**Software Engineering Group Project -**

**Group 6 End-of-Project Report**

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# 1. Introduction

## Purpose of the document

The purpose of this document is to assist the markers in evaluating individual performances and the overall performance of the group throughout the project.

## Scope

This document will consist of five main components which are all centred around the performance of the group members. The report will highlight areas where the group has performed well as well as areas where there is room for improvement.

## Objectives

The main objective is to give a detailed description of the group's strength and weaknesses as well as discussing the progress which was made on the project assigned. The document will also explain to the marker the main events that have happened throughout the project as well as the planning process to ensure that the project was completed by the deadline. The report will also explain the final state of the project.

# 2. A Management Summary

In the opinion of the group the project has been a success. There are many things that need more work but overall, the group is happy with the end product, the final submission of the code has passed 8/9 of the functional requirements with the only two things letting the group down.

The first thing that was not completed to the specification that was given was the testing features for the dictionary, although the user is able to go through each test that was required they are unable to take one big test where they will complete a random collection of all the tests. The group believes that this could have been rectified if noticed at an early date, it was decided that this would be left out due to how close the deadline was. The group feared that if things were added into the code with such little time left then the final submission could have been compromised with code that contained broken features as well as the amount of work it would have taken.

The second thing that caused the group problems was the bugs and glitches which were found in the code, like the problem with the tests unfortunately these were found late on in the process. The group was able to solve a lot of these issues, but some remained in the code. Some of the bugs that remain in the code include:

* The buttons to switch the ordering of the words were the wrong way around, meaning that if the user selected ‘Welsh to English’ the words were ordered by the English words.
* The verbs in the dictionary were placed in the words beginning with ‘T’ due to the verbs being displayed with ‘To’ before the word.
* When adding in a word to the dictionary there is only a check to see if the user has selected a word type, meaning if a word type is selected the user can add an empty word. As well as this there is no validation to see if the word has already been added into the dictionary.
* When the user is going through the flashcards, they can only translate the card once and cannot change it back to English unless they come back to the card. As well as this the randomisation of the cards was light as there is no check to see if that word has already been used in that session.

In regards the documentation, the group believes that all the documentation excluding the design documentation is to a high standard which follows the feedback provided by Chris Price. Although the majority of the changes that suggested were completed there are a few that were not, the group came into a few problems when it came to this. The first being that the architecture of the code was changing with every problem that was encountered this made it difficult to produce an accurate document. Another problem that was encountered was that members of the group which had not been working on the coding were then working on the design document, this meant that the progress of the document was slowed down as it meant that people working on the code had to explain certain aspects of the project in detail.

The group believes that the way problems were solved were effective and efficient. Any time a big problem was found the group worked as a whole to find a solution, this was mainly done in the groups meetings without the project manager and involved every member of the team giving their input to find a solution. In regards to changes in the documents to follow the feedback this was also done in a similar way where the group would analyse the document and point out errors and areas to improve upon.

# 3. A historical account of the project

## 3.1.0 Week 1

Week 1 was mainly spent familiarising ourselves with the contents of the assignment. The first meeting served as a chance for everyone to meet each other and get a general overview of what the project entailed; the group was informed of the positions that needed to be filled. Each members jobs were assigned:

* Wojciech Sowinski – UI team
* Jaime Sanchez Revuelta – Design team
* Josh Rogers – QA manager
* Valentin Daros – Testing team
* Andreas Rabjerg Strand – Testing team
* Jacob Back – Design Team
* William Priamo – UI Team

## 3.1.1 Week 2

During the week, each group had started to work on their tasks. The design team had begun to work on the architecture and had started the design specification document. The design team then presented the progress to the group, which was a description of the classes accompanied by a brief description. The UI team had also made a start with William giving a short presentation on the design of the interface showing the overall layout and the placement of buttons. Wojciech had started to work on the JavaFX at this point. Valentine and Andreas had both presented their ideas on how the testing should be done by producing a table which explained the tests that would have to be carried out on the main functions.

## 3.1.2 Week 3

Jaime reported on the progress that had been made in the Architecture design, which was mainly on how we would handle the ‘favourite’ words. He was also working on the most appropriate data structure to use. William presented the improvements he had made on the UI specification, which included how the user would interact with the UI and deciding on a colour scheme to use. Wojciech had also made progress on the JavaFX work and had been following the UI spec that was being created. Valentin and Andreas had been working on new tests that we would need for the final product. New roles were appointed as decided by the group:

* Project Leader – William Priamo
* Deputy Project Leader – Valentin Daros
* QA Manager – Joshua Rogers
* Deputy QA Manager – Andreas Strand

The group also agreed to have additional meetings without the project manager.

