Module Code: CS1SE16

Assignment report Title: Proposal

Student Number: 29017995

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Actual hrs spent for the assignment: 20

Assignment evaluation (3 key points): Good software for diagrams makes a massive difference, Read from multiple sources, Take your time.

**Proposal**

**Introduction**

The purpose of this document is to consider what entails creating the system of the game.

University students will be the main system users and would be expected to log in, play the game and solve puzzles in a graphical adventure requiring them to enter short text entries based on their university work, earning points for their solutions. Members of the university staff will be the minority system users in an administrative role to facilitate adding/blocking users, checking on progress, editing content and uploading new content.

The material served will all be in HTML format with JavaScript functionality as it is web-based game. The system will run on a web server which will host the game with a separate webserver used to deliver the pages across the internet to whatever devices the students choose to use. University students will be the main system users and would be expected to log in, play the game and solve puzzles in a graphical adventure, earning points for their solutions.

A user control interface will need to be developed to use the game. Their scores will be displayed in a public leaderboard. It is aimed to be designed in this way in order to create a competitive element as studies show that competitive games lead to more investment and the more invested the students are the effective the game will be for their learning. There will also be intentions to be able to use an in-line chat/forum facility to communicate with other students on their course if they decide to. This is good because it encourages more cooperation and leads to further use of the game furthering their knowledge.

The key people involved in the creation of this system will be programmers, designers, testers, artists and sound engineers. The bulk of the game will be programmed in C language and unity will be used to model 3D elements. During development there will also be use of HTML and JavaScript. Free-domain elements will also be used.

A stable system requires resilient components and the system must calculate movements, graphics and random events, rendering appropriate graphics and events as quickly as gamers can take them in and respond. To achieve this there will have to be multiple tests carried out in order to make sure the system meets its requirements including: the forum communication, login functions, and whether the score can be saved and updated to the leaderboard.

The existing university database will store all the information including all the student accounts and their scores. Authorised personnel will be able to look at this data and this is how they will be able to track the students’ progress.

The requested time to complete the development of this project is 6 months which under the conditions presented is completely feasible

**Feasibility Study**

**Social and Legal Feasibility**

A main issue that you have to be aware of when creating the system is copyright, a bunch of rights that protects your idea from being copied by another creator. Copyright protects original works of authorship fixed in any tangible medium of expression. These specifically include things like literary works, musical scores, static and motion pictures, and dramatic works. It does not protect ideas, concepts, or discoveries. It’s important to not break the laws of copyright because you could be liable to be sued which would set you back a lot of funds and could even see the game stripped from you. Even though fair use exists there is still grey area on what constitutes this and is usually judged on a case by case basis. Attempts to claim fair use for commercial purposes are almost always an uphill battle. Also, just because you're using a small amount of the copyrighted work won't save you, as courts have found amounts of less than 5% to be enough to kill a fair use argument. That being said, it is possible to use significantly more and still be fine. As always, seek counsel's advice on these determinations.

Whether in digital or physical format, gamers will need to accept an end-user licence agreement (EULA). This will typically be between the publisher and the end-user. As such, any rights the publisher licenses to the end-user must be appropriately defined as those rights you have previously licensed to the publisher in the publishing agreement.

Privacy concerns are something that have to be taken very seriously as to not allow any leaks and distribution of personal and/or sensitive information. Hackers are also a concern linked with this as they violate legal and ethical principles whether they are hacking to achieve excellence within the game or to acquire sensitive data. So, cheating in any form of the game is clarified as an ethical issue because there is no regulation for its avoidance.

Usually games first legal concern is providing adult content games to customers who do not meet the age requirement, but this should be fine as students have to log in to play the game.

Another concern about social issues is when creating games, is do the game developers follow professional code of conduct. Some games are developed with discriminatory hidden meanings. Maintaining proper conduct and thorough review of work would minimise negative social issues from occurring.

Graphic violence and imagery are another constraint to be aware about as this is still a debated topic today as whether it actually effects young individuals who play video games. There are scientific studies such as Dang et al. (2007) that say new video games are ethically affecting people who play them. Additionally, the ethical issues include violence, rating, education, stereotyping against women, community and addiction although I would disagree with the extent that it actually has an effect, but such games could present violence as a familiar and acceptable option in order to deal with conflicts. Depending on the amount and detail of the violent imagery it also may be age restricted to protect children from being desensitised or disturbed by anything that they see in this form of media, however, for this particular game it should be fine as it is aimed towards university students. For an educational game it’s important to minimise the chance that it will offend, discriminate or insult any ethnic, religious or any other kind of group if depicting certain things, such as stereotypes, drug use, violence, explicit language and sexual content. There have been many instances (such as a baptism scene in ‘Bioshock’ in which a Christian found this content uncomfortable and made him want to stop playing the game) where the representation of religious beliefs has caused people to stop playing a game and demand refunds. Accidental offense is something to be knowledgeable of also as there was a controversial case of ‘the legend of Zelda’ causing offense as one of the maps was shaped liked a left facing swastika even though it referred to the Buddhist symbol of good fortune. If the game is too divisive in nature it could hinder the games educational goals.

