Computer Science Large Practical

Design Document

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Contents

1 Introduction

This document describes the software design of Songle. The design document discusses implementation decisions and takes the reader through a play of the game including bonus features.

2 Technologies used

The application was built using API 26, targeting devices with Android 7.1.1 (Nougat)

The external libraries used are: Google Maps, Google Play Services and XML Parser.

Google Maps The application relies on Google Maps for displaying a map of the University of Edinburgh Central Campus.

implementation 'com.google.android.gms:play-services-maps:10.0.0'

Google Play Services allows Android apps to update directly from Google Play.

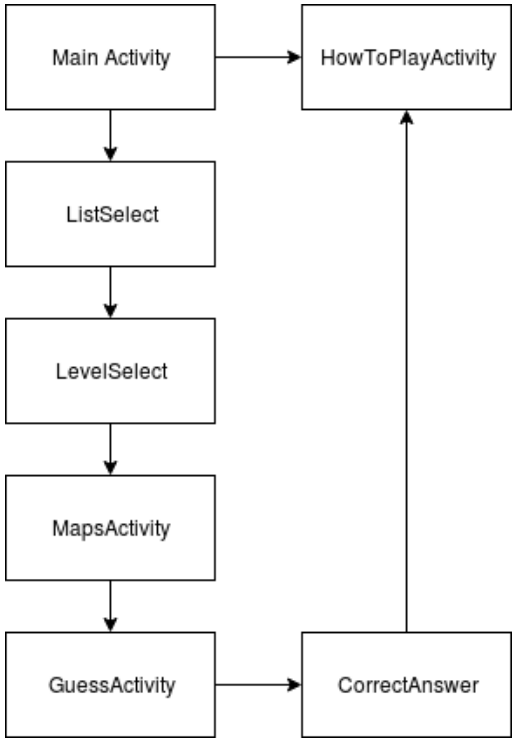
compile 'com.google.android.gms:play-services-location:10.0.0'

XMLPull This library allows parsing the xml files containing the tags.

```
import org.xmlpull.v1.XmlPullParser
import org.xmlpull.v1.XmlPullParserException
```

3 Overview

Figure 1:Activities interaction



3.1 Main Requirements

The main requirements of the game (collecting words and guessing the song) are met by MapsActivity and GuessActivity.

MapsActivity loads the KML markers for the chosen song and map(level) and saves the state of the map so the same marker can not be collected twice.

GuessActivity allows user to view collected words and guess the song. The user may ask for a hint as well, in which case the list of words is updated.

3.2 Bonus Features

The main features that should add value to the user experience are:

Difficulty Setting This feature allows the user to choose a difficulty setting(map). Maps with fewer markers make it tougher to guess the song. Since different maps have different scoring rates, the maps can act as difficulty level.

Hints This feature unlocks a random word from the song lyric and can be used as many times as needed.

