BBM412 - Computer Graphics
Term Project Proposal

Çağatay Yiğit, Ecem Varma, Şamil Ateşoğlu

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1 General Information

Project Name. Your Call For All

Name & Surname	Student Number	E-mail Address
Çağatay Yiğit	21807382	cyigit@hacettepe.edu.tr
Ecem Varma	21827962	evarma@hacettepe.edu.tr
M. Şamil Ateşoğlu	21827095	matesoglu@hacettepe.edu.tr

Table 1: Group Members

1.1 Description

Your Call For All is a walking simulator where the environment changes based on the protagonist's actions. The protagonist walks in a seemingly infinite environment, a forest, where some decision points come across to them. These decision points are subtle, meaning, unless the player pays attention to them, they can go by unnoticed. To give an example, the protagonist may pass by the bottom of a glass bottle, and if the player doesn't pick it up, it will start a fire after some time. But if the player stops and picks it up, it will not cause fire, and the environment will not get worse. After a while, if the protagonist acted for the wellness of the environment just enough, the player will be declared winner, but the player can go on forever after that. However, as the player makes some poor choices, the environment gets incrementally worse, and after a while, if the player has lost too much points, the game will be over with the protagonist collapsing on the floor.

2 Project's Relation to Environmental Problems

The aim of this project is to inform the people about powerful consequences of actions of individuals. Since we will show many environmental problems in this educational walking simulator, we will show how the environment changes based on the reactions of the character

to these problems, either ignoring them or taking action on them. Passing through a forest, the character faces these various decision points regarding the health of the environment during the journey.

3 Known Algorithms to be Employed

Procedural generation (world, path, audio): The world around the character will be generated procedurally, as well as the path he/she walks on. The path will be generated using one-dimensional lattice random walk algorithm and De Casteljau's algorithm for bezier curves. The objects in the environment will be generated using custom problem-specific algorithms we will develop. Also we plan to generate the theme music based on the status of the environment, throughout the game.

We will make use of fluid simulation algorithms to render puddles and lakes. We will also be needing to use fire rendering techniques to simulate fire in real-time, as well as the smoke it generates. We will be using real-time rendering algorithms for various post-processing operations like bloom-filtering and glare generation.

4 Visual Draft

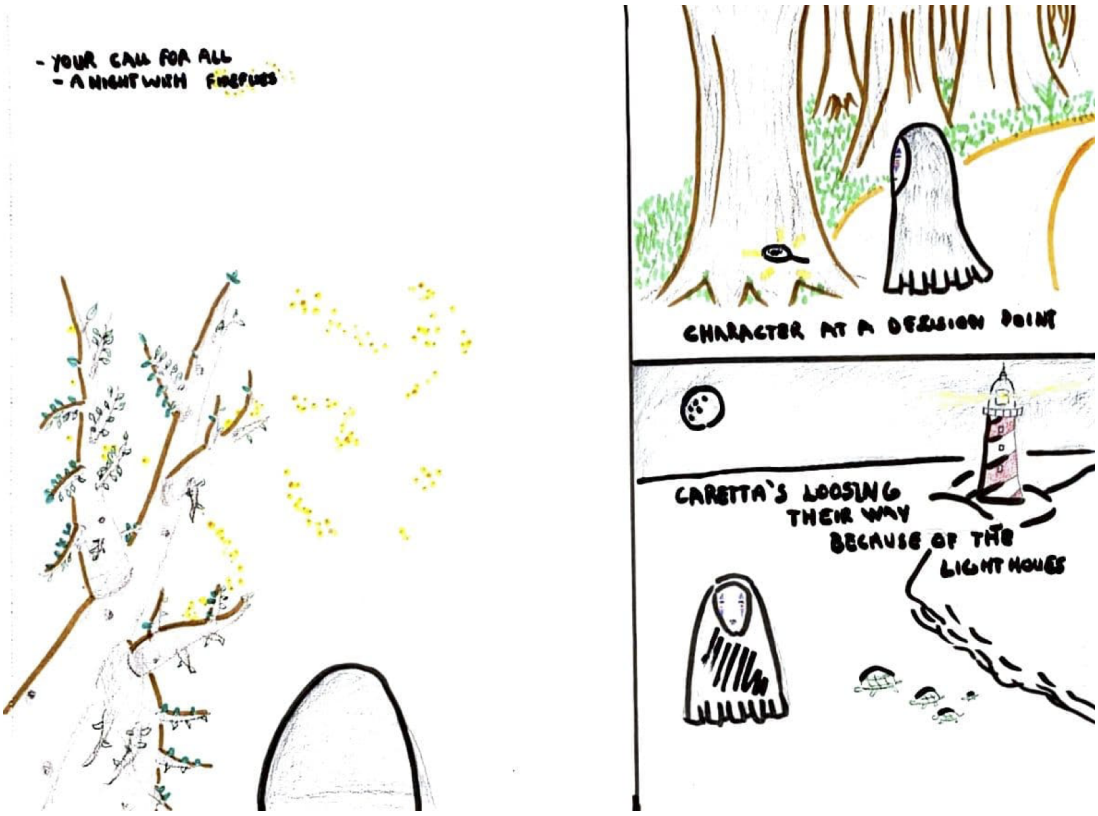

Figure 1: A sketch of the proposed project

5 Topics from Course Curriculum

Viewing. We will have a perspective camera, which follows our character throughout the journey. The character can look at anywhere freely in 3 dimensions.

Interactions. Our educational game will have a non-intrusive and subtle user interface for game menu, as well as a information window that will show when game is over. The player can interact with the game using keyboard and mouse inputs.

Lighting & Shading. Our game includes variety of light sources such as: Sun, flashlight (at night), lighthouse, fireflies.

Texture & Environment Mapping. All of the objects in the game will have a texture as well as materials, and we will use bump mapping for reflection of the lights.

6 Technical Details of Proposed Project

As we mentioned before, the character will be walking on a path. This path will be generated using customized versions of one-dimensional lattice random walk, as well as De Casteljau's algorithm [2] for bezier curves which will smooth out the generated path of the character. The terrain generation will also be procedural, using the Diamond Square Algorithm [1]. The environment and the game objects surrounding this path, will also be generated procedurally, chunk by chunk. The sizes of trees, as well as other objects will vary. The decision points will also be placed randomly along the player's path.

We plan to implement a day-night cycle, where shading modes will change based on the time of the game-day.

We also plan to integrate subtle changes in the health of the environment based on the wrong decisions and good actions done by the player, by parameterizating the shaders we will develop. To create a more realistic scenery of polluted environment, we will develop a post-processing module in which we will make use of custoomized versions of bloom effects to simulate mist in the air.

We will include puddles and lakes as well as an ocean, and for them we will implement water simulations. There will be fireflies, sun, a lighthouse, and a flashlight as light sources. The fireflies in particular will be generated using a particle system. And the player will be able to pleasantly hear the fireflies at nights.

We will also design animations for the protagonist, acting on the decision points, like picking up something, or calling authorities, as well as other contextual animations like looking at his/her watch when the dawn is near.

References

[1] 64bitdragon. The Diamond Square Algorithm. https://learn.64bitdragon.com/articles/computer-science/procedural-generation/the-diamond-square-algorithm.

[2] Wikipedia. De Casteljau's Algorithm. https://en.wikipedia.org/wiki/De$_C asteljau$