

```
import java.util.ArrayList;

public class Collisions{
    static class Atom {
        double x, y, rad;
        public Atom(double x, double y, double rad){
            this.x=x; this.y=y; this.rad=rad;
        }
    }

    static Atom [] atoms = {
        //      x      y      rad
        new Atom( 10.6,  2.8,  1.7),
        new Atom(  5.9, 18.6,  1.8),
        new Atom( 14.2, 19.3,  0.0),
        new Atom( 10.4, 12.8,  0.2),
        new Atom(  7.0, 18.8,  1.4),
        new Atom( 16.1, 10.0,  0.0),
        new Atom( 14.0,  7.3,  0.8),
        new Atom( 14.3,  9.1,  0.4),
        new Atom( 15.2, 18.7,  1.0),
        new Atom( 17.7, 17.9,  0.0),
        new Atom( 15.5,  3.8,  1.5),
        new Atom( 18.7, 13.5,  0.0),
        new Atom(  9.6,  6.3,  1.0),
        new Atom( 10.8, 10.5,  1.9),
        new Atom( 16.9,  7.0,  0.2),
        new Atom(  0.0, 18.2,  1.9),
        new Atom(  3.6,  6.6,  1.7),
        new Atom( 16.0,  6.2,  0.5),
        new Atom( 16.1,  3.1,  0.1),
        new Atom(  2.0, 18.9,  0.9),
    };

    // Parallelize the main computation
    public static void main(String args[]){

        int natoms = atoms.length;

        ArrayList<Integer> collisions = new ArrayList<Integer>();
        double xd,yd,dist,rads;
        for(int i=0; i<natoms-1; i++){
            for(int j=i+1; j<natoms; j++){
                xd = atoms[i].x - atoms[j].x;
                yd = atoms[i].y - atoms[j].y;
                dist = Math.sqrt(xd*xd + yd*yd);
                rads = atoms[i].rad + atoms[j].rad;
                if(dist < rads){
                    collisions.add(i);
                    collisions.add(j);
                }
            }
        }

        int ncollisions = collisions.size()/2;
        System.out.printf("%d collisions occurred\n",
                           ncollisions);
        for(int i=0; i<collisions.size()/2; i++){
            System.out.printf("%2d and %2d\n",
                               collisions.get(i*2+0),
                               collisions.get(i*2+1));
        }
        return;
    }
}
```