第8章 取其精华 发挥优势—继承

从点类→圆类→圆柱体类

```cpp
class Point
{       int x, y;                                   //点的x和y坐标
public:
        Point( int = 0, int = 0 );      // 构造函数
        void SetPoint( int, int );      // 设置坐标
        int GetX() { return x; }// 取x坐标
        int GetY() { return y; }// 取y坐标
        void Print();                               //输出点的坐标
};
Point::Point( int a, int b ) { SetPoint( a, b ); }
void Point::SetPoint( int a, int b )
{       x = a;
        y = b;
}
void Point::Print() { cout << '[' << x << ", " << y << ']'; }
```

从点类派生出圆类

```cpp
class Circle : public Point
{       double radius;
public:

        Circle(int x = 0, int y = 0 ,  double r = 0.0);
        void SetRadius( double );   //设置半径
        double GetRadius();                //取半径
        double Area();                                //计算面积
        void Print();                                //输出圆心坐标和半径
};
Circle::Circle(int a,int b,double r): Point(a,b) { SetRadius( r ); }
void Circle::SetRadius( double r ){ radius = ( r >= 0 ? r : 0 );}
double Circle::GetRadius(){ return radius; }
double Circle::Area() { return 3.14159 * radius * radius;}
void Circle::Print()
{       cout << "Center = ";
        Point::Print();
        cout << "; Radius = " << radius << endl;
}
```

再从圆类派生出圆柱体类

```cpp
class Cylinder: public Circle
{
        double high;
public:

        Cylinder(int x ,int y , double r , double h);
        void Set_data(int x , int y ,  double r , double h );   //修改数据
        double Area();                                //计算表面积
        double Volume();        //计算体积
        void Print();                                //输出圆心坐标和半径
};
Cylinder::Cylinder(int x, int y , double r ,double h):Circle(x,y,r)
{   high=h; }
void Cylinder::Set_data(int x , int y ,  double r , double h )
{       SetPoint(x,y);
        SetRadius(r);
        high= h;
}
double Cylinder::Volume()
{   return Circle::Area()*high;}
double Cylinder::Area()
{       double r=GetRadius();
        return 2*3.14159 * r * r + 2 * 3.1415 * r * high;
}
```

```cpp
#include <iostream>
using namespace std;
int main()
{       cout<<"测试点类"<<endl;
        Point p(30,50);
        p.Print();
        cout<<endl<<endl<<"测试圆类"<<endl;
        Circle c(120,80,10.0);
        cout << "圆心："；
        c.Point::Print();
        cout << "\n圆面积: " << c.Area() << endl;
        cout<<endl<<"测试圆柱体类"<<endl;
        Cylinder cy(240,160,10.0,10.0);
        cout << "圆柱体中心点: ";
        cy.Point::Print();
        cout << "\n圆柱体圆面积：" << cy.Circle::Area() << endl;
        cout << "圆柱体表面积：" << cy.Area() <<endl;
        cout << "圆柱体体积：" << cy.Volume() <<endl;
        return 0;
}
```