UNIVERSITY *of* LIMERICK

OLLSCOIL LUIMNIGH

DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION SYSTEMS
COLLEGE OF INFORMATICS AND ELECTRONICS

Assessment Paper

MODULE CODE: CS4013/CS4113 **MODULE TITLE**: Object Oriented Design/Programming

TERM: Autumn Semester, 2007 **EXAM DURATION:** 2.5 hours
VALUE OF EXAM: 40%

LECTURER: Chris Exton

INSTRUCTIONS TO CANDIDATES:
Answer all questions part A and B. **(Total 100 marks)**

Part A (50 Marks)

QA1: (20 Marks each)

Give a short description of each of the following, using **SAMPLE C++** code to provide a simple implementation that illustrates an example as part of your answer.

a) Access-specifier
b) Member initializer lists
c) Pointer arithmetic
d) Class template vector

QA2: (15 Marks each)

Explain the reasons and give a short description of each of the following, feel free to use a small diagram if appropriate to explain your answer.

e) Explain the "Principle of least privilege".
f) Deep V's Shallow copies.
g) Making the copy constructor private

QA31: (15 Marks)

Some people in the OOP community feel that "friendship" corrupts information hiding and weakens the value of the object-oriented design approach. Discuss the pros and cons of the friendship relation. Make sure to include and describe the symmetric and transitive aspects of the relationship as part of your answer.

Part B (50 Marks)

QB1: (25 Marks)

You compile and execute the following program. What is the EXACT output upto and including the "main end"?

```
class A
{
  public:
    A(int inValue=1)
    {
      i = inValue;
      cout << " I love C++ " << inValue << endl;
    };

    ~A()
    {
      cout << " C++ is cool " << i << endl;
    }
  private:
    int i;
};

A a0(8);

int main(int argc, char *argv[])
{
        A *a2;

        cout << " C++ is better than apple pie"  << endl;
        A a1(2);
        cout << " I Dream of C++ " << endl;
        {
        a2 = new A();
        static A a0(4);
        A a1(3);
        }
        cout << " main end" << endl;
       system("PAUSE");

}
```

QB2: (25 Marks)

You compile and execute the following program. What is the EXACT output upto and including the "main end"?

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

class MyClass {
  int x, y;
  static int val;
public:
  MyClass() {
     cout << " Here we go " << val++ << endl;
     x=0;
     y=0;
  }
  MyClass(int i, int j) {
     x=i;
     y=j;
  }
  void getXY(int &i, int &j) {
     i=x++;
     j=++y;
  }
  MyClass operator+(MyClass object2);
  MyClass operator-(MyClass object2);
  MyClass operator=(MyClass object2);
};

MyClass MyClass::operator+(MyClass object2)
{
  MyClass temp;
  temp.x = x + object2.x;
  return temp;
}

MyClass MyClass::operator-(MyClass object2)
{
  MyClass temp;
  temp.y = y - object2.y;
  return temp;
}

MyClass MyClass::operator=(MyClass object2)
{
  x = object2.x;
  y = object2.y;
  return *this;
```

```
}

int MyClass::val = 0;

int main(int argc, char *argv[])
{
  MyClass object1(10, 10), object2(5, 3), object3;
  int x, y;

  object3 = object1 + object2;
  object3.getXY(x, y);
  cout << "(object1+object2) X: " << x << ", Y: " << y << endl;

  object3 = object1 - object2;
  object3.getXY(x, y);
  cout << "(object1-object2) X: " << x << ", Y: " << y << endl;

  object3 = object1;
  object3.getXY(x, y);
  cout << "(object3=object1) X: " << x << ", Y: " << y << endl;

  cout << " main end" << endl;
  system("PAUSE");
  return 0;
}
```