Team X

Requirements Document

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COMP361 Software Engineering Project

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I. Introduction

1.1 Purpose

The purpose of this project is to create a complex piece of software that is both marketable and original in concept. We would like to build this project such that it will allow further expansion after the currently planned components have been completed and development on it can continue.

The idea of the project is to allow clients at some establishment with music playing in a common area to request song to be played on the music system. The software we create will be running on a server managed by an administrator from the establishment and on the iOS or Android devices of the clients. This project will allow clients to customize their experience at this establishment via music requests and it will also allow feedback to be sent to the administrator.

Establishments with such a set up would find our project useful since it will create a more attractive atmosphere to clients as they are able to choose their own music. The administrators will also benefit from receiving implicit feedback on their music choices from looking at request statistics as well as direct feedback sent from clients via a feedback form on their devices.

This document is intended for those who wish to have a better understanding of our project at a high level view, to investigate possibly using this project themselves, or to suggest possible expansion or other contributions to the project.

1.2 Scope

As mentioned above, this project is meant to allow clients at an establishment send music requests to a server, which will queue the selected song to be played on the establishments sound system. Additionally, clients will be able to send feedback on the establishment to the server, the administrators of the server will be able to see statistics pertaining to requests and feedback, and administrators will have simple library and playlist management capabilities.

The project is not meant to provide a complete music management system such as that found in other media players like iTunes and Windows Media Player. The project is not meant to provide an application customized to a particular establishment nor is the project meant to provide any chat-like communication between clients and administrators. The project is also not meant to allow clients to override the music choices of the administrators: they will be allowed to choose from a subset of songs approved by the administrators.

The benefit of using our project is that it allows an establishment to give clients freedom in music choices within bounds they choose. Clients will also be given a convenient method of giving feedback to an establishment without needing to fill out a form or directly speak to a representative.

The goal of this project is to create a system such that clients A and B, each on some iOS or Android device, can each request songs on a server and have them played as specified. The end goal of this project involves having this project fully implemented and effectively used in a real-life situation. This goal will be considered achieved if the project works as described during testing in a public area with several clients requesting songs and sending feedback.

1.3 Definitions, acronyms, abbreviations

Term:	Definition:
Active Queue	The currently planned sequence of songs to be played.
Administrator	A user who manages and uses the server software.
AI Playlist Generator	The module that is responsible for creating sets of songs based on user defined criteria.
Client	A user who interacts with the client software on an iOS or Android device.
Database	The component of the software that stores information on songs, playlists, the library, statistics, and feedback.
Device	Some external hardware component that is part of our project's system such as an iPhone.
Feedback	A message sent to the server from a client via an iOS or Android device.
Generator	Any component that takes a set of requirements as input and outputs some result based on that input.
Library	The subset of the database which contains only songs.
Music Manager	The module that is responsible for deciding which songs will be placed in the activity queue; the component that coordinates most of the system.
Music Player	The component of the system that plays music.
Playlist	A generated set of songs.
Request	A message sent from a client device to the server containing a song request for the server.
Request Handler	The module that is responsible for listening for and processing requests from clients.
Server	The component of our project that houses most of the core software modules pertaining to playing and managing music as well and receiving requests.
Song	An mp3 file or stream id identified in the project database.
Sound System	The method by which the server physically plays music, such as speakers or headphones.
Statistics	Any data regarding the playing or request frequency of songs or frequency or nature of requests to the server from clients.
Stream/Streaming	Audio data that can be retrieved from an internet connection via a known id in the database.
User	A human interacting with the project software.

1.4 References

We reference our Preliminary Design Document; the specific sections are provided.

1.5 Overview

For those who know nothing of this project and would like a general idea of what it consists of, start with section 1. If the reader only wishes to have a basic understanding of what the project is meant to do, the reader is recommended to read the Preliminary Design Document.

For those who already have a general understanding of the project, they are recommended to read all the following sections to get a complete view of the project. If one only wishes to understand the

functioning of the program and how it is expected to work, read sections 2.1 to 2.3 and then move on to all of section 3. If one wishes to learn more about the conditions under which the project will be used, read all of section 2 and optionally continue on to section 3.

If the reader would only like to understand or review the concepts and terminology related to the project, reading section 1 and sections 2.1 to 2.3 will give a sufficient description of all the components.

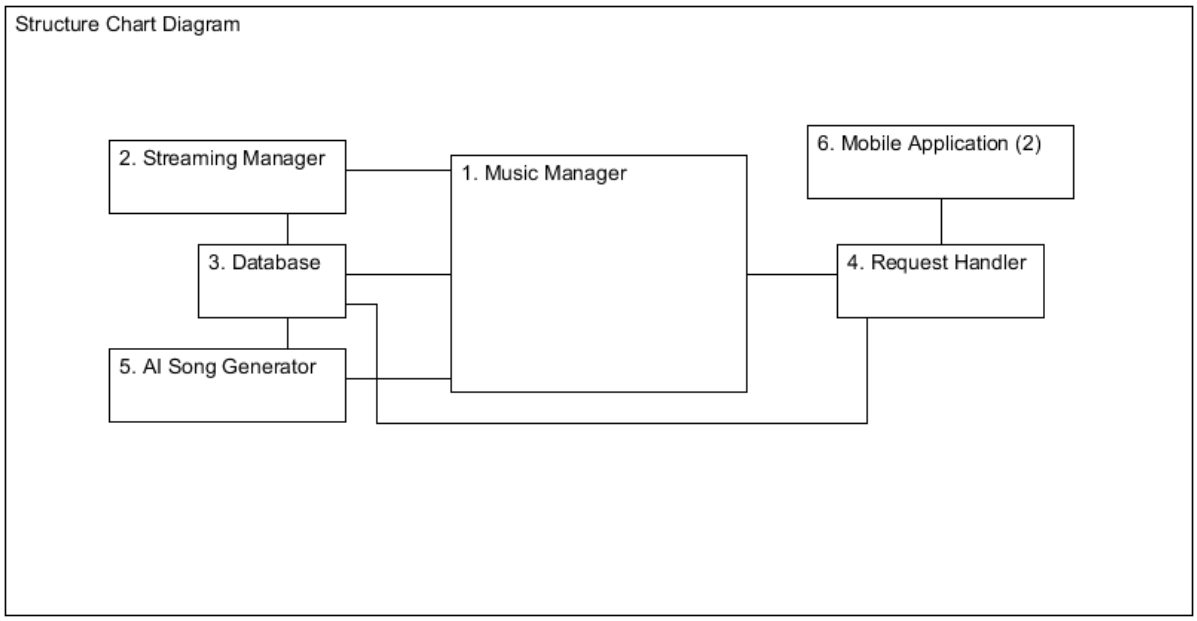
II. Overall Description

2.1 Product Functions

This section gives a general overview of the system components. The following diagrams, beginning with a general structure chart identifying the modules and which other modules they interact with, and the environment, installation, and domain diagrams, serve to show readers the basic design and requirements.

2.1.1 Structure Chart Diagram and Identification of Modules with Functions

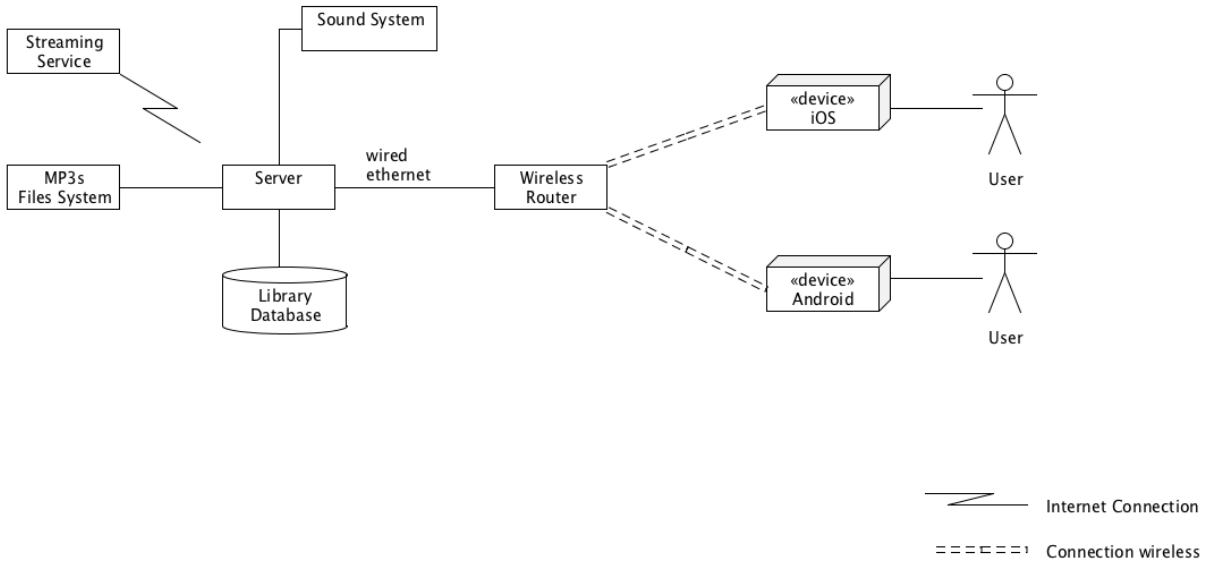
The system consists of 6 distinct modules:



	Module	Functions and responsibilities
1	Music Manager	The Music Manager is the hub of all the modules. It contains and monitors the Active Queue, Playlist, and Music Player, and appropriately processes all song requests sent from the Request Handler. It sends the corresponding success messages back to the Request Handler once the request has been processed.

		This module also monitors the Active Queue, assuring that the number of songs there do not fall below the minimum requirement. When a certain number is reached, it requests another set from the Artificial Intelligence Song Generator and adds it to the Active Queue. The Active Queue which keeps track of its list of songs and their playing times is controlled directly by the Music Manager.
2	Streaming Manager	The Streaming Manager connects to the server from which music files are streamed. It permits searching among available files, oversees the streaming of selected files, and returns status and success messages at the request of a song stream. It is the direct and only link between the streaming server and the rest of the system.
3	Database	The Database contains all the user saved libraries, as well as copies of all the songs loaded by the user, whether they are in a Playlist or not. The source of each song may be local or streamed.
4	Request Handler	The Request Handler is the direct link between the client applications and the Music Manager. It receives all song requests and text feedback which have successfully been transmitted across the network. Feedback is compiled into a special file in the database, and song requests are verified to be valid requests and existing in the database, and then passed to the Music Manager. For each request, the Request Handler waits for the Music Manager to notify it of the request's status, and returns a success or error message to the client application.
5	Artificial Intelligence Song Generator	This module contains all the intelligent algorithms which generate sets of songs when requested by the Music Manager. The generator has access to all the songs in the database and uses the song properties, time, and date (season) to determine current popular songs.
6	Mobile Application (2)	This module has two representations which are developed separately but have identical functions and responsibilities. Each application requires a working local network, and allows users to (1) view the current Active Queue at that site, (2) select a song from it and make a request, and (3) send text feedback to the organization.

2.1.2 Environment diagram



The environment diagram above is a representation of the software and equipment required for our application to be functional.

The minimum requirement for our application is a computer acting as a server. The server is connected to the sound system and must have local music files in mp3 format or an internet connection so streaming can be activated. The server has access to the music files via the local file system and access to a streaming service via an internet connection. With access to the local files and streaming music, the server can store and manage songs and playlists in a local database. This database includes a library of songs created by the server.

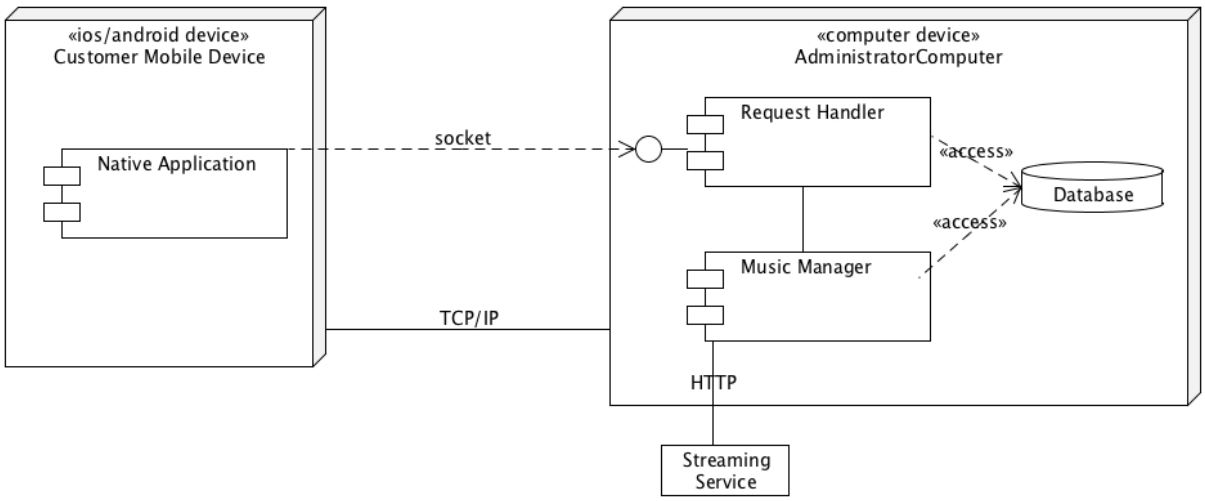
The administrator of the server is allowed to create new entries in the database for songs and playlists as well as the capability to access statistics and feedback generated by requests to the server.

A wireless router is needed to create a network by which clients or users can connect their devices to the server. The server is connected to this router as well. Clients or users can connect to this network with devices running iOS or Android OS. An application present on these devices allows a connection to be established with the server. This application will be available in the Apple Store and Android Market Place. No other platforms are currently supported.

From these client devices, users can see lists of song available for request on the server and songs currently playing on the server. Users can request songs to be queued for play from the list of available songs shown. The server administrator controls what the client devices can display to the user. Additionally, users can send feedback to the server through the client application. This feedback will be visible to the administration on the server.

The server can function fully without an internet connection but there will be no streaming capabilities. This requires that there are local music files for music to be played. This being the case, we deny any responsibility of setting up the local network and internet connection.

2.1.3 Installation diagram



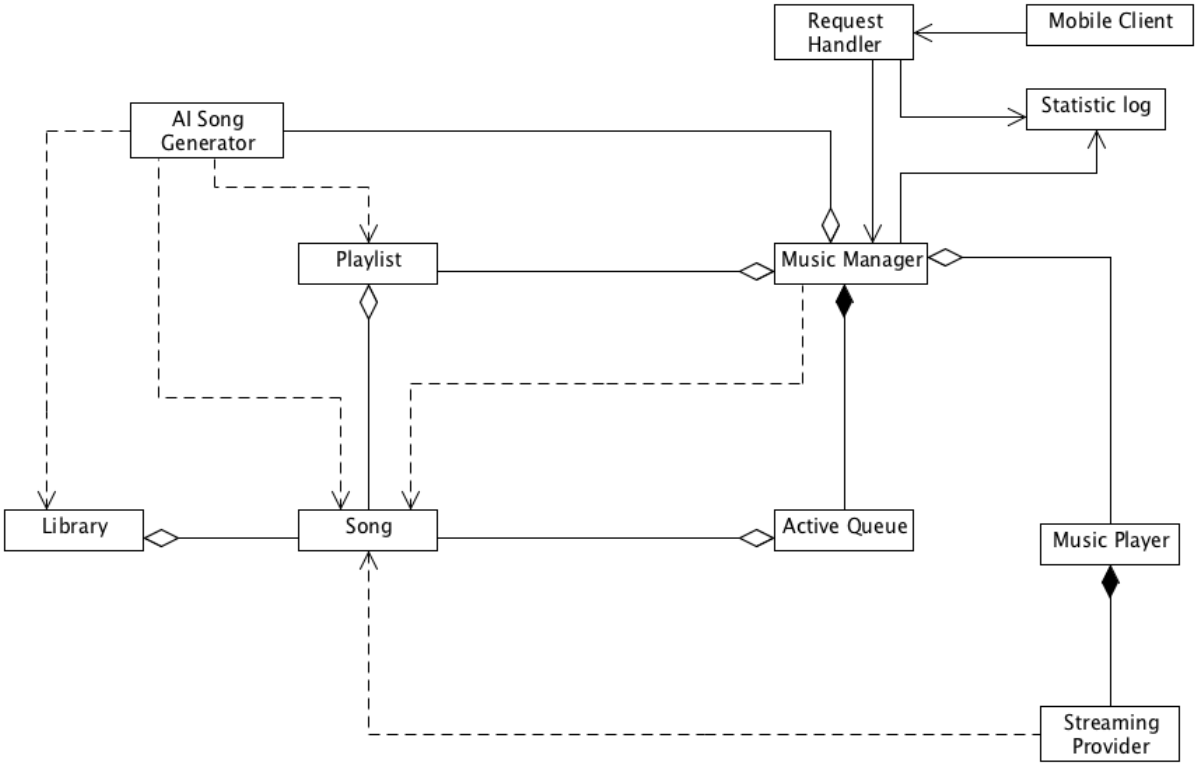
The installation diagram describes the communication between components in our system and external providers. The components include a Mobile Application, Request Handler, Music Manager, Database and a Streaming Service.

The Request Handler is responsible for handling connection and requests coming from the mobile application and record statistics in the database. The communication is done using sockets through TCP/IP.

Music Manager is responsible for managing playlists and playing songs requested by mobile devices or set by the administrator. The communication between the Request Handler and the Music Manager is done internally since they will be running in different threads. The Music Manager can also play songs from an external Streaming Service. The communication is done using HTTP.

Both Request Handler and Music Manager will come in the same installation package that will be available for download on our website. The Mobile Application will be available in their native application store (iOS – Apple Store, Android – Android Market Place).

2.1.4 Domain diagram



The domain diagram given describes the relationship between components in our system at a high-level. The components included in our system are the following: Song, Playlist, Statistic log, Library, Music Manager, Active Queue, Music Player, Streaming Provider, AI Song Generator, Request Handler, and Mobile Client.

A Song is representative of a song in our system. It contains information about the song including its location and whether it is a streamed song or local. Songs are used by several components of the system including the Library, Playlists, the Music Manager, the AI Song Generator, the Active Queue, and the Streaming Provider.

A Playlist is a set of Songs that can be generated by the AI Song Generator and read by the Music Manager. The Music Manager contains at least one Playlist at a time.

A Statistic log is a data object that is mean to contain logging information about Songs, such as when they are played and when they are requested, and about requests, such as how often they are made and who is making them. The Statistic logs are created by the Request Handler and the Music Manager.

The Library is the full collection of Songs in the system database. The database contains other forms of data than songs so the Library is meant to refer specifically to songs that exist in the database. The Library can be accessed by the AI Song Generator.

The Music Manager is a component that manages which music is currently playing in the Active Queue, which music will be played next according to a Playlist, and sends music to the Music Player. The Music Manager can take requests from the Request Handler for a particular Song to be played. It will then locate and retrieve the Songs that are to be played. When a Song is played, the Music Manager will log this

activity with a Statistic log, which can later be viewed by the user. The Music Manager contains the Active Queue and the Playlist specifying which Songs are to be played. An AI Song Generator can also be used by the Music Manager to determine which songs to play. The Music Manager also contains and manages the Music Player.

The Active Queue is a small set of Songs that will be playing soon. Once a Song enters the Active Queue it will be played. The Active Queue is meant to ensure that there is always some knowledge of what is going to be played in the near future. The Music Manager manages the Active Queue.

The Music Player is responsible for playing the music. It will be managed in the Music Manger, which will give it the locations of Songs which it will either play directly if they are local or it will locate them via the Streaming Provider if not. If the music is to be streamed, the Music Player will create an instance of the Streaming Provider to search for and retrieve this required music.

The Streaming Provider provides connections to an external music streaming service. Given a Song, the Streaming Provider instance will locate the stream for this song and give it to the Music Player to be played.

The AI Song Generator is a library of programs that is meant to return a song or set of songs that meet a specified set of constraints. This component is used by the Music Manger. The Music Manager will use an AI Song Generator in order to retrieve Songs to be queued in the current Playlist or to choose Songs from the current playlist to add to the Active Queue next. The AI Song Generator will be able to search through the Library of songs in order to find Songs that meet the requirements specified in the generation request.

The Request Handler is the component of the system which is listening for external Song requests. It will wait for a request from a Mobile Client, log the request with a Statistic log and then forward the request to the Music Manager.