Since computer games usage is increasingly spreading, concern must be placed on the ethical issues that are built in them. There are many games involving violent acts as well as other content related to violence. Thus, many people may believe that playing these types of video games can cause a person to be more violent (Dang et al., 2007). From the education perspective, gaming can be used to teach different things, some positive while others are negative. Responsible game developers need to be informed and take under consideration the research findings concerning the effects of the medium they utilize. Also, game designers and developers need to make knowledgeable decisions for the game content, purpose and goals.

Something that blurs the line between social and legal responsibility are online/microtransactions a business model where users can purchase virtual goods with micropayments. This is widely viewed as a palatable form of gambling and as such is being beginning to see a lot more regulation within the law so it could be legal or illegal depending on which area you are in, so it is wise to check the status of its legality if it is a feature that is decided to be implemented. Microtransactions can lead to increased engagement in your game because the players vested interest in it financially but because of that it can also lead to game addiction which is something to be aware of.

When the game is available to the public, it could be beneficial to look at ways of protecting the brand that has been developed as a result of its release. Registering intellectual property such as trademarks and designs can be expensive and difficult to enforce though.

These legal and ethical issues must be considered to ensure you adequately protect yourself and your game.

**Economic Feasibility**

A game on average takes around 20-100 individuals to complete including designers, artists, programmers, and testers with the upper bound tending to heavily reflect AAA games. Since this is a web-based game the manpower required will be significantly lower, almost comparable to an indie game. I would say that this game would be easily achievable with:

Three programmers: An experienced programmer to take lead with two inexperienced programmers to minimise costs. They will deal with the technical elements within the game. Fewer programmers can lead to better communication between them which will in turn create a more efficient work process.

Three Designers: There should be more than one designer as the main point of the game is to pass educational knowledge onto the students, so it is important that the content is presented in the best way possible to maximise learning. More than one person enables different ideas to be bounced of each other and shared providing more perspectives. At least one of the designers should be someone with expert historical knowledge.

Two Artists: One lead artist will lead another artist and they will do various jobs, such as Concept Art, Environment Art, Character design, 3D Modelling. This is very important as students could be potentially turned off on a game that doesn’t look visually appealing.

Two Sound Engineers: One lead engineer. They’ll work on the SFX to create more immersion within the game. It helps to take the game more serious with accurate sound design.

Two Testers: One lead software tester

Due to the clients request of finishing the game within 6 months more people will be required if they wish to maintain the same level of quality

An estimate of the cost to the company

Three programmers: £212,000 per year

Designers: £150,000 per year

Testers: £100,000 per year

Artists: £160,000 per year

Sound Engineers: The average salary of a software engineer is £26,000 so we can expect £104,000 to cover the costs

Office space (12 people): £36,000 per year

Software costs: £1,000

Licensing: £5,000 to cover licensing costs

Outsource testing: £12,000

Hosting and maintaining: £5,000 per year

Marketing & Promotion: Not that much needed for promotion as it is geared towards university students but £500 should cover costs. Spending too much would have diminishing returns as there is a limited group of people to market the game to.

In total the amount needed to feasibly produce this game would be an estimated £785,000 per year assuming that equipment doesn’t break down, people don’t need to be replaced or salaries renegotiated.

**Technical Feasibility**

In the development of the system for the markup we will use HTML.

For the scripting we will be using JavaScript which will enable us to implement more complex features like animation.

Other key programming languages that will be in use include: C++ & C. The technology required for these languages are widely available. We have the required resources and manpower to utilise these to their maximum ability.

Unity will be used to model 3D elements.

There are no experimental features or unproven technologies, but the hardware provided should be able to handle to the software, so they’ll be required to have a lot of RAM.

3D engines, material editors, code libraries and APIs, and drivers are risks as if they fail it could end up causing major setbacks. Replacing any of these will end up delaying the schedule as new software and/or hardware will need to be implemented.

If everything goes smoothly the game can be expected to be completed within 6 months.

**Development Methodology**

The development method of choice for this project is the Kanban approach. Kanban is an agile method to manage and improve work across human systems. An agile approach is good because making a game is a creative process and creative ideas are going to change over time.