## 3.1.3 Week 4

Jaime and Jacob discuss with the group the problems that may arise due to collisions and state that they want to test a cuckoo hash map. William and Wojciech discuss with the group the layout of the flashcard system and decide to go with the single flashcard idea, the idea of a separate navigation bar for the individual letters is purposed, but that idea is scrapped. A dropbox is decided as the best method for the user to enter the word type when adding a new word, and this will remove user error. Valentin and Andreas discuss the tests they are adding as more functions are added to the program. Sirui Yin attends his first meeting this week and is assigned to the testing team to look at Junit.

## 3.1.4 Week 5

William presented the final presentation before the submission date. He received feedback on what needs to be added, and the presentation can now be interacted with as if the user was interacting with the program. It was also decided that words from the dictionary.json file should replace the placeholder text and that the practice words list should be an option that the user can select. Wojciech presents his current progress on the JavaFX and is tasked with creating use cases for the UI documentation. Josh has been working on the JSON implementation this week using Jackson, which he will continue doing. Andreas and Valentin will continue to develop the list of tests that need to be carried out, and Jacob and Jaime will carry on testing the cuckoo hashing.

## 3.1.5 Week 6

Josh had continued to fix bugs in regard to the JSON implementation using Jackson as well as reviewing the UI spec before it was submitted. Jacob and Jamie have both worked on the design specification and have been testing different data structures. Wojciech had continued to work on the JavaFX but has now moved onto the architecture to help speed up the process. This week a review of the test specification was carried out with the group with feedback being given to both Valentin and Andreas.

## 3.1.6 Week 7

William has received the feedback from Chris and has started making the changes suggested. Jacob, Jaime and Wojciech are still working on the architecture and attempting to find the best data structure. The testing team have continued to work on Junit tests.

## 3.1.7 Week 8

Both William and Valentin have both continued to work on the feedback which was given by Chris Price. The design team are getting the document ready for the formal review for the following week. Jacob and Jaime have both been working on the design document ready for the submission as well as adding in JavaFX classes to the UML diagram.

## 3.1.8 Week 9

This week was spent coming up with how the team would deal with the closure of the university. William decided that the group should use Microsoft Teams as everyone can sign in through their university email address, A channel was made for the appropriate teams where the group could post messages as well as message each other. Microsoft Teams also has the feature to hold conference calls which will be used for our future meetings.

## 3.1.9 Easter

During the Easter break, the group carried on with the project. The group decided that it would be beneficial to have a meeting every week and carry on with the work, over the three weeks the group had made a lot of progress and had started developing a working prototype of the code which was demonstrated to the group by Wojciech, Jacob and Jaime.

## 3.2 Week 10

This week William told everyone what the plan would be for the integration week, the plan included a meeting at 9am every morning which would be used to give out tasks for the day and a meeting at 5pm to see what everyone had accomplished. Wojciech gave a demonstration of the code that had been produced with a working JavaFX interface, Valentin and Andreas also handed in the reviewed version of the Test specification which Josh would look over.

## 3.2.1 Day 1 integration week

The day started with a meeting at 9am, where tasks were handed out. Wojciech was to carry on with the code with the assistance of Jaime who would be creating CSS files for the JavaFX. Jacob was also assigned to help with the system by making sure it was well organised and that everything was commented. Valentine and Andreas produced a test report form and began testing the code in its current state. William and Josh have both been working on finalising the UI and the test spec documents to ensure they follow all of Chris’ feedback.

## 3.2.2 Day 2 integration week

The meeting started with a demonstration from Wojciech which showed the working code, the group then gave feedback on what needed to be completed, Jaime and Jacob were assigned to continue working on the code with Wojciech. Sirui had sent some Junit tests to the group and Valentin and Andreas were assigned to see if they could be used. William was to go through the design documentation and start to make changes following the feedback Chris had given as well as meeting with the testing team to discuss the tests that Sirui had made, the Junit tests could not be used so Sirui was contacted. Josh had started to work on the maintenance manual.

## 3.2.3 Day 3 Integration week

It was decided that Valentin, Andreas and Jaime would spend the morning completing the Junit tests as Sirui was unable to do so, after the 2pm meeting that was help it was decided that Jaime would then move back onto the coding with Wojciech. William and Jacob were both assigned to work on the design document for the day to try and make progress on the feedback which was given. Josh carried on working on the maintenance manual for the day.

## 3.2.4 Day 4 Integration week

Due to the deadline for the coding being the next day it was decided that Valentin, Andreas and Jaime would work with Wojciech on the code to ensure that the all test failures were corrected as well as formatting the code. Jacob continued to work on the sequence diagrams and the changes to the design document with William when it was decided that William would start to work on the end of project report at the 2pm meeting. Josh worked on completing the maintenance manual as well as reviewing the code.

