Java Lab Assessment 7
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1. Program to demonstrate the visibility of members in subclasses of same and different packages.

First Package pkg1

ClassA

```
package pkg1;



public class ClassA {

   protected int num = 10;

   public static void StaticA() {

       System.out.print("This is a public static method in class A");

   }

   public void publicA() {

       System.out.print("This is a public  method in class A");

   }

   void DefaultA() {

       System.out.print("This is a default method in class A");

   }

   private void privateA() {

       System.out.print("This is a private method in class A");
```

```
    }

    protected void protectedA() {

        System.out.print("This is a protected method in class A");

    }

    public static void main(String args[]){

        ClassA a = new ClassA();

        a.privateA();

    }

}
```

Output

This is a private method in class A%

ClassB

```
package pkg1;



public class ClassB {

    public static void main(String args[]){



        ClassA.StaticA();

        ClassA a = new ClassA();

        a.publicA();

        a.DefaultA();
```

```
        a.protectedA();

        System.out.println(a.num);

    }

}
```

Output

This is a public static method in class AThis is a public method in class AThis is a default method in class AThis is a protected method in class A10

SubA

```
package pkg1;



public class SubA extends ClassA{

    public static void main(String args[]) {

        StaticA();

        SubA sa = new SubA();



        sa.publicA();

        sa.DefaultA();

        sa.protectedA();



    }

}
```

Output

This is a public static method in class AThis is a public method in class AThis is a default method in class AThis is a protected method in class A%

Second package pkg2

ClassC

```
package pkg2;



import pkg1.ClassA;



public class ClassC extends ClassA

{

   public static void main(String args[])

   {

       ClassA.StaticA();

       ClassA a = new ClassA();

       a.publicA();



   }

}
```

Output

This is a public static method in class AThis is a public method in class A%

2. Program to create a user defined package in Java.

testPackage

TestA

```
package testPackage;



public class TestA {

   public static void printA() {

       System.out.print("This is TestA class");

   }

}
```

Output

This is TestA class%

TestB

```
package testPackage;



public class TestB extends TestA {

   public static void main(String args[]) {

       printA();

   }

}
```

Output

This is TestA class%

3. Program to find the roots of a quadratic equation using interface and packages.

- Declare an interface in package Quad1

- Declare another package Quad2 and implement the interface

Package Quad1

```
package Quad1;

public interface QuadRoots {
   default float calculateDeterminant(int a, int b, int c){
       return b*b - 4*a*c;
   }
   void calculateRoots(float d, int a, int c);
}
```

Package Quad 2

```
package Quad2;
import java.util.*;
import Quad1.*;

public class CalcRoots implements QuadRoots {
   public void calculateRoots(float d, int a, int b){
       double r1,r2;
       if(d>0){
           r1 = (-b+Math.pow(d, 0.5))/2*a;
           r2 = (-b-Math.pow(d, 0.5))/2*a;
           System.out.println("Roots are:" + r1 +","+r2 );
       }
       else if(d==0){
           r1 = (-b+Math.pow(d, 0.5))/2*a;
           System.out.println("Root is:" + r1);
       }
       else{
           System.out.println("No solution");
       }
   }

   float deter(int a, int b, int c){
```

```
        return calculateDeterminant(a, b, c);
    }

    public static void main(String[] args) {
        int a,b,c;
        float determinant;

        CalcRoots q = new CalcRoots();

        System.out.println("Enter the coefficients of the equation: ");
        Scanner sc = new Scanner(System.in);
        a = sc.nextInt();
        b = sc.nextInt();
        c = sc.nextInt();

        determinant = q.deter(a, b, c);
        q.calculateRoots(determinant, a, b);
        sc.close();
    }
}
```

Output

Enter the coefficients of the equation:

1

5

2

Roots are:-0.4384471871911697,-4.561552812808831

4. Define a Interface Polygon in package pack1. create a class triangle from Polygon in package pack2, override method to calculate area of the triangle and raise an exception if it is an equilateral triangle.

Note: Exception has to be defined in package pack3.

Pack1

```
package pack1;

public interface Polygon {
    float area(int b, int h);
}
```

Pack2

```
package pack2;
import java.util.*;
import pack1.Polygon;
import pack3.EquiException;;

public class Triangle implements Polygon{
   int s1,s2,s3;
   int b,h;

   public float area(int b, int h) {
       return (float) (0.5*b*h);
   }

   public static void main(String args[]) {
       Triangle t = new Triangle();

       Scanner sc = new Scanner(System.in);
       System.out.println("Enter the length of the triangle's side: ");
       t.s1 = sc.nextInt();
       t.s2 = sc.nextInt();
       t.s3 = sc.nextInt();
       System.out.println("Enter the height of the triangle: ");
       t.h = sc.nextInt();
       System.out.println("Enter the base of the triangle: ");
       t.b = sc.nextInt();

       EquiException.checkEQ(t.s1,t.s2,t.s3);

       System.out.println(t.area(10,15));
       sc.close();
   }

}
```

Pack3

```
package pack3;

public class EquiException extends Throwable{
   public static void checkEQ(int s1,int s2, int s3) {
       if(s1==s2 && s2==s3) {
```

```
            try{
                throw new EquiException();
                }
            catch(EquiException ae)
                {
                System.out.println("Exception: Triangle is equilateral");
                }
        }
    }
}
```

Output

Enter the length of the triangle's side:
5
7
6
Enter the height of the triangle:
4
Enter the base of the triangle:
7
75.0

5. Develop a program to demonstrate exception handling by using THROW, MULTIPLE CATCH & FINALLY statements.

```
import java.util.Scanner;

class AgeVerification extends Exception{
   public AgeVerification(String s) {
        super(s);
   }
}
class PassStrength extends Exception{
   public PassStrength(String s) {
        super(s);
   }
}
class PasswordMatch extends Exception{
   public PasswordMatch(String s) {
        super(s);
```

```
    }
}
public class ExpectionHandling {
    static String uname, pass1, pass2;
    static int age;
    public static void main(String args[]) {

        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a username: ");
        uname = sc.nextLine();
        System.out.println("Enter your age: ");
        age = sc.nextInt();
        sc.nextLine();
        System.out.println("Enter a password: ");
        pass1 = sc.nextLine();
        System.out.println("Reenter the password: ");
        pass2 = sc.nextLine();

        try {
            if(age<18) {
                throw new AgeVerification("Minors cannot register");

            }
            else if(pass1.length()<10) {
                throw new PassStrength("Weak password");
            }
            else if(!pass1.equals(pass2)) {
                throw new PasswordMatch("Passwords do not match");
            }

        }
        catch(AgeVerification a) {
            System.out.println(a.getMessage());
        }
        catch(PassStrength p) {
            System.out.println(p.getMessage());
        }
        catch(PasswordMatch pm) {
            System.out.println(pm.getMessage());
        }
        finally {
            System.out.println("Thank you for using this service.");
```

```
            sc.close();
        }


    }
}
```

Output

Enter a username:
aadityakm113
Enter your age:
20
Enter a password:
abc123
Reenter the password:
abc123
Weak password
Thank you for using this service.