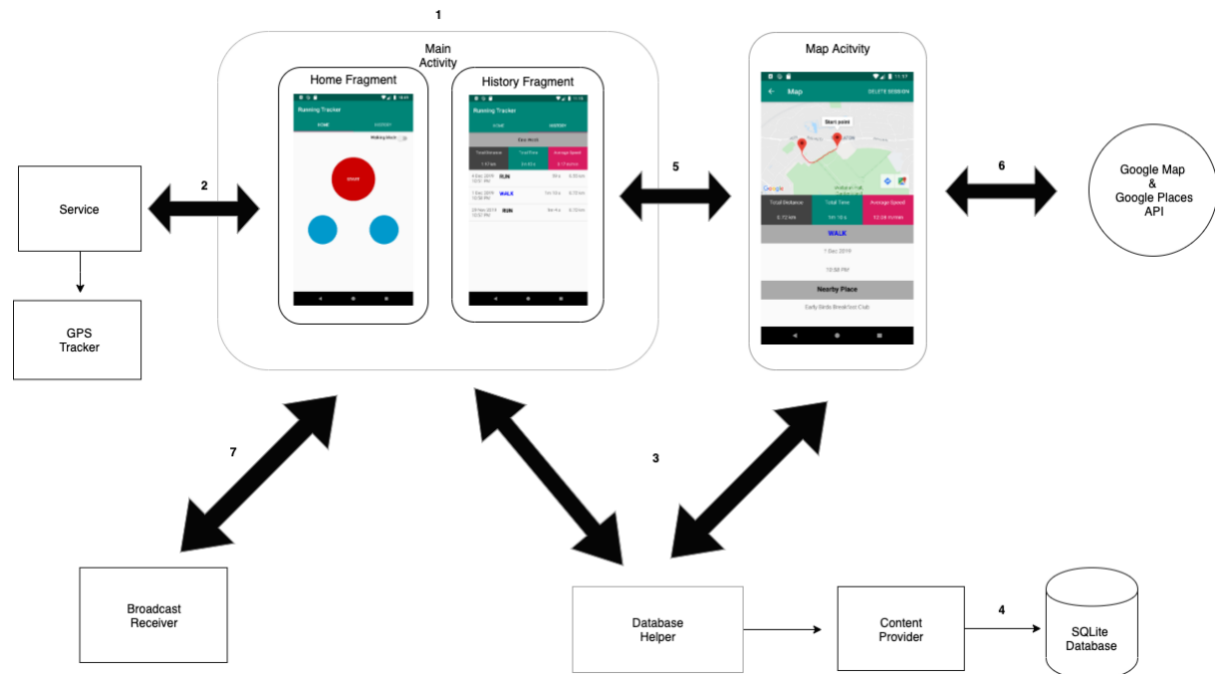# REPORT for COMP 3040 Coursework 2

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This description of the "Running tracker" application is broken down into 7 sections as depicted in the diagram above, with each section detailing the involved components and their relationships and purposes.

1. The main activity is a tabbed activity that contains two fragments that are HomeFragment and HistoryFragment. HomeFragment is the main interface where users can log running/walking sessions by pressing the Start/ button and then stop the session by clicking the same button. When a Home Fragment is first started, the application will check permission and if permission to ACCESS_FINE_LOCATION is not granted, a request for permission pop up will show up in order for user to grant permission. A timer is used to periodically update the TextViews that shows the distance and time of the session.

   HistoryFragment is where users can see the saved sessions that are queried by different periods such as "Today", "week", "months," "year" and "all". There are three TextViews displaying the total distance, time and average speed for all sessions that are listed below. Each row will display the date and time of individual session and how far and for how long the session is and most importantly, if it's a walking session or a running session.

   A Switch button is implemented to allow user to choose between walking or running mode.

2. Logging begins when users press "Start", which triggered a function call to start the service. When the service starts, GPStracker is initialised and start listening to location changed. Every new location detected by the device is saved in an array so that it can be used to draw route on the map later. The service is able to stay on foreground by displaying notification, so it will continue running until the user stop the running/walking session by clicking the same button which now showing "Stop". This will ensure the tracker won't get interrupted and keep running even when the application is not on foreground. User can go back to the application either by pressing the application in the drawer or click on the notification, the application will continue updating and showing the correct time/distance of the session.

    There are two scenarios where the service will get stopped and destroyed. It's when user stop it by clicking the "Stop" button and when the application is killed. Both of which will result in saving the last started session.

