

Some exercises on a class in C++

Q. 1. Consider the following class definition.

```
class BankAccount
{
private:
    double balance;
    double interest_rate;
public:
    void set(int dollars, int cents);
    //The account balance is set to $dollars.cents;
    void update();
    //One year of simple interest is added to account balance
    double get_balance(); //Return the current account balance
    double get_rate(); //Return the current interest rate
};
```

Present the code for each member function. Make use of the comments to build the code.

Q. 2. We want to maintain the time of a day. To that end, consider the following skeletal definition of a class.

```
class clockType
{
private:
    int h;
    int m;
    int s;

public:
    :
    void getTime(int&, int&, int&);
    :
};
```

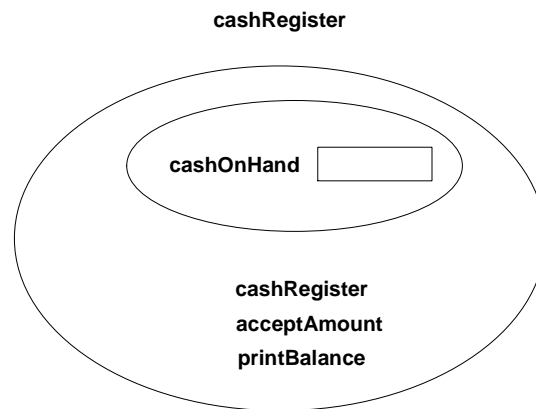
The objective is to compare the times of two class variables, each of clockType, for equality; return true if they are equal, and return false otherwise.

- Write a member function for this purpose.
- Write a non-member function for this purpose.

Q. 3. The objective is to define a class `cashRegister` for a candy machine. The register has an initial cash of 500 units. It accepts an amount of cash from the customer. The following operations are to be performed:

1. Set an initial balance of 500 units.
2. Accept an amount from the customer, and update the amount in the register.
3. Print the current balance.

A conceptual diagram appears below.



Present the declaration of the class `cashRegister`.

Q. 4. Present the output in its content and form corresponding to execution of the following program.

```
#include <iostream>
using namespace std;
class A
{
private:
    int n;
public:
    A();
    A(int a);
    void f();
    void g();
    int h() const;
    void k() const;
};

A::A() {n = 0;}
A::A(int a) {n = a;}
void A::f() {n++;}
void A::g() {f(); n = 3*n; f();}
int A::h() const {return n;}
void A::k() const {cout << n << endl;}

int main()
{
    A a; A b(2); A c; A d(4);
    a.f(); b.g(); c.f(); d.g(); d.k();
    A e(a.h() + b.h() + c.h()); e.k();
    return 0;
} // end of main
```

Q. 5. True or False?

- a. class is a reserved word.
- b. pointer is a reserved word.
- c. By default, all members of a class are public.
- d. It is possible to initialize a data member at the time of its declaration in a class.
- e. As parameters to functions, classes may be passed either by value or by reference.
- f. A class may have multiple constructors.

Q. 6. Consider the following class declaration:

```
class YourClass
{
private:
    int info;
    char moreInfo;
public:
    YourClass();
    YourClass(int newInfo, char moreNewInfo);
    void doStuff();
};
```

Which of the following statements appearing in the test program are legal with respect to the preceding class? Give a reason if you believe that a particular statement is illegal.

```
YourClass object1(42, '?');
```

```
YourClass object2;
```

```
YourClass object3(42, B);
```

```
object4 = YourClass();
```

```
object5 = YourClass;
```

Q. 7. Here is a class declaration:

```
class dateType
{
private:
    int month; //variable to store the month
    int day;   //variable to store the day
    int year;  //variable to store the year
public:
    void assignDate(int m, int d, int y); //assign the date
    void displayShort(); //display date as mm/dd/yy
    void displayVerbose(); //display date as Month Day, Year
};
```

Assuming that a correct implementation file exists, write statements for a client program (i) to create a `dateType` object `valentine`, (ii) set `valentine` to Valentine's Day for 2010, (iii) print `valentine` in short format, and (iv) print `valentine` in long format. (Valentine's day falls on Feb. 14 this year.)

Q. 8. Find syntax errors (if any) in the declarations of the following classes.

```
class AA
{
    public:
        void print();
        int sum();
        AA();
        int AA(int, int);
    private:
        int x;
        int y;
};
```

```
class BB
{
    int one;
    int two;
    public:
        bool equal();
        print();
        BB(int, int);
}
```

```
class CC
{
    public;
        void set(int, int);
        void print();
        CC();
        CC(int, int);
        bool CC(int, int);
    private:
        int u;
        int v;
};
```

Q. 9. Consider the declaration of the following class.

```
class CC
{
    public;
    CC();           // Line 1
    CC(int);       // Line 2
    CC(double, int); // Line 3

    private:
    int u;
    double v;
};
```

- a. For each of the following, present the line number of the constructor that is executed.
 - (i) `CC two(5);`
 - (ii) `CC one;`
 - (iii) `CC three(3.5, 8);`
- b. Write the definition of the constructor at Line 1 so that private member `u` is initialized to 0 and private member `v` is initialized to 0.0.
- c. Write the definition of the constructor at Line 2 so that private member `u` is initialized according to the value of the parameter, and private member `v` is initialized to 0.0.
- d. Write the definition of the constructor at Line 3 so that private members are initialized according to the values of the parameters.

Q. 10. Consider the following class definition:

```
class AA
{
    private:
        double price;
        double profit;
    public:
        void setPrice (double newPrice);
        void setProfit (double newProfit);
        double getPrice( );
        double getProfit( );
};
```

Suppose that the main function of the program contains the following declaration:

```
AA potato, onion;
```

Which of the following statements in the main function will cause errors at the compilation time?

```
potato.price = 45.50;
onion.setPrice(34.65);
double aPrice, aProfit;
aPrice = potato.getPrice;
aProfit = potato.getProfit( );
```

Q. 11. Consider the following description of a class.

```
class testClass
{
    private:
        int x;
        int y;

    public:
        int sum(); // return the sum of the private data members
        void print() const; // print the values of the private data members
        testClass (); // set each of x and y to 0.
        testClass (int a, int b); // set x and y to a and b, respectively.
};
```

Present the definitions of the member functions as described in the comments.

Q. 12. Present the output corresponding to execution of the following program.

```
#include <iostream>
using namespace std;
class A
{
private:
    int n;
public:
    A(); A(int a); void f(); void g();
    int h() const; void k() const;
};
A::A() {n = 0;} A::A(int a) {n = a;}
void A::f() {n++;} void A::g() {f(); n = 2*n; f();}
int A::h() const {return n;}
void A::k() const {cout << n << endl;}
int main()
{
    A a; A b(2); A c; A d(3);
    a.f(); b.g(); c.f(); d.g(); d.k();
    A e(a.h() + b.h() + c.h()); e.k();
    return 0;
} // end of main
```