SENG2200/6220 –Programming Languages & Paradigms
Computer Lab for Week 9, Semester 1, 2019

Objectives

This lab aims to build the understanding of parameter passing mechanisms and Java synchronization.

Questions

1. Explain the difference between pass-by-value and pass-by-reference parameter passing.

2. What sort of parameter passing does Java use?

3. What sort of parameter passing does C++ use?

4. What is the difference between a reference parameter and a const-reference parameter in C++? When should a const-reference parameter be used in preference to a reference parameter?

5. What is the output of the following program?

```
public class Test {
    protected int value = 0;
    public static void test(Test test) {
        test.value = 1;
        test = null;
    }
    public static void main(String[] args) {
        Test test = new Test();
        System.out.println(test.value);
        test(test);
        System.out.println(test.value);
    }
}
```

6. What is the output of the following program?

```
#include <iostream>
using namespace std;

void testing(int test[]) {
    test[0] = 7;
}
int main() {
    int test[2];
    test[0]=0;
    test[1]=1;
    testing(test);
    cout << test[0] << " " << test[1] << endl;
}
```

7. Write Java code for a Point class, containing attribute data for xCoord and yCoord (doubles). Write a constructor that will initialize these attribute via parameters, and a default constructor that will have a default initialization which is the origin. Now write 2 methods for your Point. The first will calculate the distance between 2 Points, and the second will calculate the distance of a Point from the origin by a direct invocation of the first of your two methods.

8. Modify the first of your methods in Q7, so that the Origin can be asked how far it is away from any Point passed to the method.

9. It is common for software houses to establish their own "coding standards" for code written in a particular language. What do you think would be a good rule for the use of **const** in C++ methods and parameters (and in general for that matter).

10. What are the advantages and disadvantages of pass-by-result and pass-by-value-result as parameter passing mechanisms.

11. What are the advantages and disadvantages of pass-by-reference as a parameter passing mechanism.

12. Design a parameter passing mechanism that will allow the transparent passing of information between caller and callee, irrespective of whether they are local to each other, or on autonomous computers (nodes) across a network.

13. What is the purpose of the synchronized keyword in Java.

14. Why does Java need two separate ways of setting up and invoking threads within a Java program. Outline the two methods.