Group Project 05
Design Specification

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1. Introduction

1.1. Purpose of this document

The purpose of this document is to describe the outline design for the Walking Tour Creator system, consisting of an Android application, database and website taking into account the details of the group project requirements and group project quality assurance.

1.2. 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;
- Website design.

This document should be read after familiarisation with the Project Management Plan [1] and Test Specification [2]. The specifications listed in General Document Standards [3], Design Specification Standards [4] and Java Coding Standards [5] have been followed in the process of constructing this Design Specification.

1.3. Objectives

The objective of this document is:

- To describe the main components of the Walking Tour Application;
- To describe the main components of the database and website;
- To depict the dependencies between the components.

2. Decomposition Description

2.1. Programs in system

The Walking Tour System consists of two main components:

- The Android application;
- The Website and database;

The Android application will allow the user to create a walking tour. This tour will consist of automatically added locations through GPS along the walk as well as separate points of interest the user has added on their own along with a description and possibly photos. When the user is done, the walk can be uploaded to the online database in the form of a MIME message containing the information on the walk 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 by querying it and displaying the walks using the Mapping API.

2.2. Significant classes in the Android program

2.2.1. Main Activity

This is the launcher activity for the app, when the app first starts this is the screen the user is presented with.

2.2.2. Walk Activity

This is the main part of the app, this where the user builds their tour. From here they can:

- Add/remove points of interest.
- Add/remove photos to/from a point of interest.
- Cancel their walk.
- Save their walk for later viewing.
- They are also able to adjust the sample rate for non-key locations to save on how much data they transmit to the server.

2.2.3. About Activity

This is just a credits screen. It mentions who is on the team, the app name and version number. There are also some supporting UI classes for dialogs.

2.2.4. Tour Save

This class is used to save the current tour the user is creating to a temporary file so they don't lose their tour when they leave the app.

2.2.5. WTC Tour

This class represents the tour the user is making. This class contains the name, short description, long description and list of locations in the tour.

2.2.6. WTC Location

This class represents non-essential locations in the tour and is only used for tracking purposes.

2.2.7. WTC KeyLocation

This class represents the key locations in the tour. This class contains a name for the location, a description have the location and list of photos.

2.3. Web program components

2.3.1. Database

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.

All the data is packed into a MIME message containing all the information about the tour formatted as a JSON file. Appendix A defines the format of the MIME message; Appendix B defines the format of the JSON file. The message is transmitted from the android device in a HTTP POST request. The value will be paired using the key "message". The data is accessed in PHP using the $_POST ['message'] handle. The request is made to the file upload.php which is 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 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.

The Database will have the following structure:

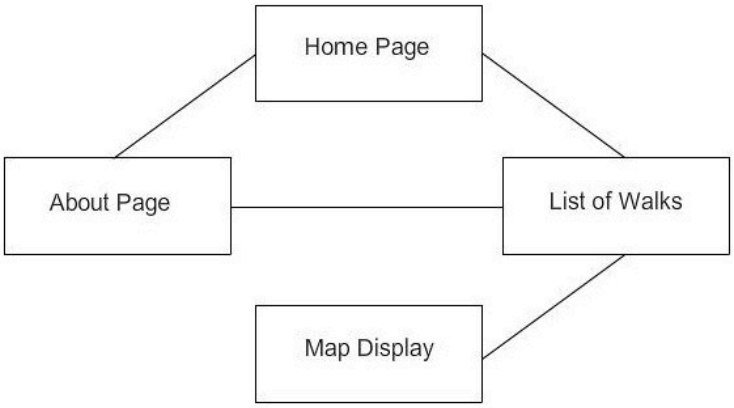
Table Name	Table Description
ListOfWalks	A list of walks/ tours, which the program will display.
Location	A list of geographical locations referencing a record in the tour table, describing the route of the tour as a sequence of locations.
PlaceDescription	A list of points of interest along tours referencing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

2.3.2. Website

The Website consists of 4 main pages:

Page Name	Page Description
Home page	The index page containing general information.
List of walks page	Displays a list of walks available to view from the database.
Contacts page	Information on how to contact the group.
About page	Other info for the site such as version and links.

The website will contain the following pages:



On the Home page there will be a little bit of information about the WTC project and a few of the most common routes. The layout of the home page has a content which will hold the most used routes. There will be a map on that screen to display one of the selected walks immediately.

The list of walks page contains a list of all walks in the database that the user can select to view on the map.

The map page will have the mapping API and will take the information on locations for a walk from the database and display them. Locations added by the user will be indicated by pins, which on click will display additional information the user has given and a list of photos that can be viewed.

The Contact page is so people can get in touch and contact us via a form which will be written in either JavaScript or PHP which will allow people to send us feedback and suggestions on how to improve on the system.

The About page will contain general information for the site such as creators, copyright and other legal matters and site version. The names of the developers and a contact e-mail address will be present so we can be contacted with recommendations etc.

All of the pages are accessible via a Navigational Bar under the header with buttons to each of the pages on the website, allowing for a dynamic experience and feel to the site as the buttons change upon behaviour of highlighted, clicked and also passive. The map will only be displayed when a walk is selected to be displayed.

