CSE1007: Java Programming

SLOT: L53+L54

Faculty: JAISANKAR N

LAB Assessment- 5

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1.Write a Java program that takes two numbers and string as command line arguments and prints the reverse of the sub-string of the string specified by two numbers. The program should handle all possible exceptions that may arise due to bad inputs. For example, in the command line argument, if a user types Java Substring Cookie 1 4 The output should be 'ikoo'.

Code:

```
import java.util.*;
class MyException extends Exception
{
    public MyException(String s)
    {
        super(s);
    }
}
class HandlingException
{
   static void validate(String s,int a,int b)throws MyException
  {
     if(a<0 || a>s.length())
      throw new MyException("Invalid Arguments, sub string length
  should be in range of string length");
     else if (b<0 || b>s.length())
      throw new MyException("Invalid Arguments, sub string length
  should be in range of string length");
     else if (a>b)
      throw new MyException("start of sub string should be less than
  end");
   }
}
class ReverseSubstring
```

```
{
 static String reverseString(String str)
   {
    StringBuilder sb=new StringBuilder(str);
    sb.reverse();
    return sb.toString();
   }
 public static void main(String[] args)
    {
      HandlingException he=new HandlingException();
      String s=args[0];
      int a=Integer.parseInt(args[1]);
      int b=Integer.parseInt(args[2]);
      try
      {
        he.validate(s,a,b);
      }catch(Exception e)
      {
        System.out.println(e);
      }
      s=reverseString(s);
      System.out.println(s.substring(a,b+1));

    }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac ReverseSubstring.java

C:\vit\kandra ksheeraj\AS-5>java ReverseSubstring "ksheeraj" 1 4
aree
```

2. IT Professors are allowed to enter CAT mark and QUIZ mark for students. Professors can enter only CAT mark is between 0 and 100 and Quiz mark is between 0 and 10. Write a Java program that receives the CAT mark and QUIZ mark from Professor. If the marks fail to satisfy the criteria, then handle the exceptions separately for CAT mark and QUIZ mark.

Code:

```
import java.util.*;
class Professor extends Exception
{
```

```
  Professor(String s)
   {
     super(s);
   }
}
class Marks
{
  int[] catarray;
  int[] Quizarray;
  void n() throws Professor
  {
    throw new Professor("cat marks range should be  0 to 100");
  };
  void m() throws Professor
  {
    throw new Professor("Quiz marks range should be  0 to 10");
  }
  public void mn()
  {
    Scanner sc=new Scanner(System.in);
    int n;
    System.out.println("enter no.of students:");
    n=sc.nextInt();
    catarray=new int[n];
    Quizarray=new int[n];
    System.out.println("enter cat marks of students:");
    for(int i=0;i<n;i++)
    {
       catarray[i]=sc.nextInt();
       if(catarray[i]<0||catarray[i]>100)
       {
          try
           {
            n();
           }catch(Exception e){System.out.println(e);}
       }
    }
    System.out.println("enter Quiz marks of students:");
    for(int i=0;i<n;i++)
    {
       Quizarray[i]=sc.nextInt();
       if(Quizarray[i]<0||Quizarray[i]>10)
       {
```

```
          try
           {
            m();
           }catch(Exception e){System.out.println(e);}
        }
     }
   }
   public static void main(String args[])
   {
       Marks ob =new Marks();
       ob.mn();
   }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac Marks.java

C:\vit\kandra ksheeraj\AS-5>java Marks
enter no.of students:
2
enter cat marks of students:
75
110
Professor: cat marks range should be  0 to 100
enter Quiz marks of students:
8
7
```

3.Write a Java program using threads to compute the first 15 natural numbers, and to compute the first 50 Fibonacci numbers. Set the priority of thread that computes Fibonacci number to 9 and the other to 5. After calculating 30 Fibonacci numbers, make that thread to sleep and take up natural number computation. After computing the 15 natural numbers continue the Fibonacci number computing.

