Midterm 2 sample

1. What is the output when the code below: [6]
2. is ran as is:
3. the word virtual is put in front of the function “area” in class Shape

#include <iostream>

using namespace std;

class Shape {

protected:

int width, height;

public:

Shape( int a = 0, int b = 0) {

width = a;

height = b;

}

int area() {

cout << "Parent class area :" <<endl;

return 0;

} };

class Rectangle: public Shape {

public:

Rectangle( int a = 0, int b = 0):Shape(a, b) { }

int area () {

cout << "Rectangle class area :" << width \* height <<endl;

return (width \* height);

}

};

class Triangle: public Shape{

public:

Triangle( int a = 0, int b = 0):Shape(a, b) { }

int area () {

cout << "Triangle class area :" << width \* height / 2<<endl;

return (width \* height / 2);

}

};

// Main function for the program

int main( ) {

Shape \*shape;

Rectangle rec(10,7);

Triangle tri(10,5);

// store the address of Rectangle

shape = &rec;

// call rectangle area.

shape->area(); \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

// store the address of Triangle

shape = &tri;

// call triangle area.

shape->area(); \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

return 0;

}

1. Assume that an integer takes 4 bytes and there is no alignment in following classes, predict the output. [4] and answer the question [4]

|  |
| --- |
| #include<iostream>  using namespace std;    class base {      int arr[10];  protected: char initial;  public: int sum;  };    class b1: public base { };    class b2: public base { };    class derived: public b1, public b2 {};    int main(void)  {    cout << sizeof(derived);    return 0;  } |

(ii) Write names of all the data members which are accessible from the object of class b2

T/F:

1. For a C++ derived class to override an inherited member function, the base class is required to declare the function to be virtual
   1. True B. False
2. There is nothing like a virtual constructor of a class
   1. True B. False
3. Private members of a base class are inherited and accessed by the child class.  
   1. True B. False
4. A friend function of a class has direct access to the class’s data members  
   1. True B. False
5. A handle for a class object can also refer to any derived class objects
   1. True B. False

Consider the code below and assume appropriate implementations are provided , answer the following questions in the space provided:

class My\_class{

public:

My\_class();

My\_class(char c, int i, float f);

void set\_char(char m);

int get\_ID();

void display(ostream& p) const;

ostream & operator<<(ostream & x, My\_class & C);

private:

char name;

int id;};

1. (2 points) Does the operator overloading function need to call the display() function? Why?
2. (2 points) Assume Q and M are objects of the class My\_class. Can we have instructions below execute without error? Why?

cout<<Q<<M<<endl;

1. (2 points) To have the following instruction execute without error, what should be the return type of the function display ()?

Q.display(cout).set\_char(‘N’);

**C# Part:**

Consider and assume all necessary is implemented:

class Program

{

static void Main(string[] args)

{

Console.Write("Enter Student Name: ");

Student st = null;

Console.WriteLine("Total {0}: {1}", st.studentName);

Console.ReadKey();

}

private static IList<String> FindAllStudentFromDatabase(string studentName)

{

var studentList = // find all students with same name from the database

return studentList;

}

}

What can be a possible problem with this code?