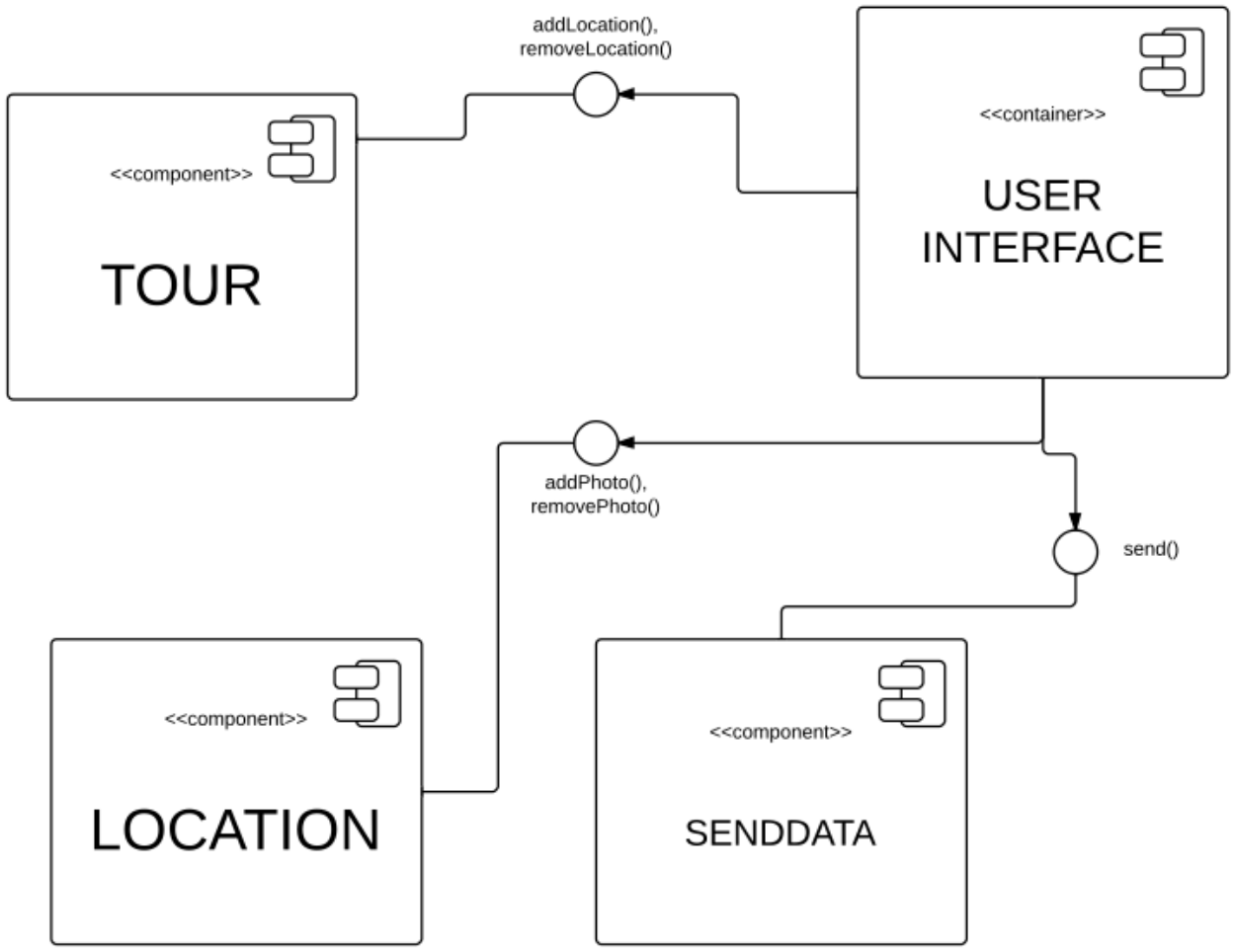
2.4. Table mapping requirements

Requirement	Modules providing requirement
FR1	MainActivity class
FR2	NewWalkFragment class, WTCTour class, ListOfWalksTable
FR3	WalkActivity class, WTCLocation class, LocationsTable
FR4	WalkActivity class, WTCKeyLocation class, PhotoUsageTable
FR5	EndWalkFragment class, FinishWalkFragment class, TourSave class, DialogCallbacks interface
FR6	NoNetworkFragment class, SendData class, Upload.php
FR7	WalkActivity class, TourData class
FR8	Index.php, Map.php, List.php
FR9	Upload.php

3. Dependency Description

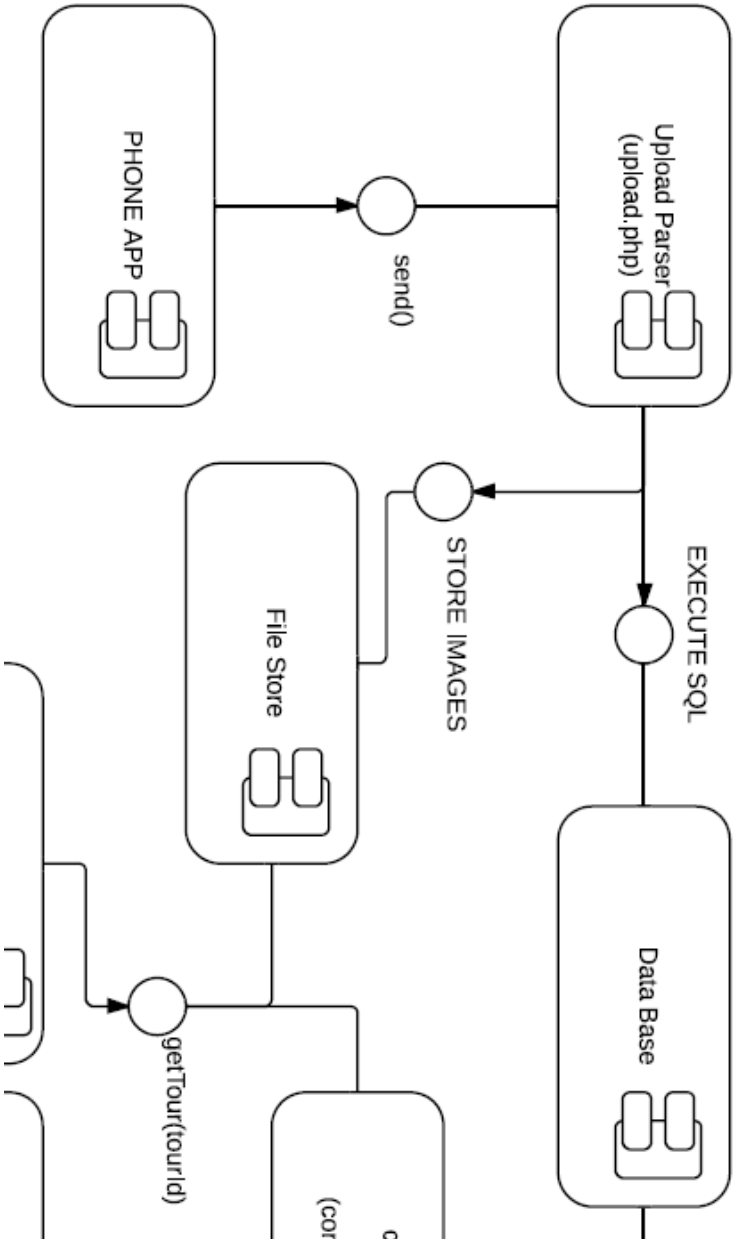
3.1. UML Component Diagram for the Android application

The diagram depicts the different components, the Android application consists of and how they interact with each other. The User Interface component can interact with the Tour, Location and Communication components through the respective methods depicted in the diagram.



