

Unit 4: Programming

**Assignment 2**

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**Project Link:**[**https://github.com/Sparkesy/Programming-Quiz/tree/master**](https://github.com/Sparkesy/Programming-Quiz/tree/master)

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# Analysis of the brief

The required and desired functionalities mentioned in the brief outline the basic requirements of a quiz application. The required functionalities mainly focus on the basic features that are essential for a quiz application, while the desired functionalities aim to enhance the user experience by providing additional features.

The first required functionality is to welcome the user and explain the purpose of the application. This is an essential feature as it sets the tone for the user's interaction with the application. It provides an overview of what the application is about and what the user can expect from it.

The application is also required to ask at least five questions. Each question should be in the form of a multiple-choice question, and there should be no less than four possible answers, with one being the correct choice. This feature ensures that the user is presented with a variety of questions that test their knowledge on different topics.

The application must also report on the performance of the user through a score report screen or feature. This functionality is crucial as it provides feedback to the user on how they performed. The score report should include both the number of questions answered correctly and the percentage of questions answered correctly.

The desired functionalities aim to enhance the user experience by providing additional features. For instance, the users' scores are recorded and stored, which allows users to track their progress over time. This feature is useful as it enables users to identify areas where they need to improve.

The application should also display the highest 10 stored scores in descending order, in the form of a high score table screen or feature. This functionality allows users to compare their scores with other users and provides an added layer of motivation to perform well. Each entry in the high score table should include the name of the student who achieved that score.

In conclusion, the required and desired functionalities mentioned above outline the essential features of a quiz application. While the required functionalities focus on the basic requirements, the desired functionalities aim to enhance the user experience by providing additional features. A well-designed quiz application should have all these features to provide an engaging and enjoyable experience for the user.

# Time plan

|  |  |  |  |
| --- | --- | --- | --- |
| Week No. / Date | Activity | Estimated time to complete | Date Completed |
| 22  7/3/23 | * List user requirements * Complete Initial project plan * Constraints-Time, Knowledge, Tools, etc. * Design Data storage options * Design Data storage selected | 15 mins  30 mins  30 mins  30 mins  30 mins | 15/3/23 |
| 23  14/3/23 | * Design - User Interface * Design - Reasons for choice of objects * Design - list of events for each form * Feedback on design / Update design | 60 mins  30 mins  30 mins  30 mins | 20/3/23 |
| 24 - 29  21/3/23 | * Produce end program using improvements suggested. | N/A | 25/3/22 – 12/5/23 |

# Constraints

This project may be challenging for me due to my lack of experience in undertaking projects of this nature. While I am competent with programming, my previous experience has been limited to personal projects that were quite different from the requirements of this application.

Furthermore, time constraints may present a challenge for me, as I have other assignments, work, and activities outside of college that may require my attention. This may limit the time I have to complete each task.

In addition, the tools available to me may not meet my expectations or may not be compatible with the design specifications. For instance, if the project is intended to be a web application, I may need to use an alternate Integrated Development Environment (IDE) such as JetBrains or Nova, which may be more suitable.

Overall, while I am confident in my programming abilities, I recognize that this project may present some challenges that I will need to overcome. I will need to carefully manage my time and ensure that I have the necessary tools and resources to successfully complete the project.

# 

# Data Design

## Data Storage options

# For this project, I have determined that the only option for storing data is to store high score data using XML. This is because the questions and answers used in the quiz are non-modifiable.

# The high score data will be stored using an XML file, which will allow the user to enter their name along with their score when they begin a new quiz. This data will be stored in the high score file and displayed on the main page using a datagridview, allowing users to see their score and compare it to others on the high score table.

# Overall, using XML to store high score data is an efficient and effective way of managing the data required for this project. It allows for easy retrieval and display of the high score table, while also ensuring that the questions and answers used in the quiz remain non-modifiable.

# What this program needs to fulfil

As outlined in the project brief, the required functionality of this program is to provide the user with the ability to answer at least five multiple-choice questions, each with four or more possible answers. The program should record the user's answers and display the results on a score page as a score and a percentage. Additionally, a welcome page should be included to explain the purpose of the program.

In addition to the required functionality, the project brief also includes a set of desired functionality. While not essential, these features would greatly enhance the program. One of these desired features is the ability to record the user's scores into a high score leaderboard. The leaderboard should display the highest 10 scores in descending order, with the user's name given along with their recorded score.

By including these desired features in the program, it will provide additional motivation for users to perform well on the quiz and will make the program more engaging and enjoyable to use.

# Consideration of alternative programming languages and techniques

# When preparing for this project, I had to carefully consider which programming language would be most appropriate for the task at hand, taking into account my previous experience with various languages such as C#, Swift, BASIC, Python, Java, and Visual Basic. After weighing up the pros and cons of each language, I ultimately decided to use C# as it is the language that I am most comfortable and experienced with.

# While I have experience with other languages, my experience with C# is more extensive and in-depth. This familiarity with C# will allow me to work more efficiently and effectively, which is essential given the tight deadline for this project. Furthermore, C# is well suited to creating Windows Forms applications, which is the type of program that I have determined to be most appropriate for this project.

