Group Project 05

Design Specification

Authors: bmo; sr11; hac22; wia2; Department of Computer Science

wjl3; njv1 Aberystwyth University

Config Ref: SE\_05\_DS\_01 Aberystwyth, Ceredigion

Date: 14/11/13 SY23 3DB

Version: 1.0 Copyright © Group 05

Status: Draft Aberystwyth University 2013

Contents

[1. Introduction 3](#_Toc373923157)

[1.1. **Purpose of this document** 3](#_Toc373923158)

[1.2. **Scope** 3](#_Toc373923159)

[1.3. **Objectives** 3](#_Toc373923160)

[2. **Decomposition Description** 4](#_Toc373923161)

[2.1. **Programs in system** 4](#_Toc373923162)

[2.2. **Significant classes in the Android program:** 4](#_Toc373923163)

[2.2.1. Tour class: 4](#_Toc373923164)

[2.2.2. Location class: 4](#_Toc373923165)

[2.2.4. Walk activity class: 4](#_Toc373923166)

[2.2.5. Link interface: 5](#_Toc373923167)

[2.2.6. Key Locations class: 5](#_Toc373923168)

[2.2.7. Settings activity 5](#_Toc373923169)

[2.2.8. Main Activity 5](#_Toc373923170)

[2.3. **Web program components** 5](#_Toc373923171)

[2.4. **Table mapping requirements** 6](#_Toc373923172)

[3. Dependency Description 7](#_Toc373923173)

[3.1. UML Component Diagram for the Android application: 7](#_Toc373923174)

[3.2. UML Component Diagram for the Android application: 8](#_Toc373923175)

[4. Interface description 9](#_Toc373923176)

[4.1. Main activity class 11](#_Toc373923177)

[4.2. Tour class 12](#_Toc373923178)

[4.3. Location class 14](#_Toc373923179)

[4.4. Key location class 15](#_Toc373923180)

[4.5. Communication class 16](#_Toc373923181)

[4.6. Link interface 17](#_Toc373923182)

[4.7. Walk activity class 17](#_Toc373923183)

[4.8. About Activity 17](#_Toc373923184)

[4.9. Map Activity 17](#_Toc373923185)

[5. Detail Design 18](#_Toc373923186)

[5.1. Sequence Diagrams 18](#_Toc373923187)

[5.2. Algorithm Description 19](#_Toc373923188)

[5.2.1. Server Side Data Delivery Algorithm: 19](#_Toc373923189)

[5.2.2. Android - Harvey has the algorithm! 20](#_Toc373923190)

[5.3. Data Structures 20](#_Toc373923191)

[5.3.1. Android data structures 20](#_Toc373923192)

[5.3.2. Server side data structures 21](#_Toc373923193)

[5.4. Entity Relationship Diagram 22](#_Toc373923194)

[6. References 23](#_Toc373923195)

[7. Document History 23](#_Toc373923196)

# Introduction

## **Purpose of this document**

The purpose of this document is to describe the outline design for the Walking Tour Creator system. Taking into account the details of the group project assignment and group project quality assurance.

## **Scope**

This document includes detailed description of:

* The classes used in the Android application;
* The methods used in each class;
* Sequence diagrams;
* Interaction between the application and the database;
* Database design and data handling.

## **Objectives**

The objective of this document is:

* To describe the main components of the Walking Tour Application;
* To describe the main components of the Web site;
* To depict the dependencies between the components.

# **Decomposition Description**

## **Programs in system**

The Walking Tour System consists of two main components:

* The Android application;
* The Website;

The android application will allow the user to create a walking tour using GPS tracking and add photos and more detailed information about places of interest they come across during the walk. The walk can then be uploaded to the online database in the form of a MIME message containing all the information formatted as a JSON file. This message is sent through HTTP POST, intercepted by the PHP on the site and gets stored in the database. The Website allows the user to view walks currently stored in the database using the Mapping API.

## **Significant classes in the Android program:**

### Tour class:

The main storage class of the application; Tour will hold a linked list of locations for the walking tour; it will contain variables as follows:

* a string for the location of the tour e.g. “Aberystwyth”;
* a string for the long description of the tour that will have no more than 1000   
  characters;
* a string for the short description/summary of the tour that is limited to 100   
  characters;

### Location class:

A location within the tour recorder periodically; it consists of:

* a longitude and latitude for the location;
* a name of the location where the user is;
* a time stamp that can be used to calculate a total time for the walk;
  + 1. **Communication class:**

This is the class that handles the communication to the server. It will implement the Link interface.