3.2. UML Component Diagram for the Database

The diagram depicts the different components, the Server side application consists of and how they interact with each other. After the data is received from the phone application it is processed by the Upload Parsed component and sent to the Database component. From there depending on what the user wants to see, either the List of walks or the Map component is called.

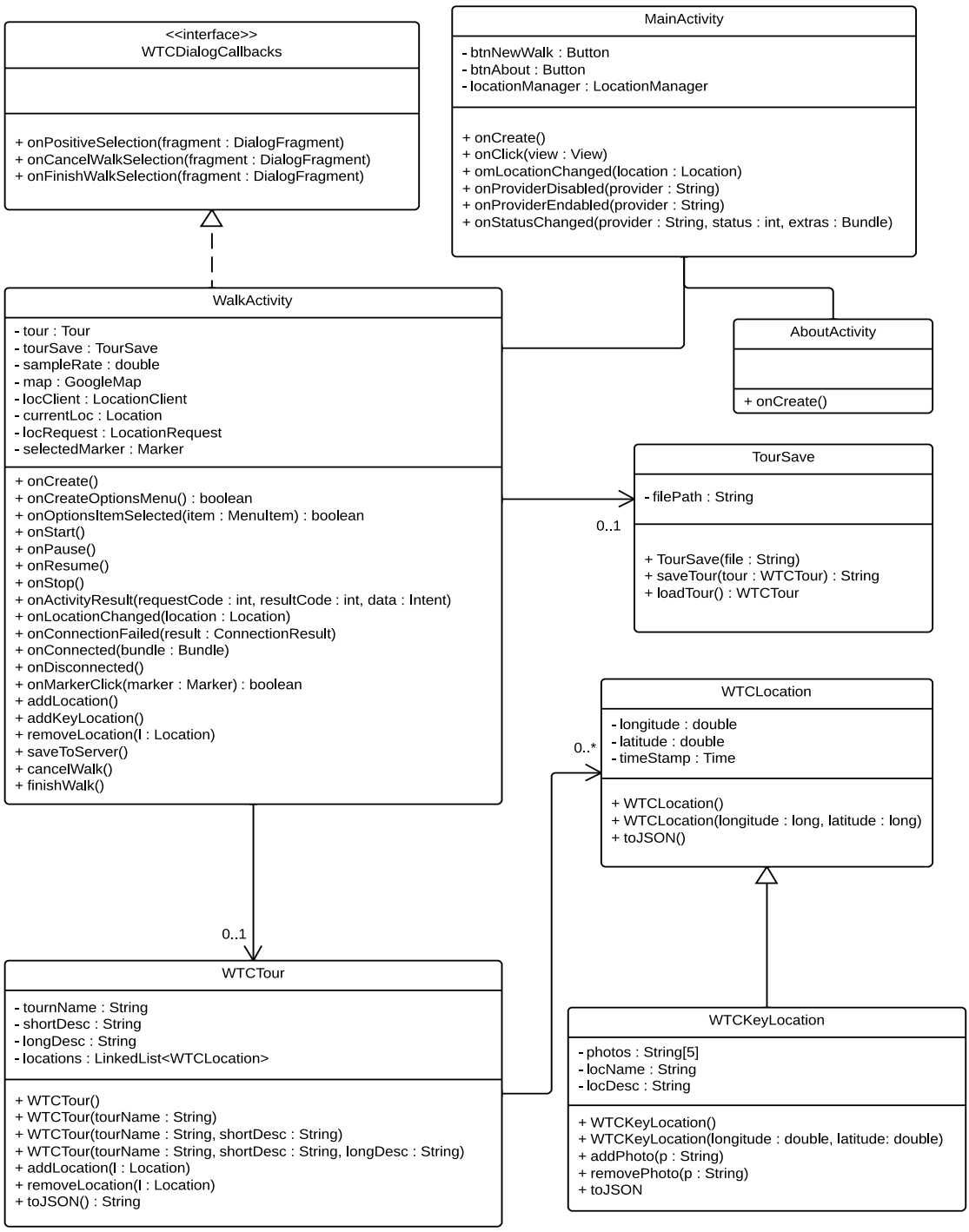


4. Interface description

This section contains all of the classes in the Android application and their class skeletons, depicting the methods that are to be implemented in them along with the appropriate JavaDoc commenting for clarification.

4.1. Android Class Diagram

The UML class diagram depicts all the significant classes the application consists of. The default Android classes such as Activity are extended by some the program uses like MainActivity etc. but are omitted from the class diagram.



4.2. Main Activity class

```
/*
 * @(#) MainActivity.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class MainActivity extends Activity implements OnClickListener, LocationListener {

        /**
        * Creates this activity and sets its layout. It also initializes the buttons and sets
        * their listeners.
        */
        @Override
        protected void onCreate(Bundle savedInstanceState) {
        }

        @Override
        protected void onStop(){
        }

        /**
        * Dictates what what happens when the user clicks a button.
        */
        @Override
        public void onClick(View view) {
        }

        @Override
        public void onLocationChanged(Location location) {
        }

        @Override
        public void onProviderDisabled(String provider) {
        }

        @Override
        public void onProviderEnabled(String provider) {
        }

        @Override
        public void onStatusChanged(String provider, int status, Bundle extras) {
        }
}
```

4.3. About Activity class

```
/*
```

```
 * @(#) AboutActivity.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class AboutActivity extends Activity {

        /**
        * Creates this activity and its layout.
        */
        @Override
        protected void onCreate(Bundle savedInstanceState) {
}
```