# While other languages could have been used, such as Python or Java for their cross-platform capabilities, or Swift for its compatibility with iOS devices, I ultimately chose to use C# for the reasons mentioned above. By leveraging my experience and comfort with C#, I can ensure that this project will be completed to the highest standard within the given timeframe.

# Analysis of Development Process

Upon analysis of the development process, it is clear that the project is somewhat limited by the choice of resources used, as it was developed using the Windows Forms architecture written in C# (.NET Framework), which is restricted to use on Windows-based systems. While this limitation could be overcome by developing the program in a more universally compatible language, such as Java or Swift, my lack of experience with these languages and the time constraints of the project made this an unviable option.

Despite this limitation, it was beneficial to develop the program for the Microsoft Windows environment, as this is the operating system of choice in the college, which ensures compatibility with the intended users.

In terms of the development approach taken, I utilized my tools wisely by using Visual Studio to create my designs before making detailed annotations of my designs in my documentation. This allowed me to better understand the requirements and approach I would take to achieve them.

Overall, while there were some limitations in the development process, the approach taken was effective in producing a high-quality program that meets the needs and requirements of the project brief.

# 

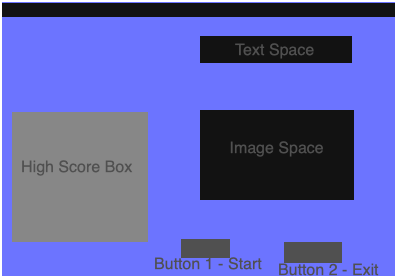
# User Interface Design

Two buttons used for either starting the quiz or

exiting the program, these are contained

in a group box to make it more visually appealing.

## Main Menu



High score box created using a

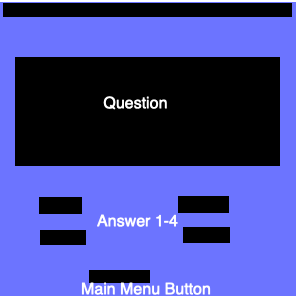
DataGrid view table linked to an XML backend

Decorative icon and title

The Blue colour scheme is used

throughout the program

## Quiz Screen



Group box containing the Question label

The final button on this page are to

Navigate back to the main menu

Buttons contained within a group box

with possible answers to the question.

## Results Screen

## 

Navigation buttons allowing the user to

retry the quiz or return to the main menu.

Listbox which lists all the questions and

has a tick next to the correct ones

Label which updates with the score of the quiz just taken

In general, I have applied a consistent design scheme that employs a blue colour palette, adequately sized fonts, and easily recognizable and accessible buttons. Additionally, I have incorporated various group boxes to enhance the overall organization of the program. The program icon on the taskbar and the image on the main page both align with the quiz theme and complement the colour scheme.

# Reviewing of initial designs

## Based on my evaluation, the initial designs show a lot of potential and require minimal adjustments to achieve the desired outcome. To improve the results page, I recommend adjusting the layout to reduce clutter and improve alignment. Additionally, adding a username entry form before the quiz starts would align with the desired functionalities outlined in the brief and enable users to record their names and scores for display in a top 10 high score section on the program's main page.

## I received valuable feedback from two colleagues who reviewed the designs, which I incorporated to improve the final version significantly.

## Third Party Review

### Oliver Smith

Review date: 25.3.23

|  |  |
| --- | --- |
| Question | Feedback |
| Ease of navigation | The navigation was straightforward and easy to use. I had no trouble moving between different screens and answering questions. |
| Look and feel of the app | The app had a clean and modern design. The colors and fonts were easy on the eyes and made it pleasant to use. |
| Welcome screen | The welcome screen was well-designed and informative. It provided clear instructions on how to use the app. |
| High scores feature | The high scores feature was a great addition to the app. It provided a competitive element and motivated me to do my best. |
| Running the quiz | The quiz ran smoothly with no technical issues or glitches. The questions were clear and easy to understand. |
| The results | The results screen was well-designed and easy to read. It provided a clear summary of my performance on the quiz. |
| Any general comments | Overall, I really enjoyed using this app. It was well-designed and easy to use. The quiz questions were challenging but fair. |

### Evan James

Review date: 29.3.23

|  |  |
| --- | --- |
| **Question** | **Feedback** |
| Ease of navigation | The navigation is very easy to use. |
| Look and feel of the application | The look of the application is very simple and works smoothly. |
| Welcome screen | The welcome screen is very simple to use and navigate. |
| High scores form | The high score form seems very simplistic and easy to use. |
| Running the quiz | The quiz ran as expected and I experienced no issues. |
| The results | The results of the quiz functioned correctly and easy to understand. |
| Any general comments | N/A |

# Testing of Final Designs

Following improvements testing was performed to ensure all functionality worked as it should and was documented in the table below, five tests have been performed of the core functionality which are the navigation, the quiz functionality, the scoring and percentage, the high score function and the correct answers section on the end page.

