Assignment 10

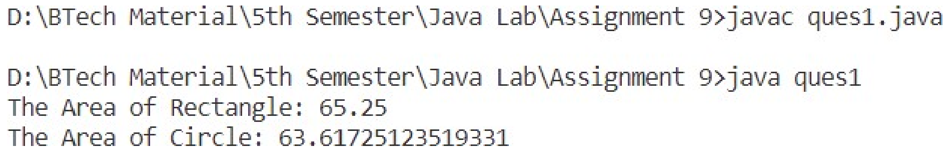
DATE – 03/11/2022

1. **Create an interface named Shape with a field pie (=3.14). Create two subclasses of it named Circle and Rectangle create object of the two classes and calculate their area.**

   Solution

```
interface Shape {
    public double pi = Math.PI;
    public double getArea();
}
class Rectangle implements Shape {
    public double length;
    public double breadth;
    public Rectangle(double length, double breadth) {
        this.length = length;
        this.breadth = breadth;
    }
    @Override
    public double getArea() {
        return length * breadth;
    }
}
class Circle implements Shape {
    public double radius;
    public Circle(double radius) {
        this.radius = radius;
    }
    @Override
    public double getArea() {
        return pi * Math.pow(radius, 2);
    }
}
public class ques1 {
    public static void main(String[] args) {
        Rectangle rectangle = new Rectangle(7.5, 8.7);
        Circle circle = new Circle(4.5);
        System.out.println("The Area of Rectangle: " + rectangle.getArea());
        System.out.println("The Area of Circle: " + circle.getArea());
    }
}
```

   Output



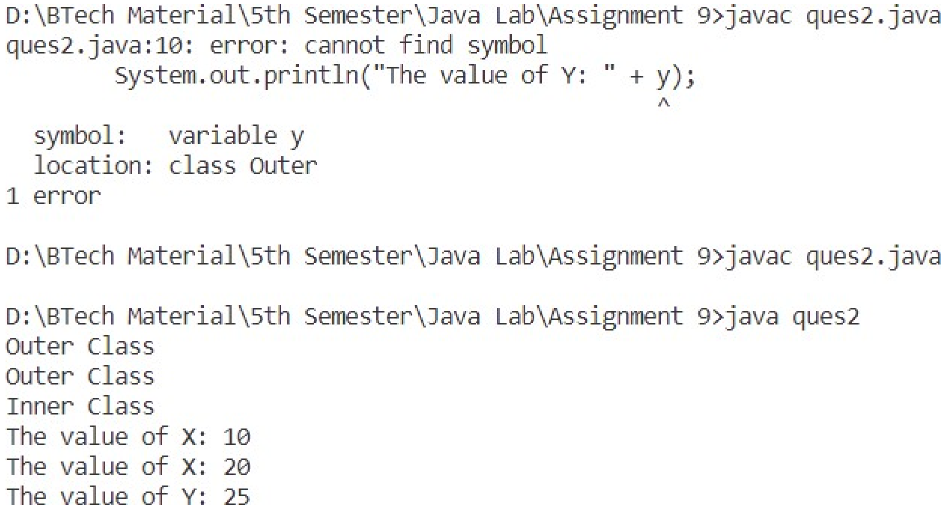
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques1.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques1
The Area of Rectangle: 65.25
The Area of Circle: 63.61725123519331
```

2. **Create a class which contains an inner class. Show that inner class can use member of outer class directly, but Outer class can use member of Inner class only through its object. Check the name of class file, you created.**

   Solution