### Walk activity class:

This is the class that links the model and the user interface together. From here the user will add locations to the tour with descriptions and a set of up to 5 photos. The user will be able to set the sample frequency (how often a coordinate should be placed automatically on the map) of the coordinates.

### Link interface:

Standard interface for communication between the app and the server; It contains the methods for connecting and disconnecting to the server and sending data.

### Key Locations class:

A key location within the tour; it consists of:

* a longitude and latitude for the location;
* a name of the location where the user is;
* a short description of the location limited to 140 characters;
* a time stamp that can be used to calculate a total time for the walk;
* an array of photos taken along the walk with a maximum of 5;

The Key location is an extension of Location.

### Main Activity

The launch activity of the app, from here you can go to settings, start a walk and go to app details.

## **Web program components**

The Server side of the system consists of a database, holding the information on the tours and a website that displays the tours on an interactive map to the user.

1. Android app uploads MIME message to a PHP server page over the internet using the HTTP POST method;
2. The PHP file unpacks the image attachments and saves them to a temporary directory with a unique name (ie tmp/05012013my\_tour). It records success/ failure to the server log and if successful, will progress;
3. The PHP file extracts the JSON code and produces an SQL query to insert the data into the   
   database. It records success/ failure to the server log and if successful, will progress;
4. The files are moved from the tmp directory to a permanent directory with a unique name. (The primary key of the tour in the database)

The Database will have the following structure:

|  |  |
| --- | --- |
| Table Name | Table Description |
| tours | A list of walks/ tours which the program will display. |
| locations | A list of geographical locations referencing a record in the tour table, describing the route of the tour as a sequence of locations. |
| pointsOfInt | A list of points of interest along tours referencing a location. |
| photos | A list of photographs referencing a point of interest |

