# Simple Collision Resolution

Section 7.1

Make a demo that does the following:

1. Shows two particles.
2. User can control individual mass.
   1. Particle sprite adjusts size accordingly.
3. User can control initial velocity values.
   1. Be sure to have intelligent default values.
4. User can auto step or manually step.
5. User can turn on and off the visibility of the various vector quantities involved with collision resolution found in the reading.
6. User can trigger a collision at any time via a button press.
7. Objects naturally trigger a collision press when they touch.
8. Have a check box that allows the user to change the contact normal to that of an axis-aligned box. Be sure to display the box.

Questions:

1. What is closing velocity?
   1. Total speed two objects are moving together at.
2. What is separating velocity?
   1. Total speed two objects are moving apart at.
3. Why do I only care about these velocities and not all components of the two particle velocities?
4. Why are these called velocities and not speeds even though we measure them in a scalar value?
   1. Because they have direction (in the 1st dimension).
5. What is an elastic collision?
   1. A collision with 100% conservation of momentum; no velocity is lost.
6. What is an inelastic collision?
   1. A collision where some portion of the energy is lost (in the real world to things like heat and friction), which makes it so that the total energy spent as movement is less after the collision than it was before.
7. What is the coefficient of restitution?
8. What is an impulse?
   1. An instantaneous change in velocity.
   2. An impulse affects velocity in the same way a force affects acceleration.
9. How are impulse and force related?
10. What is momentum?
11. How are momentum and impulse related?
12. What is conservation of momentum?
13. What is the role of the contact normal?
14. What is the contact normal for two particles?
15. Why is it important to consider the effect of the collision from each object’s point of view?
16. Talk intelligently regarding the dimensional analysis concerning force, time, and impulse. (p 118)