```
class  Outer  {
    int x;
    Outer(int x) {
        this.x = x;
        System.out.println("Outer Class");
    }
    void outerShow() {
        // System.out.println("The value of Y: " + y);
        System.out.println("The value of X: " + x);
    }
    class Inner  {
        int y;
        Inner(int y) {
            this.y = y;
            System.out.println("Inner Class");
        }
        void innerShow() {
            System.out.println("The value of X: " + x);
            System.out.println("The value of Y: " + y);
        }
    }
}
public class ques2 {
    public static void main(String[] args) {
        Outer out = new Outer(10);
        Outer.Inner in = new Outer(20).new Inner(25);
        out.outerShow();
        in.innerShow();
    }
}
```

Output



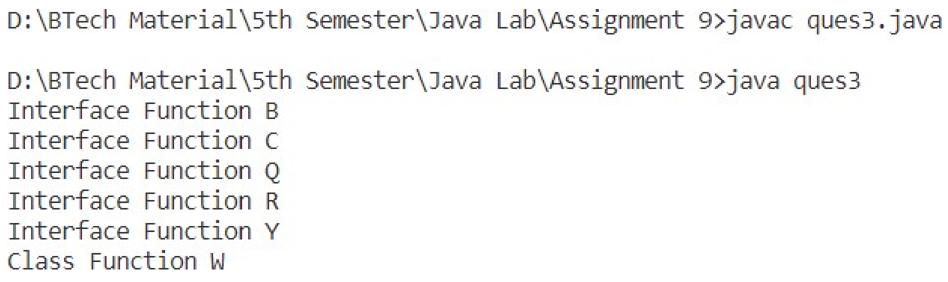
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques2.java
ques2.java:10: error: cannot find symbol
        System.out.println("The value of Y: " + y);
                                                ^
  symbol:   variable y
  location: class Outer
1 error

D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques2.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques2
Outer Class
Outer Class
Inner Class
The value of X: 10
The value of X: 20
The value of Y: 25
```

3. **Create two interfaces, each with two methods. Inherit a new interface from the two, adding a new method. Create a class by implementing the new interface and also inheriting from a concrete class. In main() method, create an object of derived class and call the methods [do all without package statement].**

Solution

```
interface A {
    public void B();
    public void C();
}
interface P {
    public void Q();
    public void R();
}
interface X extends A, P {
    public void Y();
}
class Z {
    public void W() {
        System.out.println("Class Function W");
    }
}
class Inherit extends Z implements X {
    @Override
    public void B() {
        System.out.println("Interface Function B");
    }
    @Override
    public void C() {
        System.out.println("Interface Function C");
    }
    @Override
    public void Q() {
        System.out.println("Interface Function Q");
    }
    @Override
    public void R() {
        System.out.println("Interface Function R");
    }
    @Override
    public void Y() {
        System.out.println("Interface Function Y");
    }
}
public class ques3 {
    public static void main(String[] args) {
        Inherit in = new Inherit();
        in.B();     in.C();          in.Q();
        in.R();     in.Y();          in.W();
    }
}
```

Output



```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques3.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques3
Interface Function B
Interface Function C
Interface Function Q
Interface Function R
Interface Function Y
Class Function W
```

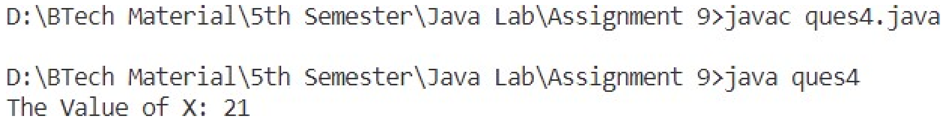
4. Write a program to demonstrate anonymous inner class (using super class and interface).

Solution

```
interface A  {
    public int x = 21;
    public void getValue();
}
```

```
public class ques4 {
    public static void main(String[] args) {
        A a = new A() {
            @Override
            public void getValue() {
                System.out.println("The Value of X: " + x);
            }
        };
        a.getValue();
    }
}
```

Output



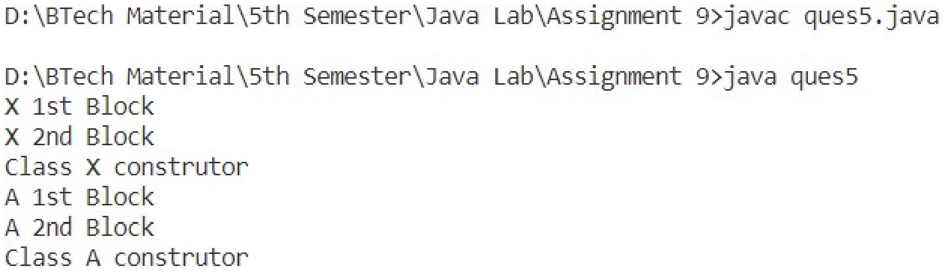
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques4.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques4
The Value of X: 21
```

5. **Show that an ordinary block is executed when an object is created and also the order of execution of these blocks (for multiple blocks/ inherited blocks).**

Solution