## **Table mapping requirements**

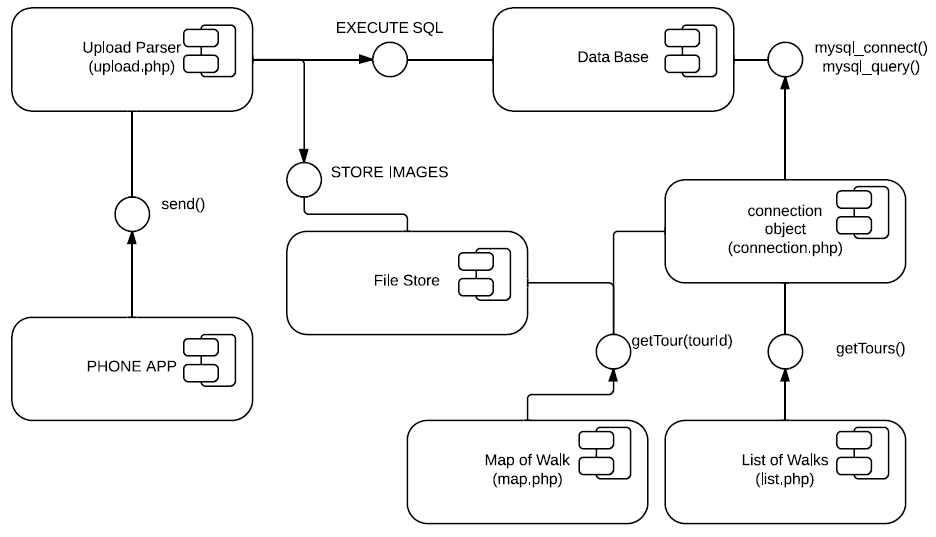


# Dependency Description



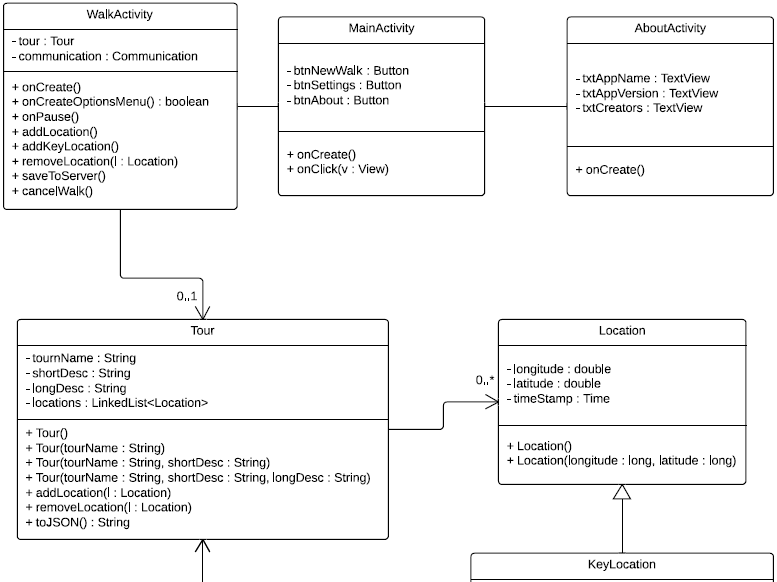
## UML Component Diagram for the Android application:

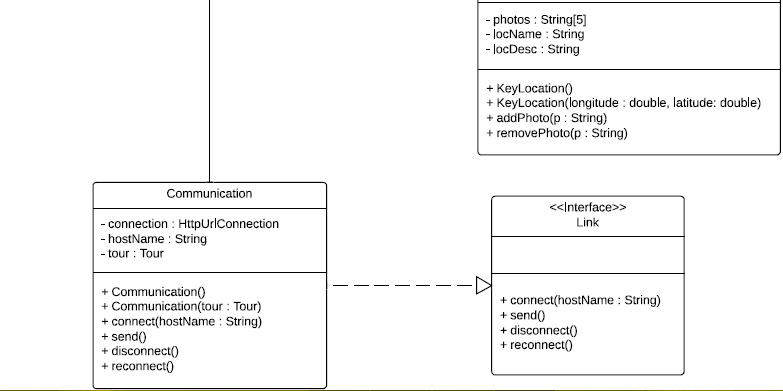
## UML Component Diagram for the Android application:



# Interface description

UML Class Diagram for the android application:





### Main activity class

### Tour class

package com.wtc.grp5.model;

public class Tour {

        /\*\*

        \* Constructs a blank tour.

        \*/

        public Tour(){

        }

        /\*\*

        \* Constructs a new tour with a specified name.

        \*

        \* @param tourName the name of the tour.

        \*/

        public Tour(String tourName){

        }

        /\*\*

        \* Constructs a new tour with a specified name and short description.

        \*

        \* @param tourName the name of the tour.

        \* @param shortDesc a short description for the tour.

        \*/

        public Tour(String tourName, String shortDesc){

        }

        /\*\*

        \* Constructs a new tour with all necessary details.

        \*

        \* @param tourName the name of the tour.

        \* @param shortDesc a short description for the tour.

        \* @param longDesc a long description for the tour.

        \*/

        public Tour(String tourName, String shortDesc, String longDesc){

        }

        /\*\*

        \* Adds a location to the tour.

        \*

        \* @param l the location being added to the tour.

        \*/

        public void addLocation(Location l){

        }

        /\*\*

        \* Removes a location from the tour.

        \*

        \* @param l the location being removed.

        \*/

        public void removeLocation(Location l){

        }

        /\*\*

        \* Takes the data stored this object and converts it to a JSON String.

        \*

        \* @return the JSON String.

        \*/

        public String toJSON(){

        }

        /\*\*

        \* Sets a new value for this.tourName.

        \*

        \* @param tourName the new value for this.tourName.

        \*/

        public void setTourName(String tourName){

        }

        /\*\*

        \* @return the name of the tour.

        \*/

        public String getTourName(){

        }

        /\*\*

        \* Sets a new value for this.shortDesc.

        \*

        \* @param shortDesc the new value for this.shortDesc.

        \*/

        public void setShortDesc(String shortDesc){

        }

        /\*\*

        \* @return the short description for the tour.

        \*/

        public String getShortDesc(){

        }

        /\*\*

        \* Sets a new value for this.longDesc.

        \*

        \* @param longDesc the new value for this.longDesc.

        \*/

        public void setLongDesc(String longDesc){

        }

        /\*\*

        \* @return the long description for the tour.

        \*/

        public String getLongDesc(){

        }

        /\*\*

        \* Sets the list of locations in the tour.

        \*

        \* @param locations the new value for this.locations.

