Drawing App

Project Documentation

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# Background

A drawing game that uses music and movement to create a flowing experience with a sense of depth. The drawing is in 3D space and it moves slowing into the distance as you draw.

You would select the music track you wish to draw to The line style of your drawing and the visual ambience would reflect the choice of music. For example, a gentle and soft slightly melancholic piano piece might have a moody blue background and a flowing, simple and smooth white drawing style similar to the one in the video. A liver tune would have more vibrant colours and an animated bouncy line style. When the music ends you can choose to save the drawing, pay the music again and add to the drawing. Start again with a blank canvas or go back to the main menu and select another track. The program is currently being developed for PC. However, it could be developed for a tablet and mobile phones in the future.

The github repository can be found at:

<https://github.com/Ross-CH/DrawingApp>

# Project Definition

## Project Purpose

The overall purpose of this project is to develop a drawing app that can help its users to relax and express their feelings, through the medium of art and music that will suit the mood of the user. The hope is to eventually have this as therapy tool for depression and anxiety and possibly a sensory tool for people with autism.

The client has already attempted to develop a prototype but as he has a very limited amount of programming knowledge, has found it difficult to be able to execute this in the most successful way. He has given us a choice to continue on what he has already developed or start developing the application from scratch.

As a team we hope to be able to produce the app with out any bugs within the code so that it will work efficiently. We would most likely be starting the project from scratch but look into what he has already done to get a correct feel for the project and keep it as close to what he would like without all the same issues he currently has. With our help, our client will be able to bring this project from being a bit of a stand and get his idea closer to being ready for going on the market.

## Project Scope & Objectives

To ensure the project can reach the specifications of the client and where they want to have this app. Objectives of this application would be as follows :-

* Gain a better understanding of the current work the client has already completed
  + Reading over the code he has tried to develop and see what could have been done to improve that situation.
* Develop an operational menu system
  + Developing a main menu and an in-game menu system that would allow the users to pause, save, load, restart or quit the game.
* Develop a level of the app, that would suit music
  + Creating level where the paintbrush style that would suit atmosphere of the music
* Create a save option
  + Allowing the users to save the level the have been drawing.
* Develop a load option
  + The ability to allow the users to load a previous drawing, with the option of viewing it or adding to the drawing
* Find appropriate music to suit the applications needs within the client’s brief.
* Different visual styles, paint brush style and looping system
  + Allowing the users to choose if that the end of the song if they would like to continue and draw over what has already been done.
  + Letting the users choose the styles of the paintbrushes being used.

## Constraints

Within this project the constraints of the team are learning a whole new programming language to ensure that the application can be coded. Understanding how to use unity for the development of the game. These would impact the time it would take to get the application completed due to no one in the team having much experience with it. It will take around a month to enable the team to be able to use the application successfully

One of the team members is unable to get a microphone, this will impact the ways of communication. Sometimes having to wait a few days for a response from that team member. This will also have an impact on the time management within this project. Making it sometimes more difficult to try and not go to far ahead without all the members knowing what is to be done next or responding to the fact tasks may be completed or not.

The team working remotely due it being made up of people from different campuses within the UHI will impact the way of ensuring the project is executed efficiently due to the team normally used to working with people from just the same campus. This is a new method of each member so finding the best way to manage time get the files for the project to each other and generally work well together took time. Finding the best way to communicate without it costing any money took a little bit of time to figure out as well.

The health of some of the team members will also have a big impact on the team. Some of the meetings maybe missed by team members. It can take time but the team will need to try an accommodate the best they cant without letting t take away to much time from the project and the people that are unwell will do what they can to catch up.

Keeping the client informed and able to work on parts of his application that we are not working on. Teaching the client how to use GitHub or Gitkraken, to keep up with version control, ensuring everyone is working off the same files. This will take some time due to the client not having a lot of programming knowledge and time restrictions. Ensuring that he also will have access to this to keep the costs down to zero.

## Outline Project Products

* Research Benefits between unity and unreal engine
* Develop an operational menu system
  + Developing a main menu and an in-game menu system that would allow the users to pause, save, load, restart or quit the game.
* Develop a level of the app, that would suit music
  + Creating level where the paintbrush style that would suit atmosphere of the music
* Create a save option
  + Allowing the users to save the level the have been drawing.
* Develop a load option
  + The ability to allow the users to load a previous drawing, with the option of viewing it or adding to the drawing
* Find appropriate music to suit the applications needs within the client’s brief.
* Different visual styles, paint brush style and looping system
  + Allowing the users to choose if that the end of the song if they would like to continue and draw over what has already been done.
  + Letting the users choose the styles of the paintbrushes being used.

