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Batch:B2

Experiment:2B

Q1: 1. Create a four-function calculator for fractions. Here are the formulas for the four
arithmetic operations applied to fractions:
Addition: a/b + c/d = (a*d + b*c) / (b*d)
Subtraction: a/b - c/d = (a*d - b*c) / (b*d)
Multiplication: a/b * c/d = (a*c) / (b*d)
Division: a/b / c/d = (a*d) / (b*c)
Create the class fraction. Use default constructor to set numerator and denominator to 1.
a) There are methods to print the four functions for fractions.
b)Program generates a multiplication table for fractions. Let the user input a
denominator, and then generate all combinations of two such fractions that are
between 0 and 1, and multiply them together. Here's an example of the output if the
denominator is 6:

	1/6	1/3	1/2	2/3	5/6
1/6	1/36	1/18	1/12	1/9	5/36
1/3	1/18	1/9	1/6	2/9	5/18
1/2	1/12	1/6	1/4	1/3	5/12
2/3	1/9	2/9	1/3	4/9	5/9
5/6	5/36	5/18	5/12	5/9	25/36

```
import java.util.*;
class Fractions{
    int n,d;
    Fractions(){
        n=1;
```

```
        d=1;
    }
    Fractions(int n,int d){
        this.n=n;
        this.d=d;
    }
    public int gcd(int n,int d){
        int gcd, rem, num, den;


        if (n > d)
        {
            num = n;
            den = d;
        }
        else
        {
            num = d;
            den = n;
        }
        rem = num % den;
        while (rem != 0)
        {
            num   = den;
            den = rem;
            rem   = num % den;
        }
        gcd = den;
        return gcd;
    }
    public Fractions addition(Fractions e,Fractions
f){
        Fractions c= new Fractions();
       c.n= e.n*f.d + e.d*f.n;
       c.d = e.d*f.d;
       int z= gcd(c.n,c.d);
       c.n/=z;
        c.d/=z;
        return c;

    }
    public Fractions division(Fractions e,Fractions
```

```
f){
        Fractions c=new Fractions();
        c.n= e.n*f.d;
        c.d=e.d*f.n;
        int z= gcd(c.n,c.d);
        c.n/=z;
        c.d/=z;
        return c;
    }
    public Fractions subtraction(Fractions
e,Fractions f){
        Fractions c=new Fractions();
        c.n= e.n*f.d - e.d*f.n;
        c.d = e.d*f.d;
        int z= gcd(c.n,c.d);
        c.n/=z;
        c.d/=z;
        return c;
    }
    public Fractions multiplication(Fractions
e,Fractions f){
        Fractions c=new Fractions();
        c.n= e.n*f.n;
        c.d=e.d*f.d;
        int z= gcd(c.n,c.d);
        c.n/=z;
        c.d/=z;
        return c;
    }
}


public class Aritmetic{
    public static void main(String[] args) {
        Scanner a = new Scanner(System.in);
        Fractions f1 = new Fractions();
        Fractions f2 = new Fractions();
        System.out.println("Enter the numerator of
first fraction:");
        f1.n= a.nextInt();
        System.out.println("Enter the Denominator
of first fraction:");
```

```
        f1.d= a.nextInt();
        System.out.println("Enter the numerator of
second fraction:");
        f2.n= a.nextInt();
        System.out.println("Enter the Denominator
of second fraction:");
        f2.d= a.nextInt();
       Fractions f3= new Fractions();
       f3= f3.addition(f1,f2);
       System.out.println("The Result of Addition
is: "+ f3.n +"/" +f3.d);
       f3 = f3.subtraction(f1,f2);
       System.out.println("The Result of
Subtraction is: "+ f3.n +"/" +f3.d);
       f3 = f3.division(f1,f2);
        System.out.println("The Result of Division
is: "+ f3.n +"/" +f3.d);
        f3 = f3.multiplication(f1,f2);
        System.out.println("The Result of
Multiplication is: "+ f3.n +"/" +f3.d);

// For Printing Table
        Fractions j= new Fractions();
        System.out.println("Enter the value of
denominator:");
        j.n=1;
        j.d=a.nextInt();
        int den=j.d;
        int i,k;
        Fractions r =new Fractions(1,den);
        Fractions c= new Fractions(1,den);
        Fractions v =new Fractions(1,den);
        Fractions h= new Fractions(1,den);
        for(i=1;i<den;i++){
            System.out.print("      "+
j.n/j.gcd(j.n,j.d)+"/"+ j.d/j.gcd(j.n,j.d));
            j=j.addition(j,h);
        }
        System.out.print("\n");
        for( i = 1; i < den; i++)
        {
            System.out.print(r.n+"/"+r.d);
```

```
            for(k = 1; k < den; k++)
            {
                v= v.multiplication(c,r);
                System.out.print("
"+v.n+"/"+v.d);
                c = c.addition(c,h);
            }
            System.out.print("\n");
            r = r.addition(r,h);
            c = h;
        }

    }
}
```