Kanban manages work by balancing demands with available capacity the amount of work in progress (WIP) and it uses the stages in the software development lifecycle (SDLC) to represent the different stages in the manufacturing process. It requires real-time communication and full transparency of work. Work items are represented visually on a Kanban board, allowing team members to see the state of every piece of work at any time. The ‘Kanban Cards’ move through the process from start to finish. The aim is to control and manage the flow of these cards so that the number of features entering the process matches those being completed. It is centred on achieving value with the adequate amount of work (not overworking or underworking) as activities that are not producing value for the customer are discarded.

Kanban projects have ‘Work In Progress’ limits which are the measure of capacity that keeps the development team focused on only a small amount of work at one time. It helps identify errors and misunderstandings within the schedule in a particular area without having the distraction of other ongoing developments. WIP limits set the maximum number of requirements that the product team can efficiently manage at each stage of their Kanban process. Using WIP limits can be a useful way for teams to manage their work, allowing them to get through their work faster. This is done by focusing only tasks that can be done now.

It is useful for this development project because the relatively small team size of 11-15 people will work well with real-time communication and it also keeps things efficient and of high quality because a good Kanban work process sees that only essentials things are ‘pulled’ forward to the next development stage. This prevents overproduction & overcomplication, optimises resources thus reduces excessive costs, and wasting time. When you optimise your resources, you become more cost-efficient, and maximise your productivity. As inefficiencies decrease, work-in-progress items also decrease because the process is leaner. Only when the developed element is up to scratch in the eyes of the development team will it pass onto the next stage. By doing this you are focusing solely on the client’s requirements which should lead to a quick development and a high customer satisfaction because when focusing your energy and attention to a specific task in results in greater quality.

The visual process and active communication help to make objectives clear and helps with making group decisions about what the next direction should be. Also, with increased visibility, predicting risks, and coming up with effective mitigation plans becomes easier. Studies also show there is increased morale within the team due to an increase in autonomy thus creating a further increase in productivity.

Kanban is iterative process as it implements feedback loops which is one reason it was chosen over a planned approach such as ‘waterfall’ as the organisational structure there is linear which is more suited to larger scale projects. As it is iterative there are reviews of tasks done after each iteration by the while team and it allows you to come back to a task and continuously improve it and refine the process maximising quality, whereas waterfall only has approvals by the leaders through the development process. As it has limited input, each phase has limited capacity of work at any one time. A work item is not allowed to move on to the next phase until some capacity opens up ahead, so this ensures you make significant ground on your current task. By controlling the number of tasks active at any one time, developers still approach the overall project incrementally which gives the opportunity for Agile principles to be applied such as transparency and an increased scope for feedback.

Which will be needed as the client has requested that the game be completed within 6 months, a Kanban methodology approach will help expedite the process. In the Agile, the client is always involved in the decision-making process which leads to greater customer retention. In the traditional framework, the customer is only involved in the planning phase and does not influence execution which affects the flexibility and adaptability. By keeping the customer in the loop and making changes according to their feedback, you deliver value to the customer and ensure that the final product is truly according to their requirements.

Kanban is a very good for tracking as you can represent the process in various diagrams like a cumulative flow diagram as it gives quick metrics quickly e.g. the cycle time (distance between each point plotted on the x-axis), the work in progress, and the rate of input of new tasks (calculated by the gradient of the graph). This will help control the rate of work that in progress and will prevents overextending the team. It will show how the cycle time changes over the course of development, if the gradient increases it means that the cycle time increases. This could be due to a task just taking a long time to finish due to its complexity or it could represent inefficiencies in the work process. The source for this cycle time can be easily identified with communication with the team. Towards the end of the project the gradient should decrease as there are fewer and fewer tasks to be completed.

**Modelling, Design and Implementation**

**Use cases**

|  |  |
| --- | --- |
| Use case 1 | University students can login to game |
| Primary Actor(s) | University Students |
| Overview | University students will be expected to log in assumed that the players will be using a recent web browser, with JavaScript enabled. |
| Subject Area | Access |
| Trigger | Prompted by webpage to put in details to access game |
| Precondition 1 | Recent web browser |
| Precondition 2 | Browser has JavaScript enabled |
| Successful Scenario | * Student enters incorrect username and password and is unable to login to their account * When incorrect details are entered this is displayed on screen in the form of an error message. * When student enters their correct username and password, they are able to sign into their account and are presented with elements of the game |
| Comments |  |

|  |  |
| --- | --- |
| Use case 2 | Staff can login into database system |
| Primary Actor(s) | University Staff |
| Overview | Staff is able access database system, which can be used to store and access players’ scores and other relevant information. |
| Subject Area | Access |
| Trigger | Prompted by webpage to put in details to access |
| Precondition 1 | The member of staff has an account to be accessed |
| Precondition 2 | n/a |
| Successful Scenario | * When Staff enters correct login information, they have access to relevant information * Staff enters incorrect login information that has no match to any login information in database they are not able to login to the database and are presented with an error message |