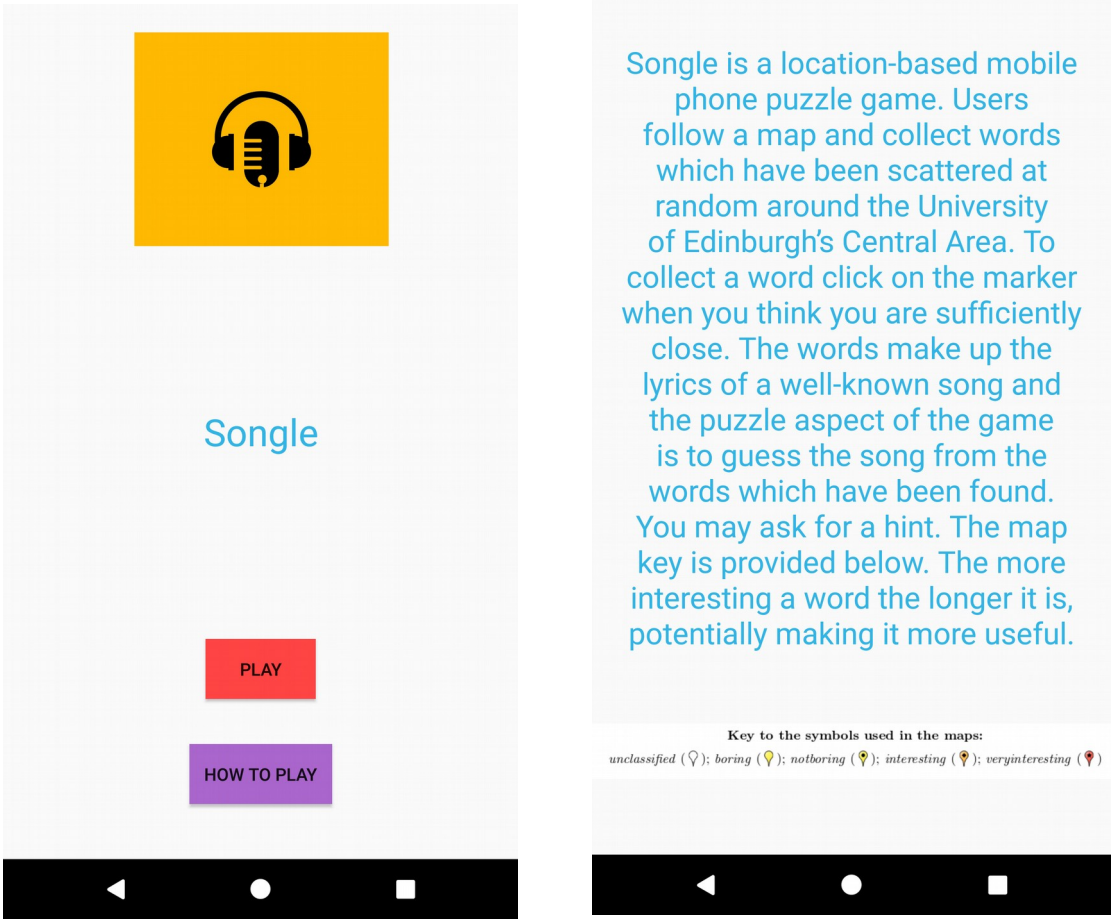
Youtube This feature allows users to watch the music video of unlocked songs. It will open either the Youtube app or default browser.

Scoring System The game features a built in scoring system which takes into account map selection, number of words unlocked and incorrect guesses. The algorithm is described in Guess Activity.

4 Activity interactions and implementations

4.1 Main Activity

The Main Activity presents a play option. There is also a how to play button that takes users to an instructions and information screen.



