University of Technology
Computer Science Department
Class: Second
Time: 3 hours

Subject: OOP
Examiner:Asia Ali Salman

Final Exam / First Trail / 2010 -2011

Note : Answer Five Questions (10 marks for each question)

Q1) Answer the following (choose five only):

a- What is the polymorphism? Explain the early binding and late binding?
b- Using examples show how many types of constructors the program in OOP could have?
c- What is Static Data Member? Show an example.
d-What are the benefits of reusability?
e- What is the meaning of ambiguity? Is there is any relation between it and the overriding, show using examples.
f- How can we initialize constant members in a class? Give an example.

Q2) A- Write a class to represent a rectangle, with a function to calculate the area, and a friend function to duplicate the width and height of the rectangle.

B- Write a class to represent a string of characters, with overloaded constructor function, the first function with no parameter, the second function with an array of characters as a parameter, and the third function contains an integer parameter to be converted to a string.

Q3) A- . Show the output of the following program:

```
#include<iostream>
class A{
public:
int f(){return 1;}
virtual int g(){return 2;}
};
class B: public A{
public:
int f(){return 3;}
int g(){return 4;}
};
class C: public A{
public:
int g(){return 5;}
};
int main(){
A *pa;
A a;
B b;
C c;
pa=&a; cout<<pa -> f()<<endl; cout<<pa -> g()<<endl;
pa=&b; cout<<pa -> f() + pa -> g()<<endl;
pa=&c; cout<<pa -> f()<<endl; cout<<pa -> g()<<endl;
return 0;
}
```

B- Write a complete OOP program to represent a class of string has the following function:

1- Check number of the vowel letters in a string, and return a counter to main function
2- A display function.

Q4) A- Define an array of objects with initial values as given in the following table:

Country	Capital	Population
Iraq	Baghdad	24,775,987
Egypt	Cairo	50,435,434
Yemen	Sana'a	28,905,224

B-Write a program to illustrate how to define and declare a class template for reading two data items using special function (constructor) and to find the multiplication of the given two data items.

Q5) Implement a class which is named time. Each object of this class represent a specific time of the day. Store the hours, minutes, and second as an integer number. Use constructor to input the data and then member functions named (**advance**)used to update the time and (**reset**) function used to accurate the time. The last function is (**normalize**) which is used to arrange the time.

Q6) A-Write an OOP program that contain an overload functions for the operators (>, +). (>) to check if the first cube is bigger than second one (its bigger if its x, y, z is greater than the x, y, and z of the second one) and the second function (+) to add x, y, z to the x, y, and z of the second one) add a statements in the main program to check the functions.

B- Write class Point, where each point represented by two integer numbers (X, Y), with a suitable constructor and a function to print the point, then derive class circle, where each circle represented by the central point and radius, with a suitable constructor and a function to compute the area of the circle. Note that the access visibility is protected.

GOOD LUCK