```
class X {
    {
        System.out.println("X 1st Block");
    }
    X() {
        System.out.println("Class X construtor");
    }
    {
        System.out.println("X 2nd Block");
    }
}
class A extends X {
    {
        System.out.println("A 1st Block");
    }
    A() {
        super();
        System.out.println("Class A construtor");
    }
    {
        System.out.println("A 2nd Block");
    }
}
public class ques5 {
    public static void main(String[] args) {
        new A();
    }
}
```

Output



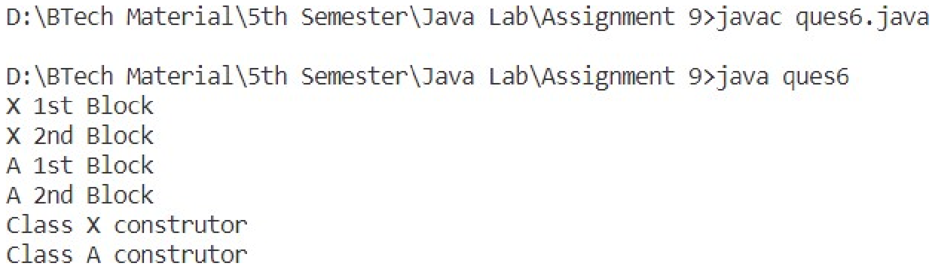
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques5.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques5
X 1st Block
X 2nd Block
Class X construtor
A 1st Block
A 2nd Block
Class A construtor
```

6. **Show that a static block is executed at the time of class loading and also the order of execution of these blocks (for multiple blocks/ inherited blocks).**

Solution

```
class X {
   static {
      System.out.println("X 1st Block");
   }
   X() {
      System.out.println("Class X construtor");
   }
   static {
      System.out.println("X 2nd Block");
   }
}
class A extends X {
   static {
      System.out.println("A 1st Block");
   }
   A() {
      super();
      System.out.println("Class A construtor");
   }
   static {
      System.out.println("A 2nd Block");
   }
}
public class ques6 {
   public static void main(String[] args) {
      new A();
   }
}
```

Output



```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques6.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques6
X 1st Block
X 2nd Block
A 1st Block
A 2nd Block
Class X construtor
Class A construtor
```

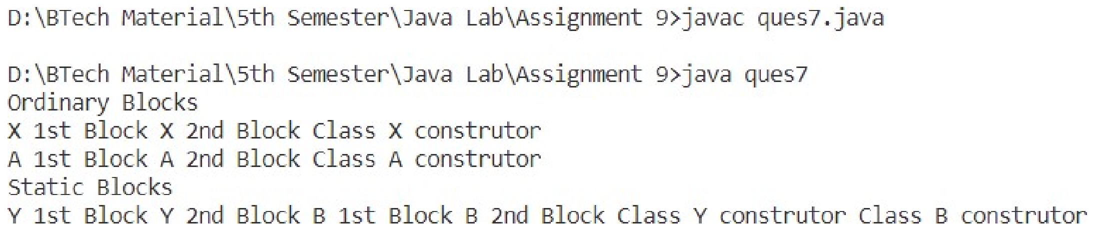
7. **Write a program to show the difference between ordinary block and static block.**

Solution

```
class X {
   {
      System.out.print("X 1st Block ");
   }
   X() {
      System.out.println("Class X construtor ");
   }
   {
      System.out.print("X 2nd Block ");
   }
}
class A extends X {
   {
      System.out.print("A 1st Block ");
   }
   A() {
      super();
      System.out.print("Class A construtor ");
   }
   {
      System.out.print("A 2nd Block ");
   }
}
class Y {
   static {
      System.out.print("Y 1st Block ");
   }
   Y() {
      System.out.print("Class Y construtor ");
   }
   static {
      System.out.print("Y 2nd Block ");
   }
}
class B extends Y {
   static {
      System.out.print("B 1st Block ");
   }
   B() {
      super();
      System.out.println("Class B construtor ");
   }
   static {
      System.out.print("B 2nd Block ");
   }
}
```

```
public class ques7 {
    public static void main(String[] args) {
        System.out.println("Ordinary Blocks");
        new A();
        System.out.println("\nStatic Blocks");
        new B();
    }
}
```