## Risks

* Performance Risks
  + There is a possibility that we may not produce the results consistent with the project specifications
  + The possibility that the project has an area that fails, can lead to the schedule being compromised and changing when tasks could be completed, extending the project to a different date.
* Technical Risks
  + Due to the team requiring too learn a new programming language, this could potentially lead to errors in the programming
  + It could also lead to the testing quality to be poor due to the lack of knowledge, just because it works does not mean that all the errors or bugs in the code has been found and corrected
  + The client has little knowledge of programming and use of software such as GitHub. This could cause confusion when he is trying to see the latest file updates.
* Interpersonal Risks
  + Communication issues may arise if one of the team members is unable to obtain a microphone for meetings
  + Keeping the team motivated while also completing other modules course work could cause some issue’s further down the line

# AnALYSIS & DESIGN

## Project Planning

The client most important aspect is to be kept informed and able to see what we are achieving while trying to implement his projects design. Another quality the client is interested in is ensuring that the application functions properly, getting the brushes to work as he envisioned. He has offered us to start from the beginning but that we are to use his current work as a guide to how the whole application is to look and feel. He has the design of the application already set so with the approach to creating the drawing application we would stick to the same styles as he has.

To be able to keep to a plan and time scale there will be a project Gantt chart and timeline that the team can follow to ensure that the project is completed on time in the most efficient manner.

The chosen planning methodology we have opted to use is agile methodology. This is because of it will allow us as a team to go from meetings to short cycles of works that allows for rapid production and have the ability for constant revision that can be backed up by “Agile focuses on rapid and frequent delivery of partial solutions developed in an iterative and incremental manner.” (O’Regan, 2018). With the time frame being a huge factor for the client, we opted for agile methodology, it means that as a team we can have meetings then program in short quick cycles, that would allow the team to show the client what has been done. This would allow the client to make small changes or have a say on what is happening and when. “Scrum methodology is a method that tries to keep things simple in a constantly shifting ” (Alexandros, Sakas, Vlachos and Dimitrios, 2017). With this approach it would be better to use scrum framework that will implement the agile development and testing. As we are a small group made up for just 3 people, it is an adaptive, work segmentation. Working in sprints to get the application completed.

To test the application, we will be using the agile testing strategy to ensure each aspect programmed will be working efficiently.

Appendix A

## Analysis

The client has come to a stand still one what he can successfully attempt to develop for this app. He has asked for our help to bring his “idea to life”. He has specified that this app can be started as new and use his current work as a guide. As he has done the design himself, we will try to keep it as similar as possible, so when he takes it back over there is not much different and wont be required to learn to much new and keep it as simple as possible.

The current application that has been developed. Even though the app kind of works it is full of bugs and does not run as smoothly as the client would want it to. His current system doesn’t really have any comments throughout the code, and not organised in the most efficient manner. He says that his code and application is “very messy and hard to understand” We will be aiming to achieve the same outcome he already has but with the use of naming conventions and documented code to explain to anyone what that are is suppose to do. We will be designing a brush system that will allow the user to see what they draw on the screen, and hopefully have a selection of brush types to choose from. Another area we will add is having the audio that will loop around until the user has finished drawing. Another component that will be designed is the main menu and pause menu, with button mapping. Keeping in with the style that the client already has completed.

Appendix B

## Design

The Design of the application has been taken from the client’s current application unity drawing program V03. The client had given us a prototype of what he had done already. We used this as a reference to get our application to look as similar as possible, with less clutter. We kept a black background when the user uses a mouse or drawing tablet it will be displayed on the screen. This will then move into the centre and disappear giving them a constant canvas to work on. While they draw a soundtrack will be playing so they can draw intime to the music.

Changes we have made is with the paint brush in the originally version, was with a glowing style but it would not always keep a line drawn whole. We took away the glowing effect have a bright colour and make the line stay without any pixel games.

Appendix C.

## Implementation & testing

The chosen test strategy should be evaluated against the original products with evidence of all levels of testing where appropriate. Any client feedback should be incorporated into the overall evaluative statement.

Any supporting test documents must be included in Appendix D. The raw test data, physical code, screen dumps, authenticated test logs should all be included in the appendix.

## User Manual and Other System Documentation

A video of the application working can be found in the appendix D folder, also our work has been hosted on GitHub to allow access for everyone

The GitHub repository can be found at:

<https://github.com/Ross-CH/DrawingApp>

# Evaluation

## Critique

The major objectives of this project were to create a drawing application that allowed the user to create drawings that slowly moved away from the camera, fading into darkness while relaxing music played. The application was to be able to save and load these drawings. The user should be able to edit the brush that they create their drawings with.

The team was able to implement the creation of drawings by the user properly. The camera slowly moves away from the user’s drawings which themselves fade into darkness in the distance by the use of proper lighting. The team was not able to implement the saving and loading functionality. This was largely due to time constraints and would have been completed if the team had more time. Ross had a proper understanding of how this could be done but the team did not have the time to implement it in a working state.