3. Both HomeFragment and HistoryFragment uses a helper containing a content provider that manage access to database by performing inserting, querying and deleting. The functions such as add(RunningSession session), findById(int id), find(long timestamp), deleteSession(int id) in helper enable both fragments to save, retrieve and delete sessions. In order to query sessions that are belong in a certain period. Current timestamp is substracted by timestamp that's calculated (Today – total milliseconds of 7 days = timestamp of a week ago)based on the selected "period" is used as parameter to the "find" function. The content provider will query back the sessions that have a timestamp greater than parameter timestamp.

4. Using a content provider allows other applications to use the sessions data. However, in the scope of this coursework. A content provider is mainly used by the main application to query, insert and delete the data.

5. When a row in RecyclerView in HistoryFragment is clicked, that particular row will start a MapActivity with intent that contain the id of that particular session. The database helper is then used to query that session. The data of the session is then used to display the running route in Google Maps, date, starting time, total distance and time, average speed of the associated session. User can also delete the session by clicking the "DELETE SESSION" menu button on the menu.

    Google Places API is also used find the nearest place to the starting point. However, since it takes some time to load Google Map, some measures (indeterminate progress bar) are used to inform the user that the activity is starting and UI interaction is disabled in order to prevent multiple clicks/callings of the activity.

6. Google Maps API is used to display the running route. The route is drawn on Google Map by using the Longitude and Latitude of the location parsed from the saved location string. A string is used to store all the locations as SQLite database doesn't accept array. Google Places API is also called to return a list of likelihood places that's close the starting point of the running routes and the one with the greatest likelihood is chosen to display under the "Nearby Place" section.

7. Broadcast Receiver is in charge of detecting any changes to the GPS setting of the device. If the GPS is turn off, the "start" button will be disabled and set to text "can't start – GPS is disabled". The button will be enable only after the user has turned the GPS back on.

8. In the case of unlikely event that GPS is turned off when the application is running, if the session is in progress, the app will immediately save the running session and pop up a dialog to inform user that the GPS is turned off and urge user to turn it back on in order to proceed. If no session is in progress, the application will disable the "start" button and pop up alert dialog to inform the user, a positive button is also placed in the dialog for user to quickly migrate to the location settings.

The design of the application opt for a minimalist approach. This application is designed with six things in mind:
1. The UI design is clean, intuitive and simple.
2. Must be fast and easy to log new session.
3. Important information (total distance, time used, average speed) of a session should always be on display
4. Map can be used to show the running route.
5. Tackles all unexpected use cases such as (what happened when GPS is switched off during a session or when the application is killed)
6. All in progress session must be saved – no data loss occur.
7. UI are working in both portrait and landscape. Layout can be scrolled to show more views.

Diagrams

Screen 1 (10:52)

Running Tracker
HOME HISTORY

RUN MODE

STOP

0:55   0.49 km

Screen 2 (11:03)

Running Tracker
HOME HISTORY

Walking Mode

⚠ GPS turned OFF
Your Session has been saved

OK   GO TO LOCATION SETTING

0:00   0.00 km

Screen 3 (11:14)

Running Tracker
HOME HISTORY

Walking Mode

⚠ GPS turned OFF
Enable it back to start tracking

OK   GO TO LOCATION SETTING

0:00   0.00 km

Screen 4 (10:53)

Running Tracker
HOME HISTORY

Today's session

Total Distance	Total Time	Average Speed
0.81 km	1m 23 s	0.16 m/min

| 4 Dec 2019 10:52 PM | **RUN** | 24 s | 0.26 km |
| 4 Dec 2019 10:51 PM | **RUN** | 59 s | 0.55 km |

Screen 5 (11:15)

Running Tracker
HOME HISTORY

Three Months

Total Distance	Total Time	Average Speed
2.92 km	4m 23 s	0.19 m/min

4 Dec 2019 10:51 PM	**RUN**	59 s	0.55 km
1 Dec 2019 10:58 PM	**WALK**	1m 10 s	0.72 km
29 Nov 2019 10:57 PM	**RUN**	1m 4 s	0.70 km
19 Nov 2019 11:01 PM	**RUN**	32 s	0.34 km
15 Oct 2019 11:14 PM	**RUN**	23 s	0.34 km
15 Oct 2019 11:08 PM	**RUN**	15 s	0.27 km

Screen 6 (11:17)

← Map   DELETE SESSION

Start point
A609 Russell Dr   WOLLATON   Wollaton Rd
Google   Wollaton Hall, Gardens and

Total Distance	Total Time	Average Speed
0.72 km	1m 10 s	12.08 m/min

WALK

1 Dec 2019

10:58 PM

Nearby Place

Early Birds Breakfast Club