Mobile Clients are the components of the system that are physically unattached to the rest of the system. They send requests for particular Songs to be played to the Request Handler via a network connection. The Request Handler can give the Mobile Clients information on what Songs are currently available through getting the current Playlist from the Music Manager.

2.2 User Characteristics

2.2.1 General Identification

The software will have two categories of end-users:

1. Administrators – the users at the service provider who will select the Active Playlist, select files for the database, and be able to view feedback and statistics. The main application will run on their server, an on-site computer.
2. Clients – the recipients of some service the administrators' organization provides.

For the sake of identifying constraints, the following software components may also be considered as users: the Request Handler, Music Manager, Active Queue, Streaming Manager, and AI Song Generator.

There are no stakeholders at this point.

2.2.2 User-specific goals, outcomes, and interface expectations

End-Users	Goals	Outcomes	Interface Expectations
Administrators	The goal is to be able to make song requests and to increase client satisfaction at their sites, by allowing clients the opportunity to select their own background music.	The outcome should be that clients have an increased desire to come back to the service provider site, and depending on the particular service, that this feature will attract other clients.	The interface should be simple, easy to navigate, and fast (see *Preliminary Design Report, I iv. Success factors, p. 5*); it should add no additional stress to the administrator's pre-existing tasks and responsibilities.
Clients	The goal is to be able to request a song(s) and have it played at the requested time, with a reasonable scheduling margin.	The outcome will be increased interaction between the client and their environment at the service provider site, as well as the unique experience of being able to choose background music.	The iOS and Android applications should be easy to use, simple, and visually attractive.

2.2.3 Minimum User Requirements

Administrator users must have the main Java application downloaded to their on-site computer, and they must provide or have access to a local network.

Client users must have either an Android or an iOS device, and at some point must have downloaded the application for their operating system.

2.2.4 User, Internal, and External Constraints

User constraints will be satisfied if the user-specific goals are met.

Internal constraints are imposed by module requirements or specific actors (see Section 3 for all Use Case Diagrams showing actors and their responsibilities):

1. Request Handler – the Request Handler is expecting textual feedback from the client applications and song requests. No other kind of input from the network will be accepted or processed. Invalid requests will be discarded and not saved.
2. Music Manager – the Music Manager can receive and process one request at a time from the Request Handler, and the same from the Active Queue. See Section 3 for detailed information on how these function and interact.
3. Active Queue – must contain at least 10 songs before the Play option may be selected. This is to ensure that clients have a reasonable list from which to choose. Playing without having this constraint met will display an error message. Streamed songs on the Queue also impose constraints; they must be buffered before played. The Queue anticipates this and asks to buffer songs in advance when possible.
4. Streaming Manager – receives streamed song references from the Queue (when trying to buffer in advance) and the Music Manager (when the user chooses songs to add to playlists) but is also limited by the website from which it streams.

5. AI Song Generator – imposes constraints on what options the user must specify in order to generate a list of songs. It also requires songs to exist in the database, whether referencing local files or streamed songs.

Externally, the website from which we will be streaming imposes constraints. We are limited to the songs in their selection, and no downloading can occur, only streaming. This means that each streamed song we refer to must be streamed every time it is played.

The network connection strength will determine the request and feedback processing speed, and the buffering of streaming songs, which will be done in advance when possible.

2.3 Constraints

General project constraints include the following:

Regulations: All streaming is carried out within legal requirements.

Network limitations: For full functionality to satisfy the user needs constraints, a local wireless network must be available on-site, and the connection must be consistent. The system's Request Handler and Streaming Manager will need to deal with and adjust to slower networks; however the main application will adapt and still play background music even without all the complete functions.

The network security setting could also be an issue. If the setting is private and requires a password, the administrator must make the adjustments that allow, exceptionally, the client application to connect across the network.

Parallel operation: the main application on the server and many applications on smart devices must be able to execute at the same time. The main application's Request Handler will manage receiving multiple requests simultaneously.

Reliability: Project release, even as a beta version, requires that the system be reliable within at least a 30% margin of the goals detailed previously. See *Preliminary Design Report, I iv. Success factors, p. 5.*

Time: the beta version of the project must be completed by the end of April 2012. See *Preliminary Design Report, IV, V Dated Activity Graph, p. 14.*

Money: Development should not cost the developing team anything other than time.

2.4 Assumptions and Dependencies

These are the elements of the project that, if changed, would affect the requirements and could delay or restrict development:

1. The streaming functionality is dependent upon the requirements from the site we plan to stream from. Users must have a premium account in order to stream, and must have approval from the site. Further on in our development process, we will contact them with our request.
2. We are assuming that the administrator users have some kind of wireless network on-site, as well as a local server onto which they can install the main application. We are assuming that there is minimal demand so that bandwidth will not pose a problem.
3. Administrator users must be willing to use a sound system connected to their local server to play the background music.

4. In order to have any interaction with the system, client users must have either an Android or a smart iOS device. They also must have already downloaded the application, or may download it on-site if wireless internet connection is available.
5. The local computer must be capable of running the Java Virtual Machine for our Java application to operate.
6. The initial version of the software will be in the English language, so users must understand English.

2.5 Apportioning of Requirements

ID	Title	Description	Delay Reason	When
01	Viewing Additional Information	The functionality that allows clients to view information about their service provider from their device application.	This is not necessary to the project, so we want to focus first on producing a good, working beta version before adding additional features.	After April 2012
02	French language	A translation of our programs into French.	This is a secondary concern that does not affect the design or implementation.	After beta version release

2.6 Risk Management

2.6.1 Risk Assessment: Expounded ID Table

Risk location is identified by module or sub-modules (see Section 2.2 Modules).

Priorities

For identifying risk priorities, we have designated some terms. The priorities are determined based on three factors: (1) the seriousness of the problem it could cause the program based on the program's output, (2) the impact to the client, and (3) our interest in the affected functionalities.

Low risk – 15%

Moderate risk – 50%

High risk – 75%

Probabilities

Likewise, since we cannot perform frequency experiments as this stage, we have assigned terms for probability values, with the given justification:

Very low – 5%. It is well within our abilities to prevent a failure from occurring, based on our pre-existing knowledge of the system and our available resources.

Low – 10%. With the research we have done to present, we have already done basic testing and prototypes to ensure that this functionality is feasible, and that a failure should not occur.

Medium – 30%. We possibly have done research and some basic testing, but there remain unknowns or assumptions we are making.

High – 50%. We have very little knowledge about this and consequently a failure is likely.

Exposure

Exposure is calculated as the product of the probability percentage and the loss. Since our project is not funded or paid for, our only loss is time; our loss estimates are made in working days.

ID nomenclature: N – network, D – development, S – scheduling, C – client.

ID	01N
Title	Network-related security
Description	Because our software is heavily dependent on a local network connection and sending messages across it, it is important that the database of songs and playlists on the local computer are secure, and that clients may only view the pre-selected playlist contents, without having access to the actual files.
Location	Database Module, Streaming Manager, Request Handler
Priority	High
Impact	A failure could result in legal problems, and the loss of client confidence in the software as a whole.
Probability	Very low
Exposure	0.05*10 = 0.5

ID	02D
Title	Development process risk: Streaming
Description	We are not very familiar with this area, and will need to choose some site(s) from which we can stream music, account for potential network problems and deal with them, and take care to respect all copyrights. The other possibility is that research reveals this to be impossible.
Location	Database Module, Streaming Manager, Request Handler
Priority	Moderate
Impact	The streaming functionality would be removed if we cannot resolve the above issues.
Probability	Medium
Exposure	0.30*8 = 2.4

ID	03D
Title	Development process risk: Graphic user interface
Description	Because we are using Java to ensure compatibility with multiple operating systems, our interface is limited to Java libraries. Creating an interface we are satisfied with, that is user-friendly and intuitive, could require research and/or more advanced designing.
Location	All modules with a user interface on the main application: Music Manager, Statistics, and Music Player.
Priority	Low
Impact	The interfaces would be less appealing than desirable. No functionality would be affected.
Probability	Low
Exposure	0.10*10 = 1.0

ID	04D

Title	Development process risk: Server to device communication
Description	Our smart device applications need to be able to locate and communicate with the server across the local network. Problems could include network strength, reliability, identification, and connection between device and server.
Location	Request Handler; but the whole system would be affected.
Priority	Moderate
Impact	Loss of a major functionality of our system – the ability to make requests across the network – and thus an unsuccessful project.
Probability	Low
Exposure	0.10*10 = 1.0

ID	05S
Title	Scheduling related issues; time constraints
Description	It is possible that our estimations of work and effort, and thus the corresponding portions of time allotted to work on phases were not feasible. We are working under several external deadlines, and multiple self-imposed internal ones. Getting too far behind could result in quality and functionality problems.
Location	Entire project.
Priority	Moderate
Impact	There would be increased stress on the developing team, and there could potentially be quality and functionality issues.
Probability	Medium
Exposure	0.30*10 = 3.0

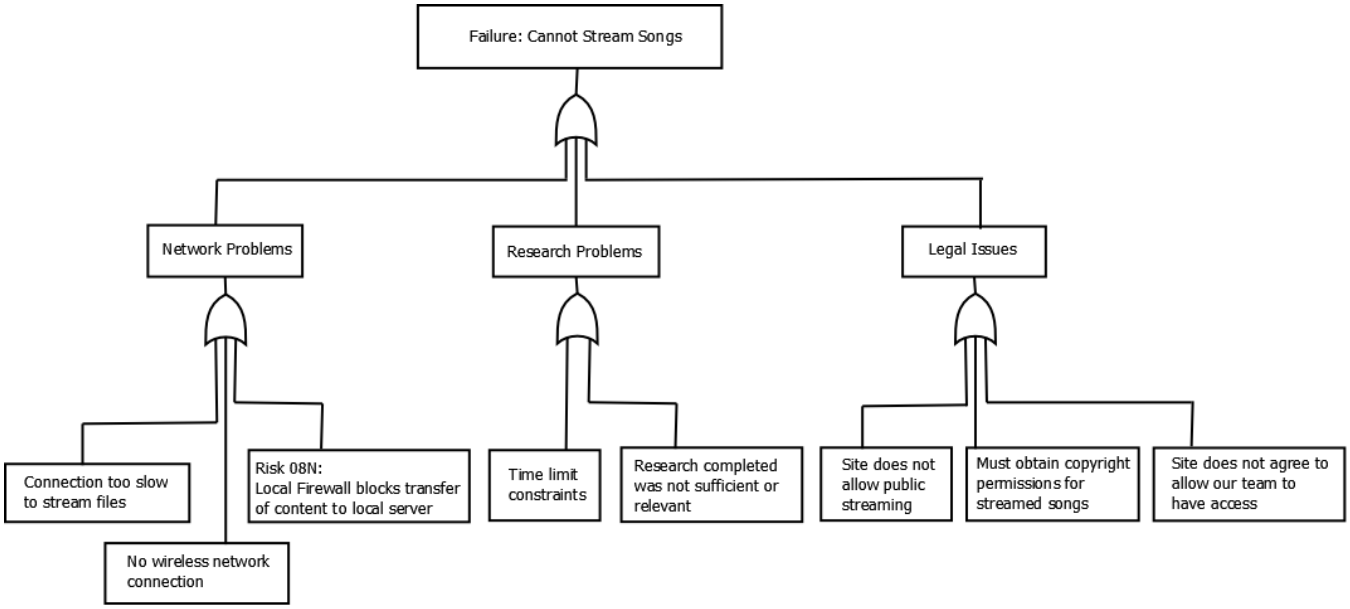
ID	06D
Title	Development process risk: Library limitations
Description	Based on the libraries we choose, development could be inhibited later on in the process. We could also find that our assumptions about multi-platform compatibility for certain libraries are not correct.
Location	Music Manager, Music Player, Statistics Manager.
Priority	Moderate
Impact	We would need to re-evaluate our options and decide on new strategies or workarounds for problems which cause functionality issues.
Probability	Medium
Exposure	0.3*15 = 4.5

ID	07C
Title	Client feedback
Description	After our initial stage of testing with clients, feedback might indicate that we did not correctly gage user needs and opinions. Time permitting, this would require us to loop back to development stages and make adjustments.
Location	This could affect the entire project.
Priority	Low
Impact	This would affect the release date.
Probability	Low
Exposure	0.1*5 = 0.5

ID	08N
Title	Local Firewall
Description	The administrator's on-site computer may have a local firewall which blocks external access to ports. This would prevent the client applications from connecting with the

	socket even if the network is functional.
Location	Request Handler; but the entire system would be affected.
Priority	High
Impact	This would not allow our system to have any of the functionalities involving network connection.
Probability	Medium
Exposure	0.3*5 = 1.5

2.6.2 Risk Analysis: Fault Tree for 02D Development process risk: Streaming



2.6.3 Risk Solution Table: Action, Leverage, Control Summary

To calculate leverage, the exposure after the control risk management steps is calculated. As with the previous exposure calculations, exposure is the product of probability and loss in working days.

Leverage = (risk exposure – exposure after control reduction)/cost of reduction.

ID	Title	Type of Action	Brief Control Summary	Cost of Reduction (working days)	Leverage
01N	Network-related security	Assume	We will assume this risk since it is crucial to our functionality. We will focus on this risk while structuring our database, and run unit testing specifically to make sure it is secure.	10 – extensive unit testing	0.04
02D	Development process risk: Streaming	Assume	The risk will be assumed; extra time has been designated before the third milestone research streaming API's. We will also anticipate the	3 – research period	0.67

			possibility of needing to cut it out, and will prepare other options.		
03D	Development process risk: Graphic user interface	Assume	Special time has been designated for the fourth milestone to develop UIs. There is also time at the end during final integration and testing where interface polishing can be done.	5 – final integration and testing period	0.10
04D	Development process risk: Server to device communication	Assume	This functionality is essential so we will assume this risk, and try to create simple prototypes during the research phase of our project to anticipate these types of problems.	5 – research period	0.59
05S	Scheduling related issues; time constraints	Assume	At this point, we can anticipate only by allowing buffer time for our milestones, which may potentially cut into time we designated for vacation, exam period, etc. We will learn from experience as the project progresses, and if needed will make changes to our activity graph accordingly.	10 – total buffer time	0.20
06D	Development process risk: Library limitations	Assume	We will do our library-related research carefully before the third milestone, but will also need to use buffer time to make changes if large problems arise.	5 – total buffer time	0.40
07C	Client feedback	Assume	This risk must be assumed; we plan to complete our project as designed for the purpose of the course, and then make extensions to our timeline before releasing it to the public.	N – we are free to specify the release date	Very minimal – close to zero
08N	Local Firewall	Transfer	The computer's administrator must make changes to the local firewall to allow our software access to a port.	0	n/a – transferred risk

In summary, all risks will be assumed and the control solution taken, except for the Risk 08N for which we deny responsibility. For most risks, our control method involves allowing extra time to account for extra research, testing, and experimentation as necessary. While we do allow buffer time in our scheduling, scheduling itself is also a risk; minimizing this requires us to learn from experience and assume that our rough estimations are reasonable.

III. Specific Requirements

The purpose of this section is to give a global view of the program from two aspects of the user perspective. Firstly, the menu diagram presents the actual menu options visible to the user, with their submenus and options, and a brief description of the functionality of each option. Secondly, the global data-flow diagram demonstrates how data flows through the system. The three data flows of interest to

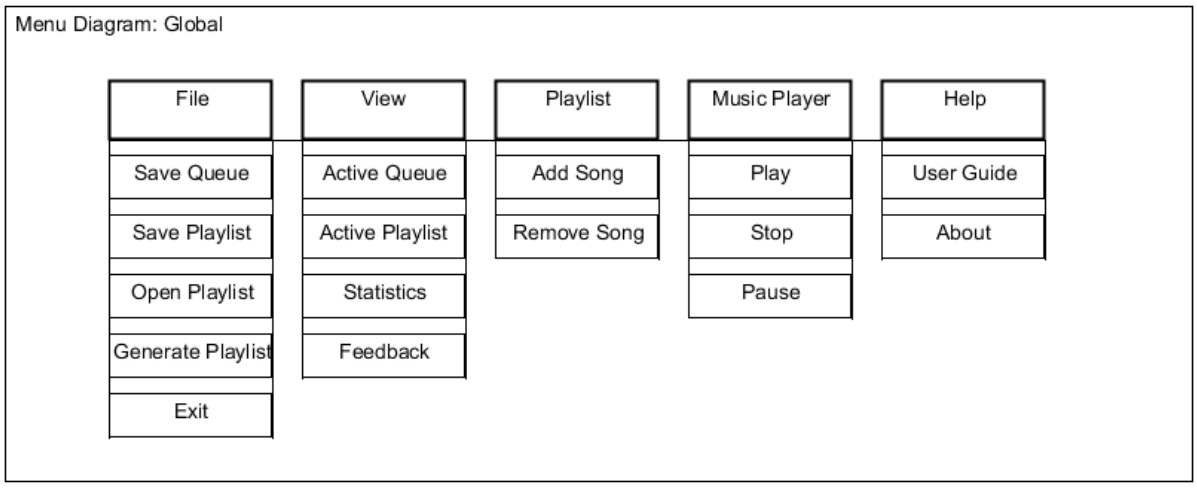
users have been chosen: when a client makes a request and it is added to the Active Queue to be played, when a client has submitted some feedback, and when a streamed song is on the Active Queue.

Following this is Section 3.2 which, for each module, displays the relevant screen layouts, label descriptions, Use Case diagram, and Use Case templates. For the Database module, data tables and descriptions are shown instead of the above. The modules appear in this order:

1. Music Manager
2. Music Player
3. Streaming Module
4. Request Handler
5. Database
6. Intelligent Playlist Generator
7. Statistics and Reports
8. Android application
9. iOS application

3.1 Global Program View

3.1.1 Menu diagram and brief description of elements



File

Save Queue – Saves the current Active Queue.
Save Playlist – Saves the current Active Playlist.
Open Playlist – Displays a window allowing user to choose a new saved Playlist to open. Once selected, the new Playlist replaces the current Active Playlist.
Generate Playlist – Displays a window allowing the user to specify options for generating a new Playlist.
Exit – Exits the program.

View

Active Queue – Switches to the Queue View, where the Active Queue is displayed. See Section 3.2.1.1

Active Playlist – Switches to the Playlist View, where the Active Playlist is displayed. See Section 3.2.1.2.

Statistics – Displays a window allowing the user to select options and view the song request statistics. See Section 3.2.7.

Feedback – Displays a window with the output of the compiled feedback file from the database. See Section 3.2.7.

Playlist

Add Song – Displays a window allowing the user to browse locally and online (among the songs able to be streamed) and choose a song or multiple to be added to the current Active Playlist.

Remove Song – Switches to the Playlist View and allows the user to choose which song to be removed from that active list.

Music Player

Play – Plays the next song on the Active Queue; available when not playing.

Pause – Pauses the song being played from the Active Queue; available when not paused.

Stop – Stops the song being played from the Active Queue; available when not stopped.