4.4. Walk Activity class

```
/*
 * @(#) WalkActivity.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class WalkActivity extends Activity implements ConnectionCallbacks, OnConnectionFailedListener,
        LocationListener, OnMarkerClickListener, WTCDialogCallbacks{

        @Override
        protected void onCreate(Bundle savedInstanceState) {
        }

        @Override
        protected void onStart() {
        }

        @Override
        protected void onPause() {
        }

        @Override
        protected void onResume() {
        }

        @Override
        protected void onStop() {
        }

        @Override
        protected void onActivityResult(int requestCode, int resultCode, Intent data) {
        }

        @Override
        public void onLocationChanged(Location location) {
        }

        @Override
        public void onConnectionFailed(ConnectionResult result) {
        }

        @Override
```

```
}

@Override
public void onDisconnected() {
}

/**
 * Sets the selected marker.
 *
 * Called when the user clicks on a map marker.
 */
@Override
public boolean onMarkerClick(Marker marker) {
}

/**
 * Creates the action bar where all the buttons are.
 */
@Override
public boolean onCreateOptionsMenu(Menu menu) {
}
/**
 * Dictates what happens when the user clicks a button on the options menu.
 */
@Override
public boolean onOptionsItemSelected(MenuItem item) {
}
/**
 * Used to add a new key location to the tour.
 */
@Override
public void onPositiveSelection(DialogFragment fragment) {
}
/**
 * Used to cancel the tour if the user selects 'OK' on the dialog.'
 */
@Override
public void onCancelWalkSelection(DialogFragment fragment) {
}

@Override
public void onFinishWalkSelection(DialogFragment fragment) {
}

/**
* Adds a location to the tour.
*/
public void addLocation() {
}




/**
* Adds a key location to the walk.
*/
```

```
  public void addKeyLocation(WTCKeyLocation keyLoc) {
  }

  /**
  * Removes a location from the tour.
  *
  * @param marker the marker being removed from the map; also used to identify which location to
remove.
  */
  public void removeLocation(Marker marker) {
  }

  public void addPhoto() {
  }

  /*
   * The following method was taken from the Android Developers Documents
   *
   * URL: http://developer.android.com/training/camera/photobasics.html
   */
  private File createImageFile() throws IOException {
  }

  public void removePhoto() {
  }

  /**
  * Saves the tour to the server.
  */
  private void saveToServer() {
  }

  /**
  * Stops the recording of the and deletes the data.
  */
  public void cancelWalk() {
  }

  /**
  * Adds a stopping location to the tour and stops the recording.
  */
  public void finishWalk() {
  }

  /**
  * @param tour the new value for this.tour.
  */
  public void setTour(WTCTour tour) {
  }




  /**
  * @return the tour.
  */
```

```
        public WTCTour getTour() {
        }

        /**
         * Sets a new value for this.sampleRate.
         *
         * @param sampleRate the new value for this.sampleRate.
         */
        public void setSameRate(long sampleRate) {
        }
        /**
         * @return the sample rate.
         */
        public long getSampleRate() {
        }
}
```

4.5. WTC DialogCallbacks interface

```
/*
 * @(#) WTCDialogCallbacks.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public interface WTCDialogCallbacks {

        /**
         * This method is used when the user clicks the positive button on a dialog.
         *
         * @param fragment the DialogFragment that made this callback.
         */
        public void onPositiveSelection(DialogFragment fragment);

        /**
         * This method is to be called when the user clicks the positive button
         * on the CancelWalkFragment.
         *
         * @param fragment the DialogFragment that made this callback.
         */
        public void onCancelWalkSelection(DialogFragment fragment);

        /**
         * This method is to be called when the user clicks the positvite button
         * on the FinishWalkFragment.
         *
         * @param fragment the DialogFragment that made this callback.
         */
        public void onFinishWalkSelection(DialogFragment fragment);
}
```

4.6. TourSave class

```
/*
 * @(#) TourSave.java Version 1.0
```

```
 * All Rights Reserved
 */
public class TourSave {
        /**
         * Constructs a TourSave object with a file path to where the tour data will be saved.
         *
         * @param filePath the file path for where the tour will saved on the device.
         */
        public TourSave(String filePath){
        }

        /**
         * Serializes the tour data out to file.
         *
         * @param tour the tour being saved.
         * @return a message to say whether the save was successful or not
         */
        public String saveTour(WTCTour tour) {
        }

        /**
         * Deserializes a tour data file.
         *
         * @return the tour loaded in from file
         */
        public WTCTour loadTour(){
        }
}
```

4.7. WTCTour class

```
/*
 *  @(#) WTCTour.java Version 1.0
 *
 *  Copyright(c) Group 5 @Aberystwyth University
 *  All rights reserved
 */
public class WTCTour implements Serializable{
        /**
        * Constructs a blank tour.
        */
        public WTCTour(){
        }

        /**
        * Constructs a new tour with a specified name.
        *
        * @param tourName the name of the tour.
        */
        public WTCTour(String tourName){
        }

        /**
        * Constructs a new tour with a specified name and short description.
        *
        * @param tourName the name of the tour.
```

```
*/
public WTCTour(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 WTCTour(String tourName, String shortDesc, String longDesc){
}

/**
* Adds a location to the tour.
*
* @param location the location being added to the tour.
*/
public void addLocation(WTCLocation location){
}

/**
* Removes a location from the tour.
*
* @param index the index of the location being removed.
*/
public void removeLocation(int index){
}

/**
* 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<WTCLocation> locations){
}

/**
* @return the list of locations in the tour.
*/
public LinkedList<WTCLocation> getLocations(){
}

/**
 * A shortcut method to get the size of the list of locations
 *
 * @return the size of the list of locations in the tour
 */
public int getLocationsSize(){
}
/**
 * Adjusts the timestamps for each location in the tour to be
 * minutes from the start of the tour.
 */
public void fixTime(){
}

/**
 * Calculate a rough estimate for the distance of the tour
 */
 private double calcDist(){
```

```
        }

        private static double GreatCircle(WTCLocation loc1, WTCLocation loc2){
        }
}
```

4.8. WTCLocation class

```
/*
 * @(#)WTCLocation.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class WTCLocation implements Serializable{

        /**
         * Constructs a blank location.
         */
        public WTCLocation(){
        }

        /**
         * Constructs a location object a specified longitude and latitude.
         *
         * @param longitude the longitude of the location.
         * @param latitude the latitude of the location.
         */
        public WTCLocation(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(long newTime){
        }

        /**
         * @return the time stamp for when this location was recorded
         */
        public String getTimeStamp(){
        }

        /**
         * @return the original timestamp for the location
         */
        public Calendar getOldTime(){
        }

        /**
        * Converts the data stored in this object to a JSON string.
        *
        * @return the JSON String.
        */
        public String toJSON(){
        }
}
```