        \*/

        public void setLocations(LinkedList<Location> locations){

        }

        /\*\*

        \* @return the list of locations in the tour.

        \*/

        public LinkedList<Location> getLocations(){

        }

}

### Location class

package com.wtc.grp5.model;

public class Location {

        /\*\*

         \* Constructs a blank location.

         \*/

        public Location(){

        }

        /\*\*

         \* Constructs a location object a specified longitude and latitude.

         \*

         \* @param longitude the longitude of the location.

         \* @param latitude the latitude of the location.

         \*/

        public Location(double longitude, double latitude){

        }

        /\*\*

         \* Sets a new value for this.longitude.

         \*

         \* @param longitude the new value for this.longitude.

         \*/

        public void setLongitude(double longitude){

        }

        /\*\*

         \* @return the longitude of the location.

         \*/

        public double getLongitude(){

        }

        /\*\*

         \* Sets a new value for this.latitude.

         \*

         \* @param latitude the new value for this.latitude.

         \*/

        public void setLatitude(double latitude){

        }

        /\*\*

         \* @return the latitude for the location.

         \*/

        public double getLatitude(){

        }

        /\*\*

         \* Sets a new value fort this.timeStamp.

         \*

         \* The time stamp is set completely by the method and therefore takes

\* no parameters.

         \*/

        public void setTimeStamp(){

        }

        /\*\*

         \* @return the time stamp for when this location was recorded

         \*/

        public String getTimeStamp(){

        }

        /\*

        \* Converts the data stored in this object to a JSON string.

        \*

        \* @return the JSON String.

        \*/

        public String toJSON(){

        }

}

### Key location class

package com.wtc.grp5.model;

public class KeyLocation extends Location {

        /\*\*

         \* Constructs a blank key location.

         \*/

        public KeyLocation(){

        }

        /\*\*

         \* Constructs a key location with a given longitude and latitude.

         \*

         \* @param longitude the longitude of the location.

         \* @param latitude the latitude of the location.

         \*/

        public KeyLocation(long longitude, long latitude){

        }

        /\*\*

         \* Adds the file path of a photo to this key location.

         \*

         \* @param p the file path.

         \*/

        public void addPhoto(String p){

        }

        /\*\*

         \* Removes the file path of a photo from this hey location.

         \*

         \* @param p the file path.

         \*/

        public void removePhoto(String p){

        }

}

### Communication class

package com.wtc.grp5.model;

public class Communication implements Link {

        /\*\*

         \* Constructs a blank Communication object.

         \*/

        public Communication(){

        }

        /\*\*

         \* Constructs a Communication object with a specified Tour object.

         \*

         \* @param tour the object to sent to the server.

         \*/

        public Communication(Tour tour){

        }

        @Override

        public void connect(String hostName){

        }

        @Override

        public void send(){

        }

        @Override

        public void disconnect(){

        }

        @Override

        public void reconnect(){

        }

}

### Link interface

public interface Link{

/\*\*

\* Connects to a server with a given IP address and port number.

\*

\*

\*@param ipAddr The IP address of the server you wish to connect to.

\*@param portNum The port number of the application that you are using.

\*/

public void connect(String hostName);

/\*\*

\* Sends data to the server.

\*

\*

\*/

public void send();

/\*\*

\* Receives data from the server.

\*

\*/

public void disconnect();

/\*\*

\* Re-opens a paused connection the server.

\*

\*

\*/

public void reconnect();

}

### Walk activity class

### About Activity

public class AboutActivity extends Activity {

        @Override

        protected void onCreate(Bundle savedInstanceState) {

        }

        @Override

        public boolean onCreateOptionsMenu(Menu menu) {

        }

}

### Map Activity

# Detail Design

## Sequence Diagrams



## Algorithm Description

### Server Side Data Delivery Algorithm:

All the data will be packed into a single string, which will be transmitted from the android phone in a HTTP POST request. The value will be paired using the key “message” and will be accessed in PHP using the $\_POST [‘message’] handle. The request will be made to the file upload.php which will be stored in the root of the website. All requests will be recorded in by upload.php in a file called log.txt in the root of the site as per the testing strategy.

