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Software Engineering Principles and Practice

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Introduction

The aim of this report is to effectively evaluate the methods of design and testing that has been created in order to develop an application based on the game Connect 4 with slight variations of the game. The methods mentioned in this report will include user story maps that were created to plan out what the project should do in certain situations for the user. This report will also evaluate CRC cards. Testing methods such as blackbox and whitebox testing will also be mentioned to show how the application can possibly be tested.

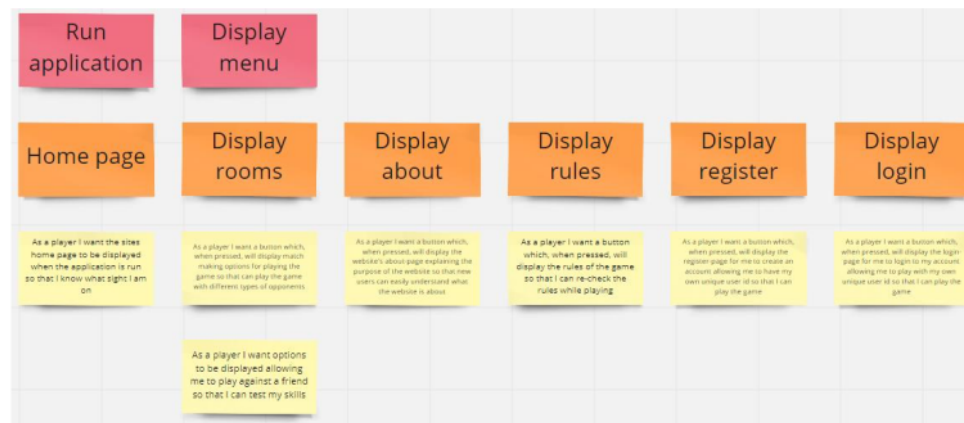
Design Evaluation

Design methods are essential to developing a proper application that can meet a standard users requirements. There were a few methods that were decided to be used for this process, these include user stories to give an idea of the type of user experience that should be achieved, another method used is Class-responsibility-collaboration cards were also used to identify the classes and the uses of them.

User Stories

User stories are a method used in agile software development to essentially focus on the customer needs that can sometimes be overlooked. This is done by looking at the potential user activities and figuring out how they can be given the best experience in certain scenarios.

The first thing done was figuring out the user activities and the tasks that they would lead to. There were five user activities that were decided upon with the first being Run Application followed by displaying the menu, this gives the user a few tasks to choose from such as displaying rooms that are open, displaying the rules of the game or having the ability to sign in or register. The user stories were then created for the first release to give an idea of what the user would want from each of the tasks.



The first release was limited to just being able to play against only friends, this can be fairly limiting so the decision to add a second release where the user is able to play against a bot and a third release which allows the user to play against random people online, adding these releases gives the user a better experience as it allows them to have more variety in who they play against.

CRC Cards

CRC stands for Class-Responsibility-Collaboration and are a set of cards created by developers that are developing a project. CRC cards are a fairly simple approach that can be used to emphasize any possible responsibilities that a class in the project would have. A CRC card will also contain the collaborator section, this section includes other CRC cards that have been made that can potentially be used with it.

Class: Grid	
Responsibilities	Collaborators
Know grid size Build grid Display grid Store counter positions	Turn Player Counter

This was the first CRC card that was created for the project. This class is responsible for creating and managing the grid for the Connect 4 game. This class will be used to both build and display the grid and will also manage it by storing the pieces that each player sets in the possible locations. The collaborators are classes that should be able to interact with the grid class at some point during the project.

Class: Turn	
Responsibilities	Collaborators
Drop counter Switch to next players turn	Counter Player Grid

This is the second CRC card which is for the turn class. This class is responsible for managing which user's turn it is while playing connect 4, it is also responsible for collaborating with the grid class to make sure that the counters are going into the grid properly. The collaborators are classes that are linked to the turn class in some way such as the player class, which determines which players turn it is.

Class: Player	
Responsibilities	Collaborators
Ask for player name Enter name(s) Take turn	Turn

This is the third CRC card which is for the player class. This class is responsible for managing the player names and is also responsible for collaborating with the turn class to make a valid turn.

