Java Programming Lab 2

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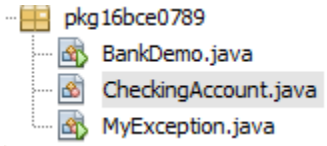
The Quesuions:

1. Implement a bank application where an alert message is issued when the minimum balance is going below 1000INR. Create an exception class and a Bank class for this application and test it with a Java program.

The Code:




```
package pkg16bce0789;

import java.util.Scanner;


public class BankDemo {

 public static void main(String [] args) {

    Scanner sc = new Scanner(System.in);

 CheckingAccount c = new CheckingAccount(101);

 int d = sc.nextInt();

 //System.out.println("Depositing $500...");

 c.deposit(d);


 try {

 System.out.println("Withdrawing $100...");
```

```
 c.withdraw(100.00);
 System.out.println("Withdrawing $600...");
 c.withdraw(600.00);
 } catch (MyException e) {
 System.out.println("Sorry, but you are short $" + e.getAmount());
 e.printStackTrace();
 }
 }
 }
package pkg16bce0789;

class CheckingAccount {
 private double balance;
 private int number;

 public CheckingAccount(int number) {
 this.number = number;
 }

 public void deposit(double amount) {
 balance += amount;
 }

 public void withdraw(double amount) throws MyException {
 if(amount >1000)
```

```
{
if(amount <= balance) {
balance -= amount;
}else {
double needs = amount - balance;
throw new MyException(needs);
}
}
else
{
  double needs = amount - balance;
  throw new MyException(needs);
}
}

public double getBalance() {
return balance;
}

public int getNumber() {
return number;
}
}
import java.io.*;
class MyException extends Exception {
```

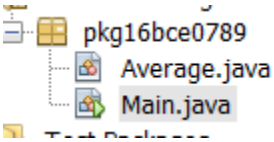
```
private double amount;

public MyException(double amount) {

this.amount = amount;

}

public double getAmount() {

return amount;

}

}
```

The Output:

```
run:
600
Withdrawing $100...
Sorry, but you are short $-500.0
pkg16bce0789.MyException
        at pkg16bce0789.CheckingAccount.withdraw(CheckingAccount.java:33)
        at pkg16bce0789.BankDemo.main(BankDemo.java:19)
BUILD SUCCESSFUL (total time: 2 seconds)

run:
3600
Withdrawing $100...
Withdrawing $600...
BUILD SUCCESSFUL (total time: 6 seconds)
```

2. Develop a Java application for calculating the average mark of 'n' students. Read the number of courses they have appeared for the past semester and the marks in all the courses. The number of courses should not be zero and if it is zero handle that case with a standard exception.

The Code:




```
package pkg16bce0789;
```

```
/**
 *
 * @author OM MISHRA
 */
class Average

{

  double avg=0;

  void check (double amount) throws ZeroException

 {

   if (a==0)

       throw new ZeroException();

   else

         continue;

 }
```

```
  Average(int a[])

  {

    for(int  i=0;i<a.length;i++)

    {

      avg=avg+a[i];

    }

  }

}
class Main

{

  public static void main(String args[])

  {

   int i;
```

```
System.out.println("Enter number of subjects");

Scanner sc=new Scanner(System.in);

int n=sc.nextInt();

int[] a=new int[n];

System.out.println("Enter marks");

for( i=0;i<n;i++)

{
```

```
  a[i]=sc.nextInt();

}



Average c = new Average(a);

c.check();

System.out.print("Average of (");

for(i=0;i<n-1;i++)

{

 System.out.print(a[i]+",");

}
```

```
System.out.println(a[i]+") ="+c.avg/n);

 }

}
```

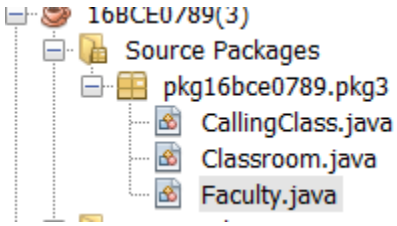
The Output:

```
utput - 16BCE0789 (run)
run:
Enter number of student
3
Enter number of subjects for student 1
2
Enter marks for student 1
44
40
Average of (44,40) = 42.0
Enter number of subjects for student 2
3
Enter marks for student 2
24
22
45
Avearge of (24,22,45) = 30.333333333333333332
Enter number of sunjects for student 3
0
Zero Exception
BUILD SUCCESSFUL (total time: 0 seconds)
```

3. Write a Java program to develop an application where you have a class 'ClassRoom' which have to be used by the (thread) objects of class 'Faculty' to deliver their course contents. Since the

'Faculty' class objects are active simultaneously, synchronize the usage of the object of 'Classroom'.