(a) Main Activity

(b) HowToPlay Activity

Figure 2:Main Activity and HowToPlay Activity

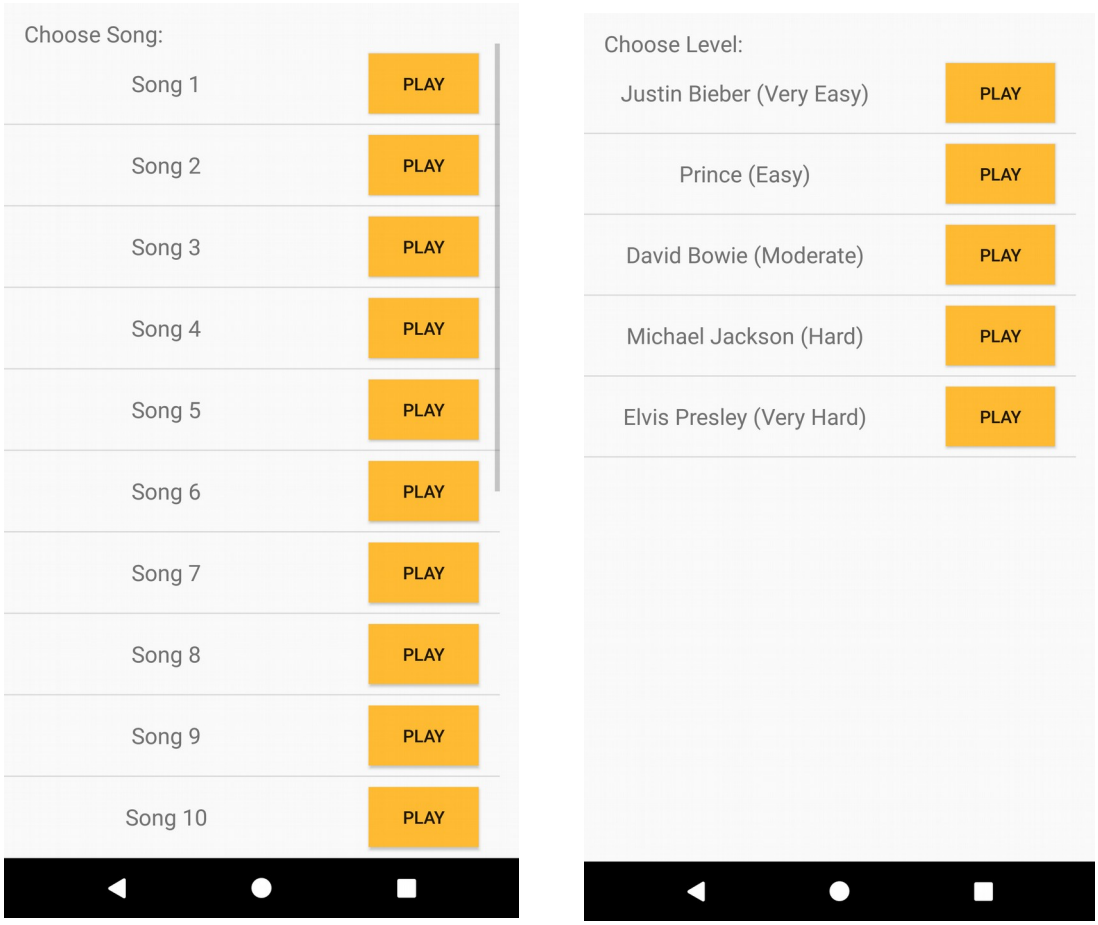
The starting screen is very simple. On clicking the How To Play Button the user is taken to the instruction screen and can then return to the Main Activity screen. The User may otherwise choose to start playing the game which will take them to a song selection screen.

4.2 HowToPlay Activity

Very basic screen with game instructions and information. A little key is provided to help with the markers on the map. User can only proceed to return to the Main Activity.

4.3 ListSelect Activity

ListSelect displays a list of songs the user can choose to play from. This includes a play button next to each song. The list of songs will be generated from the XML parser that checks for a new list of songs on creation. This download and parsing is done in the background. The songs are displayed as a ListView which allows scrolling. Clicking the Play button takes the user to the LevelSelect Activity.