Class: Counter	
Responsibilities	Collaborators
Check counter on diagonal Check counter above Check counter on horizontal Check if opponents piece can be captured Check if opponents piece is destroyed	Turn Grid WinLoseDraw

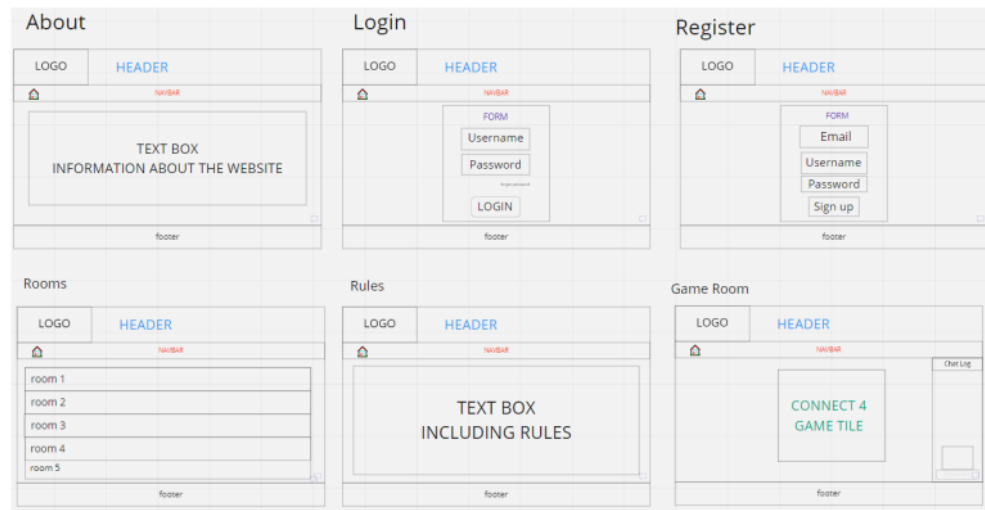
This is the CRC card for the counter class, this class is responsible for checking the current state of the grid to make sure that once one of the game requirements such as if a piece gets captured or destroyed.

Class: WinLoseDraw	
Responsibilities	Collaborators
Check if player wins Check if players draw Display appropriate message according to condition	Grid Counter Turn

This final CRC card is for the class WinLoseDraw, it is responsible for checking if a player has either won or if no more moves can be made which ends the game in a draw.

Wireframe

A wireframe design was then created for the website which the connect 4 game would be on. Wireframing is used in web development and servers to connect the sites information architecture to the visual design of the website. Wireframing this gave an idea on how the website can be structured and how it would look may look if made. The wireframes that were made refer to the user stories that were made to make sure that it remains consistent across all of the design phase, an example of this is the rooms on the wireframe along with the user stories.



Strengths

There were a few strengths with using these methods to design the project overall. The first benefit to using these methods was that they were cost effective, every method that was used was free. Another benefit of these methods is that they encourage communication between team members, the communication between the team members would lead to an overall better design process and could lead to a better application. Due to everything being created on the computer the overall size of the design process was quite small.

Software Testing

Software testing is a crucial piece of development applications so that you can ensure the quality of the product and that it also functions properly while having the amount of errors be minimal.[1] As you develop the software it's best to test it each time a new feature is added into it, this is the best way to keep on top of testing and allow fixes to happen sooner rather than later when there could potentially be more. Testing frequently can potentially also help reduce costs of development later on, it will also improve user experience and reliability of the software. There are various methods to software testing, Blackbox and Whitebox testing are both common methods.

Testable code is a type of code that is able to be verified programmatically and provides information in a high level of detail.[7] this is beneficial because once a test fails it would be optimal to know the exact problem so that it can be fixed immediately.

Blackbox Testing

Blackbox testing, which is also known as behavioural testing is a method used when testing software. This method is used to test the functionalities of software applications, it does by having a tester test the software without having the knowledge of the 'internal code structure, implementation details and internal paths'.[2] Blackbox testing primarily focuses on the input and the output of software applications. An example of blackbox testing would be a testing professional who has no knowledge on any of the internal data structures and examines the pages of a website by navigating them and performing actions on each page.

There are a few ways to do blackbox testing, the first type of blackbox testing is known as function testing, this is related to the functional requirements of a system, this type of testing is done by software testers. Another type of testing is non-functional testing, this type of testing is related to the non-functional requirements which include scalability, usability and performance. The final type of blackbox testing is regression testing, this is once the code fixes are complete, it is done to check if the new code has not affected the existing.

Advantages of Blackbox Testing

There are multiple advantages to using blackbox testing, the first is that testing is performed as a user instead of as a designer, this means that the testing results from this will usually be unbiased due to the tester working independently.[4] Another advantage is that the tester has no knowledge of the specific programming languages that were used, this allows a fair test to reliability and the functionality of the product.[5] Test cases are able to be designed as soon as the specifications are complete.

Disadvantages of Blackbox Testing

There are also a few disadvantages when using blackbox testing, the first disadvantage is that testing could end up redundant if already done by a software designer.[4] One problem that could occur is

that the tester may not be able to test everything due to lack of knowledge on the software itself, even if the tester had good knowledge the time to test is too time-consuming which means there is a chance that many paths get untested. Testing can also be fairly difficult with no clear specifications available.