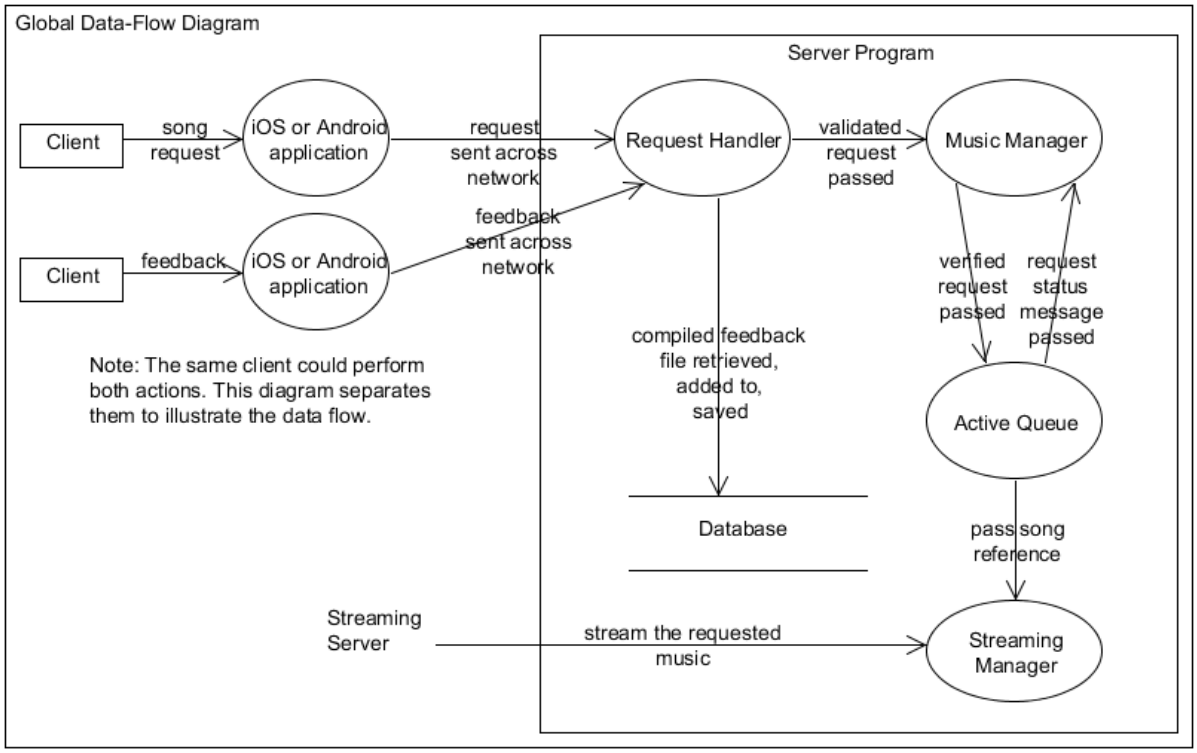
Help

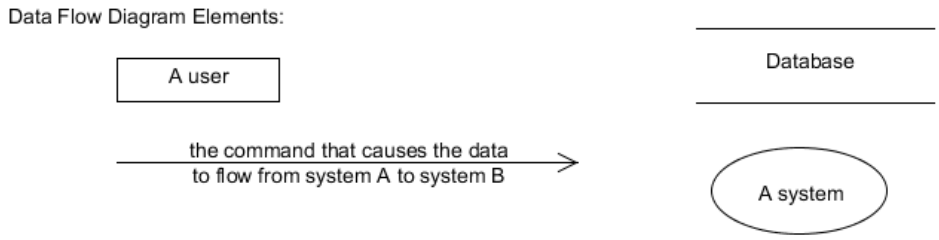
User Guide – Displays a window showing the basic instructions for operating the program. See Section 3.2.1.3.

About – Displays a window showing information about the software and development team. See Section 3.2.1.3.

3.1.2 Global data-flow diagram

The data flow diagram shows the flow of data – song requests, feedback, and streamed song references – throughout the system.

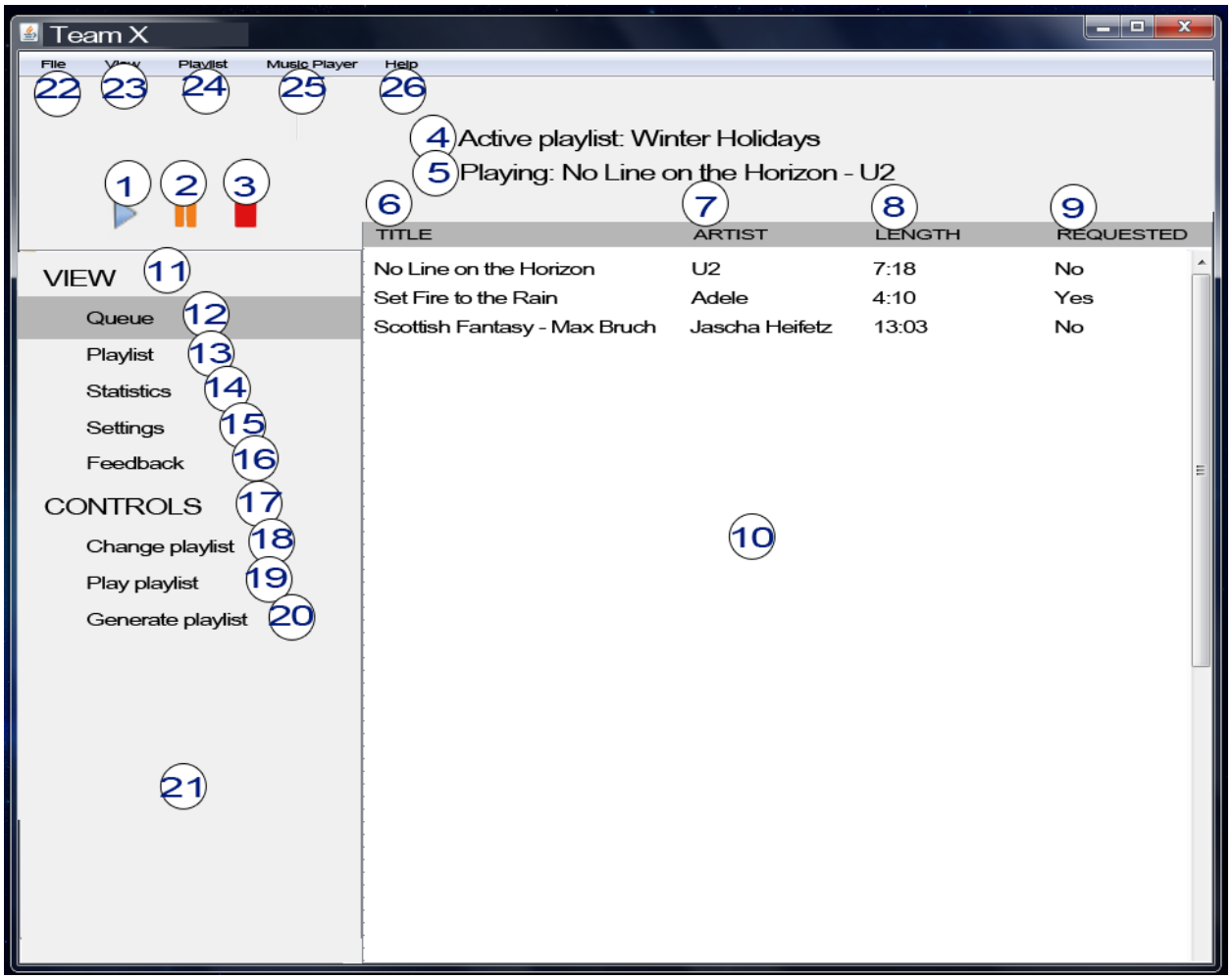




3.2 Logical Unified Software Breakdown

3.2.1: Music Manager

3.2.1.1 Screen Layouts: 1 – Queue View



1: Play option – plays the first song on the Active Queue. See Use Case *Play song*, Section 3.2.2

2: Pause option – pauses the song that is currently playing. See Use Case *Pause song*. 3.2.2

3: Stop option – stops the song that is currently playing or paused. See Use Case *Stop song*. 3.2.2

4: Displays the active playlist.

5: Displays the title and artist of the song currently playing from the Active Queue.

6: The column for the title of each song on the Active Queue.

7: The column for the artist of each song on the Active Queue.

8: The column for the length in minutes and seconds for each song on the Active Queue.

9. The column displaying whether each song on the Active Queue has been client requested or not.

10: Main panel - the main panel of the UI which displays the Active Queue in the Queue View.

11: View - the first category of options on the side panel.

12: Queue option - when selected, this displays the Active Playlist in the main panel.

13: Playlist option - when selected, this displays the Active Playlist in the main panel. See Section – 3.2.1.2.

14: Statistics option – when selected, a pop-up window appears, displaying options for viewing song request statistics and generated reports. See Section 3.2.7.

15: Settings option – when selected, a pop-up window appears, displaying the Settings. See Section 3.2.1.

16: Feedback option – when selected, a pop-up window appears, displaying the contents of the compiled feedback file stored from the database. See Section 3.2.7.

17: Controls – the second category of options on the side panel.

18: Change playlist – when selected, displays a pop-up window which allows the user to change the playlist. See Use Case *Choose new playlist* Section 3.2.1.

19: Play playlist – when selected, this displays the Playlist View and begins playing the contents of the current Active Playlist. The Active Queue is saved but ignored, and no song requests are respected. A confirmation pop-up window appears before playing is begun, warning the user that song requests will not be received with that option.

20: Generate playlist – when selected, a pop-up window appears allowing the user to specify options to generate a new playlist. See Use Case *Generate a playlist* Section 3.2.1.

21: Side panel – contains the View and Controls option categories.

22: File drop-down menu – displays sub-menu options related to file management. See 3.1 Global View: Menu Diagram.

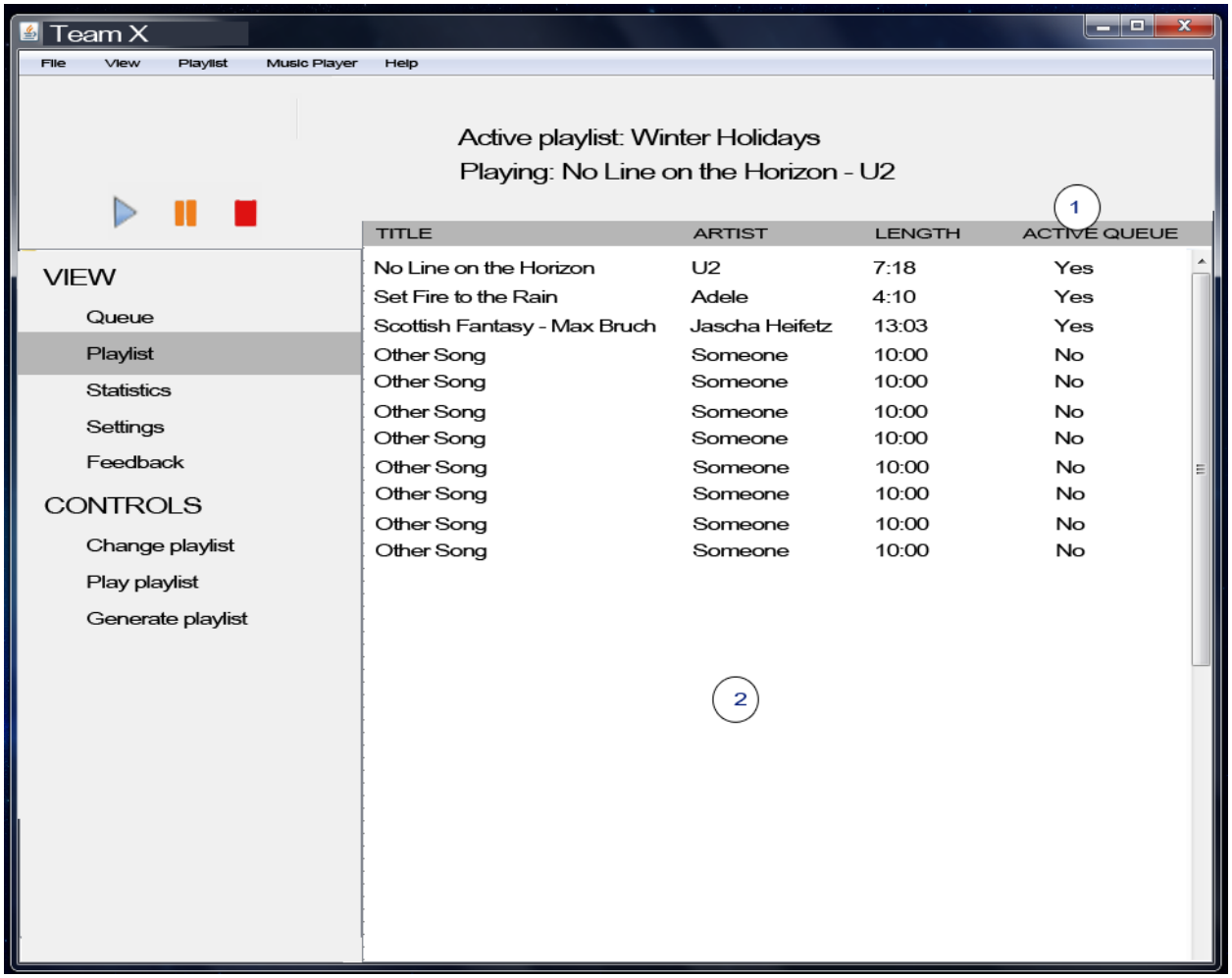
23: View drop-down menu – displays sub-menu options related to the view. See 3.1 Global View: Menu Diagram.

24: Playlist drop-down menu – displays sub-menu options related to the playlist. See 3.1 Global View: Menu Diagram.

25: Music Player drop-down menu – displays sub-menu options related to Music Player commands. See 3.1 Global View: Menu Diagram.

26: Help drop-down menu – displays sub-menu options User's Guide and About. See 3.1 Global View: Menu Diagram.

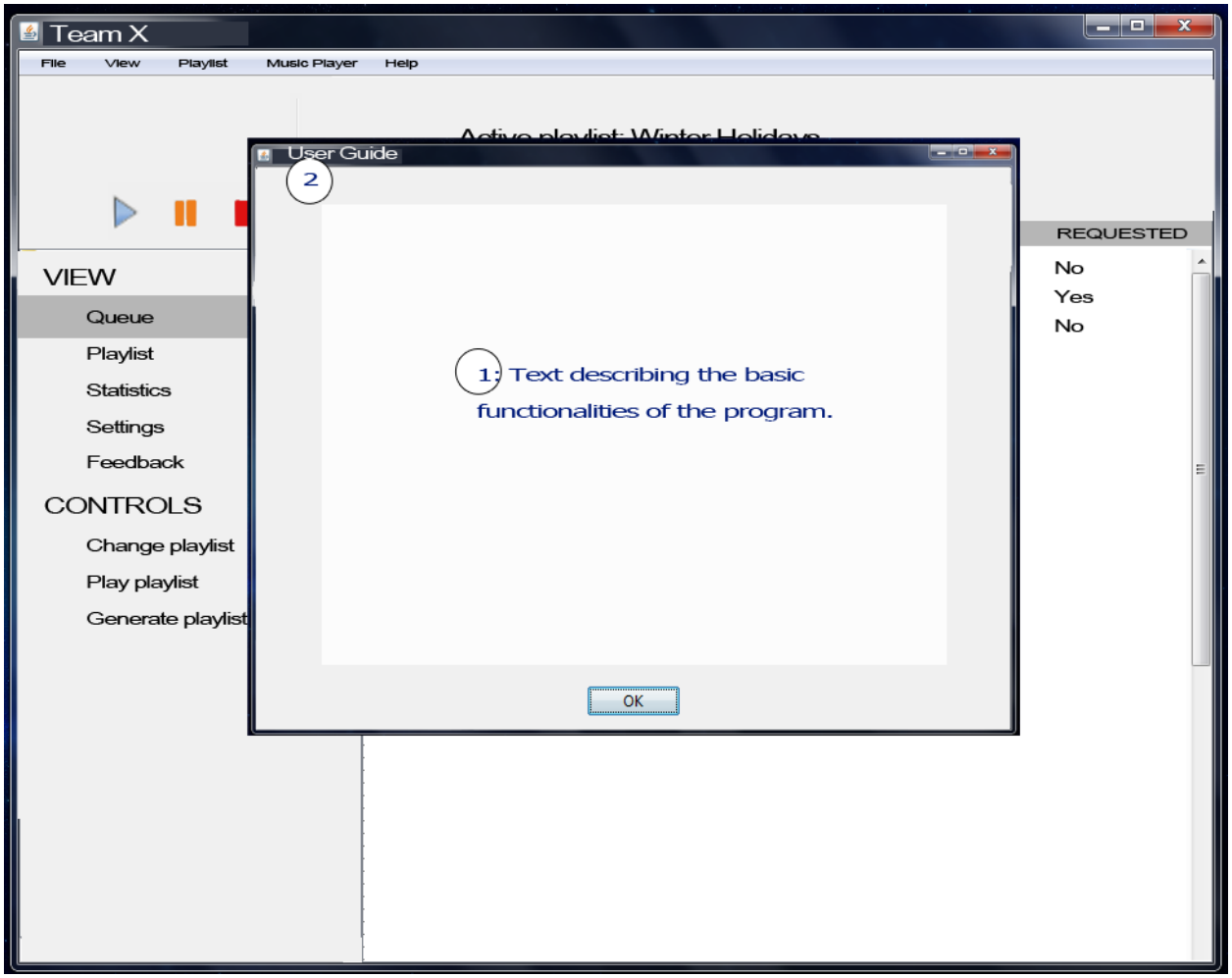
3.2.1.2 Screen Layouts: 2 – Playlist View



1: The column for displaying whether each song on the playlist is also on the Active Queue.

2: The main panel, which now displays the Active Playlist.

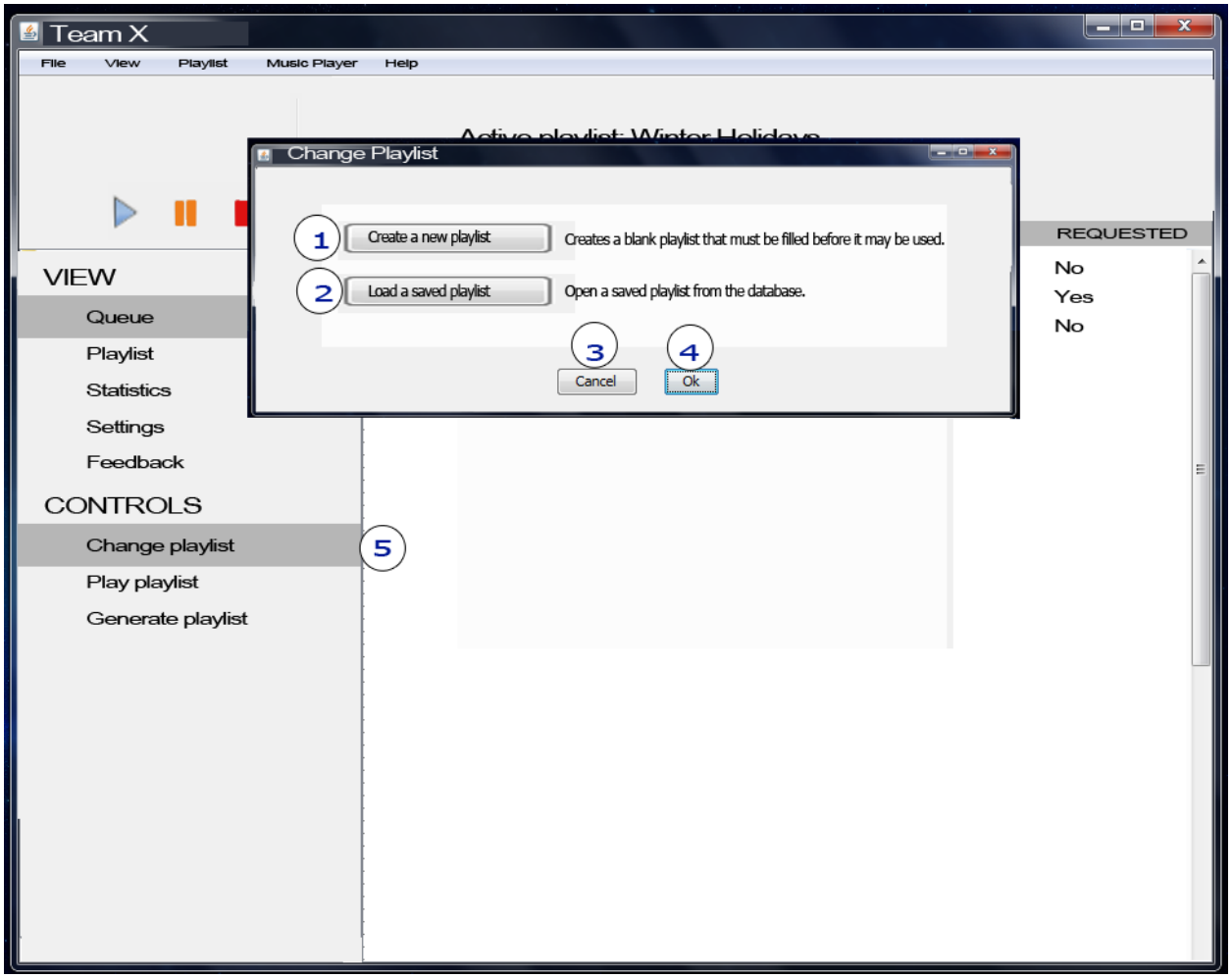
3.2.1.3 Screen Layouts: 3 – Help Sub-options



1: Text – for the second Help sub-option, About, this will have text describing the software briefly, the date of release, and brief team information.

2: User Guide - for the second Help sub-option, About, this will be replaced by the text “About”.