4.9 WTCKeyLocation class

```
/*
 * @(#) WTCKeyLocation.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class WTCKeyLocation extends WTCLocation {
        /**
         * Constructs a blank key location.
         */
        public WTCKeyLocation(){
        }
        /**
         * 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 WTCKeyLocation(double longitude, double latitude){
        }

        /**
         * Adds the file path of a photo to this key location.
         *
         * @param path the file path.
```

```
        public void addPhoto(String path){
        }

        /**
         * Removes the file path of a photo from this hey location.
         *
         * @param path the file path.
         */
        public void removePhoto(String path){
        }

        /**
         * @return the list of photo paths in this location
         */
        public List<String> getPhotos(){
        }

        /**
         * @return the name of this location
         */
        public String getLocName() {
        }

        /**
         * Sets the name of this location
         *
         * @param locName the name of the location being set
         */
        public void setLocName(String locName) {
        }

        /**
         * @return the description of this location
         */
        public String getLocDesc() {
        }

        /**
         * Sets the description of this location
         *
         * @param locDesc the description of the location being set
         */
        public void setLocDesc(String locDesc) {
        }

        @Override
        public String toJSON(){
        }
}
```

4.10 SendData class

/*

```
 * @(#) SendData.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class SendData extends AsyncTask<String, Void, Void> {

        /**
         * Constructs a SendData object.
         *
         * @param activity a link back to the activity that made this object.
         * @param tour the tour being saved to the server
         */
        public SendData(Activity activity, WTCTour tour){
        }

        /**
         * Sends the tour data to the specified server.
         * <p>The tour data and the accompanying photos are placed into a
         * Multi-Part MIME and sent to the server using HTTP POST.</p>
         *
         * @param params the list of URLs to send the tour to.
         */
        @Override
        protected Void doInBackground(String... params) {
        }

        /**
         * Notifies the user that the tour was saved and takes them back to the home screen.
         */
        @Override
        protected void onPostExecute(Void result) {
        }
}
```

4.11 NewWalkFragment class

```
/*
 * @(#) NewWalkFragment.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class NewWalkFragment extends DialogFragment implements OnClickListener{

        /**
        * Creates the dialog box that collects the details for the walk.
        */
        @Override
        public Dialog onCreateDialog(Bundle savedInstanceState) {
        }



        /**
        * Dictates what happens when the user clicks the positive or negative button on the
        * dialog.
        */
```

```
        public void onClick(DialogInterface dialog, int which) {
        }
}
```

4.12 LocationsDetailsFragment class

```
/*
 * @(#) LocationDetailsFragment.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class LocationDetailsFragment extends DialogFragment implements OnClickListener{

        /**
         * Links this dialog back to the activity that created it.
         */
        @Override
        public void onAttach(Activity activity){
        }

        /**
         * Creates the dialog and sets its layout.
         */
        @Override
        public Dialog onCreateDialog(Bundle savedInstanceState) {
        }

        /**
         * Dictates what happens when you click a button on the dialog.
         */
        @Override
        public void onClick(DialogInterface dialog, int which) {
        }

        /**
         * @return the text field for the location name.
         */
        public EditText getTfLocName() {
        }

        /**
         * @return the text field for the location description.
         */
        public EditText getTfLocDesc() {
        }
}
```

4.13 NoNetworkFragment class

```
 * @(#) NoNetworkFragment.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class NoNetworkFragment extends DialogFragment implements OnClickListener {
        /**
         * Create this dialog and sets its layout.
         */
        @Override
        public Dialog onCreateDialog(Bundle savedInstanceState) {
        }

        /**
         * Does nothing in this instance, just needs to be here.
         */
        @Override
        public void onClick(DialogInterface dialog, int which) {
        }
}
```

4.14 FinishWalkFragment class

```
/*
 * @(#) FinishWalkFragment.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class FinishWalkFragment extends EndWalkFragment {
        /**
         * Creates the dialog and sets its layout.
         */
        @Override
        public Dialog onCreateDialog(Bundle savedInstanceState) {
        }

        /**
         * Dictates what happens when you click a button on the dialog.
         */
        @Override
        public void onClick(DialogInterface dialog, int which) {
        }
}
```

4.15 EndWalkFragment class

```
/*
 * @(#) EndWalkFragment.java Version 1.0
 * Copyright(c) Group 5 @Aberystwyth University Computer Science Dept: Yr 2 (2014)
 * All Rights Reserved
 */
public class EndWalkFragment extends DialogFragment implements OnClickListener{

        /**
         * Link the this dialog back to the activity creating it.
         */
        @Override
        public void onAttach(Activity activity){
        }

        /**
         * Creates the dialog and sets its layout.
         */
        @Override
        public Dialog onCreateDialog(Bundle savedInstanceState) {
        }

        /**
         * Dictates what happens when you click one the dialog buttons.
         */
        @Override
        public void onClick(DialogInterface dialog, int which) {
        }
}
```

