Project Proposal

Professional Experience - 300579

Group 2: WSUSCC1 2020

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# Executive Summary

The purpose of this document is to define the current situation regarding the Squashlands Gym & Fitness centre music system and provide the client with 3 alternative solutions and one recommended solution. From these three solutions we will provide one recommended solution which will be the best suited for the client’s needs. Each alternative solution will go into detail about the difference amongst each one, how it is applied regarding the business and the specific risks there are when developing the Jukebox software.

An outline of the main functionality is shown which is listed either as an essential function or optional function which will be based on the importance of the client’s needs additional to that a list of use cases of each function and how it will operate in a real life situation.  Finally, the document will propose a development release schedule which will be applied to the development of the project. The output of this project will allow the client to come to a final decision as to what direction he would like to pursue in terms of the project solution and full understanding of what the project will require to be undertaken for development.

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# Introduction

The purpose of this document is to explain our understanding of the client’s problem and provide viable solutions that address the needs of the client. Gyms are making use of more technology to gain a competitive advantage against other gyms in the area. Gyms these days are expected to have a desirable music system, that allows gym members to focus on their workout and enjoy the environment while at the gym. Currently, Squashlands Gym & Fitness is facing an issue where their music system is not up to date enough for the desires of the gyms members.

This document entails the project background and information about the client. It provides three alternative solutions that offer slightly different final products from each other. Functional requirements from the client are represented as High-Level Business Functions, followed by use cases describing each listed. The recommended solution details what we believe is the clients best choice. The expected project development scope is depicted through a Development Release Schedule, before reaching a conclusion that will summarise the proposal.

# Client Details and Project Background

|  |  |
| --- | --- |
| **Client Contact Details** | |
| **Name:** | Angel Georgieff |
| **Email:** | [angel@pageone.net.au](mailto:angel@pageone.net.au) |
| **Location:** | 1 Shaw Rd, Ingleburn NSW 2565 |

### Figure 1 – Client Contact Details Table

Music is an essential aspect whilst exercising to keep fit these days. Gym members want to be able to decide what songs and custom playlists they want to listen to whilst exercising. Squashlands want to provide this option and functionality available to patrons through the Squashies Jukebox app as a result removing the need of admin or staff members to change the music that is currently being played in the queue.

The Jukebox application should allow users to interact with a small tablet device which they can decide what songs they would like to listen to and queue the song into the Jukebox playlist. Currently the staff members have an interface to interact with allowing them to view what songs are being played, play, pause, stop and change the songs in the playlists. The server side of this application is fully functional and is fully capable to carry out the necessary functions. As a result, our team is responsible for the user interface which will link to the server backend.

# Problem Statement

Currently the majority of gyms and fitness centres implement a music system that allows users to decide what music is to play which can be controlled through a Jukebox or music queuing application. The Squashlands Gym & Fitness currently face this issue as a result they have been requested several times for music to change that is more suitable for them.

Feedback from members is a high priority. If there is no response to feedback, members will take business elsewhere believing they are able to find better value for their money. This issue should be dealt with as soon as possible.

# Alternative Solutions

# Alternative Solution 1 – Kotlin with JavaScript and XML (AJAX)

## Solution Description

The Android Operating System is a Mobile-Based Operating System which is used on portable devices such as mobile phones or tablets. Android devices are affordable at lower costs yet are still effective enough to run applications effectively and can be used for everyday tasks easily such as running a music jukebox application. The API version for this project would be programmed in API 23 (Marshmallow) to better suit the client’s device.

Kotlin is a programming language available on the Android Studio platform which will allow us to develop the user interface for the jukebox application. This is suitable and is compatible with the client's current android tablet. Kotlin is a powerful language and is effective in being concise, cleaner and faster to work with. Kotlin is a language that has a community exponentially growing, being great as a future proof option. It will do the exact same as current applications running the programming language Java. Kotlin also has the potential of being a software that is compatible with both iOS and Android. However, Kotlin has become an official language for Google and officially favouring it, as a result, more and more new applications are being developed with this language.

Asynchronous JavaScript and XML (AJAX) will be implemented with development for the purpose of being able to create asynchronous web applications. This will let us retrieve data from the server, specifically the song file, description of the song and other specific requests needed for full functionality. This will work well with the current Administrator panel implemented with the server side which was developed previously. The application will require this technology for full functionality and meet the user’s needs.