3.2.1.4 Screen Layouts 4: Controls – Change Playlist option

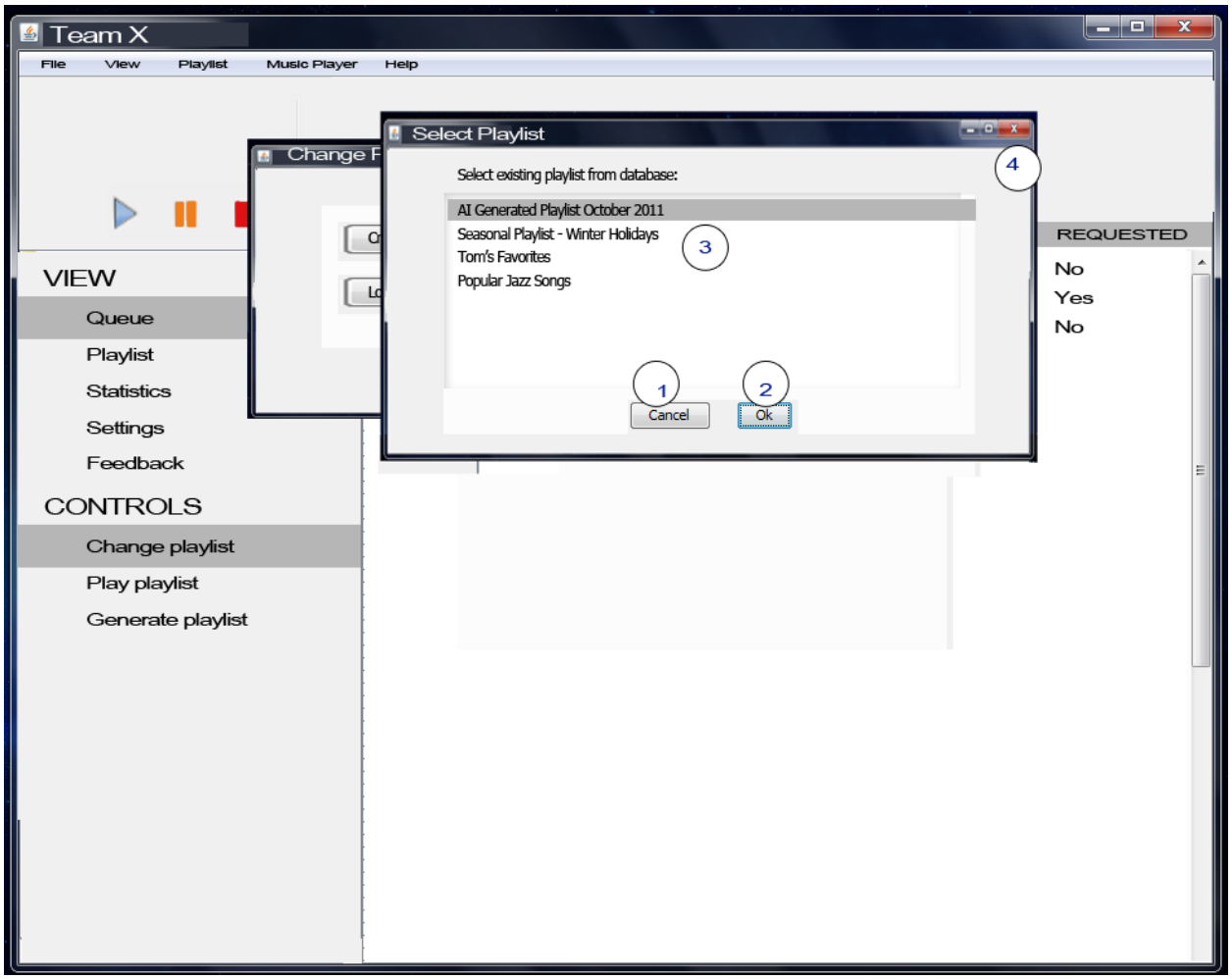


1: Create a new playlist – selecting this creates a blank playlist that must have at least 10 songs in it before it may be used. See the following screen layouts.

2: Load a saved playlist – this triggers a second pop-up window to appear, displaying the list of saved playlists in the database. See the following screen layouts.

3: Cancel – closes the window without making any changes.

4: Ok – If a saved playlist has been loaded, then this option replaces the current Active Playlist with the one selected. Otherwise, it does the same action as Cancel.

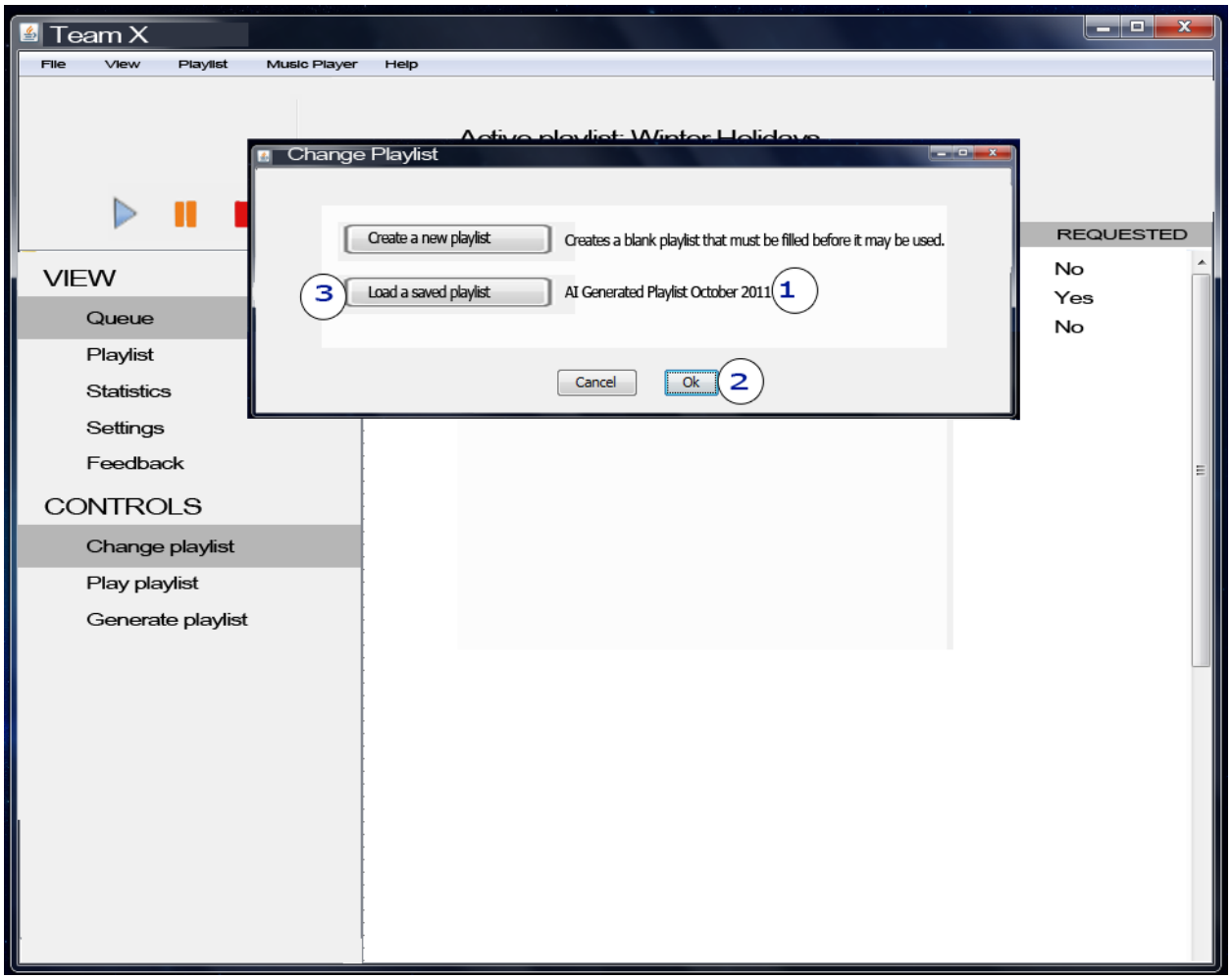


1: Cancel – this selection closes the window and returns the user to the Change Playlist window.

2: Ok – this selection chooses the highlighted playlist and returns to the Change Playlist window; see the following screen layout.

3: This area displays the list of the saved playlists in the database from which the user can choose.

4: Clicking Close returns the user to the Change Playlist window, identical to Cancel.

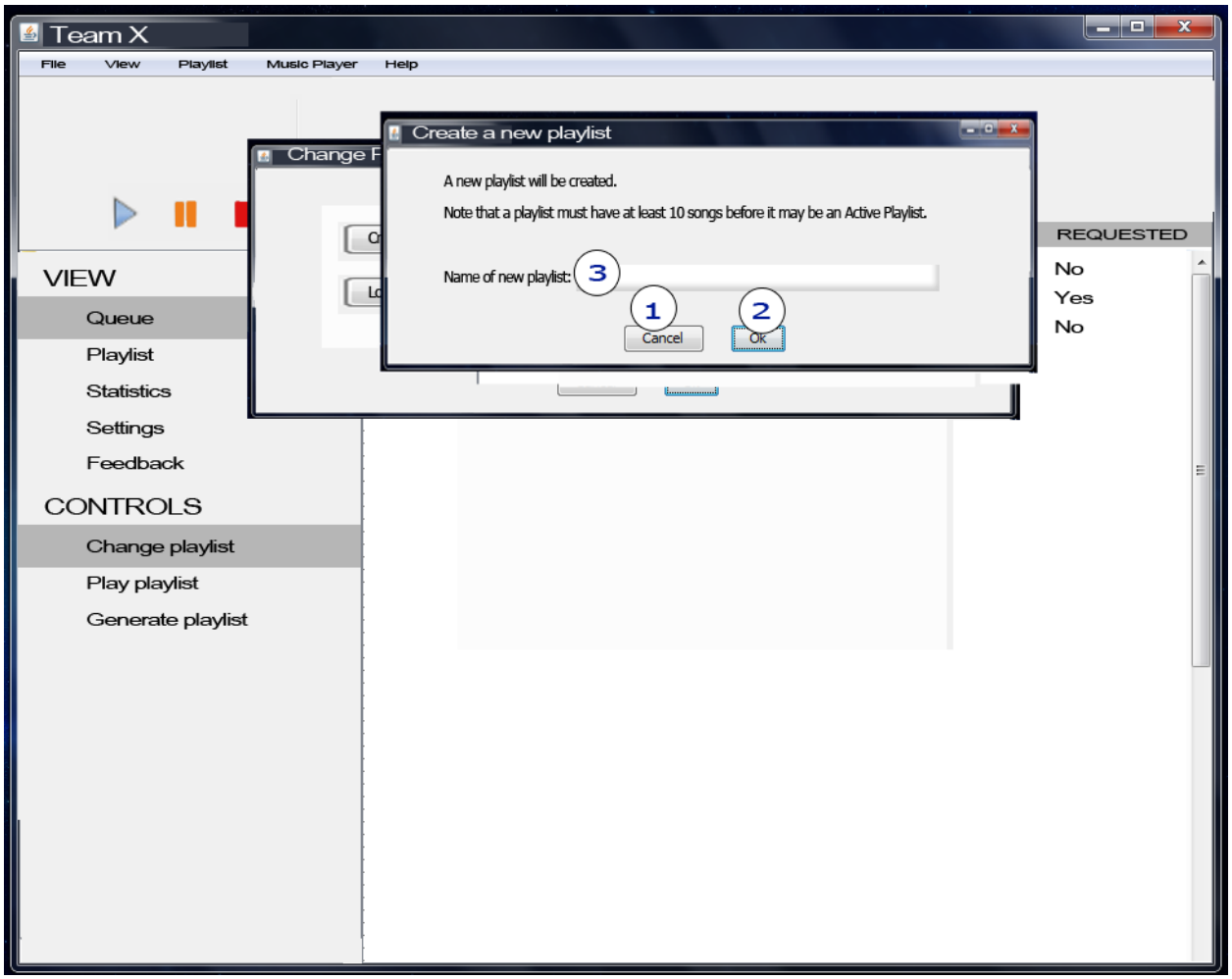


A saved playlist has been selected and the user is returned to the Change Playlist window.

1: This now displays the selected saved playlist.

2: Ok – selection loads the displayed playlist as the Active Playlist, replacing the current one.

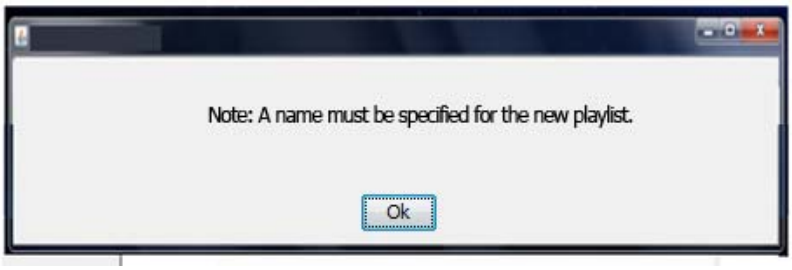
3: Load a saved playlist – this functionality remains the same as before.



1: Cancel – closes the window and returns the user to the Change Playlist window.

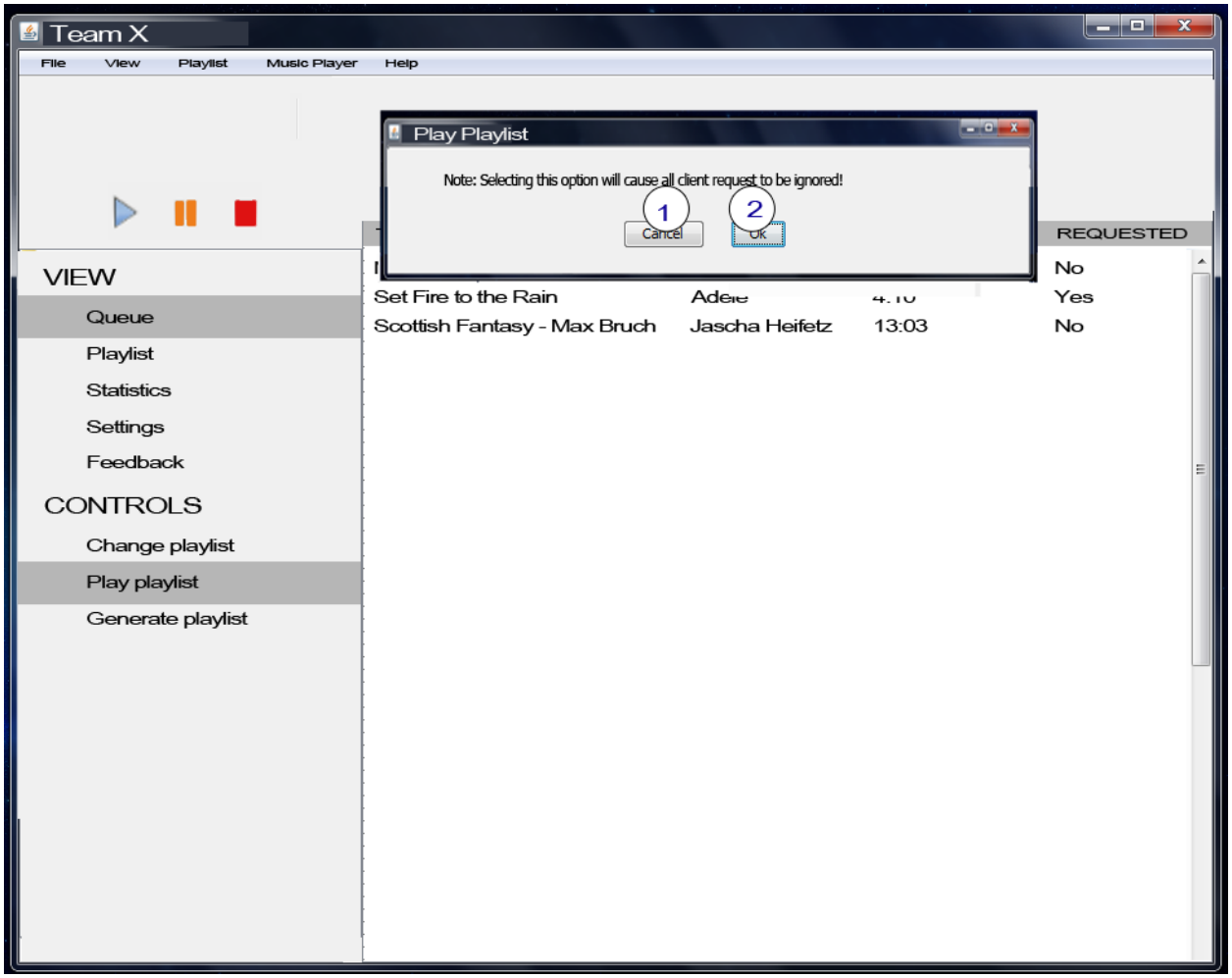
2: Ok – this closes both the sub-windows and displays the Playlist View of the main screen. After this, if there are fewer than 10 songs added to that list, an error message will show up if the Play option is selected.

3: Name field – here the user must enter the name of the new playlist. If there is no name, then another window is displayed:



Selecting Ok returns the user back to the window shown above for creating a new playlist.

3.2.1.5 Screen Layouts 5: Controls – Play Playlist option

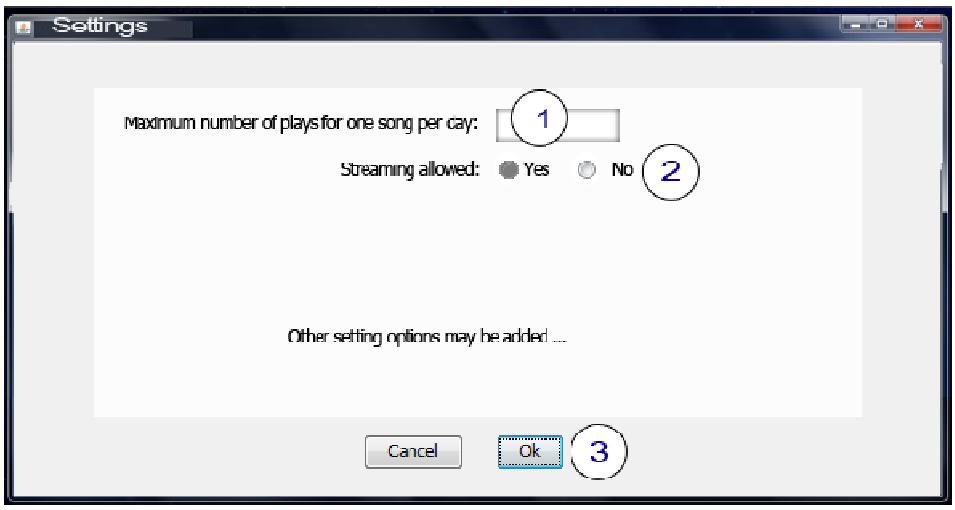


1: Cancel – closes window and returns user to the current main view. The Play Playlist option under Controls is un-highlighted.

2: Ok – plays the current Active Playlist.

3.2.1.6 Screen Layouts 6: Settings Option

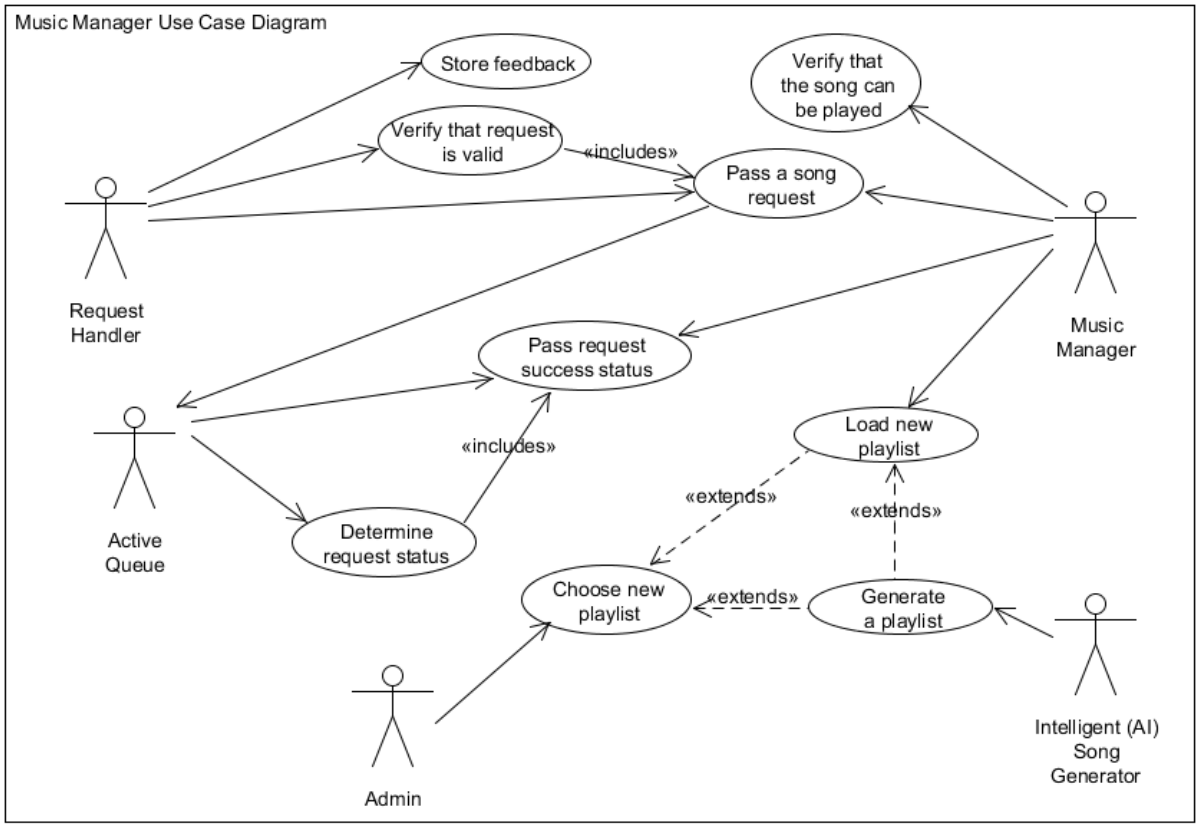
The Settings option under VIEW will be highlighted, as in 3.2.1.1 except with Settings instead of Queue. The following pop-up window will be displayed:



1: Text field where the user enters an integer number.