The Code:



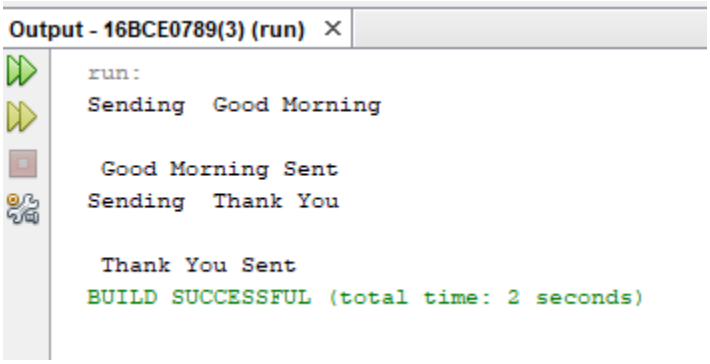

```
// A Class used to send a message

class Faculty

{

   public void send(String msg)

   {

      System.out.println("Sending\t"  + msg );

      try

      {

         Thread.sleep(1000);

      }

      catch (Exception e)

      {

         System.out.println("Thread  interrupted.");

      }

      System.out.println("\n" + msg + "Sent");

   }

}

package pkg16bce0789.pkg3;
```

```
/**
 *
 * @author OM MISHRA
 */
class Classroom extends Thread
{
   private String msg;
   private Thread t;
   Faculty  faculty;

   // Recieves a message object and a string
   // message to be sent
   Classroom(String m,  Faculty obj)
   {
      msg = m;
      faculty = obj;
   }

   public void run()
   {
      // Only one thread can send a message
      // at a time.
      synchronized(faculty)
      {
         // synchronizing the snd object
```

```
            faculty.send(msg);
        }
    }
}
package pkg16bce0789.pkg3;


/**
 *
 * @author OM MISHRA
 */
class CallingClass
{
    public static void main(String args[])
    {
        Faculty f1 = new Faculty();
        Classroom C1 =
            new Classroom( " Good Morning " , f1 );
        Classroom C2 =
            new Classroom( " Thank You " , f1 );


        // Start two threads of ThreadedSend type
        C1.start();
        C2.start();


        // wait for threads to end
```

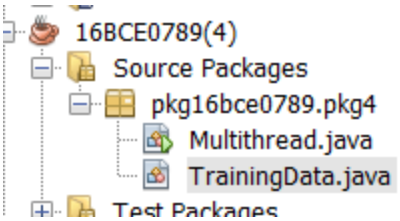
```
        try
        {
            C1.join();
            C2.join();
        }
        catch(Exception e)
        {
            System.out.println("Interrupted");
        }
    }
}
```

The Output:



4. We need to train the patient data to predict whether a new patient may or may not get the disease. Implement a data training application in Java which prepares the data set used in a disease prediction algorithm. The 'TraingData' class has an array of records (patient-id, patient-age, diseaseid, and disease-seriousness-index) and two methods 'writeData' and 'readData'. In a multi-threaded environment, if one thread is writing the data then other threads have to wait and if one thread is reading the data then other threads have to wait.

The Code:




```
package pkg16bce0789.pkg4;


/**
 *
 * @author OM MISHRA
 */
import java.io.*;
import java.util.*;
import java.lang.*;


public class Multithread
{
   public static void main(String[] args)
   {


      Scanner sc = new Scanner(System.in);
      //int n = 8; // Number of threads
      int n = sc.nextInt();
      for (int i=0; i<n; i++)
      {
         TrainingData object = new TrainingData();
         object.writeData();
```

```
            object.readData();
            object.start();
        }
    }
}
package pkg16bce0789.pkg4;

/**
 *
 * @author OM MISHRA
 */
import java.io.*;
import java.util.*;
import java.lang.*;

class TrainingData extends Thread
{
    public int Patientid[];
    public int age[];
    public int disid[];
    public int dsi[];
    static int i = 0;

    public void writeData()
    {
```

```
    Patientid = new int[] {1,2,3,4,5,6,7,8,9};
    age = new int[] {12,56,45,89,26,78,24,67,74};
    disid = new int[] {1,2,1,1,2,2,1,1,1};
    dsi = new int[] {1,2,3,1,1,3,2,1,2};
}

public void readData()
{
     while(i!=9)
        {
        System.out.println("Pateint Id :"+Patientid[i]);
        System.out.println("Pateint age :"+age[i]);
        System.out.println("Disease Id :"+disid[i]);
        System.out.println("disease-seriousness-index :"+dsi[i]);
        i++;
        }
}


public void run()
{
    try
    {

        // Displaying the thread that is running
```

```
            int n =(int) Thread.currentThread().getId();
            System.out.println ("Thread " + n + " is running");
            System.out.println("Pateint id "+Patientid[(n-11)]);
            System.out.println("Patient age "+age[(n-11)]);
            System.out.println("Disease id "+disid[(n-11)]);
            System.out.println("disease-seriousness-index "+dsi[(n-11)]);

        }
        catch (Exception e)
        {
            // Throwing an exception
            System.out.println ("Exception is caught");
        }
    }
}
```

The Output:

pkg16bce0789.pkg4.TrainingData

Output - 16BCE0789(4) (run)

```
Thread 11 is running
Pateint id1
Thread 12 is running
Pateint id2
Patient age56
Thread 14 is running
Patient age12
Disease id1
Thread 13 is running
Pateint id3
Patient age45
Disease id1
disease-seriousness-index3
Thread 18 is running
disease-seriousness-index1
Thread 16 is running
Thread 17 is running
Pateint id7
Patient age24
Disease id1
disease-seriousness-index2
Pateint id4
Patient age89
Disease id1
disease-seriousness-index1
Thread 15 is running
Pateint id5
Patient age26
Disease id2
disease-seriousness-index1
Disease id2
Pateint id6
Patient age78
Disease id2
disease-seriousness-index3
Pateint id8
Thread 19 is running
Pateint id9
Patient age74
Patient age67
Disease id1
disease-seriousness-index1
disease-seriousness-index2
Disease id1
disease-seriousness-index2
BUILD SUCCESSFUL (total time: 3 seconds)
```