Sprint 1 – Project Acceptance Tests

Team 9

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Objectives:

The objective of this document is to outline the various testing methods and implementations that will be used throughout the project.
For a list of the objectives of the project please see the Scope of Work document.

1. FPS Test

The simulation is expected to run smoothly as to avoid motion sickness.
Therefore, while the simulation is running the framerate will be constantly monitored. Should it drop bellow 60 FPS a warning will be output to the console for further review.

2. Multithreaded Test

The simulation is expected to be implemented in a multithreaded manner.
Therefore, while the simulation is running all thread synchronizing events will be recorded and reported for further review.

3. Multiple particle Test

The simulation is expected to be able to render at most ten particles per simulation space.
Therefore, tests will be conducted with at least ten particles.

Automatic tests will summon ten particles and then attempt to summon an eleventh. It will then scan the environment counting all particles and assert that only ten exist, and that they match the initial ten created.

Automatic tests will summon ten particles with random attributes and simulate them for an amount of time whilst consistently measuring the framerate. Should the framerate drop below the minimum allowed, the test will fail recording all attributes of the simulation at the time.

4. Isolation Test

It is expected that isolated environments should be allowed to simulate simultaneously.
Therefore, all systems involving particle simulation will be tested for their parameters, classes, and data, to maintain that they are self-contained.

5. Particle creation and destruction Test

It is expected that particles will be able to be created and destroyed at will during any part of the simulation.
Therefore, automated tests will create particles, assign them properties, and check those properties to maintain that they were successfully created. Should this fail an error will be recorded with all details of the attempt.
Automated tests will also create particles, delete them, and then search the environment for the deleted particles. Should the search discover the particles that were supposed to be deleted, an error will be recorded with details of said particles.

6. Scale Test

It is expected that scaled information will be able to be extracted from the simulation.
Therefore, automated tests will create particles and assign certain parameters to them, then search the environment for these particles and attempt to extract the scaled parameters from them, checking to see if they line up with the expected scaled parameters. Should this fail, an error will be recorded containing the particle details.

7. Vector Field Test

It is expected that at least three vector fields be used to emulate interactions.
Therefore, automated tests will create two particles seven times, each time changing the active vector field. When these two particles are created, they will have a select vector field (or fields) enabled and initial parameters set, run the simulation for a set duration, and then check each particle to measure the effect of the vector field(s) on each other. It will compare this measured result with the expected result and report an error should they not match. All details of the simulation will be recorded with this error.

The vector field combinations will be as follows:

1. Coulomb Potential
2. Lennard-Jones Potential
3. Morse Potential
4. Coulomb Potential + Lennard-Jones Potential
5. Lennard-Jones Potential + Morse Potential
6. Coulomb Potential + Morse Potential
7. All three Potentials

8. Collision Test

It is expected that the simulation calculates particle collisions.
Therefore, automated tests will conduct a series of repetitious tests with increasing velocities. The tests will create two particles and set their parameters so that they will collide with each other, then wait a specified amount of time and listen for a collision event to occur. Should the event not occur in the time frame an error will be recorded. Each test will be done with an incremental increase in initial velocities until set velocities reach the maximum allowed.