Output



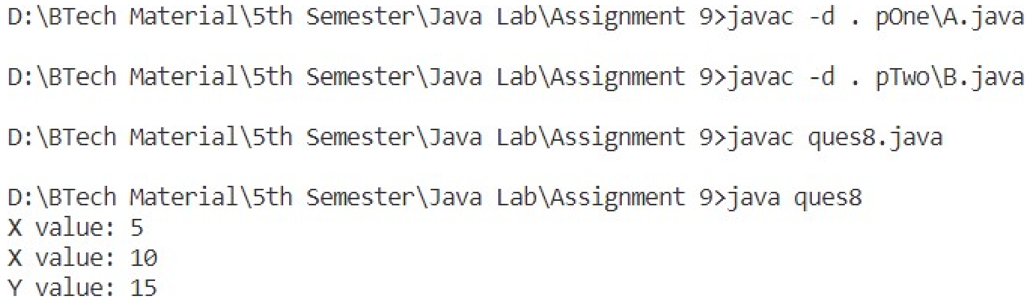
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques7.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques7
Ordinary Blocks
X 1st Block X 2nd Block Class X construtor
A 1st Block A 2nd Block Class A construtor
Static Blocks
Y 1st Block Y 2nd Block B 1st Block B 2nd Block Class Y construtor Class B construtor
```

8. Create a class with variable(s) and method(s) (all will be default accessed) under package pOne. Now create a class under package pTwo, which is a subclass of the firstly created class. In the method here (i.e. class of pTwo) call variable(s) and method(s) of previous class (i.e. class of pOne). If errors come, rectify them. Now from Main (under working directory) check access to second class's members.

Solution

```
package pOne;
public class A {
    public int x;
    public A(int x) {
        this.x = x;
    }
    public void showX() {
        System.out.println("X value: " + x);
    }
}

package pTwo;
import pOne.*;
public class B extends A {
    public int y;
    public B(int x, int y) {
        super(x);
        this.y = y;
    }
    public void showY()  {
        super.showX();
        System.out.println("Y value: " + y);
    }
}

import pOne.A;
import pTwo.B;
public class ques8 {
    public static void main(String[] args) {
        A a = new A(5);
        B b = new B(10, 15);
        a.showX();
        b.showY();
    }
}
```

Output



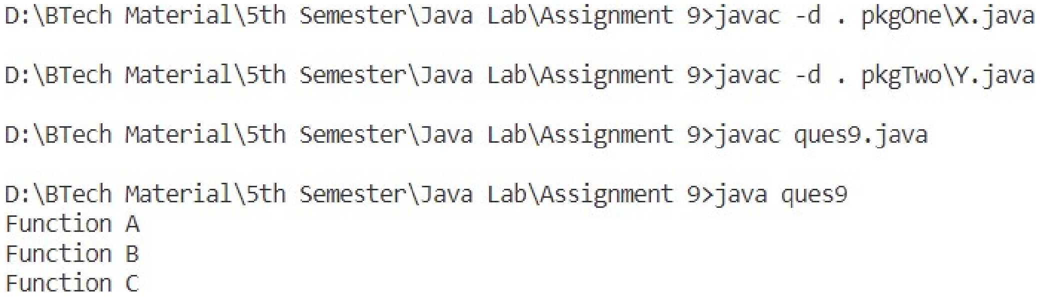
```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac -d . pOne\A.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac -d . pTwo\B.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques8.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques8
X value: 5
X value: 10
Y value: 15
```

9. **Create an interface containing three methods, in a package ‘pkgOne’. Implement the interface from a class under package pkgTwo. From the main(), under the working directory, create an object of the class and call methods of the interface.**

Solution

```
package pkgOne;
public interface X {
    public void A();
    public void B();
    public void C();
}

package pkgTwo;
import pkgOne.*;
public class Y implements X {
    @Override
    public void A() {
        System.out.println("Function A");
    }
    @Override
    public void B() {
        System.out.println("Function B");
    }
    @Override
    public void C() {
        System.out.println("Function C");
    }
}

import pkgTwo.Y;
public class ques9 {
    public static void main(String[] args) {
        Y y = new Y();
        y.A();
        y.B();
        y.C();
    }
}
```

Output



```
D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac -d . pkgOne\X.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac -d . pkgTwo\Y.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>javac ques9.java

D:\BTech Material\5th Semester\Java Lab\Assignment 9>java ques9
Function A
Function B
Function C
```