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CSE 1007

JAVA Programming

DIGITAL ASSIGNMENT - 3

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Q1) Create a package named Pack1, with a class 'Words'. Create another package Pack2 inside Pack1 with a class 'Length' in it.

a) **In the 'Words' class, define a method countNumWords() that will count the number of words in the given text.**
b) **In the 'Length' class, define a method strLength() to find the length of the string without using length() function.**
c) **Define the main class and import the packages and call the methods under the classes Words, Length respectively.**

Ans 1)

CODE:

Words.java

```
package pack1;
public class Words{
public static int countNumWords(String s){
    String arr[] = s.split(" ");
    return(arr.length);
    }
}
```

Length.java

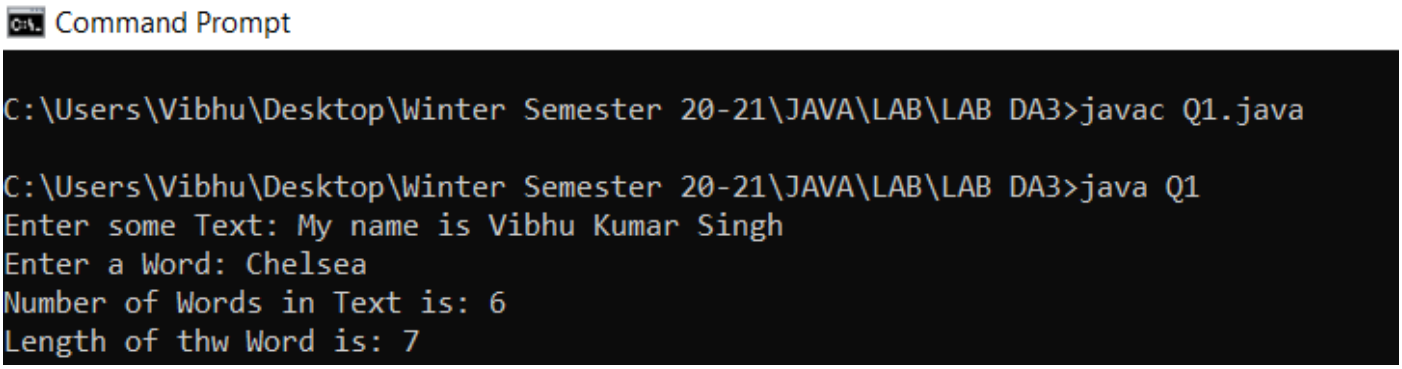
```
package pack1.pack2;

public class Length {
    public static int strength(String s){
        int count=0;
        String[] arr= s.split("(?!^)");
        for(String i:arr)
            count+=1;
        return(count);
    }
}
```

Q1.java

```
import pack1.Words;
import pack1.pack2.Length;
import java.util.*;

class Q1{
    public static void main(String[] arg){
        Scanner sc= new Scanner(System.in);
        System.out.print("Enter some Text: ");
        String s1 = sc.nextLine();
        System.out.print("Enter a Word: ");
        String s2 = sc.nextLine();
        int n1= Words.countNumWords(s1);
```

```
            int n2 = Length.strength(s2);
            System.out.println("Number of Words in Text is: "+n1);
            System.out.println("Length of thw Word is: "+n2);
        }
    }
```

OUTPUT:



Q2) Write a Java program to demonstrate multiple inheritance with two interfaces and a class with main class to find sum of n numbers and factorial of a given number.

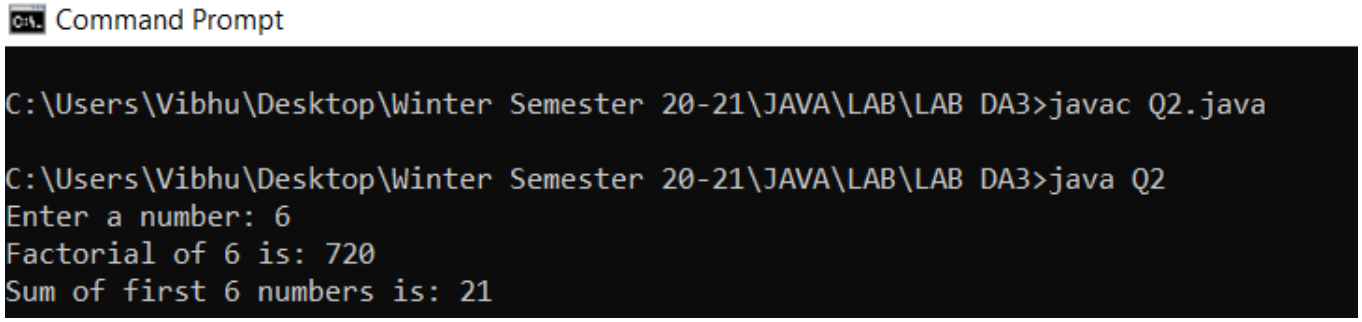
Ans 2)

