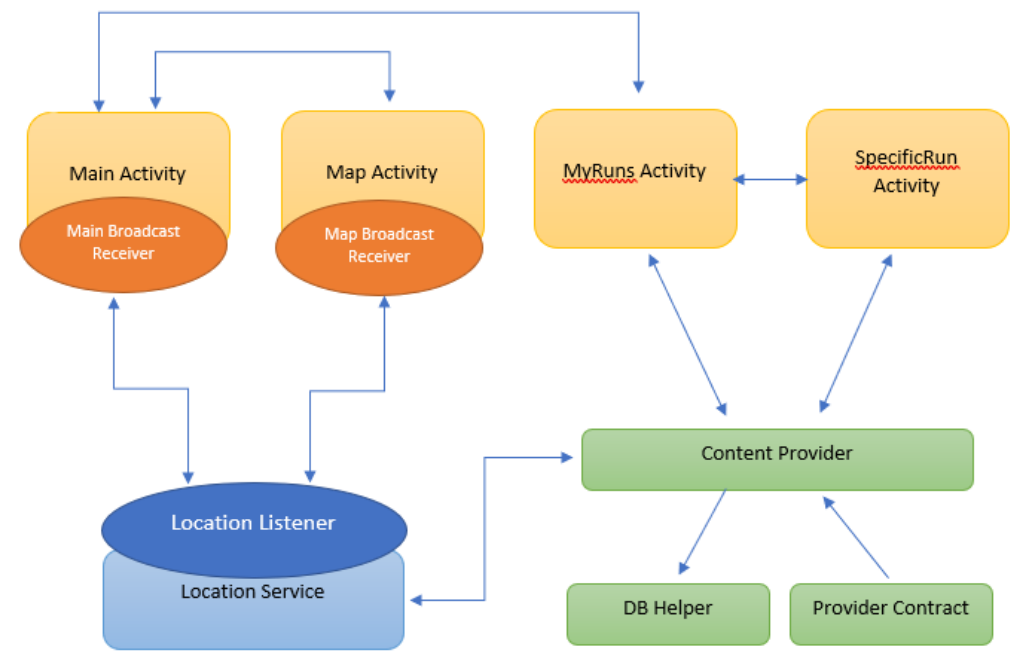


Coursework Report



Overview

On starting the running tracker the user will be taken to the Main Activity which displays the current details of the run whilst also acting as a hub to take the user to the other pages (Activities). The Main activity consists of a Start Run button which notifies the Location Listener that the event has started and the user is on a run.

There are 4 Text View elements that show the duration, distance, average & max speed of the current run which will be updated after the start button has been pressed and the user moves location. There is also a text box for the user to enter any notes about the run which will be saved in the database.

Below the text elements there is a stop button which, when clicked, notifies the service to the stop run and store the run data in the DB and then resets the data to be ready for a new run. The Main Activity also has two other buttons to take the User to the My Runs Activity and the Map activity.

The My Runs activity contains a list view that displays all the previous runs in the database with options to sort the list through oldest, newest, furthest (km) and longest (seconds) via 4 buttons on top of the list. The list will have a clickable interface which takes the user to the Specific Run Activity which loads the data of the run clicked in the list and will display all the information kept in the DB which is Average speed, Top Speed, Distance, Duration and any notes they typed. There is also a button on this page to delete the session from the DB, if the user wanted. All the activities are fully navigable with back buttons for easy traversal.

The map activity allows the user to see their current location on a map which is constantly updated via the Map broadcast receiver.

Components

Main Activity

Main Activity is the default activity when starting the app. It's the main page displaying the running statistics of the current run whilst also acting as a hub page to take the user to the two other main activities (Maps and My Runs). The textboxes displaying the run details (distance, duration, avg speed, max speed) are updated whenever the user changes location by calling `onLocationchanged()` in the `LocationListener` class inside `Location Service`. There is also an Edit Text box below the run details in which the user can enter any specific notes he wants to make about the current run. Main Activity has a broadcast Receiver subclass which takes in the data calculated by the `Location Listener` to input into the textboxes. As specified in the Overview, Main Activity also has start and stop buttons, start and stop the current run. When the stop button is clicked, the notification service will end, tracking data will stop and the current run data will be saved in the Database.

Maps Activity

Map Activity is navigable from the Main Activity by clicking on 'Current Location' button. The Map activity consists of a map fragment, return button and a broadcast receiver. The location data will be obtained from the Location service using `LocationListener` in the same way as Main Activity and will be fed to the Map broadcast receiver in which the map fragment can show the current location with a marker, which will be updated when the user has moved location. The back button returns the user to Main Activity.

My Runs Activity

My Runs activity is the other activity that is navigable from Main Activity via clicking on the 'My Runs' button. This activity is used to display all previous runs to the user in a `ListView` in which all records in the list are clickable and will take the user to the Specific Run Activity to see that specific run in more detail. Above the List of runs is four buttons which are different options to sort through the runs stored in the database. The four buttons allow the user to sort through longest distance first, longest duration first, newest run first, oldest run first (by default it is longest duration first). Below the list is a back button to take the user back to the Main Activity.

Specific Run Activity

The Specific Run Activity is the fourth and final activity in the application. It is accessible by clicking on a record on the Run List in the My Runs activity. It will store the ID of the run clicked in the My Run activity which is used to query the Database to get all the stored details of that specific run ID. The results taken from the database are displayed using four textboxes, similar to Main Activity, where it displays distance, duration, average speed, max speed and any notes entered from the run. Below the run details are two buttons, one to return the user back to the My Runs page and another to delete this specific run from the database.

Location Service

The Location Service is the main service used in the application. The main functionalities of the service is to provide the Main Activity location details using a `LocationListener` subclass and calling `onLocationChanged` which gets polled when the user changes location. The location Object retrieves the relevant data calculated in that sub class which is longitude, latitude and time (from change in distance) and will convert it to the relevant data statistics that the user wants to see (average & max speed, duration, distance), which will be sent to the Broadcast receiver inside Main Activity and Map Activity. Average speed is calculated by dividing the total speed (difference in location divided by difference in time divided by 100) over the number of different locations visited. Maximum speed is calculated in a function that takes in the current speed and compares it to the previous max and will update the maximum speed variable if the current speed is greater. Distance is calculated as a float value from the distance between the last location which is added onto the total distance variable to give an overall distance of the run, the values are rounded (although it doesn't always work as planned). Duration is calculated from the difference in time from the previous location to the current location and added onto a `totalDuration` variable which keeps track of the total duration from each Location change polled by the Location Listener. The duration value is rounded and converted into a suitable time format for the user. The broadcaster will send all the calculated data to Broadcast Receiver in Main Activity and Map activity. The service also contains a binder to allows abstraction from the service, location listener and database and provides a platform to safely query the DB, create notifications and manage the Location Listener. The binder enters the run data in the DB and destroys the notification when the stop button is clicked.

Database Helper, Content Provider and Provider Contracts

The content Provider helps us manage the database and safely encapsulates the data using abstracted queries. The content provider provides the SQL statements used to query, insert and delete records from the database. The provider contract establishes a contract between the Content Provider and the Activities that require access to the run information stored in the database. It stores the URI's used to access the database along with the column values used to query the database. The DB helper is used for initialising, creating and updating the database.