Assignment 4
Due: 11:59pm Oct. 31 (Sunday)

This assignment is done individually or by a group of 2 students (each group submits only 1 copy of the assignment)

1. [30 points] Given the following code in Java

```java
public class A
{ public void p() { System.out.println("A.p");}
  public void s() { System.out.println("A.s");}
  public void r() { p(); s();}
}

class B extends A
{ public void p() { System.out.println("B.p");}
}

class C extends B
{ public void s() { System.out.println("C.s");}
  public void r() { s(); p();}
}
…
A a = new B();
a.r();
a = new C();
a.r();
```

What does the above program print?

2. [30 points] Question 10.20 Given the following code in C++:
```cpp
class A{
 public:
        virtual void p(){cout << "A.p"<< endl;}
        void t(){cout << "A.t" << endl;}
        virtual void r(){p(); t();}
};
class B: public A{
 public:
        void p(){cout << "B.p" << endl;}
};
class C: public B{
 public:
        void t(){cout << "C.t" << endl;}
        void r(){t(); p();}
};
…
A a; C c; a = c; a.r();
A* ap = new B; ap -> r();
A* ap1 = new C; ap1 -> r();
```

What does the above program print?

3. [40 points]
Class A
{ public:
        virtual void h();
        virtual void g();
  private: int a;
};
class B: public A
{ public:
        void h();
        void t();
  private: int b;
}
Class C: public B
{ public: void g();
  Private: int c;
}
Draw the VMT of each class and the layout of memory for a dynamically-allocated object of each class. Please note:
1. Private variables of a class are not accessible in its subclasses, but they are still allocated in objects of subclasses and are allocated at the same offset as their superclass objects.
2. Once virtual, always virtual — if a variable is defined as a virtual variable in a class, then the variable is also a virtual variable in its subclass, even if there is no "virtual" keyword in the subclass.

Instruction of Submission:

Submit a .pdf file containing the name and email address of the group members, and solutions of all questions through brightspace.binghamton.edu.

Academic Honesty:

All students should follow Student Academic Honesty Code (http://watson.binghamton.edu/acadhonorcode.html). All forms of cheating will be treated with utmost seriousness. You may discuss the problems with other students, however, you must write your OWN codes and solutions. Discussing solutions to the problem is NOT acceptable. Copying an assignment from another student or allowing another student to copy your work may lead to an automatic **F** for this course. If you borrow small parts of code/text from Internet, you must acknowledge this in your submission. Also, you must clearly understand and be able to explain the material. Copying entire material or large parts of such material from the Internet will be considered academic dishonesty. Moss will be used to detect plagiarism in programming assignments. You need ensure that your code and documentation are protected and not accessible to other students. Use **chmod 700** command to change the permissions of your working directories before you start working on the assignments. If you have any questions about whether an act of collaboration may be treated as academic dishonesty, please consult the instructor before you collaborate.