(a) ListSelect Activity (b) LevelSelect Activity

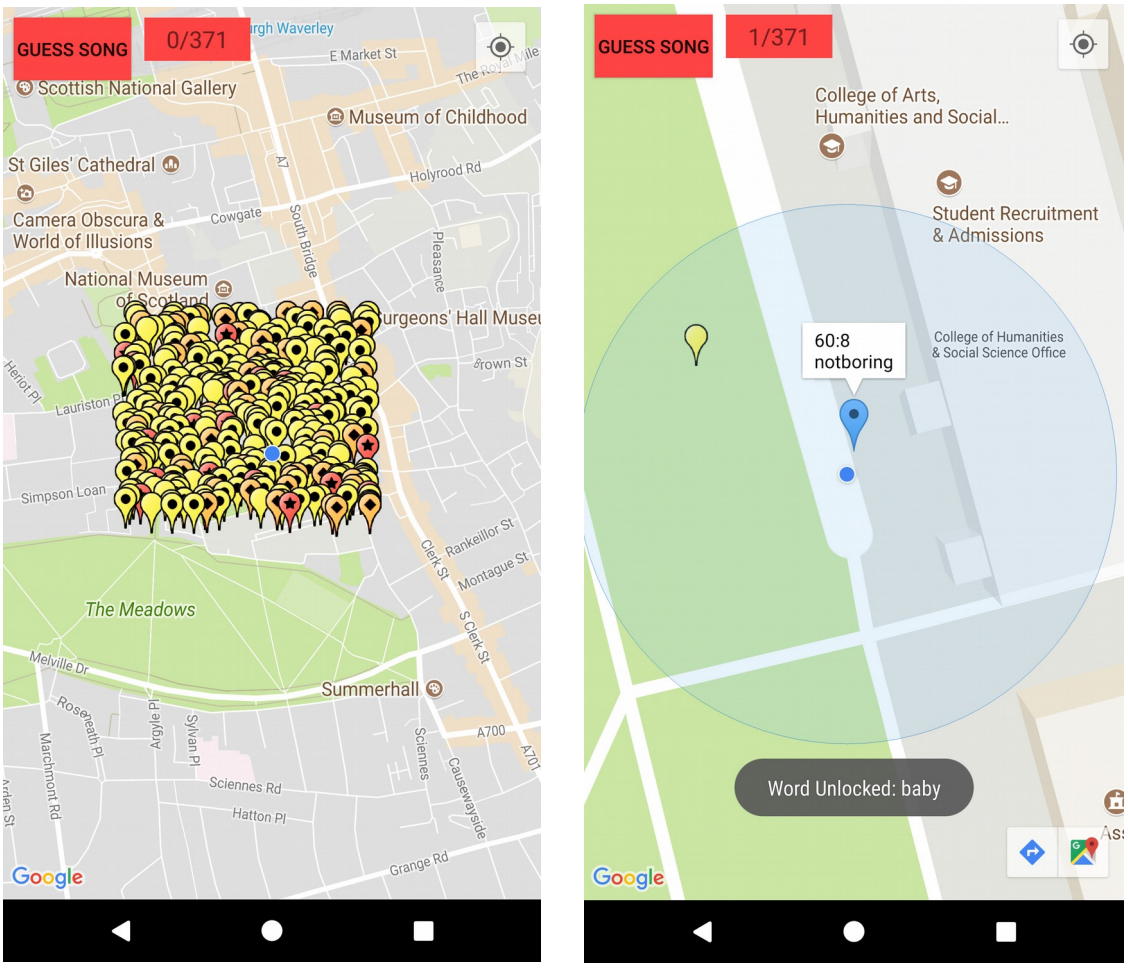
Figure 3:ListSelect Activity and LevelSelect Activity

4.4 LevelSelect Activity

LevelSelect displays a list of difficulty levels(maps) the user can choose to play from. This includes a play button next to each song. The list of maps will be generated from the given map sets which will be downloaded. The songs are displayed as a ListView which allows scrolling. On clicking the Play button the appropriate map is loaded on the following activity which is the Maps Activity.

4.5 Maps Activity

Maps Activity starts by loading the appropriate kml map chosen by the user.
It loads all the given placemarks in the map. The default camera location is set to a central location in the Edinburgh central campus. The location button can be used by the user to check their location. The game can not be played without 4G.



