tick submission form

Time Estimate: 8 hours

Title: User design implementation

Description: Implement code for user interface such as checking for valid email address and prompting the user to put valid data

Time Estimate: 8 hours

Title: Database and server connection

Description: Implement code that submits to the WDGPG server

Time Estimate: 8 hours