The mime message will contain a “From” field which will store the user’s name and email (From: User’s Name <user@usershost.com>) and the name of the tour in the “Subject” field (Subject: My Tour). Writing the tour name to the subject field will allow the server to record the process in the log, even if there is an error with the JSON code. It will include a MIME version declaration of version 1.0 (MIME-Version: 1.0) and a multipart content type declaration (Content-Type: multipart/mixed; boundary=”part”). The JSON code will be stored in the only text type part. All of the images will be stored as attachments in jpeg format.

The data set will need to contain a title for the tour, a short description of the tour and a long description, a collection of GPS coordinates for the route, a collection of locations associated with GPS coordinates on the route including images and description, the total time of the route and the total distance of the route.

Fields for root of JSON data set:

|  |  |  |
| --- | --- | --- |
| Variable Name | Description | Format |
| title | The title of the walk | A string of <30 characters |
| shortDesc | A short description of the tour to be displayed in lists of tours on the website. | A string of <100 characters |
| longDesc | A long description of the tour to be displayed alongside the map on the website. | A string of <1000 characters |
| route | A sequence of GPS locations that describe the route of the tour | A collection of objects representing GPS coordinates. (See Table 2) |
| locations | A set of locations of interest along the tour. | A collection of objects representing locations of interest. (See Table 3) |
| time | The number of seconds that elapsed during the recording of the tour. (Not including when paused) | Integer |
| distance | The distance of the route of the tour in meters. | Integer |

Fields for location/ route objects

|  |  |  |
| --- | --- | --- |
| Variable Name | Description | Format |
| id | A unique ID indicating the index of the location in the sequence | Integer |
| longitude | The longitude of the current GPS location on the route | Integer |
| latitude | The latitude of the current GPS location on the route | Integer |
| time | The number of seconds that elapsed from the beginning of the tour to this recorded location. (Not including when paused) | Integer |

Fields for POI object

|  |  |  |
| --- | --- | --- |
| Variable Name | Description | Format |
| coord | The ID of the GPS coordinate object that the location is attached to | integer |
| description | A short description of the current location. | A string of <500 characters |
| media | A set of URLs pointing to the images to be associated with the location | A string collection of variable length. |

### Android - Harvey has the algorithm!

## Data Structures

### Android data structures

The data structure for the application is essentially one class containing a linked list of objects of another class. More specifically it has a ‘Tour’ class which holds the linked list of ‘Location’ objects. The Tour class contains fields for the tour’s name, short description and long description; along with a field which is the linked list. The Location class holds fields for the latitude and longitude of the location; it also has a timestamp for when that location was recorded. There is also a ‘KeyLocation’ class which contains further information. More specifically it contains an array of file paths to the photos the user takes for that location, a name for that location and a short description for that location.

### Server side data structures

The tables in the database that will hold all the data for the walk:

List of Walks Table

|  |  |  |
| --- | --- | --- |
| Field Name | Field Description | Field Data Format |
| id | Primary Key (auto increment) | integer |
| title | Title of the tour | text |
| shortDesc | A short description of the tour (<100 characters) | text |
| longDesc | A detailed description of the tour. (<1000) | text |
| hours | The number of hours the walk will take | float |
| distance | The total distance of the tour in kilometers | float |

Location Table

|  |  |  |
| --- | --- | --- |
| Field Name | Field Description | Field Data Format |
| id | Primary Key (auto increment) | integer |
| walkID | Foreign key, referencing the id field of the tour that the location is associated with | integer |
| latitude | The latitude map reference for the location | float |
| longitude | A detailed description of the tour. | text |
| timestamp | The time in hours from the beginning of the tour | float |

Place description table

|  |  |  |
| --- | --- | --- |
| Field Name | Field Description | Field Data Format |
| id | Primary Key (auto increment) | integer |
| locationID | Foreign key, referencing the location that the point of interest is referencing | integer |
| description | The description of this point of interest. (<500 characters) | text |

Photo Usage Table

|  |  |  |
| --- | --- | --- |
| Field Name | Field Description | Field Data Format |
| id | Primary Key (auto increment) | integer |
| placeID | Foreign key, referencing the point of interest that the image is attached to | integer |
| photoName | The name of the jpg file for the photo (without “.jpg” suffix) | text |

## Entity Relationship Diagram



# References

# Document History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | CFF No. | Date | Changes made to the document | Changed by |
| 1.0 | N/A | 02.12.13 | N/A – First release of the Design Specification | srr11 |
|  |  |  |  |  |