(a) Maps Activity Start

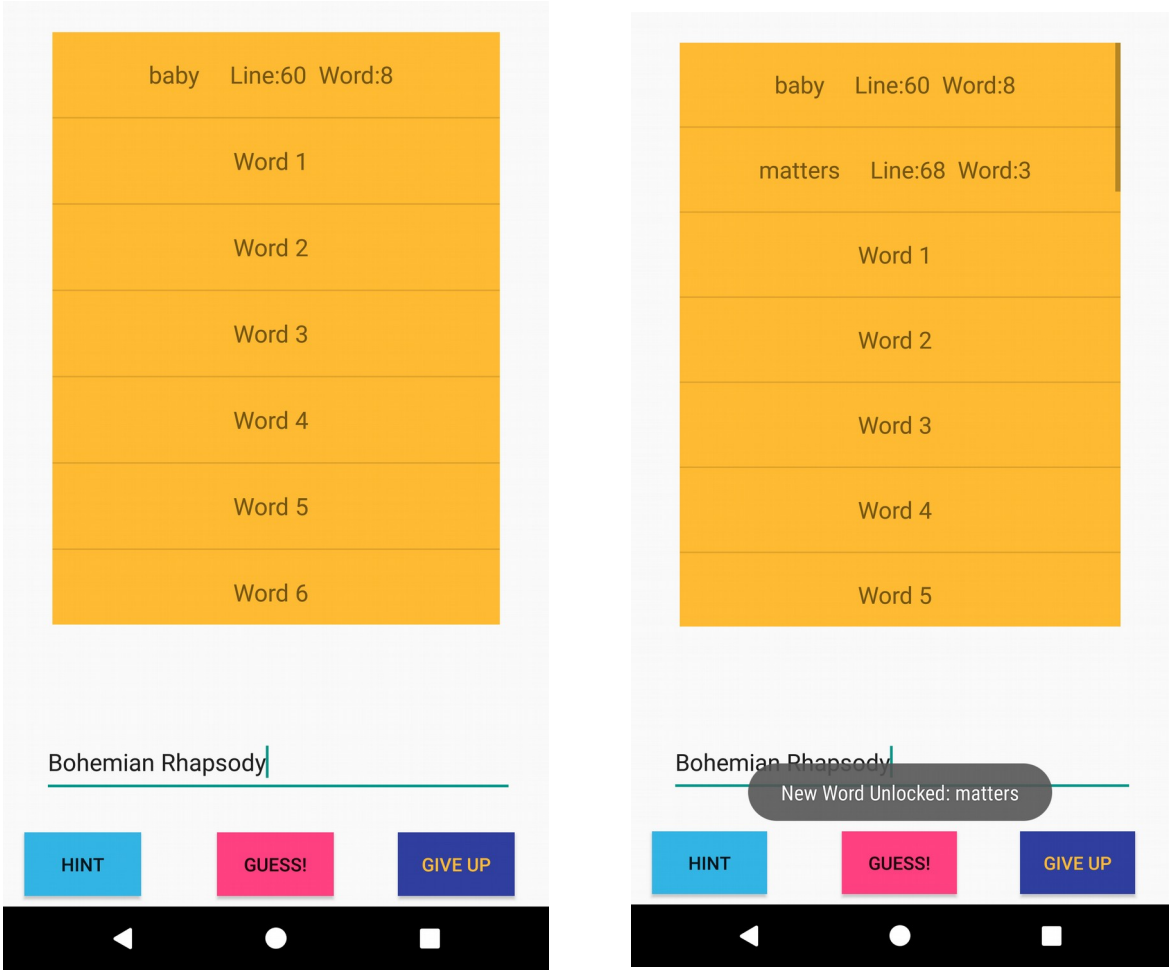
(b) Maps Activity Unlocked Word

Figure 4: Maps Activity

If the user wants to unlock a word they must first be within a certain distance of the marker. Then they must click the marker on the map, if they are sufficiently close to the marker, its colour changes to blue and an appropriate message is displayed. This word is subsequently added to list of unlocked words along with its tag(line and word number). The number of words unlocked is displayed at the top of the map. Users can use the guess song button to move on to the Guess Activity. They can review the words that have been unlocked in the Guess Activity screen. If the users decide to go back the current instance of the map is saved.