## Business Case

This solution will be compatible with the current Android device that the client has which will be cheaper and more affordable. This will also be compatible with the current server standing and will be able to satisfy the needs of the client.

## Cost Benefit Analysis for Solution 1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Details** | **Year 1** | **Year 2** | **Year 3** | **Total** |
| **Costs** | | | | |
| **Software Package** | $1,500 | $0 | $0 | $1,500 |
| * **Software Development** | $1,250 | $0 | $0 | $0 |
| * **Software License** | $0 | $0 | $0 | 0 |
| * **System Migration and Implementation** | $250 | $0 | $0 | $0 |
| **Maintenance and Updates** | $0 | $50 | $100 | $150 |
| **User Training** | $100 | $0 | $0 | $100 |
| **Data Migration** | $50 | $0 | $0 | $50 |
| **Total Costs** | $1,650 | $50 | $100 | $1,800 |
| Revenue from this Solution | | | | |
| **Increased Employee Efficiency** | $250 | $500 | $1,000 | $1,750 |
| **Increased Gym Members** | $250 | $500 | $1,000 | $1,750 |
| **Total Benefits** | $500 | $1000 | $2,000 | $3,500 |
| **Cumulative Net Total** | -$1,150 | -$200 | $1,700 | $1,700 |
|  | | | **Break Even Point** | **Year 3** |
| **Disclaimer: The values listed in this Cost Benefit Analysis are unofficial and are for marking purposes only.** | | | | |

## Risks

* In comparison to the development of Java based applications, compilation of the application when using Android Studio runs very slow.
* Since the language is new, it will take time to use considering the syntax of the language is concise and different to using other object oriented languages.
* Current Kotlin community is very small, therefore relying on other online resources will be minimal.

# Alternative Solution 2 - Java (Native) with JavaScript and XML (AJAX)

## Solution Description

The majority of Android applications running today are coded and programmed with the Java programming language. This is due to the wide knowledge of the commonly used language amongst programmers, and its compatibility to run on several different Android-based Operating System devices.

Java is an object-oriented programming language that is available on the Android Studio platform. It is heavily endorsed by Google as an official language to create and develop Android applications. For this project, Java will be programmed within API 23 (Marshmallow Version 6.0.1) which is compatible with the client’s current possessions of hardware. Java is widely-known and has an already established community that is supportive and allows for the application to be easily maintained. However, due to the language being Native, it is only compatible on the Android platform.

The following solution will perform alongside with JavaScript and AJAX (an XML solution) which will be implemented within the development phase to allow for the communication of the application with the web service that was previously developed with the predecessor of this project.

## Business Case

Java, as a solution is a commonly known language to many programmers, this allows for minimal-effort to learn the programming language, with the most efficiency in developing the solution. The solution is compatible with both the client’s existing server and android device, thus being a reasonably cheap and affordable solution that can be developed in a timely manner.

## Cost Benefit Analysis for Solution 2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Details** | **Year 1** | **Year 2** | **Year 3** | **Total** |
| **Costs** | | | | |
| Software Package | $1,500 | $0 | $0 | **$1,500** |
| * Software Development | $1,250 | $0 | $0 | **$1,250** |
| * Software License | $0 | $0 | $0 | **$0** |
| * System Migration and Implementation | $250 | $0 | $0 | **$250** |
| Maintenance and Updates | $0 | $200 | $400 | **$600** |
| User Training | $100 | $0 | $0 | **$100** |
| Data Migration | $50 | $0 | $0 | **$50** |
| **Total Costs** | **$1,650** | **$200** | **$400** | **$2250** |
| **Revenue from this Solution** | | | | |
| Increased Employee Efficiency | $250 | $500 | $1,000 | **$1,750** |
| Increased Gym Members | $250 | $500 | $1,000 | **$1,750** |
| **Total Benefits** | **$500** | **$1,000** | **$2,000** | **$3,500** |
| **Cumulative Net Total** | **-$1,150** | **-$350** | **$1,250** | **$1,250** |
|  |  |  | **Break Even Point** | **Year 3** |
| **Disclaimer:** The values listed in this Cost Benefit Analysis are unofficial and are for marking purposes only. | | | | |

## Risks

* As this is a native solution, Java is only available on the Android Platform and cannot support iOS – meaning it is not a futureproof solution.
* Java has data security issues, such as SQL Injection, Insufficient Transport Layer Protection, that could impact the applications performance due to phishing attacks and expose the user to data leaks and issues, such as the clients internal network details (I.P. Address).