2: Radio buttons to specify whether streaming is allowed.

3: Ok – closes the window and submits any entered data, saving the changes, while Cancel ignores everything and closes the window. Other options may be added.



3.2.1 Module Use Case Templates

Use Case Name:	Pass a song request
Iteration:	Focused
Summary:	The client has made a request for a song, and this request is passed from the Request Handler to the Music Manager, which subsequently passes it to the Active Queue to see if it is valid.
Basic Course of Events:	1. The use case begins when one actor – the Request Handler or the Music Manager – receives a song request message. 2. The receiver passes the request to the next recipient; either the Music Manager or the Active Queue.
Alternative Paths:	None
Exception Paths:	None
Extension Paths:	None
Triggers:	A client using the iOS or Android application has made a song request, which has successfully been transmitted across the network and received by the Request Handler, OR a song request has been received by the Music Manager from the Request Handler.
Assumptions:	The song requested is one that exists in the current active Playlist. The song requested is playable.
Preconditions:	The assumptions hold true; the song exists in the current active Playlist and if the Request Handler is the receiver, the song has been verified playable.
Post conditions:	The success status of the request has been sent back to the Request Handler after being processed by the final recipient, the Active Queue.
Related business rules:	None
Author:	Rebecca Young
Date:	October 20, 2011 – Focused

Use Case Name:	Verify that request is valid
Iteration:	Focused
Summary:	The Request Handler has received a song request and needs to verify that it is valid before passing on the request.
Basic Course of Events:	1. The use case begins when the Request Handler receives a song request message from an iOS or Android application. 2. The Request Handler checks that the song is valid by accessing the song reference in the database, and verifying that the song exists. 3. The Request Handler passes the request to the Music Manager.
Alternative Paths:	3. If the song returns that it is not playable, then the Request Handler does not pass the request. Instead, it generates an error message and returns it to the original sending application.
Exception Paths:	None
Extension Paths:	None
Triggers:	The Request Handler has successfully received a song request message from an application.
Assumptions:	The song request corresponds to an actual client request from an application.
Preconditions:	The song request is in the expected format.
Post conditions:	The request has been dealt with; either sent on to the Music Manager or an error message returned. Consequently, a success status message has been sent back to the original client application – success or error.
Related business rules:	None
Author:	Rebecca Young
Date:	October 20, 2011 – Focused

Use Case Name:	Load new Playlist
Iteration:	Focused
Summary:	The Music Manager loads a new Playlist (specified by the user and requested and returned by the database or an empty one), replacing the current one.
Basic Course of Events:	1. The user selects the New Playlist or Open Playlist option from the File menu, or the Change Playlist or Generate Playlist from the Controls sidebar. See Section 3.1 for the menu diagram. 2. The Music Manager is returned the new Playlist, either an empty one or one returned by the database. 3. The Music Manager saves the current Playlist to the database and sets its Active Playlist as the new Playlist returned.
Alternative Paths:	2. If Generate Playlist is selected, the AI Song Generator is involved and must process the user's selected options. See Use Case *Generate Playlist*.
Exception Paths:	None
Extension Paths:	*Generate Playlist*
Triggers:	User selects an option to either open a new Playlist or open a saved one.
Assumptions:	The Playlist returned to the Music Manager is a valid list of songs that exist in the Database.
Preconditions:	None
Post conditions:	The old Active Playlist has been saved into the database. The Active Playlist has been replaced by the user's selection, with the exception of the case where the user has canceled the process or the new Playlist was the Active Playlist.
Related business rules:	None
Author:	Rebecca Young
Date:	October 20, 2011 – Focused

Use Case Name:	Generate Playlist
Iteration:	Focused
Summary:	The user has asked to load a new Playlist, and has chosen the Generate Playlist option. The specific options for generation have been sent to the AI Song Generator, where it is processed. The generated Playlist is then returned to the Music Manager.
Basic Course of Events:	1. The user selects Generate Playlist from the Controls sidebar, Change Playlist, or New Playlist option. 2. Options are displayed to the user in a new window. These indicate the traits or criteria by which the AI Song Generator will produce the new list. 3. The user clicks "Generate" to generate the playlist. The selected options get sent to the AI Song Generator. 4. The AI Song Generator, using various artificial intelligence algorithms, creates the Playlist by processing and selecting songs from the database. 5. The current Active Playlist is saved. 6. The returned Playlist is set as the Active Playlist.
Alternative Paths:	3. The user selects "Cancel" instead of "Generate", canceling the process and returning the user to the main display. 3. The user has not selected any options. An error message appears and step 2 is repeated. 3. The user has not selected valid options, or not all required options are specified. An error message appears and step 2 is repeated. 4. There was an error generating the intelligent Playlist. An error message appears and the user is returned to the main display.
Exception Paths:	None

Extension Paths:	None
Triggers:	The user selects Generate Playlist from the Controls sidebar, Change Playlist, or New Playlist option.
Assumptions:	There are song references in the database from which the AI Song Generator can choose. These songs have the necessary fields which can be examined. The AI Song Generator has generated correctly a playlist which corresponds to the user's specified options.
Preconditions:	None (Alternative paths may occur if the Assumptions are not true.)
Post conditions:	At the end of the normal course of events, the original Active Playlist has been replaced by the generated one, which has been set as the new Active Playlist. The original Active Playlist has been saved to the database.
Related business rules:	None
Author:	Rebecca Young
Date:	October 24, 2011 – Focused

Use Case Name:	Verify that the song can be played
Iteration:	Focused
Summary:	The Music Manager has been passed a request from the Request Handler, which checks that the song is playable. If so, it passes the request to the Active Queue to determine the status. See Use Case *Determine Request Status.*
Basic Course of Events:	1. The Request Handler has passed a song request, already validated (see Use Case *Verify that request is valid)* to the Music Manager. 2. The Music Manager checks that the song is playable, by accessing the isPlayable Boolean variable in the Song object. This variable keeps track of whether the song is on the Active Playlist, and if it has exceeded the number of allowed plays for that day. 3. The Music Manager passes the request to the Active Queue and waits for the returned success status.
Alternative Paths:	2. The isPlayable variable returns false; in this case, the Music Manager returns a failure message to the Request Handler and discards the request.
Exception Paths:	None
Extension Paths:	None
Triggers:	The Request Handler has received and validated a request, and sends it successfully to the Music Manager.
Assumptions:	The song request sent from the Request Handler is valid; the song exists in the database. See Use Case *Verify that request is valid.*
Preconditions:	None
Post conditions:	The Music Manager waits until it receives a success status message from the Active Queue. It then will pass this message back to the Request Handler. See Use Case *Pass request success status.*
Related business rules:	None
Author:	Rebecca Young
Date:	October 24, 2011 – Focused

Use Case Name:	Pass request success status
Iteration:	Focused
Summary:	The Active Queue or the Music Manager have a success status message, and they pass it on to the Music Manager or the Request Handler respectively.
Basic Course of Events:	1. The Active Queue has either added the requested song or has determined that it cannot be added. 2. The Active Queue generates a success status message.

	3. The Active Queue sends this message to the Music Manager. 4. The Music Manager sends this message to the Request Handler. Note: Steps 3 and 4 are identical; this Use Case covers both.
Alternative Paths:	None
Exception Paths:	None
Extension Paths:	None
Triggers:	The Active Queue has determined the success status of a song request.
Assumptions:	The success status message that is determined is correct, and if the message is a "success" then the request has been added appropriately to the Active Queue.
Preconditions:	The success status has been determined. See Use Case *Determine request status.*
Post conditions:	The success status message will reach its destination – the client application from which the Request Handler received the request.
Related business rules:	None
Author:	Rebecca Young
Date:	October 28, 2011 – Focused

Use Case Name:	Determine success status
Iteration:	Focused
Summary:	The Active Queue has received a song request from the Music Manager. It processes it and determines whether or not in can be added. If it can, it adds it and returns *succeeded* status message to the Music Manager. Otherwise, it returns a *failed* status message back.
Basic Course of Events:	1. The Active Queue receives a song request from the Music Manager. 2. The Active Queue checks the request time to verify whether it is a "play as soon as possible" or a specific time. 3. For a specific time request, the Active Queue checks the song scheduled to play at that time interval. 4. If there is no song scheduled then, it inserts the requested song there. 5. The success status for that request is set to *succeeded.*
Alternative Paths:	[3a. For a "play as soon as possible" request, the Active Queue inserts the song after the song following the one currently playing. (The song currently playing will terminate, then the next song in line will play, then the requested song will play.) Return to 5 of Basic Course of Events. 3b. If the end of the day's playing period after the current playing song or the next one, then the success status for the request is set to *failed.*] [4. If there is a song already scheduled then, it checks if it is a client requested song. 5. If the song is client requested, then it searches for a free interval (unreserved or filled with a non-client requested song) within 15 minutes of the requested time. 6a. If found, it inserts the song there. Return to 5 of Basic Course of Events. 6b. If not found, the success status for that request is set to *failed.*]
Exception Paths:	None
Extension Paths:	None
Triggers:	The Active Queue receives a song request from the Music Manager.
Assumptions:	The song request the Active Queue receives is valid and is playable; it exists in the Active Playlist and has not exceeded the maximum number of plays per day.
Preconditions:	The Active Queue has received a song request from the Music Manager.
Post conditions:	The Active Queue has correctly determined the success status of the request and will generate a message which will be passed to the Music Manager.
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

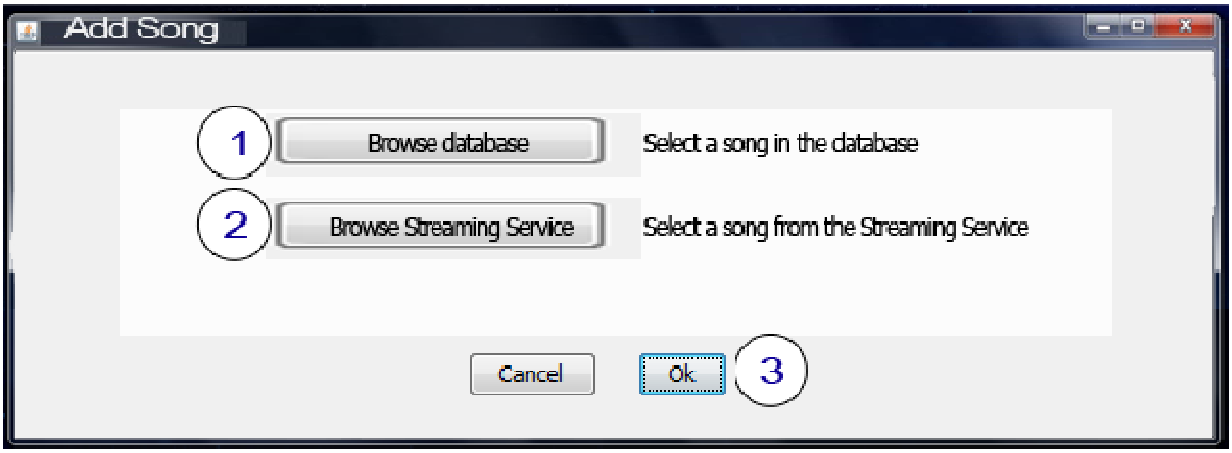
Use Case Name:	Choose new playlist
Iteration:	Focused
Summary:	The administrator (user of the main application) chooses a new playlist, either one generated by the AI Song Generator, a saved one from the database, or a new empty one.
Basic Course of Events:	1. The user chooses the Open Playlist option from the File menu, or the Change Playlist option from the Controls side panel. 2. A window displays options. The user may either select to generate one, to open a saved one, or to open a new empty one.
Alternative Paths:	2. The user selects "Cancel" to exit the process of choosing a new playlist.
Exception Paths:	None
Extension Paths:	A. If the user selects an AI Song Generator, Use Case *Generate a playlist* is executed. This may lead to Use Case *Load new playlist*. B. If the user selects a saved playlist in the database which is not the current Active Playlist, the Use Case *Load new playlist* is executed.
Triggers:	The user clicks an option which opens the window displaying options for new playlists.
Assumptions:	None
Preconditions:	None
Post conditions:	None
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

Use Case Name:	Store feedback
Iteration:	Focused
Summary:	The Request Handler receives some feedback from a client application, and stores it in the compiled feedback file from the database.
Basic Course of Events:	1. A client sends some textual feedback through the application. 2. The Request Handler receives the request. 3. The Request Handler retrieves the compiled feedback file from the database and opens it.
Alternative Paths:	None
Exception Paths:	2.The feedback is sent but never received by the Request Handler. 3a. The compiled feedback file is not found in the database; it either has been deleted or damaged and is not retrievable. 3b. There is some input or output error with the file. All exception paths result in the feedback not being stored in the file.
Extension Paths:	None
Triggers:	The Request Handler receives a feedback message sent from a client application.
Assumptions:	The feedback message sent comes from a client located on-site.
Preconditions:	A feedback message has been received by the Request Handler.
Post conditions:	The feedback message has been stored into the compiled feedback file in the database. The pre-existing contents of that file have not been altered. The user, upon selecting View Feedback, may view the most recent message sent.
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

3.2.2: Music Player

3.2.2.1 Screen Layouts 1: Music Player menu options

Selecting Add Song from the Music Player menu displays the following window:



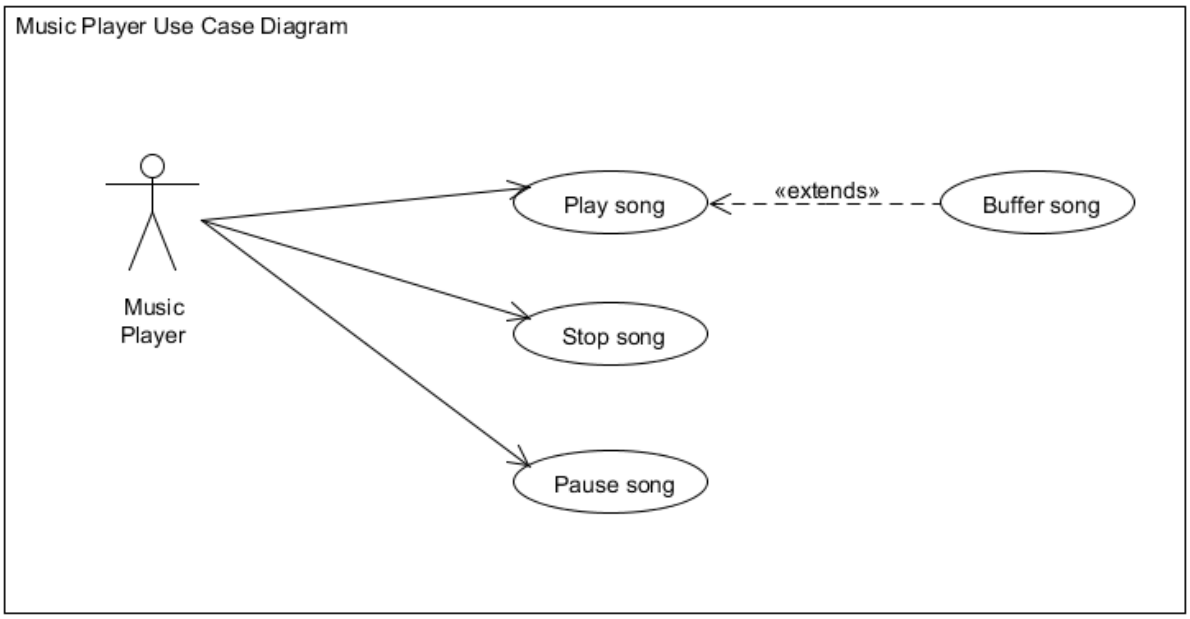
1: Selecting Browse database displays a window similar to that in Section 3.2.1.4 for playlist selection, except with a text field box where the user can query songs in the database.

2: Selecting Browse Streaming Service displays a new window shown in Section 3.2.3.1.

Both options result in the new window being opened, and if a song is selected, the song title will appear in the text to the right of the button, as in Section 3.2.1.4 for playlist selection. The buttons have the same functionalities as in Add Playlist:

3: Ok adds the song, and Cancel closes the window without making any changes.

The screen layouts for Remove Song are similar in appearance to those for Add Song.



3.2.2 Module Use Case Templates

Use Case Name:	Play song
Iteration:	Focused
Summary:	The Music Player calls the methods which cause the first song on the Active Queue to be played.
Basic Course of Events:	1. The user clicks the Play Song button from the main display, or from the Music Player menu option. 2. The Music Player identifies the first song on the Active Queue. 3. The Music Player calls the methods to play that song.
Alternative Paths:	None
Exception Paths:	If the song is already playing, clicking it again performs no action.
Extension Paths:	If the first song on the Active Playlist is a streamed song, it needs to be buffered and loaded before it can be played.
Triggers:	The user clicks an option asking for the Music Player to play.
Assumptions:	There is at least one song on the Active Queue.
Preconditions:	The song is not currently playing; it may be either stopped or paused.
Post conditions:	The first song on the Active Queue is playing.
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

Use Case Name:	Stop song
Iteration:	Focused
Summary:	The Music Player calls the methods which cause the first song on the Active Queue to be stopped (the song that is currently playing or paused).
Basic Course of Events:	1. The user clicks the Stop Song button from the main display, or from the Music Player menu option. 2. The Music Player identifies the first song on the Active Queue. 3. The Music Player calls the methods to stop that song.