## 3.2.5 Day 5 Integration week

As it was the deadline day in the morning day we went through the functionality of the code and gave feedback on what needs to be done, due to the amount that needed to be done Valentin, Andreas, Jacob,Wojciech and Jaime were all put onto the coding for the rest of the day. William and Josh were assigned the task of both working on the end of project report.

# 4. The final state of the project

Whilst we were able to satisfy many of the requirements[] in our project, unfortunately due to time constraints some features had to be left out.

One requirement in particular was unfortunately not able to be covered, this being *FR10 Running tests*[]. Due to time constraints this is absent from the final program. Whilst the user can still perform the tests on the practice list mentioned in *FR9*, as well as the Flashcards mentioned in *FR8*, the combination of tests from *FR9* that is *FR10* is not implemented.

Aside from this all other requirements are covered by the program.

There are also some issues with the code structure itself. One issue is to do with the JSON reading/writing implemented by the program. Spike work was completed early on in the project to create a JSON processing class that had the ability to read/write JSON. This class is implemented in the project, albeit in a slightly modified form, but is only used for writing JSON. This class uses Jackson. There is another implementation of a JSON library, using Jsonsimple, that is present in the code and used for reading in JSON data. There is also a Maven dependency for a third JSON library called gson in the IntelliJ project.

This means that we have 3 different JSON libraries implemented, when the functionality achieved by this solution could have been done with just one. This issue was likely caused by poor communication between group members. It is possible that a group member working on the code didn’t understand the Jackson implementation for reading JSON data, so implemented their own solution leading to the use of multiple JSON libraries in the program.

Another issue the program contains is to do with JavaFX. Many of the controller classes for the JavaFX used in this program throw exceptions when buttons are clicked, etc. Whilst this does not crash the program, it is certainly not good practice and is an issue. In particular some classes, in particular those relating to Flashcards, seem to throw a NullPointerException which is an issue when it comes to stability. This issue was again likely caused by poor communication, with multiple people working on the same code and the result being merged code that works but throws errors and is potentially unstable.

The program also has issues with adding words. It is possible for a user to add multiple words with the same English and welsh meanings and also the same word type. This is an issue because it means multiple entries are returned when searching the dictionary list. This issue was likely caused by an error made somewhere in the code to add words to the dictionary and could potentially be fixed with a simple if statement.

Finally, some documentation has issues. Whilst most documents have been reviewed by the QA manager and deemed to meet requirements, in particular the Design Document has issues. Some of the sections in the Design Document are lacking detail, with some missing diagrams. Some sections are also not relevant to the actual finished program. This issue was caused by starting the code before the Design Document was finalised. This meant that the Design Document was mainly completed after the code was done. This is a problem because the Design Document acts as an agreed template for the production of the code, which had the knock-on effect of meaning that the code was made by multiple different people, who hadn’t agreed on what to do as the Design Document was not in a useful state at that point. This contributed to the issues caused in the code as mentioned above.

One issue caused by the Design Document’s issues concerns the Maintenance Manual. This document refers to the Design Document multiple times, as the content the manual describes should be covered in more detail in the Design Document, and SE.QA.10 suggests referring to it. Unfortunately, as much of this content is missing from the Design Document, this means that the Maintenance Manual, whilst containing basic information on the various topics it covers, refers to information that in most cases is lacking detail. This issue is caused by a lack of detail in the Design Document.

# 5. Performance of each team member

## Wojciech Sowinski

Wojciech has been a very active member of the group since the first week and has shown an interest in all aspects of the project not just what he was assigned. His first responsibility was the JavaFX which he completed by following the UI spec which was completed by William, when a change in the UI design was presented in a meeting Wojciech always had the changes implemented by the following week on the JavaFX. As well as the JavaFX Wojciech has also played a vital part in the coding by offering his help to Jacob and Jaime as soon as he had completed his tasks. Without Wojciech’s input to the architecture the application would have not come this far, he the only criticism that could be given is that the communication has not always been the best and that he has not always followed the correct structure when writing the code.

## Jaime Sanchez Revuelta

Jaime has been committed to the code and the architecture from the moment he was assigned the task. For the first 4-5 weeks Jaime was experimenting with how we could design the architecture for the code and what aspects the code will need to include. Jaime has played a big part in the final code as well as the design document where he decided on the data structure that we would use, Jaime has had the ability to listen to criticism from the group and has had no problem asking for the groups opinions and help during the course of the project. Jaime also has to be commended for stepping in to do the Junit tests last minute when the group was let down by a member. Jaime could be criticised for being unorganised at times with the design spec not fully being completed on time which was not his sole responsibility.