# Alternative Solution 3 - Scala with JavaScript and XML (AJAX)

## Solution Description

The Android Operating system is implemented among all portable android devices. The Android platform's native programming language is Java. Other options to java include Java Virtual Machines such as Scala, that aims to improve on being easier to use then Java for developers. The API version we recommend for this project is API 28 (Android 9) and up but this would be situational due to the hardware’s compatibility and may be subject to change. This will ensure future proofing and is a safer option if the client wants to change to a newer device.

Scala is an object-oriented programming language available on the Android Studio platform which will allow us to develop the user interface for the jukebox application. Scala is a language that is less restrictive than Java, more concise, and well organised. It is a suitable option to build the desired jukebox application. Scala has been around since 2004 and has a large community that is able to provide support. It is able to create the same functionality that other Java languages are able to, with the intent of being able to do so concisely.

The implementation of Asynchronous JavaScript and XML (AJAX) in the development of this product will perform in communicating from the application to the server. This allows the retrieval of data, such as the audio files, song descriptions, and other needs from the server. The current Administrator panel will function well with AJAX, despite being developed previously, there shouldn't be any issues with this. AJAX is a required technology for this project and is essential for full functionality of the application. While there are alternatives to AJAX, our team believes it is the strongest

## Business Case

This solution is appropriate to reach client expectations. It will be able to serve the needs of the business by serving as an analytical tool as well as an entertainment tool. Scala would be compatible with the current server so no extra work would have to be done.

## Cost Benefit Analysis for Solution 3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Details** | **Year 1** | **Year 2** | **Year 3** | **Total** |
| **Costs** | | | | |
| Software Package | $1,000 | $0 | $0 | **$1,000** |
| * Software Development | $850 | $0 | $0 | **$850** |
| * Software License | $0 | $0 | $0 | **$0** |
| * System Migration and Implementation | $250 | $0 | $0 | **$250** |
| Maintenance and Updates | $0 | $50 | $100 | **$150** |
| User Training | $100 | $0 | $0 | **$100** |
| Data Migration | $50 | $0 | $0 | **$50** |
| **Total Costs** | **$1,150** | **$50** | **$100** | **$1350** |
| **Revenue from this Solution** | | | | |
| Increased Employee Efficiency | $200 | $400 | $800 | **$1,400** |
| Increased Gym Members | $200 | $400 | $800 | **$1,400** |
| **Total Benefits** | **$400** | **$800** | **$1,600** | **$1,600** |
| **Cumulative Net Total** | **-$750** | **$0** | **$1,500** | **$1,500** |
|  |  |  | **Break Even Point** | **Year 2** |
| **Disclaimer:** The values listed in this Cost Benefit Analysis are unofficial and are for marking purposes only. | | | | |

## Risks

* The following solution is prone to scope creep, as the functionalities will take a longer time to develop which will cause issues due project and may affect time management.
* Our team is inexperienced in the programming language and may need more time to learn how to develop specific features, which could possibly extend past the expected handover date.

# Recommended Solution - Kotlin

We recommend Kotlin as the programming language we will develop the Android Application.

## Justification

Kotlin is a solution that is easily accessible through the Android Studio Platform and can be learnt with ease. It is fully compatible with the client's current android tablet and functions within a more effective, concise manner allowing it to be simple to work with. Kotlin has a supportive community that is constantly growing, which will provide a reassurance for future-proofing as there is ongoing support for the solution. Another standing point, Kotlin is the perfect solution for this project, is that it also has the potential of being a software that is both compatible on Android and iOS.

The recommended solution will be developed in API 23, Marshmallow. However, we highly recommend the clients device to be updated to the latest version of android for future proofing reasons. To allow for the solution to be compatible with the both the device and have the best capabilities and functionalities possible. It will be developed alongside with the Asynchronous JavaScript and XML implementation that will allow the application to be able to perform concurrently with both the web server that is already existing within this system and send and request music from the server seamlessly.

