MA122 - Computer Programming and Applications

Indian Institute of Space Science and Technology

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Lecture 30

1 Polymorphism

Base Class


```
#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()//static linkage
      {
         cout << "Parent class area :" <<endl;
         return 0;
      }
};
```

Derived Classes


```
1  class Rectangle: public Shape{
2     public:
3        Rectangle( int a=0, int b=0):Shape(a, b) { }
4        int area ()
5        {
6           cout << "Rectangle class area :" <<endl;
7           return (width * height);
8        }
9  };
10 class Triangle: public Shape{
11    public:
12       Triangle( int a=0, int b=0):Shape(a, b) { }
13       int area ()
14       {
15          cout << "Triangle class area :" <<endl;
16          return (width * height / 2);
17       }};
```

Main Program


```
1  int main( )
2  {
3     Shape *shape;
4     Rectangle rec(10,7);
5     Triangle tri(10,5);
6
7     // store the address of Rectangle
8     shape = &rec;
9     // call rectangle area.
10    shape->area();
11
12    // store the address of Triangle
13    shape = &tri;
14    // call triangle area.
15    shape->area();
16
17    return 0;
18 }
```

Corrected-Virtual


```
#include <iostream>
using namespace std;
class Shape {
   protected:
      int width, height;
   public:
      Shape( int a=0, int b=0)
      {
         width = a;
         height = b;
      }
      virtual int area()//dynamics linkage
      {
         cout << "Parent class area :" <<endl;
         return 0;
      }
};
```