i. Design pattern used:

Singleton - A singleton pattern was used on the Playback.java class in order to prevent multiple instances of the Playback to be instantiated.

ii.

1. instrumentation test in the InstrumentedTest class file: tests mediaplayer resources in the Playback class.

2. instrumentation test in InstrumentedTest class file: tests playback to make sure an out of bounds error does not occur when skipping songs in a playlist.

3. instrumentation test in the LibraryActivityTest class file: tests loading of playlists into the GridView of playlists in the LibraryActivity class.

4. unit test in the UnitTest class file: tests the GUI function of making sure new playlists aren’t created if their names already exist in the database

iii. Instructions:

Android studio is used to build the whole project. Android 8.1.0, API 27 was specifically used for the version of android to be built. Open the project in android studio, make sure a device with API 27 is used as the emulator, and run the selected configuration. The app should automatically open in the emulator, initially asking you for a name if you haven’t already provided one. One playlist labeled “All Songs” should appear on the next activity. Press it to choose and play songs on the device (songs must be loaded onto the device through the Android Device Monitor tool), or create a new playlist using the already existing songs. Pressing the title of the song in the playback bar lets users view the current song status, allowing the user to enable/disable shuffling/looping, skip songs, pause songs, and edit the note for the activity. Pausing and skipping functionality are attached to the playback bar. A playlist may be edited if it is not the All Songs playlist, allowing a user to delete songs, add songs, save changes, or delete the entire playlist. The master notes activity allows users to see all the notes that exist for all songs on the device, and also allows them to edit them from the activity. Any editable textbar that appears above a list of items allows the user to filter out items in the list, and then populates the list with the original items when the text in the searchbar is deleted. On completion of certain activities, the SQL database manager will write playlists and notes out to the database.