The highest potential of this solution is the ongoing support it has within the community. Even after it has been developed by our team, there is support that can be easily accessible from both the Kotlin community and I.T. Industry, once the solution has been handed over to the client. This means that without a doubt, there will be accessibility to online support as well as possible ongoing maintenance with external entities in order to situate and maintain this solution for prolong usage, allowing the solution to be superior to the alternative solutions and be defined, future-proof.

# Ranked High-Level Business Functions

|  |  |  |
| --- | --- | --- |
| **BF ID** | **High-Level Business Functions** | **Ranking** |
| BF1 | Song Search | Essential |
| BF2 | Song Request | Essential |
| BF3 | Marquee Banner (Scrolling Text) | Essential |
| BF4 | Application Admin Panel | Essential |
| BF5 | Announcements | Essential |
| BF6 | Screen Saver | Essential |
| BF7 | Theme Change (Colour Scheme Change) | Optional |

### Figure 2 – High-Level Business Functions Table

# Use Cases

|  |  |
| --- | --- |
| **Function** | **Type** |
| **BF1. Song Search**   1. As a Patron, I would like to search for a song, I want to add to the song queue. 2. The patron is required to enter their details (name) into the tablet upon request. | **Essential** |
| **BF2. Song Request**   1. The patron is required to enter their details (name) into the tablet upon request. | **Essential** |
| **BF3. Marquee Banner (Scrolling Text)**   1. When a song is playing, have a sentence scroll through the song on the screen. | **Essential** |
| **BF4. Application Admin Panel**   1. Admin sets up the password (pin code) and can login to the Admin Panel. 2. Admin can change the IP Address on the application, to allow connection between the tablet and server. 3. Add a voice recording option for announcements. 4. Function to add text to be displayed on Marquee Banner Scroll function and set timer to scroll and (*optional*: speed). | **Essential** |
| **BF5. Announcements**   1. A pre-recorded announcement is to be played at a set time (intervals within an hour), and have an option to force an announcement. | **Essential** |
| **B6. Screen Saver**   1. A screensaver after idling for a certain amount of time to reduce screen burn in. | **Essential** |
| **B7. Theme Change (Colour Scheme Change)**   1. Admin is able to set colour theme of application, possibly have set colour schemes as well. | **Essential** |

### Figure 3 – Use Cases Table

# Development Release Schedule

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **BF ID** | **High-Level Business Function** | **Description** | **Effort** | **Start Date** | **End Date** | **Status** |
| BF1 | Song Search | Searching for songs within the list on the application. | 5 Days | 6/4/20 | 11/4/20 | Incomplete |
| BF2 | Song Request | Filling in a small number of fields on a form and leaving contact information. | 4 Days | 9/4/20 | 13/4/20 | Incomplete |
| BF3 | Marquee Banner (Scrolling Text) | A scrolling horizontal banner that displays text messages. | 6 Days | 12/4/20 | 18/4/20 | Incomplete |
| BF4 | Application Admin Panel | Able to change IP for server to application connection, modify announcements | 20 Days | 17/4/20 | 7/5/20 | Incomplete |
| BF5 | Announcements | Pre-recorded announcements to be played at specified intervals | 8 Days | 23/4/20 | 1/5/20 | Incomplete |
| BF6 | Screen Saver | A standby mode for the application to avoid ‘screen burn in’ | 6 Days | 7/5/20 | 13/5/20 | Incomplete |
| BF7 | Theme Change (Colour Scheme Change) | The option to change the background colours/theme of the application | 6 Days | 14/5/20 | 20/5/20 | Incomplete |

### Figure 4 – Development Release Schedule Table

# Conclusion

The primary goal of this project is to increase the business in Squashlands Gym through a jukebox application. The current sound system in the gym works as it should, yet is ineffective at attracting more business or allowing gym-goers to enjoy their experience to the fullest. With our recommended solution, our team is certain we will be able to provide the desired product within the time frame allocated.

Our recommended solution is Solution 1, Kotlin, and it explores the possibility of using the programming language within Android Studio to develop the application and its GUI components. We believe this to be the most suitable choice as it exceeds the client current requirements and could provide much more potential, allowing the team to develop a solution that can be perfected and moulded to the client’s needs.

Moving forward, the next steps within this project is that we look forward to hearing from you, about your ideas and potential re-adjustments if there is any. This will allow us to gain a better grasp for the project and in order to have the following recommended solution be best-fit for this business model.

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