# Fractal Exploration

|  |  |  |  |
| --- | --- | --- | --- |
| **Student** | Louis Durston-Wyatt | | |
| **Teacher(s)** | Steve Wentworth | | |
| **Version** | 1.0 | **Date issued** |  |

|  |
| --- |
| Background |
| Explain the need for this project in general terms.   * What is the problem, describe and justify the features that make the problem solvable by computational methods? * Explain how the problem features listed above are solvable through computational methods * Exactly what problem will this project solve? (value proposition). * List each of the benefits for this project as a bullet pointed list.   The problem my project will solve is the gap in truly interactive, high-quality fractal visualisers. It will be a useful educational tool for teaching students about fractals in the complex plane in a visual, interactive way.  My program’s aim is to generate and display a fractal in the complex plane (such as the Mandelbrot Set and Newton’s Fractals, generated using iterative methods) that the user can traverse by panning and zooming. The fractal will regenerate at increasing levels of precision as it is zoomed into, creating the illusion of infinite detail. The user can then “record” a route through the fractal and press “generate”; a high-resolution video following this route through the fractal will be generated using compute shaders, where the GPU can iterate many complex inputs in parallel.  This lends itself to computational methods because generating the sets that represent these fractals requires repeated iteration of functions (such as the Mandelbrot equation, zn+1 = zn2 + c) which would be impossible without computationally performing the calculations to arbitrary detail. Also, displaying these sets on the complex plane cannot be done without a computer as millions of points need to be plotted.  Benefits for this project: |

|  |
| --- |
| Research |
| **Target Market**  Do research on your project idea, whom are you solving this particular problem for? are you providing benefits to any other groups?  **Alternatives**  Do research on competitor products which offer the same or similar features to what you are offering. For those competitors, look at the features they are offering, list these features here with some discussion as to whether you will include this feature or not (if you are including a researched feature then add it to your background section above success criteria below, if you are not including a researched feature make it clear in your out of scope section. |

|  |
| --- |
| Success Criteria |
| How will you measure success? High level success criteria at this stage, you will go into more indepth success criteria during each sprint of development? |

|  |
| --- |
| Out of scope |
| List any features that you do not plan to including in your development project, examples could be **having Visa payments on a website**, then justify your reasons why you will not be including the feature. |

|  |
| --- |
| Stakeholders / Responsibilities |
| **Stakeholders**  Bullet pointed list stakeholders for the project, and the role they will play.  **Responsibilities**  Will provide ideas for requirements of the project from knowledge of business area. Will be kept informed of project progress through updates from Student. Will take part in user acceptance testing at the end of the development project. (Elaborate on this section) |

|  |
| --- |
| Ability |
| * Discuss your capabilities in Computer Science that suggests you are able to offer this computing solution. * Discuss the Computer Science techniques that will be deployed to solve this problem. * Discuss the development lifecycle that will be deployed on the project. * Discuss the programming languages that may be necessary in providing a solution to this problem. * Programming style e.g. procedural, embedded, Object Orientated. * Discuss what resources maybe necessary (hardware, software, devices, pay particular attention to hardware and software that you will need, that may currently not be installed on the school computers/laptops etc). |

|  |  |  |  |
| --- | --- | --- | --- |
| Risks | | | |
| **ID** | **Risk** | **Action to address** | **Owner** |
| 1 |  |  |  |
| 2 |  |  |  |

|  |  |
| --- | --- |
| Sprint Zero Requirements | |
| **Requirement No** | **Description** |
| 1 | High level requirements for entire project (including visual and user experience designs) |
| 2 | Detailed requirements for Sprint One |

|  |  |
| --- | --- |
| Sign off | |
| **[StudentName]** |  |
| **[Stakeholder]** | Samuel So |
| **Steve Wentworth** |  |