**202211341 컴퓨터공학부 이윤희**

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| **Question1** |
| **Source code** |
| **// Circle.h**  #pragma once  class Circle  {  private:  double radius;  public:  Circle(double radius);  ~Circle();  double getRadius();  double getPerimeter();  double getArea();  void print();  }; |
| **// Circle.cpp**  #include "Circle.h"  #include <iostream>  #include <iomanip>  using namespace std;  const double PI = 3.141592;  Circle::Circle(double r) :radius(r) {  }  Circle::~Circle() {  }  double Circle::getRadius() {  return radius;  }  double Circle::getPerimeter() {  return 2 \* PI \* radius;  }  double Circle::getArea() {  return PI \* radius \* radius;  }  void Circle::print() {  cout << "Radius : " << getRadius() << endl;  cout << "Perimeter : " << setprecision(2) << fixed << getPerimeter() << endl;  cout << "Area : " << setprecision(2) << fixed << getArea() << endl;  cout << endl;  } |
| **// Sphere.h**  #pragma once  #include "Circle.h"  class Sphere :public Circle  {  public:  Sphere(double radius);  double getSurface();  double getVolume();  void print();  }; |
| **// Sphere.cpp**  #pragma once  #include "Sphere.h"  #include<iostream>  #include<iomanip>  using namespace std;  Sphere::Sphere(double radius):Circle(radius) {  }  double Sphere::getSurface() {  return 2 \* getRadius() \* getPerimeter();  }  double Sphere::getVolume() {  return (4.0 / 3.0) \* getRadius() \* getArea();  }  void Sphere::print() {  cout << "Radius : " << setprecision(2) << fixed << getRadius() << endl;  cout << "Surface : " << setprecision(2) << fixed << getSurface() << endl;  cout << "Volume : " << setprecision(2) << fixed << getVolume() << endl;  cout << endl;  } |
| **// Main.cpp**  #include "Sphere.h"  #include <iostream>  using namespace std;  int main(void) {  cout << "Circle " << endl;  Circle circle(12);  circle.print();  cout << "Sphere " << endl;  Sphere sphere(12);  sphere.print();  return 0;  } |
| **Output** |
| **Question2** |
| **Source code ( Circle.h, Circle.cpp in Question1 )** |
| **// Cylinder.h**  #pragma once  #include "Circle.h"  class Cylinder : public Circle  {  private:  double height;  public:  Cylinder(double radius, double height);  ~Cylinder();  double getSurface();  double getVolume();  void print();  }; |
| **// Cylinder.cpp**  #include "Cylinder.h"  #include<iostream>  #include<iomanip>  using namespace std;  Cylinder::Cylinder(double radius, double height)  :Circle(radius), height(height) {  }  Cylinder::~Cylinder() {  }  double Cylinder::getSurface() {  return height \* getPerimeter() + 2 \* getArea();  }  double Cylinder::getVolume() {  return height \* getArea();  }  void Cylinder::print() {  cout << "Radius : " << setprecision(2) << fixed << getRadius() << endl;  cout << "Height : " << setprecision(2) << fixed << height << endl;  cout << "Surface : " << setprecision(2) << fixed << getSurface() << endl;  cout << "Volume : " << setprecision(2) << fixed << getVolume() << endl;  cout << endl;  } |
| **// Main.cpp**  #include "Cylinder.h"  #include <iostream>  using namespace std;  int main(void) {  cout << "Circle " << endl;  Circle circle(6);  circle.print();  cout << "Cylinder " << endl;  Cylinder cylinder(6,4);  cylinder.print();  return 0;  } |
| **Output** |
| **Question3** |
| **Source code** |
| **//Square.h**  #pragma once  class Square  {  private:  int side;  public:  Square(int side);  ~Square();  int getSide();  int getPeri();  int getArea();  void print();  }; |
| **//Square.cpp**  #include "Square.h"  #include<iostream>  using namespace std;  Square::Square(int side):side(side) {  }  Square::~Square(){  }  int Square::getSide() {  return side;  }  int Square::getPeri() {  return side\*4;  }  int Square::getArea() {  return side \* side;  }  void Square::print() {  cout << "Instantiation of Square" << endl;  cout << "Size : " << side << endl;  cout << "Perimeter : " << getPeri() << endl;  cout << "Area : " << getArea() << endl;  } |
| **//Cube.h**  #pragma once  #include "Square.h"  class Cube : public Square  {  public:  Cube(int side);  ~Cube();  int getSurface();  int getVolume();  void print();  }; |
| **//Cube.cpp**  #include "Cube.h"  #include<iostream>  using namespace std;  Cube::Cube(int side) :Square(side) {  }  Cube::~Cube() {  }  int Cube::getSurface() {  return getArea() \* 6;  }  int Cube::getVolume() {  return getArea()\*getSide();  }  void Cube::print() {  cout << "Instantiation of a cube" << endl;  cout << "Size : " << getSide() << endl;  cout << "Surface : " << getSurface() << endl;  cout << "Volume : " << getVolume() << endl;  } |
| **//Main.cpp**  #include "Cube.h"  #include <iostream>  using namespace std;  int main(void) {  Square square(30);  square.print();  cout << endl;  Cube cube(30);  cube.print();  return 0;  } |
| **Output** |
| **Question4** |
| **Source code ( Square.h, Square.cpp in Question3 )** |
| **//Cuboid.h**  #pragma once  #include "Rectangle.h"  class Cuboid : public Rectangle  {  private:  int height;  public:  Cuboid(int length, int width, int height);  ~Cuboid();  int getSurface();  int getVolume();  void print();  }; |
| **//Cuboid.cpp**  #include "Cuboid.h"  #include<iostream>  using namespace std;  Cuboid::Cuboid(int length, int width, int height)  :Rectangle(length,width), height(height) {  }  Cuboid::~Cuboid() {  }  int Cuboid::getSurface() {  return 2 \* (getLength() \* getWidth() + getLength() \* height + getWidth() \* height);  }  int Cuboid::getVolume() {  return getLength() \* getWidth() \* height;  }  void Cuboid::print() {  cout << "Instantiation of a Cuboid object" << endl;  cout << "Length : " << getLength() << " Width : " << getWidth() << endl;  cout << "Perimeter : " << getPerimeter() << endl;  cout << "Area : " << getArea() << endl;  cout << "Height : " << height << endl;  cout << "Surface : " << getSurface() << endl;  cout << "Volume : " << getVolume() << endl;  } |
| **//Main.cpp**  #include "Cuboid.h"  #include <iostream>  using namespace std;  int main(void) {  Rectangle rectangle(1,2);  rectangle.print();  cout << endl;  Cuboid cuboid(1,2,2);  cuboid.print();  return 0;  } |
| **Output** |