

ETGG1802 Spring2009

Lab7: Particle Effects and Physics

Points: 45

Assigned: 3/17/2010 (MW)

Due: 4/2/2010 (by 11:59pm) (MW)

Objective:

To gain more pygame experience and to apply some of our physics simulation ideas. Also, to demonstrate the use of particle effects.

Tasks:

1. (3 points) Create a dynamic starfield (not an image)
 - a. A collection of points, each with varying sizes, and colors.
2. (14 points) Asteroids
 - a. When an asteroid is hit, make it split into two.
 - b. Each asteroid should have a force applied to it corresponding to the angle the bullet hits them.
 - i. Make the first asteroid's force angle -15 degrees from the hit angle and the other one at +15 degrees from the hit angle.
 - c. If two asteroids hit each other, make them bounce.
 - d. There should be 3 sizes of asteroid. The bigger one becomes two medium ones; the medium asteroids become two small asteroids when hit; the small asteroids disappear when hit.
3. (8 points) Particle Effects
 - a. Ion trail for the space ship.
 - b. Explosion when an asteroid is destroyed.
4. (10 points) Additional physics
 - a. When the ship hits an asteroid, make both bounce off each other.
 - i. Apply a force to the asteroid and a ship.
 - ii. Use the angle between them to determine at what angle the force is applied.
 - iii. Also, show the ship's shield for a few frames (not just one!), which gradually fades out / gets smaller as those few frames pass.
 - b. Ship friction
 - i. This drag should cause the ship to gradually slow down, which will be noticeable when no thrust is applied (think, cosmic radiation)
 - ii. Include a maximum speed on the ship (and optionally the asteroids)
5. (5 points) Ship class
 - a. Incorporate velocity and acceleration (i.e. when you press up, the ship should gradually speed up, and it should be able to point in a direction different than the direction of movement).
 - b. Add a bullet list and a fire method.
 - i. There should be some kind of "reload" time before a second shot can be fired.

- ii. Or...the player has to release the fire button before firing a new shot.
 - c. The ship should have a shield level, indicated on-screen as a bar.
6. (10 points) Main program
- a. Start with 10 asteroids and 100 shield-points
 - b. Track and show the player's score on-screen.

A major part of your grade on each section will be how well you use good design principles: good commenting, class structure, variable names, etc – if it “works” but is sloppy code, you’ll lose some points 😊

Here's a sample image:



Extra work will likely be worth bonus points. The more difficult / useful the feature, the more points it will be worth.