4.6 Guess Activity

Guess Activity contains all the words that the user has collected. These will be sorted according to the line and word number.



a) Guess Activity user input

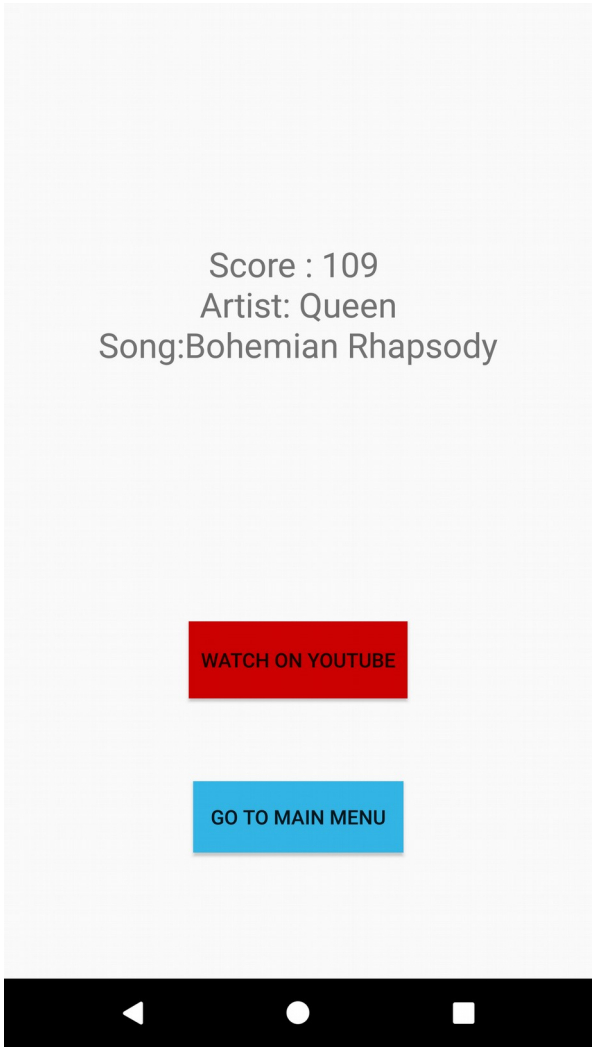
(b) Hint Button

Figure 5:Guess Activity

Guess Activity contains all the words that the user has collected. The user can view this as a scrollable list. The user has the option to go back to the Maps Activity to continue playing the game. Otherwise the user may choose to get a hint which results in a little message with the new word, this is then added to the list of words. The user may also choose to guess the song. If the answer is incorrect they get a toast message that says so. If the answer is correct the user is transferred to the CorrectAnswer Activity. The user may decide to give up in which case they are taken to the CorrectAnswer screen, but get a score of 0.

4.7 CorrectAnswer Activity

CorrectAnswer Activity displays the score, song and artist name when the user answers correctly. Score is calculated as follows:
100*(Number of words not collected/Total Words)*(1+MapLevel*0.1) – Number of Guesses*10
The result is rounded down. MapLevel can take values from 1-5. Fewer the words the map shows the tougher it is to guess, but you get a higher score.



(a) CorrectAnswer summary

b) Youtube link

Figure 6:CorrectAnswer Activity

The acitivity also provides two buttons. The first(WATCH on YOUTUBE) allows you to watch the music video on Youtube. The links are provided in the xml files that are downloaded during the ListSelect Activity. The second button(GO TO MAIN MENU) allows the user to return to the main menu. By doing so they essentially reset the game and can play the same song as if it were new. If the user presses the back button in this case it will also return them to the main menu, preventing them from trying to answer again. Basically on correctly guessing a song the game can only be played again from the start. No memory of the song being completed exists.

saving collected letters,

6.2 Local storage

Local storage is used for saving the map state and downloading required maps. Unlocked words are also stored in the local storage.