|  |  |
| --- | --- |
| Description of test | Navigation of Forms works as should including the Close function |
| Expected outcome | Forms should open and close as required and expected following button press or other action, Program should close if exit function is used. |
| Actual outcome | Forms worked as expected and the program exited as it should. |
| Date of test | 15/4/23 |
| Remedial action | None Required but it would have been to ensure the buttons were coded correctly |

|  |  |
| --- | --- |
| Description of test | Quiz functions work as expected adding the score point value when answer is correct and continuing to next form/Question. |
| Expected outcome | Point value is added, and next question form is pulled up as expected |
| Actual outcome | The point was added and the next question or result page was pulled up. |
| Date of test | 15/4/23 |
| Remedial action | None Required but would have been to ensure code was correct for buttons and that the point value was in place. |

|  |  |
| --- | --- |
| Description of test | Scoring and Percentage function and display correctly on the results page |
| Expected outcome | Once a quiz is completed the score for that quiz and the corresponding percentage are displayed on the results page. |
| Actual outcome | The score displayed although the percentage stayed at 0%. |
| Date of test | 15/4/23 |
| Remedial action | Looking at the code used for the percentage function it was established that the incorrect value was being pulled for the calculation and once changing this the problem was rectified. |

|  |  |
| --- | --- |
| Description of test | High Score functionality – XML saves, Main page score board and saving of name |
| Expected outcome | When completing a quiz, a name is taken before beginning then that name and the final score are both added to the XML file providing the backend for the high score board on the main page which should be displaying the data. |
| Actual outcome | The data was displayed correctly on the score board and was added correctly. |
| Date of test | 15/4/23 |
| Remedial action | None required |

|  |  |
| --- | --- |
| Description of test | Correct Answers Listing on final page |
| Expected outcome | Question 1-5 is displayed and below a box saying either Correct or wrong is shown following a quiz. |
| Actual outcome | This worked as expected to a degree as if a quiz was retried it would keep the existing value from before. |
| Date of test | 15/4/23 |
| Remedial action | This was sorted by adding an additional condition the IF statement controlling the Boolean used which resets the values to false following a quiz. |

# Final Review of revised Designs

The designs used in the final version are more than acceptable for how the program has been constructed, as all the forms fit their purpose correctly and work as they should. The theme chosen throughout isn’t too bright or dark and provides a comfortable experience for the user. The navigation of the program is also intuitive and with the use of easy-to-read fonts is accessible. Improvements that could be made in future revisions could be some sort of accessibility option such as the option to change screen colours or font sizes.

## Third party Testing

Following redesigns two of my peers again provided valuable feedback and insight into how the designs hold up and, in this instance, how the improvements suggested were addressed.

Evan james 29/4/23

|  |  |
| --- | --- |
| **Question** | **Feedback** |
| Ease of navigation | Same as what I said the last time really as the designs have not changed that much |
| Look and feel of the application | The application looks and handles good and is better now that the results page has been altered. |
| Welcome screen | I like the inclusion of the sub title on the welcome page |
| High scores feature | The score feature works brilliantly and the inclusion of the name is good too |
| Running the quiz | The quiz ran fine without errors |
| The results | The removal of the questions list on the result box is much better |
| Any general comments | The final designs are far better and work much better. |

Oliver Smith 4/5/23

|  |  |
| --- | --- |
| **Question** | **Feedback** |
| Ease of navigation | As like before the navigation was straight forward and intuitive |
| Look and feel of the application | The overall design stayed similar to the previous design but with a few small tweaks such as the inclusion of welcome text and some slight re arangements |
| Welcome screen | As I said the improvement to the welcome screen with the sub text while subtle does make a nice touch. |
| High scores feature | Not much has been changed here but I did notice you made it go in ascending order which was nice |
| Running the quiz | The quiz ran as expected and without error. |
| The results | The results page without the question list was much better |
| Any general comments | Great design overall which with the improvements works far better than before. |

# Evaluation of final Application

The developed application meets most, if not all, of the required and desired functionality outlined in the brief. Among the features provided are the ability to choose from four possible answers, save user scores, provide a resulting score and percentage, have a welcome screen, and present the user with at least five questions. These functionalities were achieved through the use of appropriate programming practices, which helped ensure that the app was efficient, scalable, and maintainable.

After the initial development, user testing was conducted to gather feedback from potential users. Based on this feedback, revisions were made to the original designs to improve the user experience. The revisions included minor adjustments such as font size and layout, but also more substantial improvements to the way certain functions work, such as the correct questions table at the end of the quiz.

These revisions were crucial in enhancing the application and addressing user concerns. They helped to provide an insight into what an end user would want from the application and demonstrated multiple preferences, allowing for a compromise to be established that best meets the needs of the majority of users.

Overall, the use of appropriate programming practices and the incorporation of user feedback and revisions have greatly benefited the application, making it more user-friendly, efficient, and effective. The final product is a well-designed and well-executed quiz application that is enjoyable to use and provides a valuable learning experience for its users.