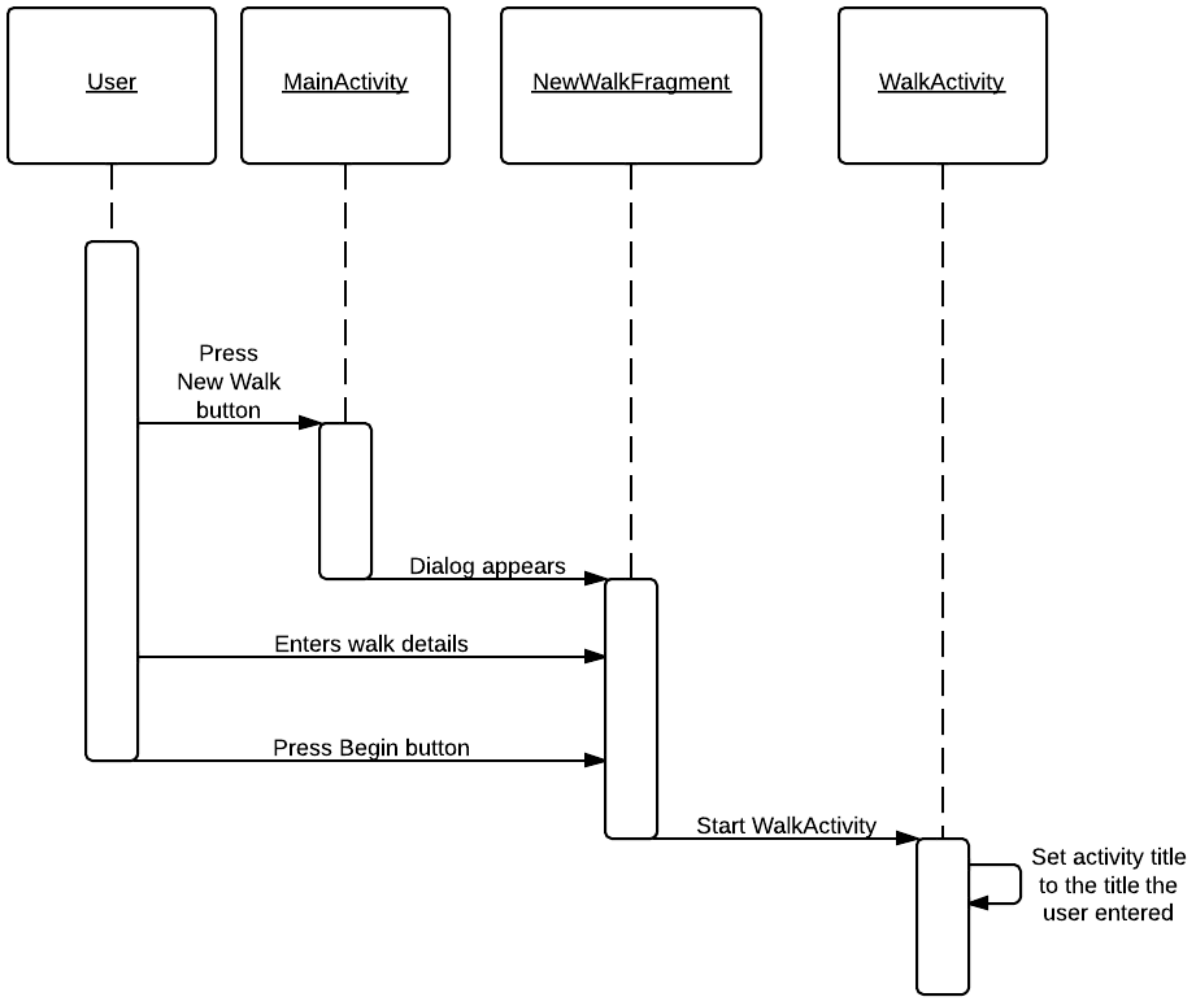
5 Detail Design

This section contains information about the more difficult and not self-evident parts of the system design. It includes the sequence diagrams for the different parts of operation to describe in more detail the order in which events in the program are executed. Further explanation on the algorithms used by both the Android and the Server side of the system are explained to clarify how the system's main components interact.

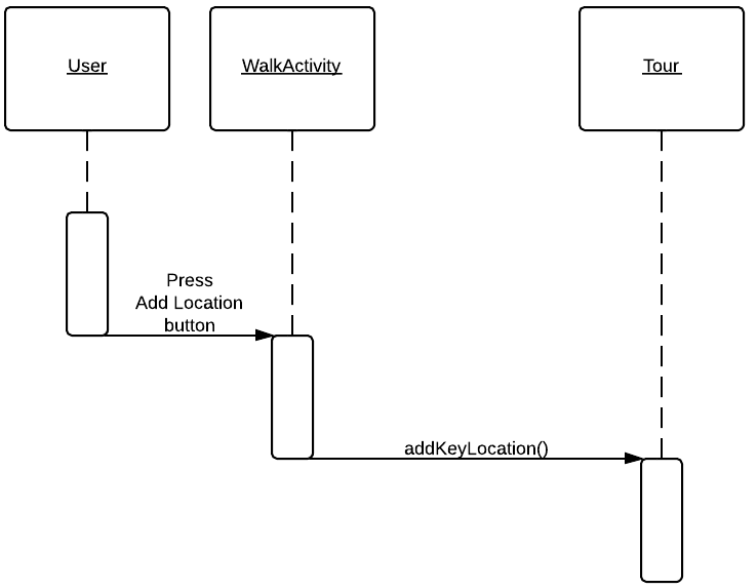
5.9 Sequence Diagrams

This section contains the sequence diagrams for the whole system. They have been split into different segments representing different aspects of system operation.

