2012.2 Object-Oriented Programming and Design
Final Exam (Dec. 20th 7pm-8:20pm)

supervisor signature	

StudentID# : ( ) , Name : ( )

* You may answer in either Korean or English. As an exception, you can use only English words in problem 1.

1. (18points) Complete following sentences by filling out blanks (a)~(f) with the most appropriate English words.
You can use only English words in this problem 1. Otherwise, you will get some penalty.

(1) In UML, (a.) describes how a system is split up into logical groupings by showing the dependencies among these groupings, and (b.) describes the business and operational step-by-step workflows of components in a system and shows the overall flow of control.

(2) UML describes a software system at a high level of (c.).

(3) (d.) provide common interface to step through the elements of any arbitrary type STL containers.

(4) In STL, a vector is a (e.) array of variables or objects.

(5) (f.) can only be used as a base class.

2. (10points)
(1) What is pure virtual function? Explain.
( )

(2) Explain the main purpose of using pure virtual function.
( )

3. (10points)
(1) What is 'container class'?
( )

(2) What are examples of 'container class'? List at least three examples.
(a.) , (b.) , (c.)

4. (12points) List four different forms of polymorphism and explain each concept.

(i) _____ :

(ii) _____ :

(iii) _____ :

(iv) _____ :

5. (10points) What is 'template instantiation'? Explain.
( )

6. Consider following C++ code and its execution output result.

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

class Student
{
public :
    Student(int id , char* name)
    {
        stu_id = id;
        stu_name = name;
    }
    ~Student() {}

    (a)

    char* getName() { return stu_name; }
    int getID() { return stu_id; }

private :
    int stu_id;         // student id
    char* stu_name;     // student name
};
```

```
(b)

int main()
{
        vector<Student> stu_vec;


        stu_vec.push_back(Student(4,"Nancy"));
        stu_vec.push_back(Student(1,"Tom"));
        stu_vec.push_back(Student(3,"Mike"));
        stu_vec.push_back(Student(2,"Lisa"));

        sort(stu_vec.begin() , stu_vec.end()); // sort by student id
        Display(stu_vec.begin() , stu_vec.end());
        Display(int_vec.begin(), int_vec.end());
        return 0;
}
```

Execution Output result:

```
1 : Tom
2 : Lisa
3 : Mike
4 : Nancy
```

(1) (16points) What code should be inserted in (a) ?

```
//Put your code here.
```

(2) (15points) What should be inserted in (b)? Write the function **"Display"** which prints out each element [student id : name] of a `Student` type vector. (See the execution output result above).

```
// Put your code here
```

7. (9 points) What are appropriate words in (a), (b), and (c) on the following figure?

(a) : ( ) , (b) : ( ) , (c) : ( )