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| --- | --- |
| Use case 3 | Staff can perform administrative functions |
| Primary Actor(s) | University Staff |
| Overview | Relevant University Staff are to be able to fulfil administration role, which involves accessing web pages on the system to facilitate adding/blocking users, checking on progress, editing content and uploading new content. |
| Subject Area | Administration |
| Trigger | n/a |
| Precondition 1 | The member of staff has an account to be accessed |
| Precondition 2 | n/a |
| Successful Scenario | * Members of staff are able to block and unblock students * Staff are able to track progress of all students from the time account was created * Staff are able to upload and delete content |
| Comments |  |

|  |  |
| --- | --- |
| Use case 4 | Points earned for solutions are saved in high score table |
| Primary Actor(s) | University Students |
| Overview | After a student has completed a puzzle the correct amount of points should be saved in the high score table. |
| Subject Area | Game score |
| Trigger | Puzzles in the game are completed |
| Precondition 1 | There are some scores already recorded |
| Precondition 2 | n/a |
| Successful Scenario | * When a puzzle is completed a score is updated onto the leaderboard * When a new highscore is achieved, the leaderboard updates to show their new highscore * Scores are displayed in descending order, from the the highest at the top to the lowest at the bottom * Scores from previous players unrelated to the current player should stay the same when the leaderboard is updated |
| Comments |  |

|  |  |
| --- | --- |
| Use case 5 | In-Line chat functionality |
| Primary Actor(s) | Students |
| Overview | In-line chat is able to send text to other students on their course while sanitising text. |
| Subject Area | Communication |
| Trigger | Texts with and without expletives are sent |
| Precondition 1 | Text is in English |
| Precondition 2 | n/a |
| Successful Scenario | * When student A sends sanitary text in English via in-line chat Student B is able to read it * When student A sends unsanitary text in English via in-line chat Student B is only able to read the sanitary words while expletives are censored |
| Comments | No way to filter rude comments that do not use expletives |

**Sequence diagram of playing a game**

**Diagram

Description automatically generated**

**Logical system architecture**

**Diagram

Description automatically generated**

**Reflection**

For me, the main thing I have learned on this module is how to organise my time efficiently. This maximised my productivity and allowed myself to actually absorb the content I was learning. By creating a schedule, I was able to divide an adequate amount of time to specific tasks and cover as much as I can. I also gave myself some leeway within the schedule as to not be so rigid as I could expect that things could not always go to plan or other things could come up and this allowed me to not stress as much of work as well as covering as much of it as I could which lead to work that turned out to be of a higher quality. With organising my time, also came fixing my sleep schedule by burning an alarm and setting a proper time to go to sleep. This just made my approach to work much more enjoyable as I had more time and a fresh mind.

This module also taught how to conduct a lot of independent research I also learnt how to go through lots of information in a relatively quick amount of time by picking out the relevant parts and focusing a lot on the key words. It also led me to discover new YouTube channels and started a practice of me bookmarking webpages and reading them in my spare time.

CSGitlab was something that I had never heard of before and starting this module has made me more proficient in it. Furthermore, through the use of CSGitlab the importance of good group communication became really, really evident as lacklustre communication within a team can lead to a degradation of a project which is something, I aim to placate in the future by being even more involved and take command if need be. With team communication also comes the importance for everyone to know their roles clearly and early to avoid and misgivings and if there are any it allows enough time to sort them out without causing harm to the project

My strengths within the module come from me preferring to spend a lot of time on something aiming to make it the best it can possibly be because the more time you put into something the higher quality you will get out of it. However, this can also be a negative as it could lead to overthinking about certain actions that need to be undertaken, delaying progress. Overtime though I was able to mitigate this by doing the basics first and focusing on tasks that required the least ‘creative deliberation’. This is a very essay heavy module, so it really refined my essay writing skills by becoming more proficient at organising, broadening my vocabulary and teaching me new terminology.

Some issues I had were pushing things I don’t understand to the side when they would probably be better off being addressed right away and not asking for help enough. When I started asking communication with other people on this course to get them to explain more concepts the work became gradually more and more understandable and it was often a simple detail I was overlooking. In the future when not understanding something I’ll make sure to be more open with asking for help early on.

Throughout the module I have learnt about the Software development cycle, different development methodologies, different software process, the different roles the people play in software development and a good overview of the stages between the initiation of a project and its conclusion. Through the module I have also learnt that even though there is a basic framework for things every situation is totally unique.

The importance of feedback has also been made apparent by using comments on previous assignments to improve future ones.

In conclusion this module has taught me a good foundation of skills such as important of time management and consistency that in the future I’ll be able to build on, and has shown me my weaknesses such as team collaboration and highlights the need for me to work on it.

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