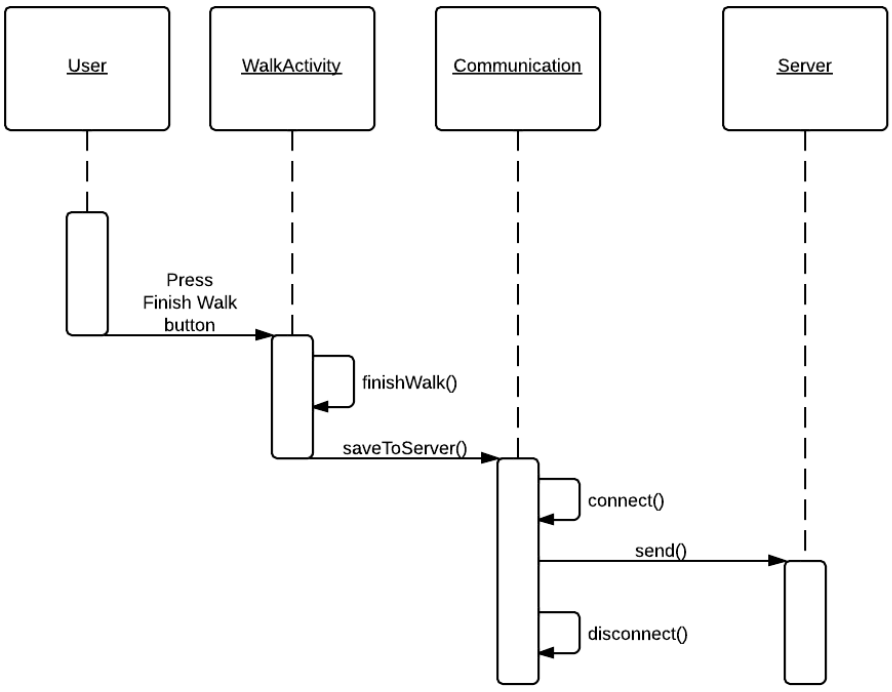
5.9.1 Tour creation sequence diagram



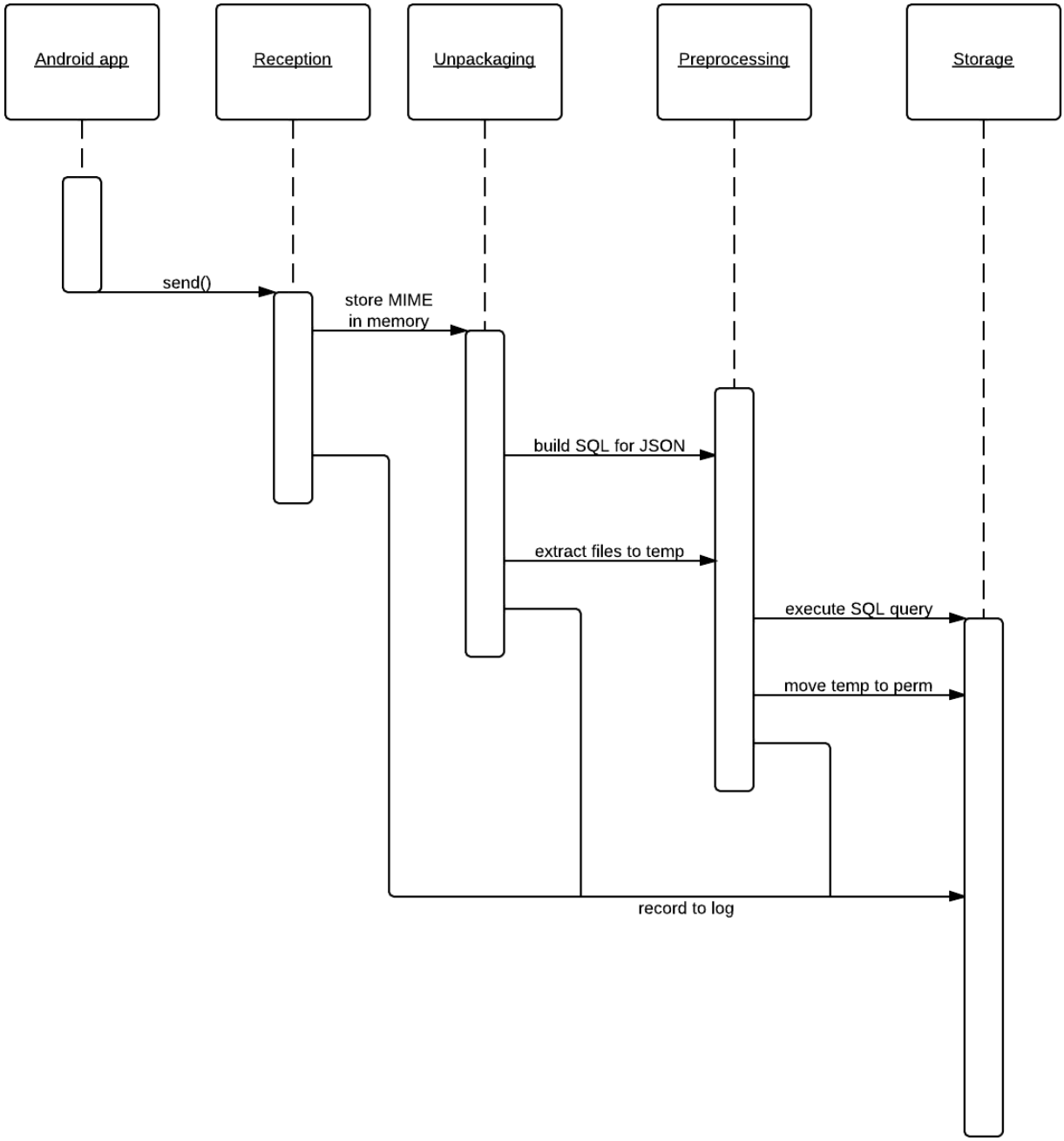
5.9.2 Add key location sequence diagram



5.9.3 Data transfer sequence diagram



5.9.4 Server side sequence diagram



5.10 Algorithm Description

5.10.1 Server Side Data Delivery Algorithm

- 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 (e.g. tmp/05012013my_tour). It records success/ failure to the server log and if successful, will progress;
- 3. The PHP file extracts the data from the JSON file, checks whether the data is valid and continues;
- 4. It then produces an SQL query to insert the data into the database. It records success/ failure to the server log and if successful, will progress;
- 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).

5.10.2 Android side algorithms

- **Generating JSON:**

All relevant classes will have a toJSON() method that constructs a JSON object based on the contents of the class (Appendix B). This includes any objects constructed by the class itself. Any photographs that are going to use have their file path added as a component of the generated JSON objects.

- **Communicating with the server:**

The created JSON objects are sent as part of a MIME message via HTTP Post.
In Android the sending of information via HTTP Post is rather simple, we create an object known as a HTTP Post object, with a URL attached to it, we then add all associated information necessary and send it to the URL previously attached.

- **Keeping track of locations:**

To keep track of the route the user is taking we are going to generate a location every few meters determined by a persistent algorithm checking the difference in the longitude/latitude and calculating if the difference equates to or is greater than the prescribed difference for adding a location. If the user adds a location within 5 minutes of the app generating one the app generated one will be removed to reduce on data transfer for the user.

- **Location management:**

As stated above the previous location will be checked on the creation of a key location by the user if the user-generated location's timestamp more than 5 minutes older than the previous location, just add the location to the end of the linked list; however if the previous non-user created location is less than 5 minutes old, replace it with the new user-generated location.

- **Photo management:**

The android operating system allows us to simply store our own images that the user will create in app in our own file storage system under the images folder on the device. This will allow us to easily attach the images for the relevant key locations while being able to just reference a file path in the JSON string.

5.11Data Structures

5.11.1 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.