CODE:

```
import java.util.*;

interface Factortial{
  int factl(int n);
}

interface SumToN{
  int sumN(int n);
}

class Demo implements Factortial, SumToN{

  @Override
  public int factl(int n){
    int P = 1;
    for (int i = 1; i <= n; ++i)
      P *= i;
    return P;
  }

  @Override
  public int sumN(int n){
    int S = 0;
    for (int i = 1; i <= n; ++i)
      S += i;
    return S;
```

```
  }

}

public class Q2{
  public static void main(String[] args){
    Demo obj = new Demo();
    Scanner s = new Scanner(System.in);
    System.out.print("Enter a number: ");
    int n=s.nextInt();
    System.out.println("Factorial of "+n+" is: "+obj.factl(n));
    System.out.println("Sum of first "+n+" numbers is: "+obj.sumN(n));
  }
}
```

OUTPUT:



Q3) Create an interface called Newspaper. In the interface, create a method called news().
Implement interface Newspaper by class Magazine.
Implement interface Newspaper by class Brochure.
The method news() in each class display the following information.
In Magazine class : String title, integer ISBN, String editor
In Brochure class: String title, integer year, integer page_number.

Ans 3)

CODE:

```
interface Newspaper{
    void news();
}

class Magazine implements Newspaper{
    String title;
    int ISBN;
    String editor;
    Magazine(String a, int b, String c){
        this.title = a;
        this.ISBN = b;
        this.editor = c;
    }
    public void news(){
        System.out.println("Title pf book = "+title);
```

```
            System.out.println("ISBN = "+ISBN);
            System.out.println("Editor of magazine = "+editor);
        }
    }

    class Brochure implements Newspaper{
        String title;
        int page_no;
        int year;
        Brochure(String a, int b, int c){
            this.title = a;
            this.page_no = b;
            this.year = c;
        }
        public void news(){
            System.out.println("Title of brochure ="+ title);
            System.out.println("Page no of brochure = "+page_no);
            System.out.println("Year of brochure = "+year);
        }
    }

    public class Q3{
        public static void main(String[] args) {
            Magazine ob1 = new Magazine("Vogue",25,"Vibhu kumar Singh");
            Brochure ob2 = new Brochure("Maxim",2019,7);
            System.out.println("In Magazine Class: ");
            ob1.news();
            System.out.println("\n");
            System.out.println("In Brochure Class: ");
            ob2.news();
        }
    }
```

OUTPUT:

Command Prompt

```
C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>javac Q3.java

C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>java Q3
In Magazine Class:
Title pf book = Vogue
ISBN = 25
Editor of magazine = Vibhu kumar Singh


In Brochure Class:
Title of brochure =Maxim
Page no of brochure = 2019
Year of brochure = 7
```

Q4) Create an abstract class called Student which includes the following for each student:

Name

Status (full time, part time)

Telephone

Then implement an abstract method which determines the amount paid by the student which varies between full time and part time students. (Tuition fees- full-time students paying a flat fee of $2,000 and part-time students paying $200 per credit hour). Create two child classes and call them FullTimeStudent and PartTimeStudent. Write a Java program by creating objects of the two child classes and display the data fields for each object.

Ans 4)

CODE:

```
abstract class Student{
    private String name,status,telephone;
    public Student(String name,String status,String telephone){
        this.name = name;
        this.status = status;
        this.telephone = telephone;
    }
    public abstract double amountPaid();
    public String toString(){
        return "\nName of Student : "+name +" Status : "+status +" Telephone : "+tel
ephone;
    }
}

class FullTimeStudent extends Student{
    public FullTimeStudent(String name,String status,String telephone){
        super(name,status,telephone);
    }
    public double amountPaid(){
        return 2000.00;
    }
    public String toString(){
        return super.toString() + " Amount Paid : $"+amountPaid();
    }
}

class PartTimeStudent extends Student{
    public PartTimeStudent(String name,String status,String telephone){
        super(name,status,telephone);
    }
    public double amountPaid(){
        return 200.00;
    }
    public String toString(){
        return super.toString() + " Amount Paid : $"+amountPaid();
    }
}

class Q1{
```

```
    public static void main (String[] args){
        PartTimeStudent s1 = new PartTimeStudent("Vibhu Kumar Singh","Part Time","80
76570505");
        System.out.println(s1);
        FullTimeStudent s2 = new FullTimeStudent("Khushi Gupta","Full Time","9811395
721");
        System.out.println(s2);
    }
}
```

OUTPUT:

Command Prompt

```
C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>javac Q4.java

C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>java Q4

Name of Student : Vibhu Kumar Singh
Status : Part Time
Telephone : 8076570505 Amount Paid : $200.0

Name of Student : Khushi Gupta
Status : Full Time
Telephone : 9811395721 Amount Paid : $2000.0
```

Q5) A travel agency offers executive travel package for a month by giving 15% off on rate for male above 65 years of age and 20% off for female above 60 years of age and 10% off to couples if female is above 18 years and male is above 21years . Create a User defined Exception class so that if the age and gender of the person is not matching with the norms of the agency it throws an exception else it offers the concession to the customer.