Output:

```
Enter the numerator of first fraction:
4
Enter the Denominator of first fraction:
5
Enter the numerator of second fraction:
6
Enter the Denominator of second fraction:
8
The Result of Addition is: 31/20
The Result of Subtraction is: 1/20
The Result of Division is: 16/15
The Result of Multiplication is: 3/5
Enter the value of denominator:
6
      1/6      1/3      1/2      2/3      5/6
1/6      1/36      1/18      1/12      1/9      5/36
1/3      1/18      1/9      1/6      2/9      5/18
1/2      1/12      1/6      1/4      1/3      5/12
2/3      1/9      2/9      1/3      4/9      5/9
5/6      5/36      5/18      5/12      5/9      25/36

Process finished with exit code 0
```

Q2: 2. There are 2 classes 'Esselworld' . In EsselWorld, those above 21 age have an entry fee of Rs.

1000 and for ages below 21 or above 60 it' s Rs. 700.
Data Members:
● name
● age
● Games[5]
● pass amount
Member functions:
● Default constructor to issue pass by adding games which are included in pass and assigning age as above 21 with pass amount 1000
● parameterized constructor if age is less than 21 or more than 60
Given:-
● Esselworld has a total of 15 games
● There are some games which are not included in the pass and have some additional cost. (Note: You can assume games are numbered like Game 1 to 5 out of which first 3 games(Game no 1 to 3) are included in the pass and the rest of the games (game no 4 to
5) have an extra charge of Rs. 50)
● When the person is going back home, the total number of games that were played and which were not played must be shown. Also, show the count of the games played.
● On weekends Pass cost is Rs 300 higher compared to the actual cost.
● Also, display the total cost of the person when he is leaving.(extra game cost+ticket
cost)
● Use an array of objects and give the list of person in descending order of the amount
paid to Esselworld
Write a program for the above scenario in Java.

Program:

```
import java.util.*;

class EsselWorld
{
String name ;
int numb_Games[] = new int[5] ;
int day ;
int pass_amount;
int age;
int sum;
EsselWorld()
{
name = "";
day = 0;
pass_amount = 1000;
age = 21;
for(int i = 0; i< 5; i++)
numb_Games[i] = 0;
sum = 0;
```

```
}
void data_store()
{
Scanner sc = new Scanner(System.in);
System.out.println("Enter name of person:");
name = sc.nextLine();
System.out.println("Enter 1 for weekday and 0 for weekend");
day = sc.nextInt();
if(day == 0)
{
pass_amount += 300;
}
System.out.println("Enter the age: ");
age = sc.nextInt();
if(age >= 60 || age <= 21)
{
pass_amount -= 300;
}
System.out.println("How many times you have played the games: ");
for(int i = 0; i < 5; i++)
{
numb_Games[i] = sc.nextInt();
sum += numb_Games[i];
}
pass_amount += 50*(numb_Games[3]+numb_Games[4]);
}
}
public class Exp2B
{
public static void main(String[] args)
{
Scanner sc = new Scanner(System.in);
System.out.println("Enter number of people visiting Essel World:");
int n = sc.nextInt();
EsselWorld[] z = new EsselWorld[n];
for(int i = 0; i < n; i++)
{
z[i] = new EsselWorld();
z[i].data_store();
System.out.println("Total number of number of Games played:
"+z[i].sum);
System.out.println("Net Cost of Pass = Rs."+z[i].pass_amount);
}
EsselWorld temp = new EsselWorld();
for(int i =0; i< n - 1; i++)
{
```

```
for(int j = 0; j < n - i - 1; j++)
{
if(z[j].pass_amount < z[j+1].pass_amount)
{
temp = z[j];
z[j] = z[j+1];
z[j+1] = temp;
}
}
}
System.out.println("List of people and their cost in decreasing order:
");
for(int i = 0; i < n; i++)
{
System.out.println(z[i].name+"\t"+z[i].pass_amount);
}
}
}
```

Output:

```
Enter number of people visiting Essel World:
2
Enter name of person:
Adwait
Enter 1 for weekday and 0 for weekend
0
Enter the age:
20
How many times you have played the games:
34
6
7
8
```

```
8
6
Total number of number of Games played: 61
Net Cost of Pass = Rs.1700
Enter name of person:
Yash
Enter 1 for weekday and 0 for weekend
1
Enter the age:
23
How many times you have played the games:
45
4
```

```
How many times you have played the games:
45
4
6
4
3
Total number of number of Games played: 62
Net Cost of Pass = Rs.1350
List of people and their cost in decreasing order:
Adwait  1700
Yash    1350
PS C:\Users\aspur\C PROGRAMS\mydirectory>
```