ACA Summer School 2014

Advanced C++

Endsem(Time: 1 hr; Max Marks: 50)

Name:
Roll number:

- No weightage for writing extra/unnecessary code. Write only what is necessary.
- Precise, clear and unambiguous answers will be appreciated.

1. Is something wrong in the following code? If no, what will be the output? If yes, what needs to be done to correct it? (3 marks)

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

class color {
private:
  int red, blue, green;
public:
  color() {}
  color(int a, int b, int c) {red = a; blue = b; green = c;}
};
class item {
private:
  int a;
public:
  item(int x) {a = x;}
  item() {}
  friend void f(item x, color y);
};
void f(item x, color y) {
  cout<< x.a << endl;
  cout<< y.red << endl;
  cout<< y.green << endl;
  cout<< y.blue << endl;
}
int main() {
  item obj1(20);
  color white(255,255,255);
  f(obj1, white);
  return 0;
}
```

2. a) Write a sample code to demonstrate run-time polymorphism. (5 marks)

   b) What calling mechanism is used while passing pointers? Call by value or call by reference? Please give reason for your claim. (3 marks)

3. Write the copy constructor for the following class: (7 marks)

```
class matrix {
private:
  int rows, cols;
int** mat;
public:
  matrix();
  matrix(int r, int c);
  ~matrix();
  void setVal(int r, int c, int val);
  int getVal(int r, int c);
};
```

Here, setVal() sets the value of cell (r,c) to val and getVal() returns the value in cell (r,c). Write only the copy constructor. Main etc is not needed.

4. What is the need for a virtual destructor? Explain and give a simple example to support your explanation. (7 marks)

5. What will be the output of the following code:(5 marks)

```
#include <iostream>
#include <vector>
using namespace std;
int main() {
  vector<int> myVec(5,25);
  iterator::vector<int> it;
  it = myVec.begin();
  myVec.insert(it, 10);
  it = myVec.begin()+2;
  myVec.erase(it);
  int sum = 0;
  for(it = myVec.begin(); it!= myVec.end(); it++) {
    sum = sum + (*it);
    cout<<`` ''<<*it;
  }
  cout<<endl;
  cout<<sum;
  return 0;
}
```

6. What is multiple inheritance? Give an example for multiple inheritance. Just give the design of the classes. Do not define the functions. Assume that base class has a non-default constructor. (3+7 marks)

7. In the following code, for each derived class, state what variables/functions are present in their private, protected and public sections : (3+5 = 8 marks)

```
class base {
private:
  int a;
protected:
  float f1();
public:
  float b;
  void f2();
};
class derived1 : protected base {
private:
  char c;
protected:
  double d;
  double f3();
public:
  void f2(int x);
};
class derived2 : public derived1 {
private:
  long e;
public:
  void f4();
};
```