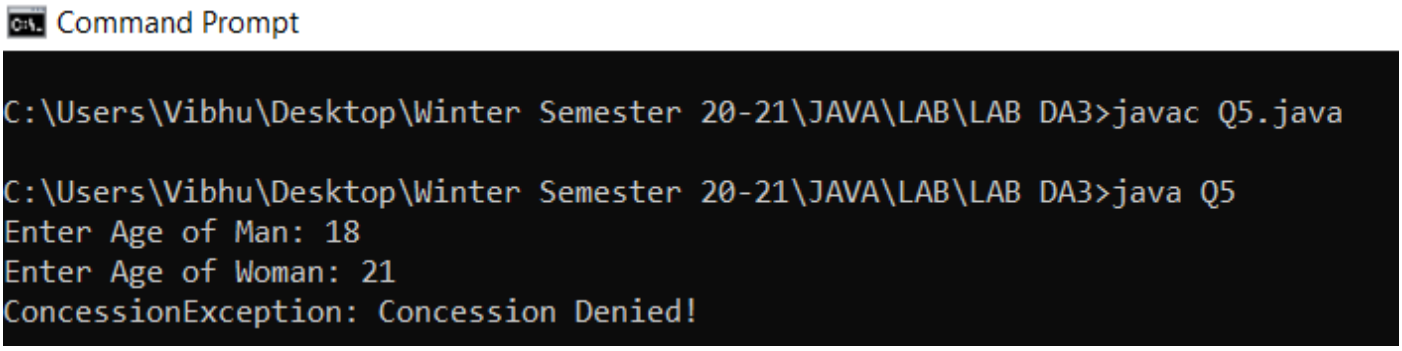
Ans 5)

CODE:

```
import java.util.Scanner;
import java.lang.Exception;
class ConcessionException extends Exception{
    public ConcessionException(String s){
        super(s);
    }
}
class Q5 {
    static void age(int menage,int womenage) throws ConcessionException{
        if(menage>65){
            System.out.println("Concession given for the Old Age Man");
        }
        else if(womenage>65){
            System.out.println("Concession given for the Old Age Woman")
```

```
                ;
            }
            else if(menage>21 && womenage>18){
                System.out.println("Concession accessed for the couple");
            }
            else{
                throw new ConcessionException("Concession Denied!");
            }
        }
        public static void main(String[] args) {
            Scanner sc = new Scanner(System.in);
            int a,b;
            System.out.print("Enter Age of Man: ");
            a=sc.nextInt();
            System.out.print("Enter Age of Woman: ");
            b=sc.nextInt();
            try{
                age(a,b);
            }
            catch(Exception e){
                System.out.println(e);
            }
        }
    }
```

OUTPUT:



Q6) Create a class MyCalculator which consists of a single method long power(int, int). This method takes two integers, n and p, as parameters and finds np. If either n or p is negative, then the method must throw an exception which says "n and p should not be negative". Also, if both n and p are zero, then the method must throw an exception which says " n and p should not be be zero". For example, -4 and -5 would result in java.lang.Exception: n and p should not be negative. Write a Java program for the function power in class MyCalculator and return the appropriate result after the power operation or an appropriate exception as detailed above.

Ans 6)

CODE:

```
import java.util.Scanner;

class MyCalculator {
    public long power(int n, int p) throws Exception
    {
        if(n == 0 && p == 0)
            throw new Exception("N and P should not be zero.");
        else if(n < 0 || p < 0)
            throw new Exception("N or P should not be negative.");
        else
            return (long)(Math.pow(n,p));
    }

}
public class Q6{
    public static final MyCalculator my_calculator = new MyCalculator();
    public static final Scanner in = new Scanner(System.in);

    public static void main(String[] args){
        System.out.print("Enter N: ");
        while (in.hasNextInt()) {
            int n = in .nextInt();
            System.out.print("Enter P: ");
            int p = in .nextInt();

            try {
                System.out.println("Output: "+my_calculator.power(n, p));
            } catch (Exception e) {
                System.out.println(e);
            }
        }
    }
}
```

OUTPUT:

Command Prompt - java Q6

```
C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>javac Q6.java

C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>java Q6
Enter N: 4
Enter P: 5
Output: 1024
```

Command Prompt - java Q6

```
C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>javac Q6.java

C:\Users\Vibhu\Desktop\Winter Semester 20-21\JAVA\LAB\LAB DA3>java Q6
Enter N: -1
Enter P: -5
java.lang.Exception: N or P should not be negative.
```