## Josh Rogers

As QA manager Josh has been an essential part of the group over this project. Josh was ensured that everything the group has produced or planned to do has followed the QA documents which were provided by Chris. His attention to detail has been exceptional through out the documentation and without him the group would not have been able to provide anything to the standard that has been submitted. As well as all this, Josh has also assisted in creating the GitLab repository and keeping that in the correct state and implementing the Json file Jackson, which can be seen in the code. There are no criticisms for Josh’s performance as everything that has been asked of him has been done to a high standard.

## Valentin Daros

Valentin has been an important member as part of the testing team, and as deputy project leader, He played a vital role in assisting in the creation of the final test report and the Junit tests. Throughout the project nobody can fault his work ethic, he has consistently been on time with his work and well organised, Valentin has also been more than happy to assist any member of the group with their work when required. As well as being part of the testing team, he is also responsible for the groups GitLab repository. Valentin has shown a huge interest in everyone’s work throughout the project by making himself familiar with all the QA documents giving him the ability to provide constructive criticism on work other team members have produced. Valentin has been a reliable person which every member of the group can depend on.

## Andreas Rabjerg Strand

Andreas was part of the testing team for the duration of this project. He is responsible for assisting in the creation of the test reports as well as the Junit tests, Andreas has done what was asked of him through-out the project. Although the work that Andreas has produced has been of a good standard he has been reserved with the group at times and could have been more active in seeking other tasks he could complete.

## Sirui Yin

The performance of Sirui has been nothing short of disappointing. He has failed to produce anything that could be used for the final submission, his lack of interest and effort in the group has been insulting. Sirui was tasked in week 4 to start working on Junit tests which was the first meeting he attended, we received those tests at the beginning of integration week which could not be used. When asked to amend his changes he replied with “The optimization work is not my part”.

## Jacob Back

Jacob has been part of the design team and has been vital in the production of the design spec document as well the data structure that has been used. Jacobs hands on approach to the project has played an important part on getting the project to where it is as he has done everything that was asked of him. Jacob could be criticised for sometimes being reserved within the group

## William Priamo

William has made his presence known as a leader from the first tutorial we had, so it came as no surprise to us that he did a very good job to keep us united and working together, even in these extraordinary situations. He has been a very good example of professionalism, taking upon himself the first two documents we had to produce, in order to set an example of the quality of the work he wanted from all of us. After all the work we had to do moved in the digital are, due to the lockdown, William kept in contact with everyone and helped wherever he could. For example, he first modified the User Interface presentation and document to match the final interface we had. He also took upon himself to change the Architecture document, so he could let Jaime and Wojciech focus on the code. Also, during the Integration week he had meeting with all of us three times a day so that he would be up to speed with everything that is happening. To be honest, this project has been a great success due to William’s leadership and implication.

# 6. Critical evaluation of the team and the project

The members of group 6 worked well as a group with having great communication in integration week and having the ability to support the other members of the group. However, the communication was not always to such a high standard at the beginning of the project, the group decided that they would initially use email to communicate with each other which meant the group often missed messages and replies were often slow. The standard of the communication increased when the University closed, this was due to the fact that the members would no longer have the ability to meet in person twice a week to discuss progress. Due to the closer A Microsoft teams’ group was created for the group which would enable instant messaging, conference calls and deadline dates to be sent, this played a vital part in the integration week. Like the communication the work rate at the beginning of the project was slow which meant that as the weeks went on the work was beginning to pile up. Luckily, the group noticed this and decided to up the work rate which resulted the project making a lot of progress in a short period of time. Overall, the group performed well as a group, the group believes that they would have been able to accomplish a lot more if the standard of communication and the work rate were as high at the start of the project.

The project that was set could have been improved in a number of ways. A meeting at the start of the project with the ‘Client’ would have been beneficial where the group would have the opportunity to quiz the client on the specification provided. As well as this the group would like to express how useful Microsoft teams is when working as a team and would highly recommend it be used as compulsory tool in future projects. It would also be beneficial for the groups to have a scheduled practical/workshop as well as the weekly tutorials, this would encourage members to start the bulk of the work earlier on the process.

Group 6 has made a lot of progress throughout the process and have improved massively as individuals and as a group. One of the things the group learnt early on is that if the work load is too much for one individual then help can always be given if it is asked for and taking on too much work can put pressure on the group as a whole. Another thing would be to set the standards high at the beginning of the project to prevent problems further on in the project, an example of this would be commenting the code which was not done as the code was being written, this resulted in a lot of time being spent rectifying this.

# REFERENCES

# DOCUMENT HISTORY

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