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| **Concordia University**  **Department of Computer Science**  **and Software Engineering** |

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| **Animation** |

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| **Assignment #3** |

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| **COMP 477**  **Winter 2013**  **Professor: Dr. Grogono** |
| **By: Patrick Modafferi**  **9401377**  **03/22/2013** |

I certify that this submission is my original work and meets the Faculty’s Expectations of originality

## Starting the game

1) Go to the PatrickModafferiA3 folder

2) Open PatrickModafferiA3.sln with visual studio 2010

3) Press F5 to compile and run in debug mode

If you do not have visual studio

1) go to PatrickModafferiA3 \ PatrickModafferiA3 \bin\x86\Debug

2) Double click on PatrickModafferiA3.exe

## Controls

SPACE – Toggle between usage 1 and 2

LEFT/RIGHT ARROW – Pan Left and Right

UP/DOWN ARROW - Pan Up and Down

W/S – Rotate Camera Up and Down

A/D - Rotate Camera Left and Right

Q/E – Move Camera Forward and Backward

X – Reset camera

## Design Notes

For this assignment I have opted to create a particle system from scratch due to specific requirements. Mainly because both usages I wanted to implement involve some customized behaviour and include a particle system of particle systems. To accomplish this, all particle systems contain an object called “Bursts” which is a list of Particle systems. This creates a recursive type of relationship in the update and draw functions.

### Star System

The star system is rather simple. The static obtain a random 3D coordinate based on two angles (Phi and Theta) mapped to a large sphere. The complexity rises when shooting stars are added. Each shooting star is more than just another particle, it also has a trail and a behaviour of its own. Therefore, when we reach the specified spawn rate, another shooting star is added to the “Bursts” discussed earlier. Their initial velocity is then calculated as a tangent to the sphere located at a random static star’s location.

### Fireworks

The fireworks are made of three main components: Firework Rockets, Firework Explosions and Firework Rocket Trails.

Their names are self explanatory and each of these components is considered as its own particle system. The rockets get fired upwards with a large vertical velocity and random sideways direction. When the vertical speed reaches zero, the rocket explodes and a new system is created at the source of the rocket’s explosion. Random lifespan and color are given along with directions calculated like in the star system. When all the exploding particles expire, we re-spawn the rocket at the initial source with a new random direction.

### Trails

Fireworks and shooting stars contain trails. These trails are simply particle systems that get new particles added to them every time the object updates. Basically, a new stationary particle gets created at the location of the leading object. These trailing particles then have their alpha value decreased and die when the alpha reaches zero.

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**DISCALIMER**

This project was meant for educational purposes only and is not intended

to be sold or distributed without consent

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Patrick Modafferi

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