Alternative Paths:	None
Exception Paths:	If the song is already stopped, clicking again performs no action.
Extension Paths:	None
Triggers:	The user clicks an option asking for the Music Player to stop.
Assumptions:	There is at least one song on the Active Queue.
Preconditions:	The song is currently playing or paused.
Post conditions:	The song has been stopped.
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

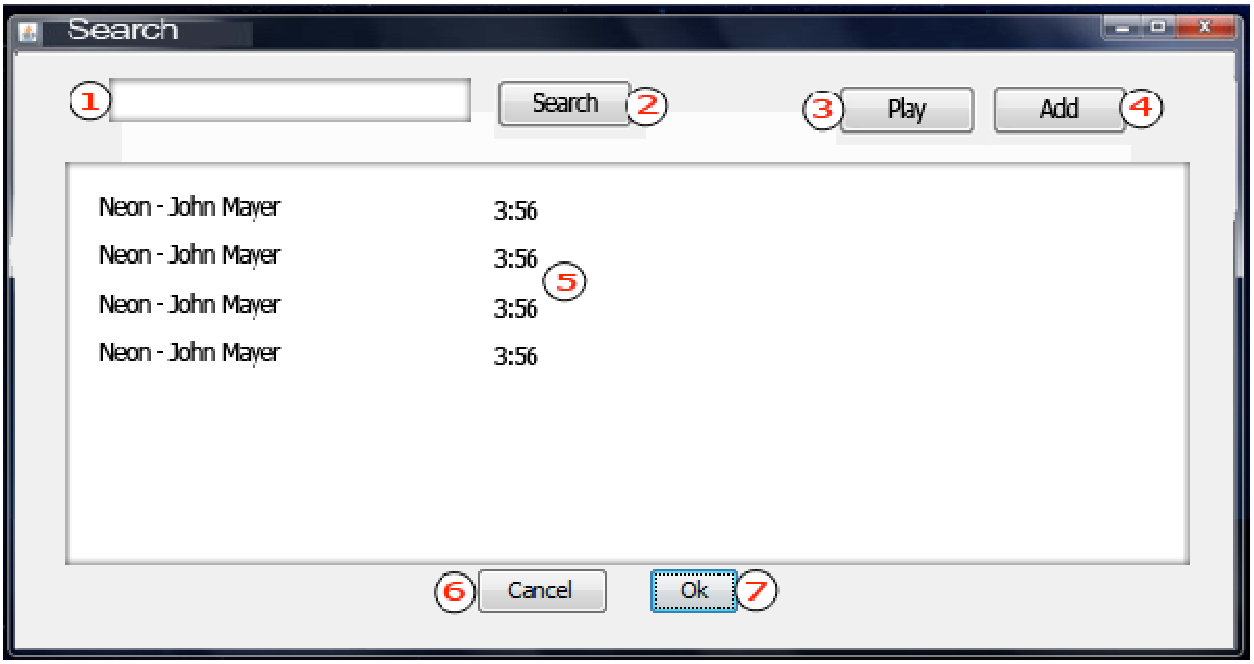
Use Case Name:	Pause song
Iteration:	Focused
Summary:	The Music Player calls the methods which cause the first song on the Active Queue to be paused (the song that is currently playing).
Basic Course of Events:	1. The user clicks the Pause Song button from the main display, or from the Music Player menu option. 2. The Music Player identifies the first song on the Active Queue. 3. The Music Player calls the methods to pause that song.
Alternative Paths:	None
Exception Paths:	If the song is already paused, clicking again performs no action.
Extension Paths:	None
Triggers:	The user clicks an option asking for the Music Player to pause the song.
Assumptions:	There is at least one song on the Active Queue.
Preconditions:	The song is currently playing.
Post conditions:	The song has been paused.
Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011 – Focused

Use Case Name:	Buffer song
Iteration:	Focused
Summary:	A streamed song is on the Active Queue and needs to be buffered before it can be played.
Basic Course of Events:	1. The Music Player detects a song in the first *n* (see Triggers) songs on the Active Queue which is a streamed song. 2. The Music Player, without disrupting other actions (playing the current song), sends the song's reference to the Streaming Module. 3. The song is buffered. 4. The song is now ready to be played.
Alternative Paths:	None
Exception Paths:	The reference to the streamed song is invalid. In this case, the song cannot be streamed and is removed from the Active Queue.
Extension Paths:	None
Triggers:	Either the first song on the Active Queue is a streamed song, or some song in the first *n* songs on the list is a streamed song. (*n* will be determined later after testing is performed to find out the time required to buffer across a network of reasonable connection strength).
Assumptions:	None
Preconditions:	None
Post conditions:	The song has been buffered and is ready to be played upon command.

Related business rules:	None
Author:	Rebecca Young
Date:	November 4, 2011

3.2.3 Streaming Manager

3.2.3.1 Screen Layouts: 1 – Search View



1: Text box – User can type a song name, artist name or album

2: Search button – Search in the Streaming Service the parameter typed in the text box

3: Play button – Play selected song

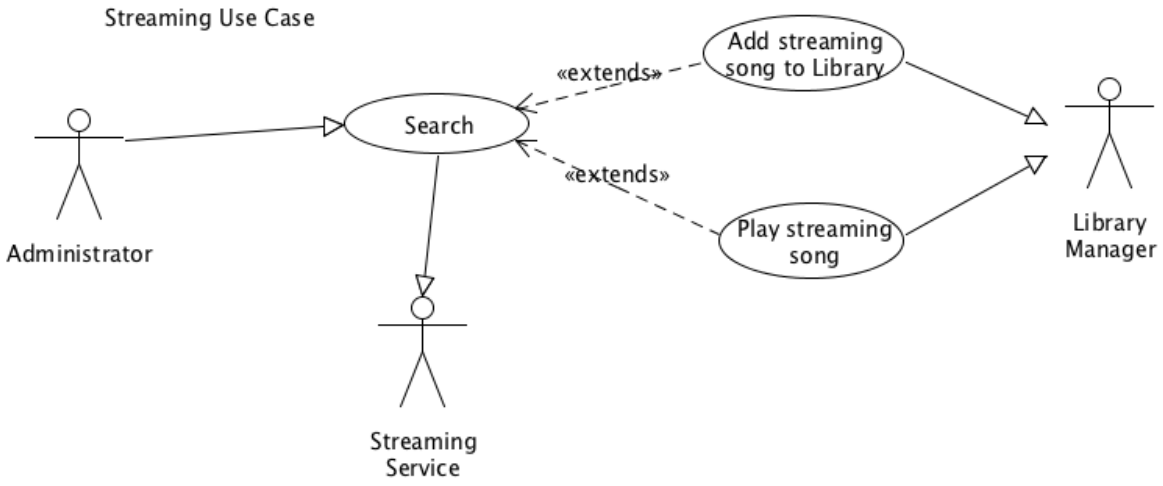
4: Add button – Add selected song to the current playlist

5: List of Songs – List of songs found

6: Cancel Button – Cancel operation

7: Ok Button – Conclude operation

3.2.3.2 Use Case Diagram



3.2.3.3 Use Case Templates

Use Case Name:	Search
Iteration:	Focused
Summary:	The administrator wants to add songs from the streaming service to the library so first he has to search for it
Basic Course of Events:	1. This use case begins when the administrator click on the search textbox 2. type name of artist, song or album that he is looking for and click search 3. the system respond with a list of songs found 4. See use case “Add Streaming song to Library”
Alternative Paths:	4. Administrator can decide to play the song instead of adding to library. See use case “Play streaming song “
Exception Paths:	If the system doesn’t find any songs it will return an empty list.
Extension Paths:	If the internet connection is interrupted it will not be possible to search for songs. I message will alert the administrator.
Triggers:	The administrator has decided to search for a song in the streaming service
Assumptions:	The computer running the application has access to the internet
Preconditions:	The administrator search for an artist, album or song name that exist.
Post conditions:	The administrator will receive a list of items found.
Related business rules:	none
Author:	Lineker Tomazeli
Date:	October 25, 2011

Use Case Name:	Add Streaming song to Playlist
Iteration:	Focused
Summary:	The administrator wants to add songs from the streaming service
Basic Course of Events:	1. This use case begins with the administrator searching for a song (see use case “Search”) 2. System respond with a list of songs found 3. Administrator select a song and clicks on “add” button 4. System will add song to current playlist and create references in the database 5. Song will be showed in the current playlist

	6. Administrator can repeat steps 1-5 again if needed.
Alternative Paths:	2. Administrator can double click the song he wants, this action replace the functionally of clicking in the “add” button
Exception Paths:	If the internet connection is interrupted it will not be possible to add the song. I message will alert the administrator.
Extension Paths:	none
Triggers:	The administrator has decided to add a streaming song to his library by selecting the song from the list found and clicking in “add” or double clicking the song.
Assumptions:	A search was made and records were found. Please see use case “Search” for details.
Preconditions:	The administrator search for an artist, album or song name and select one of the records found
Post conditions:	Song is added to the current library.
Related business rules:	none
Author:	Lineker Tomazeli
Date:	October 25, 2011

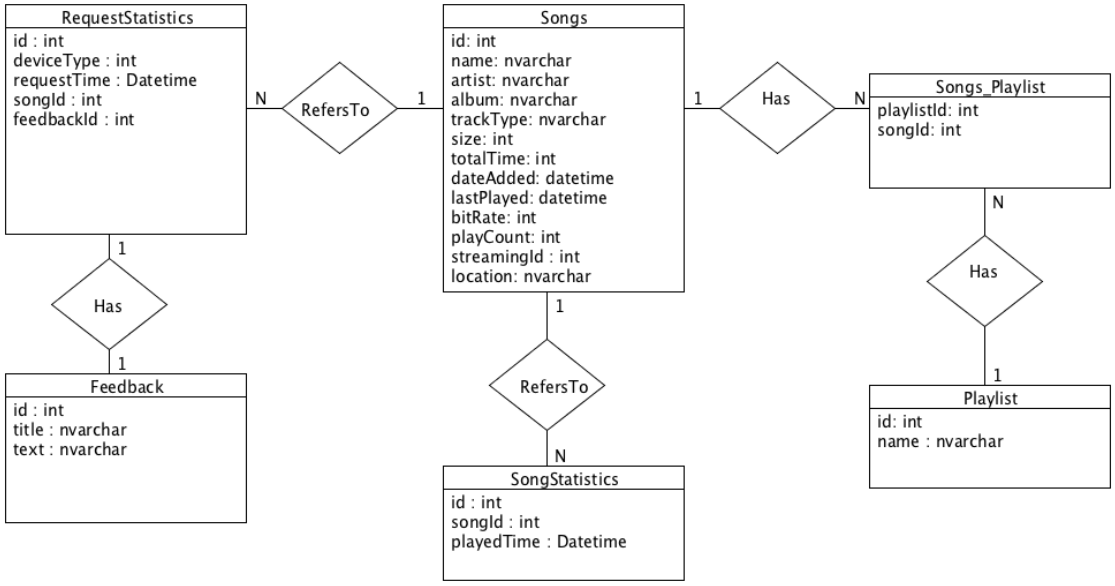
Use Case Name:	Play Streaming song
Iteration:	Focused
Summary:	The administrator wants to play a song from the streaming service
Basic Course of Events:	1. This use case begins with the administrator searching for a song (see use case “Search”) 2. System respond with a list of songs found 3. Administrator select a song and clicks on “play” button 4. System will start streaming (playing) the song, if there was a song playing before it will stop 5. Song will be showing in the current playing queue
Alternative Paths:	none
Exception Paths:	If the internet connection is interrupted it will not be possible to play the song. I message will alert the administrator.
Extension Paths:	none
Triggers:	The administrator has decided to play a streaming song by selecting the song from the list found and clicking in “play”
Assumptions:	A search was made and records were found. Please see use case “Search” for details.
Preconditions:	The administrator search for an artist, album or song name and select one of the records found
Post conditions:	Song starts to play and is added to the current playing queue.
Related business rules:	none
Author:	Lineker Tomazeli
Date:	October 25, 2011

3.2.4 Request Handler

The Request Handler has no user interface, but appears as an actor in the Use Case Diagrams in Section 3.2.1.

3.2.5 Database

3.2.5.1 Database Diagram



Songs table
Holds information of all the songs imported to the music manager.

id – Primary key
name – Name of the song
artist – Name of the artist
album – Name of the album
trackType – Type of the file, streaming or local.
size – Size of the song file
totalTime – Song length
dateAdded – Date that was added to the Library
lastPlayed – Date that was last played
bitRate – Bit rate
playCount – Counter for how many times song was played
streamingId – Reference id to be used in the Streaming service
location – Location in the local file system

RequestStatistics table
Holds statistical information about request made by users

id – Primary key
deviceType – Type of device (Android or iOS) that the request was originated.
requestTime – Time that the request was made
songId – Foreign key with Songs table, if it was a song request.
feedbackId – Foreign key Feedback table, if it was a feedback request

Feedback
Holds feedbacks sent by users

id – Primary key”
title – title of the feedback sent by user
text – text of the feedback sent by user

SongStatistics table
Holds statistical information about songs that were played

id – Primary key
playedTime – Time that the request was made
songId – Foreign key with Songs table

Playlist table
Holds information about playlists created by the administrator

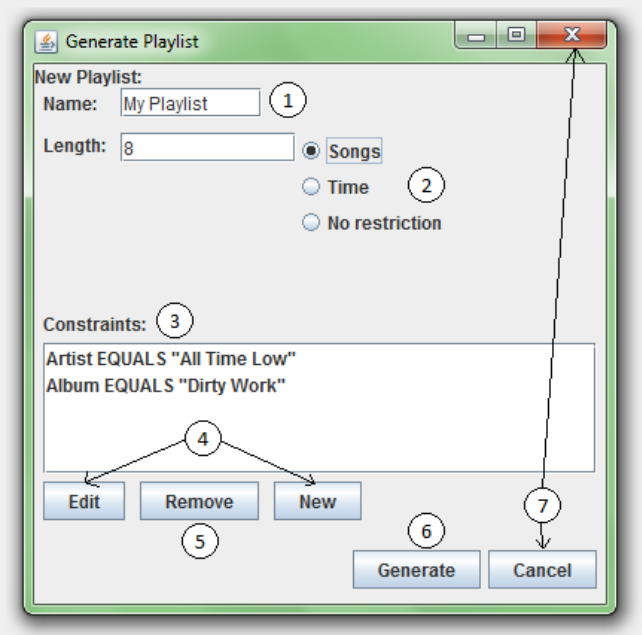
id – Primary key
name – name of the playlist

Songs_Playlist
Pivot table between playlist and songs

songId – Foreign key with Songs table
playlistId – Foreign key with Playlist table

3.2.6: Artificial Intelligence Playlist Generator

3.2.6.1: Playlist Generation Request Window



1: Name field: The name for new playlist.

2: Length criteria: The user can limit the length of the playlist by time or number of songs. They can also choose to have no restriction.

3: Constraints list: The constraints use to choose songs for the playlist.

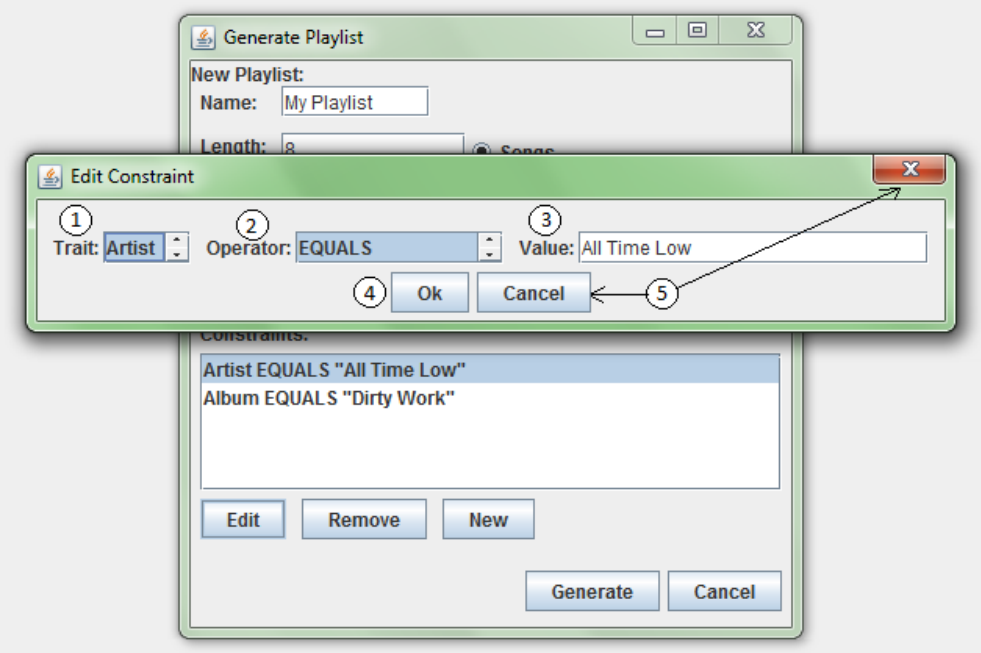
4: Edit and New buttons: These buttons open the dialog in 3.2.6.2 when a single constraint is highlighted.

5: Remove button: This button will delete a selected constraint from the current list.

6: Generate button: This button will trigger the call to attempt to create the desired playlist.

7: Cancel button and window close: These buttons will close the window and cancel the request, returning the user to 3.2.1.1.

3.2.6.2: Constraint Edit Dialog



1: Trait field: trait that the constraint applies to.

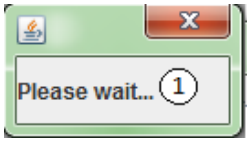
2: Operator field: operation being applied to the trait.

3: Value field: value the trait must be compared to.

4: Ok button: save constraint.

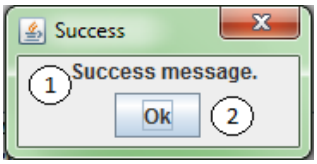
5: Cancel button and window close: cancel changes to constraint and close dialog.

3.2.6.3: Progress Dialog



1: Progress dialog message.

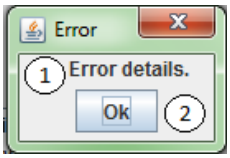
3.2.6.4: Success Dialog



1: Success message.

2: Ok button: closes dialog.

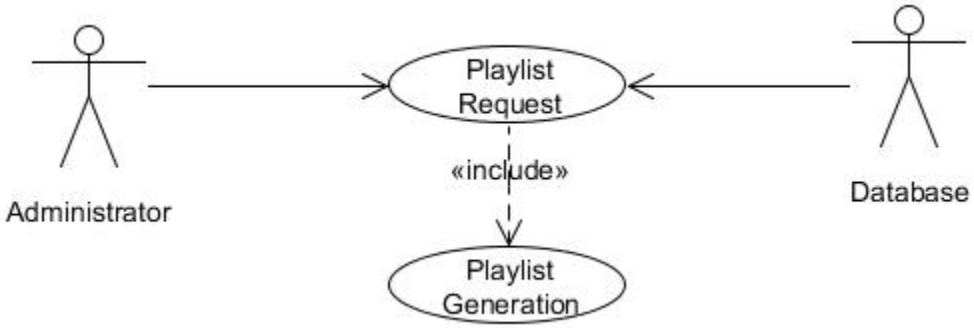
3.2.6.5: Error Dialog



1: Error message and details.

2: Ok button: closes the dialog.

3.2.6.6: Playlist Generation Use Case Diagram



3.2.6.7: Playlist Request Template

Use case name:	Playlist Request
Iteration:	Focused
Summary:	The Administrator makes a request for a playlist meeting his or her chosen criteria to be made. The full collection of songs is searched to determine the possible songs for this request.
Basic course of events:	1. Administrator selects playlist generation from main menu (3.2.1.1). 2. Administrator is presented with the playlist generation form in screen 3.2.6.1. 3. Administrator fills out form, possibly choosing constraints via the Constraint Edit Dialog in 3.2.6.2. 4. Administrator selects generation and is displayed a Progress Dialog (3.2.6.3). 5. Administrator is notified upon successful generation that the new playlist has now been created and exists in the database with a Success Dialog (3.2.6.4).
Alternative paths:	None.
Exception paths:	5.1. Administrator is notified that playlist generation failed with an Error Dialog (3.2.6.5).
Extension points:	None.
Trigger:	Administrator selects playlist generation from main menu. The Administrator would like to make a custom playlist where each song in the playlist has a particular set of traits (or satisfies a particular set of constraints).
Assumptions:	None.
Preconditions:	Songs exist in the Database satisfying the requirements of the playlist.
Postconditions:	An additional playlist now exists in the database.
Related Business rules:	None.
Author:	Alicia Bendz
Date:	November 4, 2011

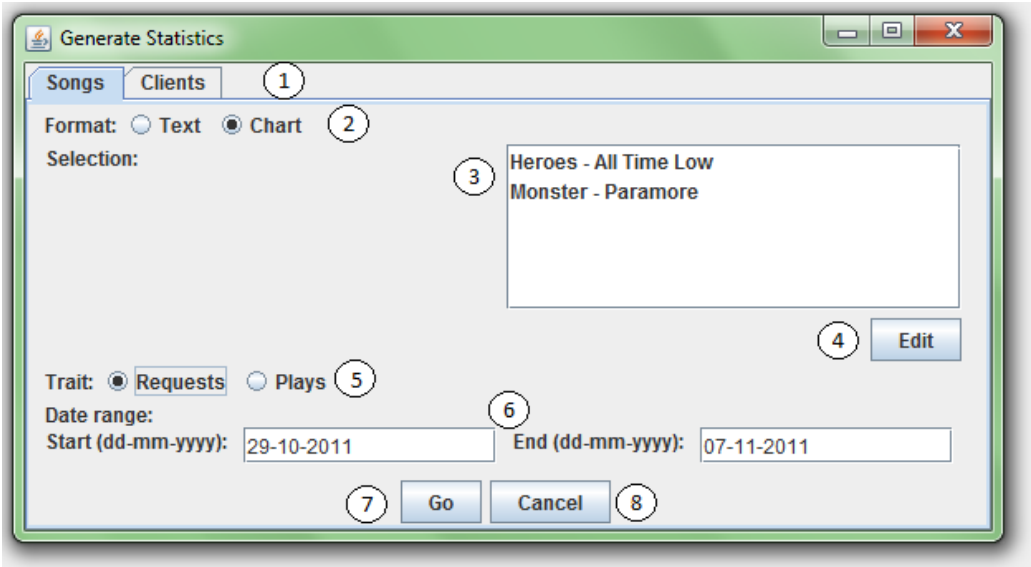
3.2.6.8: Playlist Generation Template

Use case name:	Playlist Generation
Iteration:	Focused
Summary:	A formatted playlist generation request is made, which involves searching the Database for songs. The playlist is then sent to the Database once created and the Administrator is notified of successful playlist generation.
Basic course of events:	1. Generation call is made from the Playlist Request use case (3.2.6.7). 2. An attempt to make a playlist satisfying the constraints from 3.2.6.2 is made by searching through the songs in the Database. 3. A successfully created playlist is stored in the database upon completion. The Success Dialog is shown to the Administrator (3.2.6.4).
Alternative paths:	None.
Exception paths:	3.1. If a playlist cannot be created, nothing is stored in the Database and the Error Dialog (3.2.6.5) is shown to the Administrator.
Extension points:	None.
Trigger:	A request for a playlist is made from Playlist Request Template (3.2.6.6).
Assumptions:	None.

