SIMULATION & PHYSICS – PRACTICAL 4

COLLISION 1 SJORS GIELEN 500765899 1. repeat the assignment you are implementing;

Finish the ResolveCollisionWith method to handle collisions with balls of the same mass in a generic manner.

2. explain your approach;

First detect if there is a collision, then simply executed the vector math required for this.

3. describe your code;

If the difference in length is smaller then the two radii added tighter there is an overlap, then get the collision normal. Fix interpenetration, used collusion normal and difference in velocity to get the dot product. Use the dot product and the collision normal to get the change in velocity vector, and then apply it to the velocity's of both objects.

4. show (relevant) code snippets;

```
public void ResolveCollisionWith(Ball b) {
    //Step 1: calculate the vector from the position of this ball to the other ball
    Vector2 dif = b.Position - this.Position;
    //Step 2: calculate the distance between the two balls
    float dist = dif.Length() - (b.Radius + this.Radius);
    //Step 3: if there is a collision
    if (dist < 0)
    {
        //Step 4: calculate the collision normal
        Vector2 colNormal = Vector2.Normalize(dif);
        //Step 5: Resolve interpenetration
        Vector2 resetVector = colNormal * (dist / 2);
        this.Position += resetVector;
        b.Position -= resetVector;
        //Step 6: calculate the velocity component parallel to normal
        Vector2 velDiff = b.Velocity - this.Velocity;
        float dot = Vector2.Dot(velDiff, colNormal);
        //Step 7: calculate the changeVelocity
        Vector2 cv = colNormal * dot;

        //Step 8: change the velocities (assume equal mass)
        this.Velocity += cv;
        b.Velocity -= cv;
    }
}
</pre>
```

The entire method.

5. include a screenshot of your program



Again I have made video's for the class as well These are found here: <u>https://www.youtube.com/watch?v=9uMnr0EeFzI&t=987s&list=PLARkMALdMekM6EMkY0gcQS</u> <u>KvADVAx9zK5&index=6</u>