Whitebox Testing

Whitebox testing, also known as code-based is a method of testing software which tests the internal structure along with the design and coding of software, doing this allows verification on the flow of input-output along with improving the overall security, usability and design of the product. The goal of whitebox testing is to verify the expected outputs and to validate sections of code.[6] An example of whitebox testing would be having a tester go through the code of a specific feature of a product while verifying the outcomes and resolving all of the positive and negative paths.

Advantages of Whitebox Testing

There are multiple benefits to using whitebox testing. One benefit of whitebox testing is the time it takes, with software development there will always be deadlines that have to be met so using whitebox testing can be beneficial due to it having the ability to speed up the testing process significantly. Whitebox testing can also help the developers optimize their code section of the application due to them going through it and condense the existing code. Another advantage to whitebox testing is the fact it's possible to be automated.

Disadvantages of Whitebox Testing

There are also a few disadvantages with using whitebox testing, the first being that it is an expensive testing method due to it being more thorough, compared to blackbox testing, whiteboxing testing requires more skilled testers that have a good amount of programming knowledge and due to this, the price would increase. Another disadvantage is that whitebox testing is only capable of testing features that are currently fully implemented, partially implemented sections would not be picked up on.

Version Control

What is Version Control

I believe that version control is a crucial tool that is used in software development. Version control is a component of software configuration management.[8] Version control is a tool that involves and allows multiple developers that are on a team to easily work together on the same project. Version control is used to ensure that all team members have access to the latest version of the code in their product. While the development of a project steadily gets more complex, the need to manage the versions of the project increases to prevent any major malfunctions.

Benefits of Version Control

There are multiple benefits from using version control. The first benefit of version control is that it helps development teams collaborate outside of a workplace. Another benefit is that using it allows you to compare files and identify any differences and then merge the changes before even committing any code.[9] One advantage of version control is that during development it is entirely possible to have independent code versions which keeps development separate, they can be merged later on to once it's all complete. Troubleshooting can sometimes be easier with version control due to the ability of comparing with different versions, this means that you can compare the latest working file with the file that currently has issues, this also means that developers are able to experiment with the code more. Using version control would also decrease the development time due to the overall workflow increase.

Bibliography

- [1] West Agile Labs Blog. n.d. Why Is Software Testing And QA Important For Any Business. [online] Available at: <<https://www.westagilelabs.com/blog/why-is-software-testing-and-qa-important-for-any-business/>>.
- [2] Guru99.com. n.d. What Is BLACK Box Testing? Techniques, Example & Types. [online] Available at: <<https://www.guru99.com/black-box-testing.html>>.
- [3] Guru99.com. n.d. What Is WHITE Box Testing? Techniques, Example & Types. [online] Available at: <<https://www.guru99.com/white-box-testing.html>>.
- [4] Invensis Technologies. n.d. What Is Black Box Testing: Advantages And Disadvantages - Invensis Technologies. [online] Available at: <https://www.invensis.net/blog/black-box-testing-advantages-disadvantages/#Advantages_Pros_of_Black_Box_Testing>.
- [5] Agarwal, M., n.d. Black Box Testing, Examples, Techniques, Pros And Cons. [online] Learn Programming and Software Testing. Available at: <<https://www.techbeamers.com/black-box-testing/>>.
- [6] Segue Technologies. n.d. White-Box Testing: Pros And Cons | Segue Technologies. [online] Available at: <<https://www.seguetech.com/white-box-testing-pros-cons/>>.
- [7] dzone.com. n.d. Writing Testable Code - Dzone Agile. [online] Available at: <<https://dzone.com/articles/write-testable-code>>.
- [8] Perforce Software. n.d. What Is Version Control? | Perforce Software. [online] Available at: <<https://www.perforce.com/blog/vcs/what-is-version-control#what>>.
- [9] Segue Technologies. n.d. A Review Of Software Version Control: Systems, Benefits, And Why It Matters | Segue Technologies. [online] Available at: <<https://www.seguetech.com/a-review-of-software-version-control-systems-benefits-and-why-it-matters/#:~:text=Version%20Control%20Benefits,development%2C%20QA%2C%20and%20production.>>.

FINAL GRADE

61 / 100

GENERAL COMMENTS

Instructor

Evaluation of design(10): 7

User Stories + Map (Benefits) (20): 13

CRC cards (20): 10

Software testing evaluation (20): 13

Version Control (10): 5

Coding (20): 13

Comments:

More evaluation was required for the design process.

The assignment asked you to give more analysis of a couple of stories with emphasis on the benefit or ROI.

CRC card discussion is bit brief.Did the code you produce reflect the CRC cards you produced at the start?

What is testable code?

Git needed more evaluation.

No git logs provided.

More references reqd.

Code contains a number of functions and a class.

Not testing.

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