

# Programming Design, Spring 2015

## Suggested Solution for Homework 7

Solution provider: Shelley Sun

### Problem 1

(a)

The reason of getting ten identical numbers is that the seed is set inside the loop. When we are using `time(0)`, it will only change once per second. So if the loop is completed within one second, the seed will remain the same. This leads to the same initial random number.

(b)

As we mention above, `time(0)` will only change once per second. And if by chance, the loop happens to start and finish across two seconds, the ten numbers may not be identical.

### Problem 2

(a)

```
double area(Triangle t)
{
    double area = ( (t.p1.x-t.p3.x)*(t.p2.y-t.p1.y) -
                    (t.p1.x-t.p2.x)*(t.p3.y-t.p1.y) )/2.0;
    if( area >= 0 )
        return area;
    else
        return -area;
}
```

(b)

```
struct Triangle
{
    Point p1;
    Point p2;
    Point p3;
    double area();
};

double Triangle::area()
{
    double area = ( (p1.x-p3.x)*(p2.y-p1.y) -
                    (p1.x-p2.x)*(p3.y-p1.y) )/2.0;
```

```
    if( area >= 0 )  
        return area;  
    else  
        return -area;  
}
```

(c)

As the calculation of the area is actually calculating a property of the triangle, the function we want to implement is related to only one triangle. We would prefer using the member function to attach the operation with the triangle. Once we call the member function of a triangle, we can get the desired area of this triangle. In this way, we can enhance modularity.

### **Problem 3**

Please see the .cpp file.

### **Problem 4**

Please see the .cpp file.