5.11.2 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 characters)	text
hours	The number of hours the walk will take	float
distance	The total distance of the tour in kilometres	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

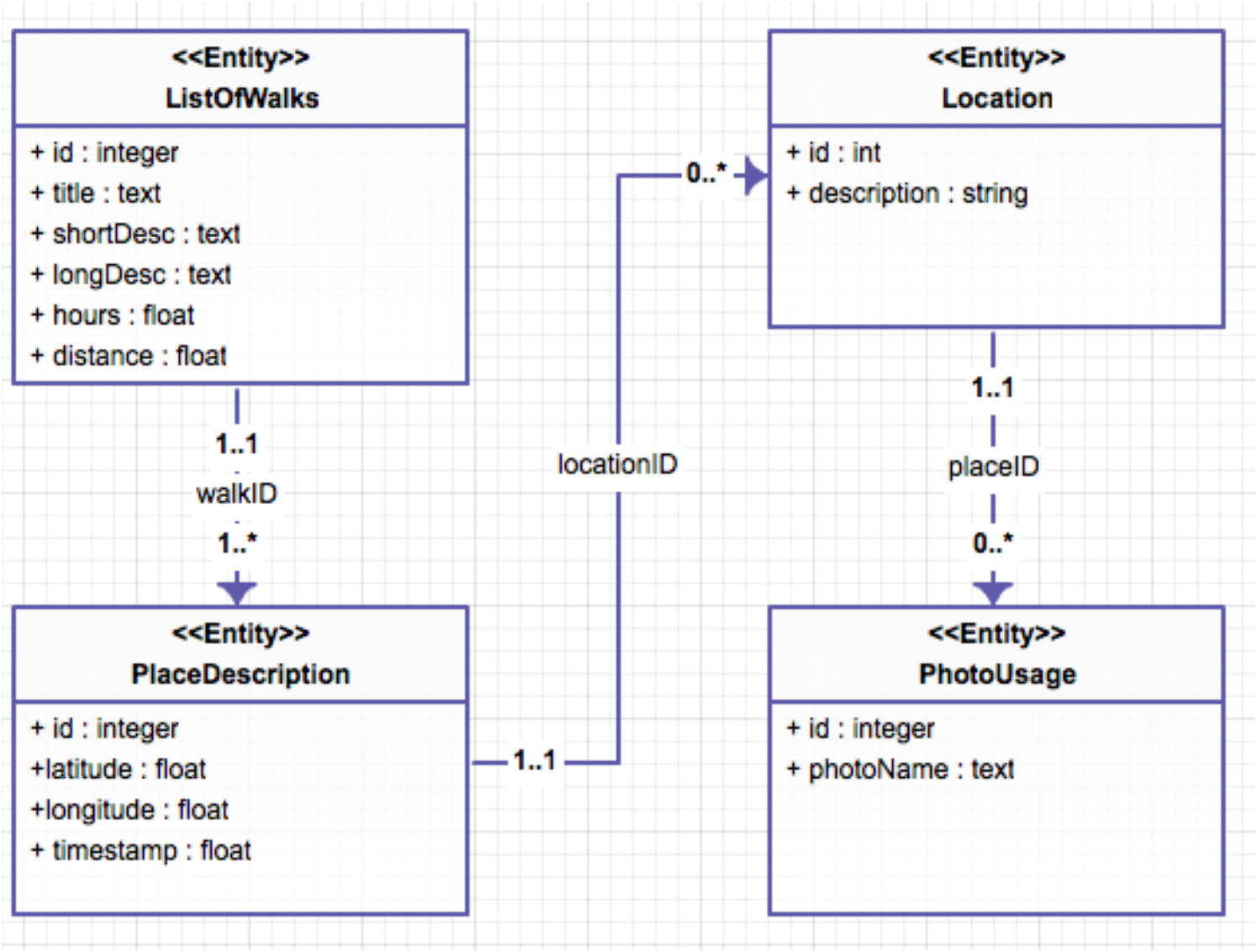
- *Place description table:*

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

5.12 Entity Relationship Diagram



6 APPENDIX A

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.

Sample MIME message:

From: John Doe <example@example.com>
Subject: TOUR NAME
MIME-Version: 1.0
Content-Type: multipart/mixed;
boundary="part"
--part
Content-Type: text/plain

JSON CODE GOES HERE

--part
Content-Type: image/jpeg;
Content-Disposition: attachment;
filename="file1.jpg"
jgfc,jbjytf,nmvk-0987y6trfgi9876trdfvbhjytrfdc
--part—

7 APPENDIX B

- *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 List of walks Table)
locations	A set of locations of interest along the tour.	A collection of objects representing locations of interest. (See Location Table)
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 be-ginning 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.

8 Appendix C

Sample JSON file:


```
{
	"Title": "My Walk",
	"shortDesc": "A walk from grans house to my house",
	"longDesc": "This is a walk that I take from my house to my nans. I hope you enjoy it…",
	"route": [
{
	"id": 0,
	"longitude": 345674,
	"latitude": 583848,
	"time": 0
},
{
	"id": 1,
	"longitude": 345684,
	"latitude": 583848,
	"time": 5
},
```


//LOTS MORE HERE…


```
],
	"pointOfInts": [
{
	"coord": 5,
	"description": "This is where I live",
	"media": [
	"file1.jpg",
	"file2.jpg"
]
},
{
	"coord": 17,
	"description": "This is about half way",
	"media": []
},
{
	"coord": 25,
	"description": "This is where my gran lives",
	"media": [
	"file3.jpg"
]
}
],
	"time": 45676,
	"distance": 23454
}
```

9 References

[1] Software Engineering Group 05. Project Plan. S. Raychev, B. O'Donovan, H. Clark, W. Arslett, W. Lea, N. Vicker and S. Clasby. 1.2 Release.

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[3] Software Engineering Group Projects. General Document Standards. C. J. Price, N. W. Hardy and B. P. Tiddeman. SE.QA.03. . 1.6 Release.

[4] Software Engineering Group Projects. Design Specification Standards. . C. J. Price, N. W. Hardy and B. P. Tiddeman. SE.QA.05A. . 1.7 Release.

[5] Software Engineering Group Projects. Java Coding Standards. . C. J. Price, A. McManus. SE.QA.09. . 1.7 Release.

10 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
1.1	N/A	05.12.13	Updated Diagrams & Tables; Added algorithms	srr11
1.2	N/A	06.12.13	Finalised the design specification	srr11
1.3	N/A	10.02.14	Changed FR Table and Class/Interface info	bmo
2.0	#1	13.02.14	Updated with Bernie's remarks.	bmo