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END OF SEMESTER EXAM JUNE 2021 SESSION **OBJECT ORIENTED PROGRAMMING**
Level: I Academic year: 2020/2021 Speciality: Software Engineering Duration: 02H

Question:(1+ 1 + 1 + 1 +1 = 5 marks)

Discuss in a precise and concise manner the following assertions

1. The role of a constructor is not to create an object on which it operates.
2. Static member functions can be invoked without a particular instance.
3. When a function is virtual, its invocation via a pointer (or a reference) on the base class results in the execution of the available code best suited to the type of the object designated by the pointer (or the reference).
4. If, during a function call, the value of an object is passed, the corresponding parameter can only be initialized by the copy constructor.
5. The lists of initialization is used to proceed to a veritable initialization of members of the instance created and not just simple assigments.

Problem 1: (1 + 1 + 1 + 2 = 5 marks)

Consider the following code

```
class A {
public:
        int a;
        voiddump(){
                cout<< "a=" << a ;
        }
};
void display (Aobj){
        cout<< "State :" ;
        obj.dump();
        cout<<endl ;
}
```

```
classB : public A {
public:
        intb;
        void dump(){
                A::dump(); cout<< ",b="<< b <<endl;
        }
};
intmain (){
        B bb; bb.a = 4; bb.b = 3;
        A aa; aa= bb;
        display(aa) ; display(bb);
        bb.dump();
}
```

What is the result of executing the main function in the following cases?

1. The code is as defined above
2. The signature of the function display() is changed to: void display(A&obj); its code remaining unchanged.
3. The dump function is declared virtual in class A.
4. The dump function is declared virtual in class A and the main function is now:

```
int main(){
        B* pB = new B; A* pA;
        pB->a = 4; pB->b = 3; pB->dump();
        pA = pB; pA->dump();
        pB = (B*)pA; pB->dump();
}
```

Problem 2: (1.5 + 1 + 2 + 1.5 + 1 + 3 = 10 marks)

We desire to conceive a class for manipulating dates in OOP Given the following declaration:

```
class Date {
        int day, month, year;
        voidnextDay(void);
        boolisValid(void);
        public:
                Date();
                voidsetDay(int day);
                voidsetMonth(int month);
                voidsetYear(int year);
                intgetDay(void);
                intgetMonth(void);
                intgetYear(void);
}
```

1. Define all the methods of the class Date explicitly.
2. Add a copy constructor to the class Date.
3. Overload the >> and << operators for them to enable respectively the display of a date in the format dd-mm-yyyy and to initialise a date from the information found in an entry stream
4. Overload the ++ operator so that it corresponds to the passage of a date to the date of the next day. The operator has to be overloaded following a post-incremental and pre-incremental declination
5. Overload the functional operator () so that it returns the day if its parameter is 'd', the month if its parameter is 'm' and the year if its parameter is 'y'. The operator must be able to be called by a constant object of type Date.
6. Write the main function that will enable the manipulation of the class while testing all the methods and operators described above.

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