Preconditions:	Songs exist in the Database to be used in a new playlist.
Postconditions:	A new playlist exists in the Database if generation was successful.
Related Business rules:	None.
Author:	Alicia Bendz
Date:	November 4, 2011

3.2.7: Statistics Generator

3.2.7.1: Statistics Generation Form



1: The tabs allow the user to select between song statistics or client request statistics.

2: Format: This allows the user to select between textual or visual representations of data.

3: Selection: This contains the list of songs for which data will be displayed.

4: Edit button: Clicking this will open the dialog shown in 3.2.7.3. This will allow song selection.

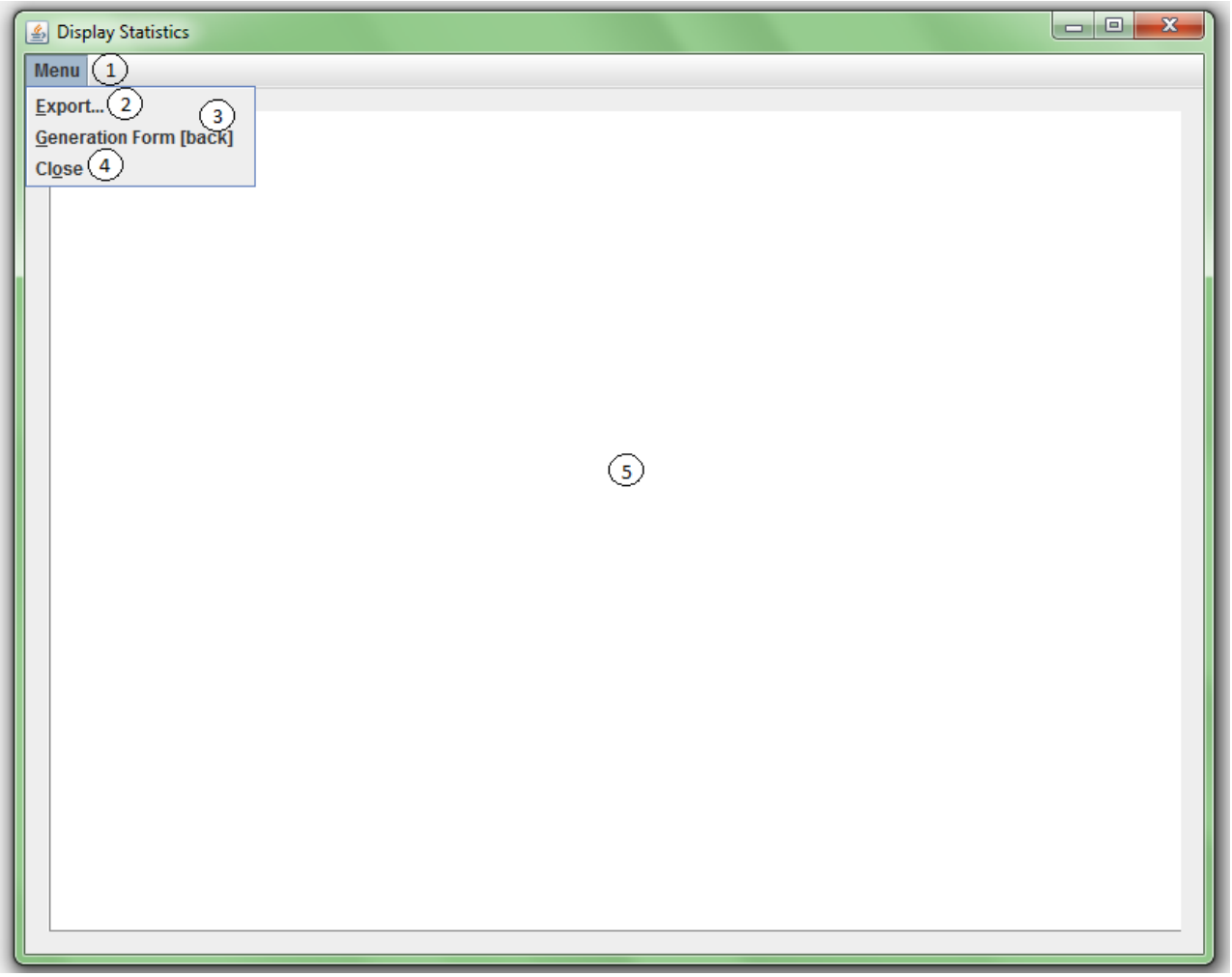
5: Trait: This allows the user to select the trait of a song to show data for, either in terms of requests or plays.

6: Date range: This allows the user to select start and end dates for the data being displayed.

7: Go button: This will send the request to display the statistics. Either the screen shown in 3.2.7.2 will be shown or an error dialog will be shown (3.2.6.5).

8: Cancel button: This will close the window and return the user to the menu in 3.2.1.1.

3.2.7.2: Statistics Display



1: Menu: pressing this will show the menu items.

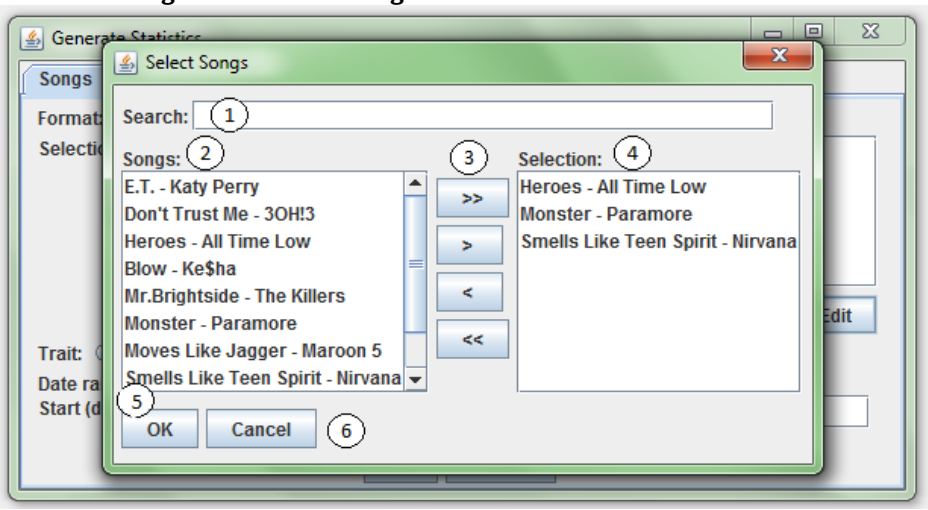
2: Export... : selection this will save current display to file system (currently optional).

3: Generation Form [back]: This will take the user back to generation form in 3.2.7.1.

4: Close: This closes the window and return the user to the menu in 3.2.1.1.

5: The data being displayed. This can be in one of many chart formats such as a scatterplot, line graph, pie chart. This can also be a plaintext list of all data or feedback.

3.2.7.3: Song Selection Dialog



1: Search field: This will allow the user to search for songs. The filtered results will be displayed in the songs list.

2: Songs list: This is a list of songs in library, which can be filtered by the search field.

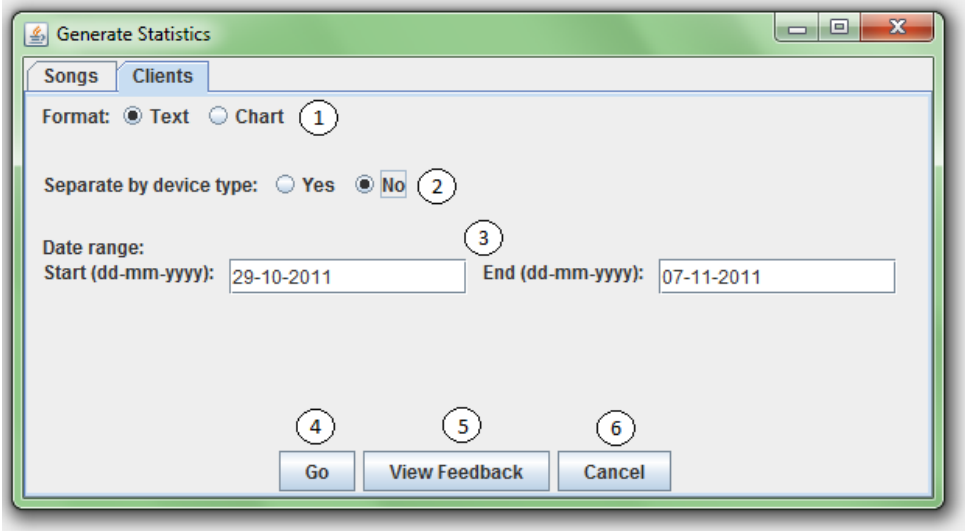
3: Selection/removal arrows: These buttons allow selection or removal of songs: “>” means add highlighted songs to selection, “<” means remove highlighted songs from selection, “>>” means add all visible songs to selection, and “<<” means remove all songs from selection.

4: Selection list: The list of songs currently selected.

5: OK button: This will save selection and close dialog, returning the user to the screen in 3.2.7.1.

6: Cancel button: close dialog without saving selection changes, returning the user to the screen in 3.2.7.1.

3.2.7.4: Client Statistics Generation Form



1: Format: This allows the user to select between textual or visual representations of data.

2: Separate by device type: This allows the user to determine if data is separated by device type or not.

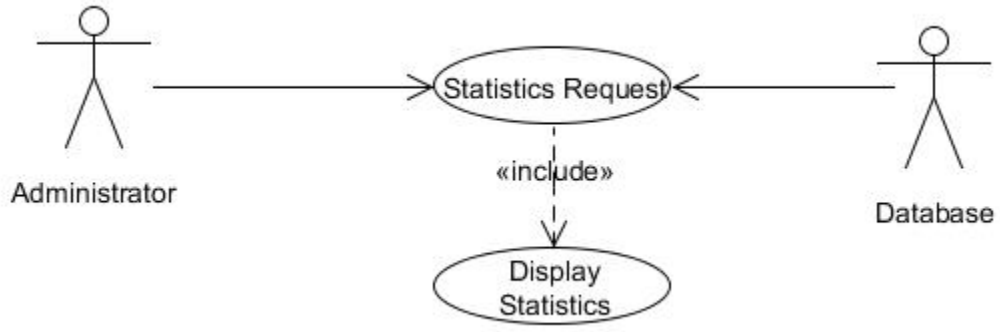
3: Date range: This allows the user to select start and end dates for the data being displayed.

4: Go button: This will send the request to display the statistics. Either the Statistics Display in 3.2.7.2 will be shown or an error dialog will be shown (3.2.6.5).

5: View feedback button: This will allow the user to view feedback from clients in a screen similar to 3.2.7.2.

6: Cancel button: This will close window and return the user to the screen in 3.2.1.1.

3.2.7.5: Statistics Generator Use Case Diagram



3.2.7.6: Statistics Request Template

Use case name:	Statistics Request
Iteration:	Focused
Summary:	The Administrator makes a request for a particular set of statistics to be generated. The Database provides the information for these statistics.
Basic course of events:	1. Administrator selects statistics option from menu (3.2.1.1). 2. A form is displayed to the Administrator to select statistics to generate (3.2.7.1 or 3.2.7.4). 3. Administrator fills out statistics request form, possibly using the song selection dialog if generating song statistics (3.2.7.3). 4. Administrator submits statistics request by pressing the "Go" button in screen shown in 3.2.7.1 or 3.2.7.4. 5. Upon successful generation of the request, the statistics will be displayed according to the Display Statistics Template(3.2.7.7) .
Alternative paths:	None.
Exception paths:	5.1. Upon failure to generate the requested statistics, the Administrator will be notified of this failure with a dialog indicating the error that occurred. (3.2.6.5) 5.2. The Administrator is returned to the statistics generation form and continues from step 2.
Extension points:	None.
Trigger:	Administrator selects statistics option from main menu (3.2.1.1). The Administrator would do this to determine the popularity of a song over a particular period of time or view the load of client requests on the server.
Assumptions:	None.
Preconditions:	There is valid data existing in the database for which statistics can be

	generated.
Postconditions:	None.
Related Business rules:	None.
Author:	Alicia Bendz
Date:	November 4, 2011

3.2.7.7: Display Statistics Template

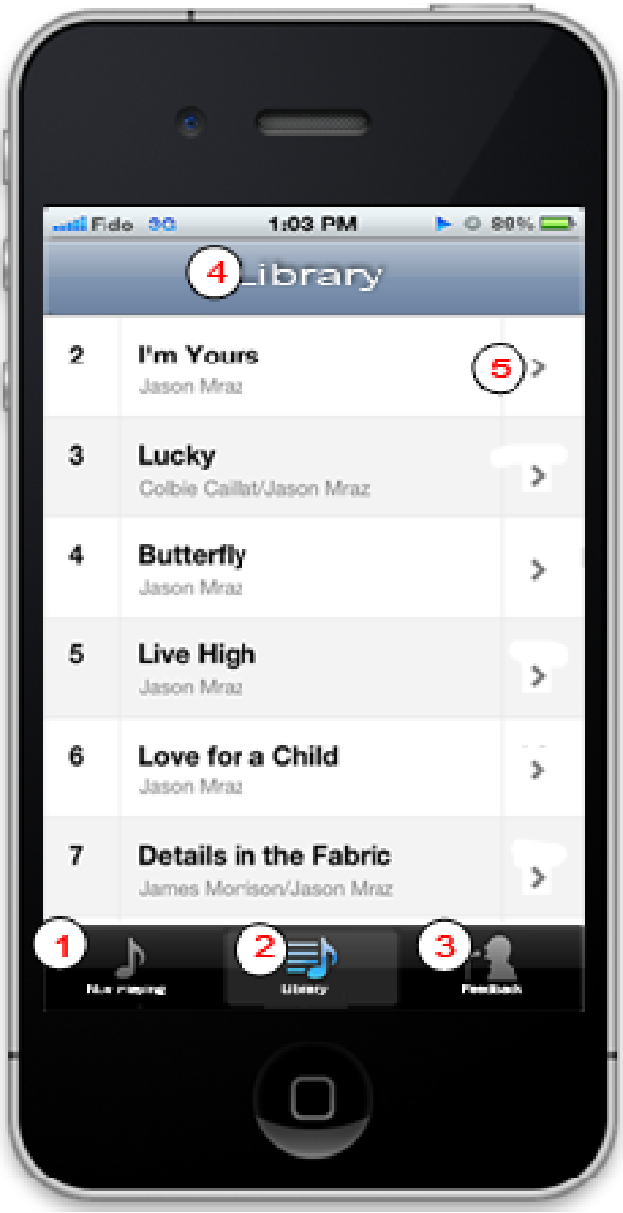
Use case name:	Display Statistics
Iteration:	Focused
Summary:	After receiving a request for statistics generation, the call to generate the correct format of display for the statistics is made. The statistics are displayed to the Administrator.
Basic course of events:	1. Result of statistics request is returned to statistics viewer from Statistics Request Template (3.2.7.6). 2. The viewer identifies format of data and presents it to Administrator in its own window such as that of 3.2.7.2. 3. The viewer closes when Administrator exits.
Alternative paths:	None.
Exception paths:	3.1. Administrator selects option to send another statistics request. 3.2. Viewer exits after displaying template Statistics Request (3.2.7.6).
Extension points:	None.
Trigger:	Statistics have been generated successfully according to a previously sent request and are ready to be displayed.
Assumptions:	None.
Preconditions:	Statistics have already been generated and are ready to be displayed.
Postconditions:	None.
Related Business rules:	None.
Author:	Alicia Bendz
Date:	November 4, 2011

3.2.8 Android Application

The Android application has the same functionality as the iOS application. See Section 3.2.9 for screen layouts, and the Appendix Section 4.2 for the Android screen layouts.

3.2.9 iOS Application

3.2.9.1 Screen Layouts: 1 – Playlist Available View



1: Now Playing tab bar button – shows current playing queue.

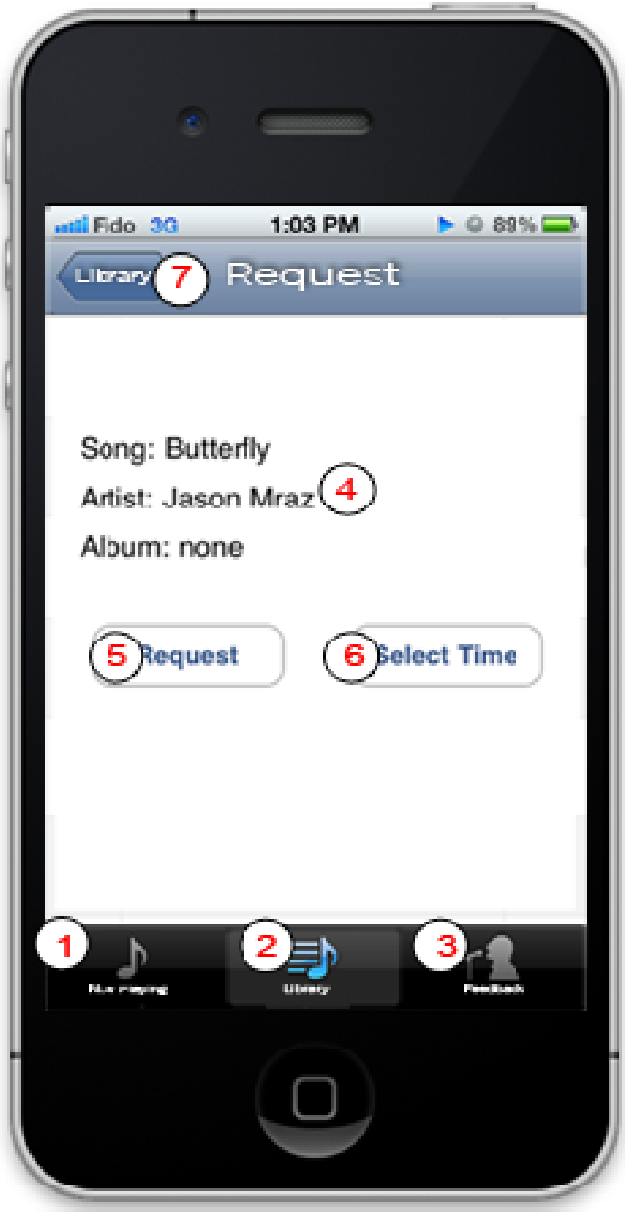
2: Library tab bar button – show playlist available for request

3: Feedback tab bar button – show form to submit a feedback

4: Title – Title for the current section

5: Arrow button – Arrow is showing that the current cell is clickable.

3.2.9.2 Screen Layouts: 2 – Request Song View



1: Now Playing tab bar button – shows current playing queue.

2: Library tab bar button – show playlist available for request

3: Feedback tab bar button – show form to submit a feedback

4: Information about the selected song

5: Request button – send a song request

6:Select Time button – show option to select what time use wants to play the requested song.

7: Library button – return to the Library tab. See layout section 3.2.9.1

3.2.9.3 Screen Layouts: 3 – Select Time View

1: Now Playing tab bar button – shows current playing queue.