## Lessons Learnt

Lessons learnt – Danielle

I have learnt that trying to achieve something as big as what the client would have liked was a lot more difficult in the time frame we had. If we had realised earlier, we would have taken on less tasks, to make the drawing application more efficient. I have offered the client to keep working on this with him after the course has been finished. I learnt that working in a team can be difficult when one member does not do the work and leave’s the rest to the other two members. If it had been noticed earlier could have adjusted the plan to catch up with where the group needed to be. This has been noted in my personal feedback form and the individual report. Found that two of us worked really well together and tried our hardest to bring the other member with us and get the word done. Stages could have been done a lot quicker but, due to waiting for some people to participate it took longer than initially planned leaving less time with the actual implantation phase.

Lessons Learnt – Nathan

I have learnt how work better together in a group by having each member have a specific role. My role was the Conciliator which focused on resolving conflicts, minimising interpersonal stress, and ensuring that members feel safe to give opinions. I have also improved my communication abilities with other members of the team. I also had the opportunity to learn how to work with a real client for the meetings, planning, and working to create the app they desire. For the project we had to use Unity, so I got to practice with a new video game engine and a new programming language. One negative was the projects planning stage went on for too long, so we did not get long enough for development and I underestimated the difficulty to learn how to use Unity. A lesson learned from that for next time would be trying out new programs/languages during the planning stage as it would give us an idea for how long we would need for development. The last lesson learnt was with copyright and songs as I have found resources for songs we can use in apps.

Lessons Learnt – Ross

Throughout the development of the project, I gained a large amount of information and learned a lot. In particular, I learned about how to work with a client such as managing and organising meetings, negotiating terms and requirements and maintaining expectations. These skills helped to gain a better understanding of what a team is capable of and what is feasible for a team in the timeframe given.

My software development skills have improved since starting this project as games development is an area that I was not familiar with. Having to learn these new skills has allowed me to improve my problem solving skills and critical thinking because developing games with software such as Unity requires a different approach than what I’m used to with web and software development.

This project has also provided me with a valuable opportunity to familiarise myself with the C# programming language, allowing me to broaden my skillset.

I have also gained an understanding of how to work with a team and the communication required to ensure the team is able to work together effectively. Each team member’s communication skills have proven to play an essential role in the outcome of the project. Early on in the project, it was clear that the team was struggling to properly maintain contact with all its members. We tried to address this issue as best we could, making sure that any uncommunicative members were always included in discussions, particularly group chats which could be read later. Unfortunately, this is an issue that requires complete cooperation by all members of the team and cannot be properly achieved without it. This directly affected the project’s rate of progress as it was difficult to advance when one of the team’s members failed to contribute for almost the entire project.

## Future Improvements

Not all intended features could be implemented into the project, partly due to time constraints. The team intended to implement a saving and loading feature to allow the user to properly save their drawings. The ability to then load these saved drawings was also planned but also could not be achieved in time. Both these features were planned to be integrated into the user interface.

The game currently supports playing music while the user draws. The team had plans to improve this feature by including additional music tracks with the option to choose which track to play before starting a drawing.

The ability to create drawings that fade into the background has been successfully implemented but plans were also in place to edit the brush settings. These included changing the colour, thickness and style of the brush.

# Bibliography

Alexandros, N., Sakas, D., Vlachos, D. and Dimitrios, N., 2017. Comparing Scrum and XP Agile Methodologies Using Dynamic Simulation Modeling. *Strategic Innovative Marketing*, [online] pp.391-397. Available from <https://link-springer-com.eor.uhi.ac.uk/chapter/10.1007/978-3-319-56288-9\_52>

O’Regan, G., 2018. Agile Methodology. *The Innovation in Computing Companion*, [online] pp.15-18. Available from <https://link-springer-com.eor.uhi.ac.uk/chapter/10.1007/978-3-030-02619-6\_4>

# appendix a (supporting materials project planning)

This will include all supporting documentation including, Gantt charts, weekly progress sheets, individual diaries, email correspondence with the client. Also include any other relevant documents you feel enables the marker to gain a better understanding of the work submitted.

# appendix b (supporting materials analysis)

This will include all work relating to data analysis (E-R models, appropriate UML diagrams, normalised data structures with original documentation etc. Work relating to the analysis of the process such as appropriate UML diagrams, HIPO charts etc must be included. Email correspondence with the client relating to this area should also be included. Also include any other relevant documents you feel enables the marker to gain a better understanding of the work submitted.

# appendix c (supporting materials design)

All storyboards, proposed site maps, emails with clients including feedback, data dictionaries/entity descriptions, process definitions. Also include any other relevant documents you feel enables the marker to gain a better understanding of the work submitted.

# appendix D (supporting materials implementation & testing)

All test logs, test data appropriate source code. Also include any other relevant documents you feel enables the marker to gain a better understanding of the work submitted.

# appendix E (inDIVIDUal student work- to include research topic report)

Each member of the team must submit materials which they have produced as individuals. This work must be referenced in sections three, four and five where appropriate.

Also include any other relevant documents you feel enables the marker to gain a better understanding of the work submitted.