2: Library tab bar button – show playlist available for request

3: Feedback tab bar button – show form to submit a feedback

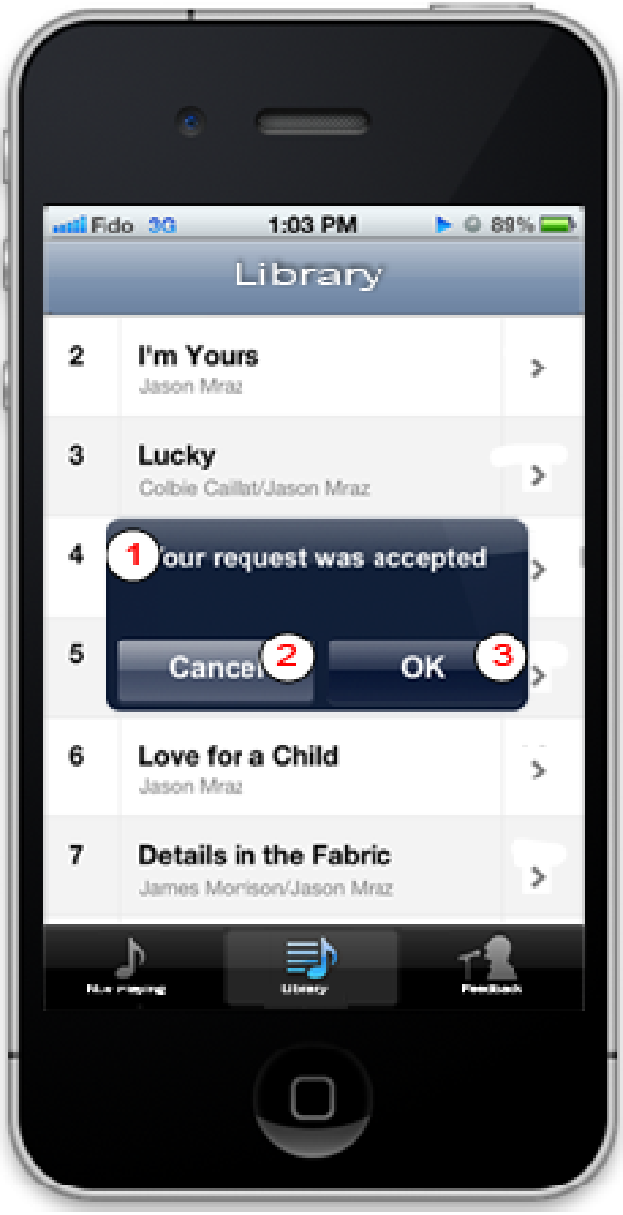
4: Information about the selected song

5: Date and time picker

6: Request button – send the song request

7: Back button – return to the request view. See section 3.2.9.2

3.2.9.4 Screen Layouts: 4 – Alert View



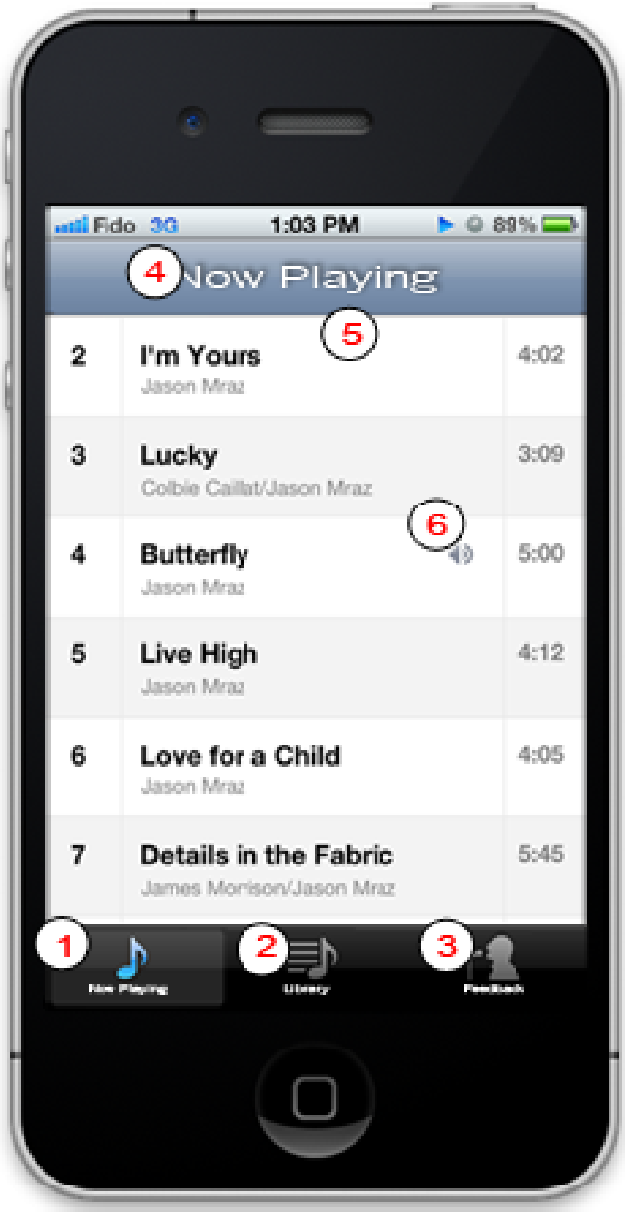
*** Layout can vary between 1 to 5 buttons**

1: Alert Message

2: Ok button – Confirmation of action

3: Cancel button – Cancelation of action

3.2.9.5 Screen Layouts: 5 – Playing Queue View



1: Now Playing tab bar button – shows current playing queue.

2: Library tab bar button – show playlist available for request

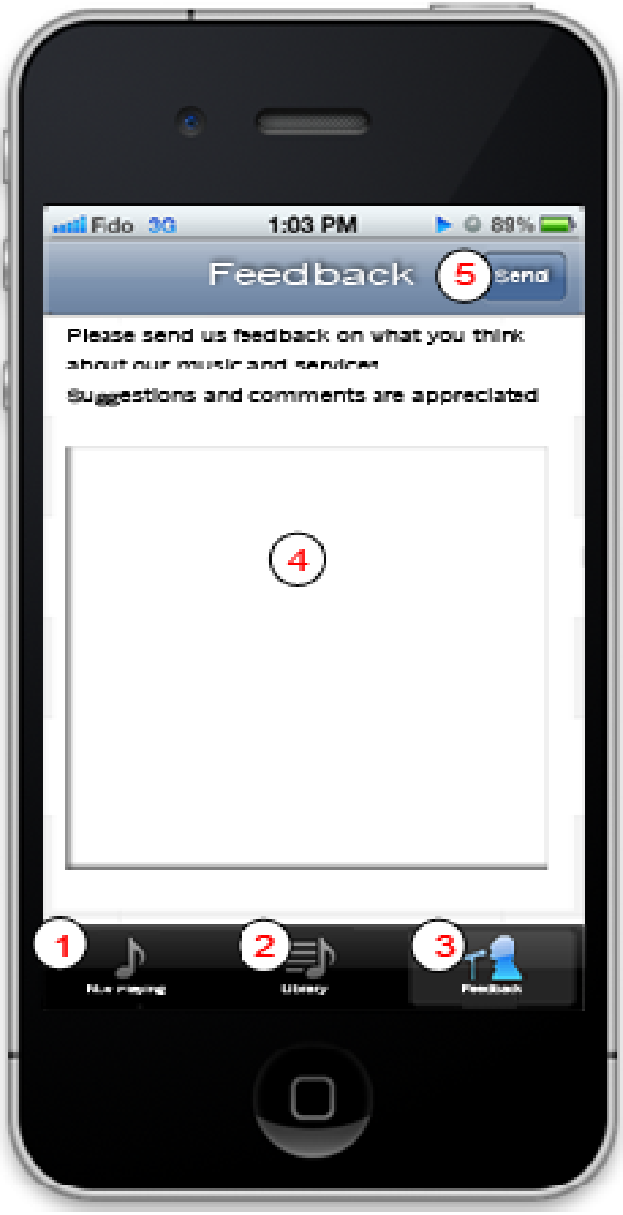
3: Feedback tab bar button – show form to submit a feedback

4: Title – title of this section

5: List of current playing queue

6: Indication of the current playing song

3.2.9.6 Screen Layouts: 6 – Feedback View



1: Now Playing tab bar button – shows current playing queue.

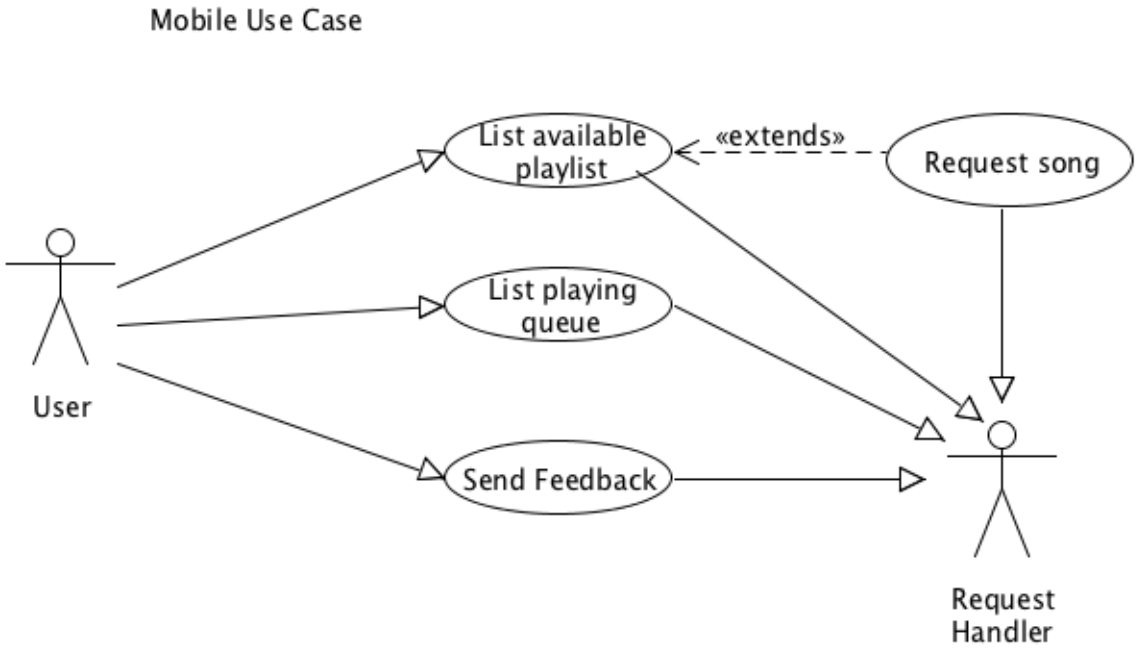
2: Library tab bar button – show playlist available for request

3: Feedback tab bar button – show form to submit a feedback

4: Text box – use can type its feedback message

5: Send button – Send feedback request.

3.2.9.7 Use Case Diagram



3.2.9.8 Use Case Templates

Use Case Name:	List available playlist
Iteration:	Focused
Summary:	The user wants to view what songs are available to request.
Basic Course of Events:	1. This use case begins with the user opening the mobile application (iOS) 2. Select tab "Library" 3. The system communicates with the server asynchronously. 4. The system responds with a list of available songs. See section 3.2.9.1 Screen Layout 1
Alternative Paths:	none
Exception Paths:	If the system doesn't find the server it will return a empty list and alert the user. See section 3.2.9.4 for alert layout
Extension Paths:	User can also "pull down" the list to refresh.
Triggers:	The user has decided to view the list of songs available for request.
Assumptions:	There is a server running in the network.
Preconditions:	The user has an device with the application installed
Post conditions:	The user will receive a list of songs available.
Related business rules:	none
Author:	Lineker Tomazeli
Date:	October 26, 2011

Use Case Name:	List playing queue
Iteration:	Focused
Summary:	The user wants to view what songs will be played.
Basic Course of Events:	1. This use case begins with the user opening the mobile application (iOS) 2. Select tab "Now Playing" 3. The system communicates with the server asynchronously. 4. The system responds with a list of songs. See section 3.2.9.5 Screen Layout 5 5. The system will highlight the current playing song and show the 5 last played and the 3 next songs
Alternative Paths:	none
Exception Paths:	If the device is connected to a network but the system doesn't find the server, it will return a empty list and alert the user The device is not connected to any network, it will alert the user. See section 3.2.9.4 for alert layout
Extension Paths:	User can also "pull down" the list to refresh.
Triggers:	The user has decided to view a list of songs that were played, the song that will be played and the songs that will be played.
Assumptions:	There is a server running in the network.
Preconditions:	The user has an device with the application installed
Post conditions:	The user will receive a list of songs.

Use Case Name:	Send Feedback
Iteration:	Focused
Summary:	The user wants to send a feedback to the administrator
Basic Course of Events:	1. This use case begins with the user opening the mobile application (iOS) 2. Select tab "Feedback" 3. User types a feedback message and click "Send" See section 3.2.9.6 Screen Layout 6 4. The system sends the feedback message to the server asynchronously. 5. The system responds with an alert message saying that message was delivered. See section 3.2.9.4 for alert layout
Alternative Paths:	none
Exception Paths:	If the device is connected to a network but the system doesn't find the server, it will return alert message to the user The device is not connected to any network, it will alert the user. See section 3.2.9.4 for alert layout
Extension Paths:	none
Triggers:	The user has decided to send a feedback message to the administrator
Assumptions:	There is a server running in the network.
Preconditions:	User types a feedback message and click send
Post conditions:	Server save the message in the database and send a confirmation message to the user.

Use Case Name:	Request Song
Iteration:	Focused
Summary:	After user had listed the available playlist, he decided to request a song to play in the sound system.
Basic Course of Events:	1. This use case begins with the user opening the mobile application (iOS) 2. Select tab "Library". See section 3.2.9.8, use case "List Available Playlist" for details 3. Select a song.

	4. The system will send the user request to the server and responds with a confirmation message saying that message was added to the playing queue.
Alternative Paths:	3. After selecting a song, the user has the option of specifying what time he wants to play it.
Exception Paths:	If the device is connected to a network but the system doesn't find the server, it will return alert message to the user The device is not connected to any network, it will alert the user.
Extension Paths:	The server might return a message saying that the request could not be completed.
Triggers:	The user has decided to request a song
Assumptions:	There is a server running in the network.
Preconditions:	User chooses a song from the current playlist
Post conditions:	Song is added to the playing queue.

IV. Supporting Information

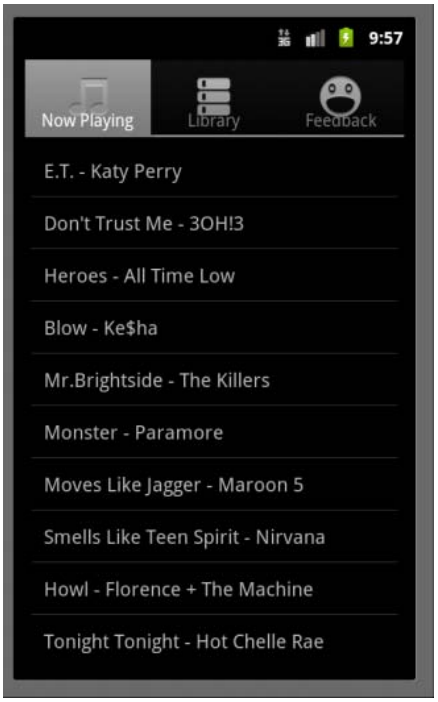
4.1 Updates

Risk 08N in Section 2.7 has been added since the Preliminary Design Report.

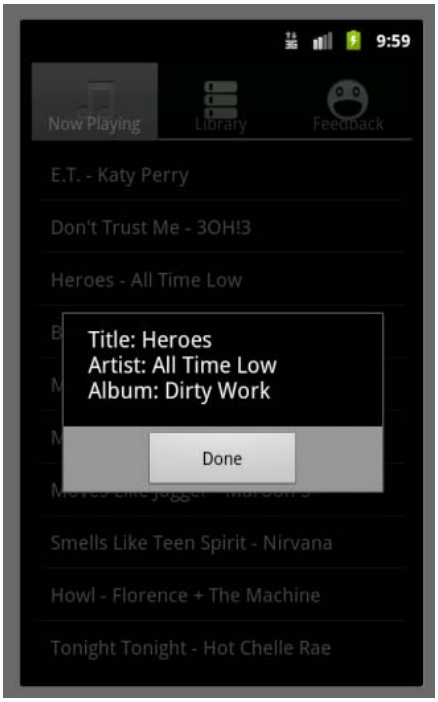
4.2 Android Application Screen Layouts

The following screen layouts are for the Android application Module from Section 3.2.8, which has the same functionality as the iOS application in Section 3.2.9.

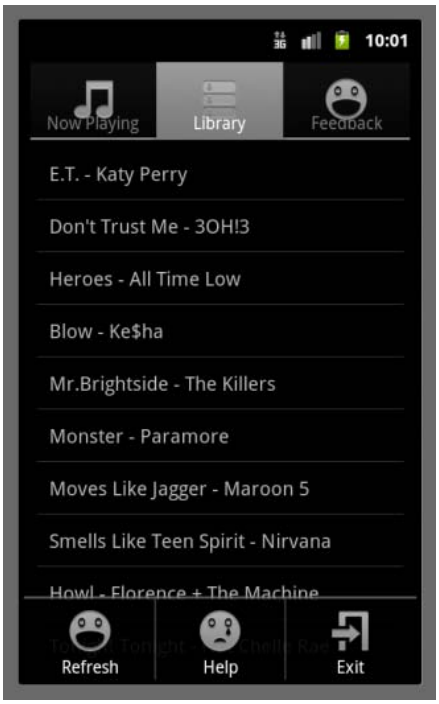
4.1.1: Current Playlist



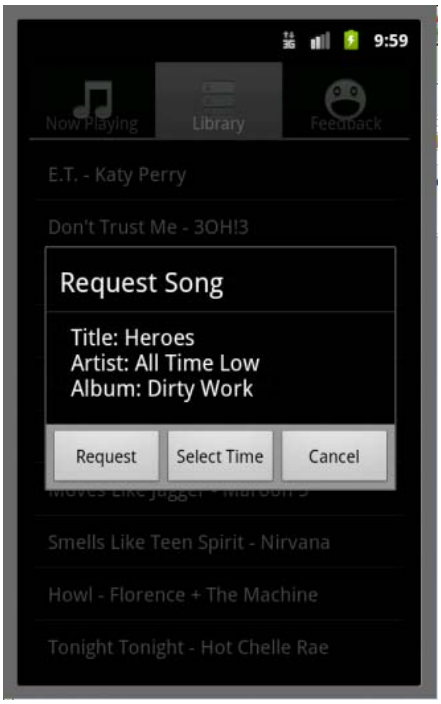
4.1.2: Song Information Popup



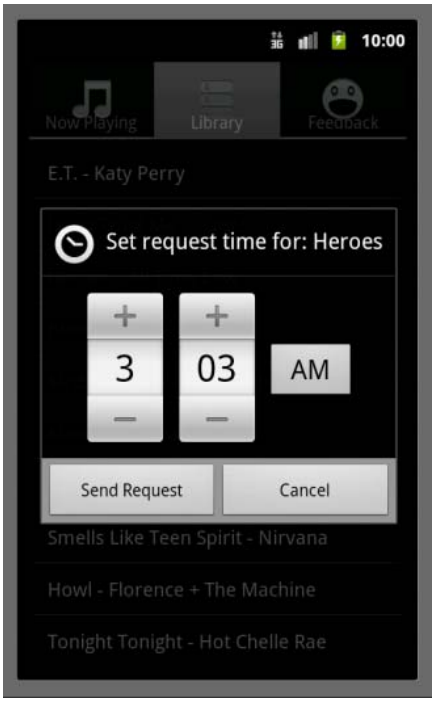
4.1.3: Library with Menu



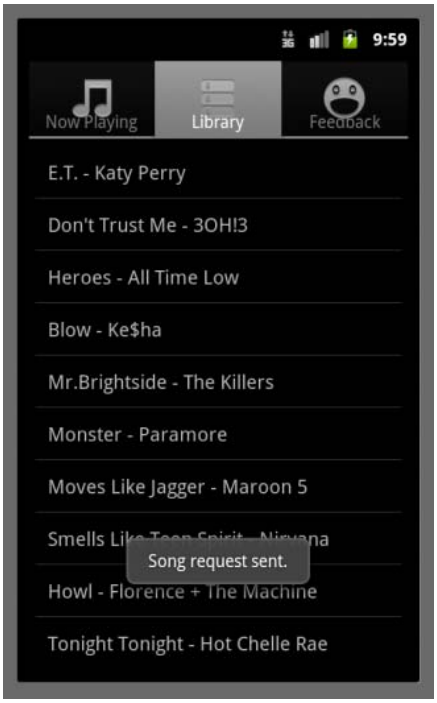
4.1.4: Song Request Popup



4.1.5: Time Select Popup



4.1.6: Request Feedback



4.1.7: Feedback Screen with message