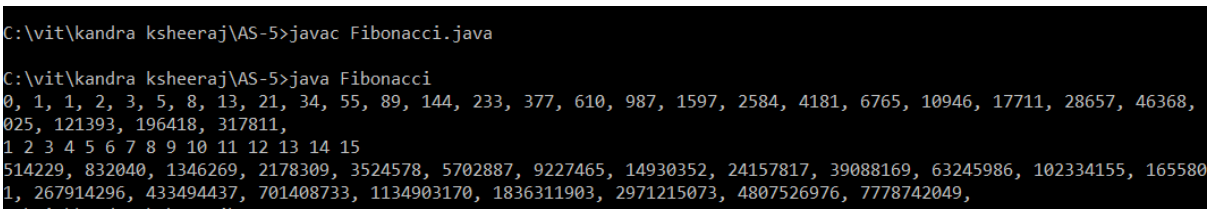
Code:

```
import java.util.*;
class Simple
{
 synchronized void fib()
 {
    int n=50;
    long firstTerm = 0, secondTerm = 1;
```

```
    for (int i = 1; i <= n; ++i)
     {
      System.out.print(firstTerm + ", ");
      long nextTerm = firstTerm + secondTerm;
      firstTerm = secondTerm;
      secondTerm = nextTerm;
      if(i==29)
       {
        try{Thread.sleep(500);}catch(InterruptedException
  e){System.out.println(e);}
        try{wait();}catch(Exception e){}
       }
     }
 }
 synchronized void natural()
 {
  System.out.print("\n");
  for(int i=0;i<15;i++)
  {
    System.out.print((i+1)+" ");
  }
   System.out.print("\n");
   notify();
  }
}
class Fibonacci
{
 public static void main(String args[])
 {
  final Simple sa =new Simple();
  Thread t1=new Thread()
  {
    public void run()
    {
       sa.fib();
    }
  };
  Thread t2=new Thread()
  {
    public void run()
    {
       sa.natural();
    }
```

```
  };
  t1.setPriority(9);
  t2.setPriority(5);
  t1.start();
  t2.start();
 }
}
```

Sample Output:



4.The southern railway offers concessions for the passengers to travel for a month by giving 25% off on rate for male above 65 years of age and 10% off for female above 60 years of age and 5% 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 concessions, it throws an exception else it offers the concession to the passenger.

Code:

```
import java.util.*;
class Southernrailway extends Exception
{
   Southernrailway (String s)
  {
    super(s);
  }
}
 class Railway
{
 int ch;
 String name;
 int age;
 String gender;
 void n() throws  Southernrailway
 {
```

```
  throw new Southernrailway  ("age and gender of the person is not
 matching with the norms of the agency for offer");
};
public void m()
 {
  Scanner sc=new Scanner(System.in);
  System.out.print("\n1.Solo travel\n2.Couples\n");
  ch=sc.nextInt();
 switch(ch)
 {
   case 1:
       System.out.print("------enter details-----\n");
       sc.nextLine();
       System.out.print("enter name of passanger: ");
       this.name=sc.nextLine();
       System.out.print("enter gender of passanger: ");
       this.gender=sc.nextLine();
       System.out.print("enter age of passanger: ");
       this.age=sc.nextInt();
       if(this.gender.equals("male") && this.age>=65)
       {
         System.out.println("Southern  railway    offers  25%  off  on
 travel");
       }
       else if(this.gender.equals("female") && this.age>=60)
       {
       System.out.println("Southern  railway    offers  10%  off  on
 travel");
       }
      else
      {
        try
        {
         n();
        }
        catch(Exception e)
        {
          System.out.println(e);
        }
       }
       break;
   case 2:
        System.out.println("----enter details-----");
```

```
        Railway obm=new Railway(),obf=new Railway();
        sc.nextLine();
        System.out.print("enter name of male passanger :   ");
        obm.name=sc.nextLine();
        System.out.print("enter age of male passanger :");
        obm.gender="male";
        obm.age=sc.nextInt();
        sc.nextLine();
        System.out.print("\nenter name of female passanger :   ");
        obf.name=sc.nextLine();
        System.out.print("enter age of female passanger :");
        obf.gender="female";
        obf.age=sc.nextInt();
        if(obf.age>=19 && obm.age>21)
        {
         System.out.println("Southern  railway  offers  5%  off  on
  travel");
        }
        else
        {
          try
          {
           n();
          }
        catch(Exception e)
        {
         System.out.println(e);
        }
       }
       break;
    }
  }
   public static void main(String args[])
  {
    Railway ob =new Railway();
    ob.m();
  }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac Railway.java

C:\vit\kandra ksheeraj\AS-5>java Railway

1.Solo travel
2.Couples
1
------enter details-----
enter name of passanger: ksheeraj
enter gender of passanger: male
enter age of passanger: 20
Southernrailway: age and gender of the person is not matching with the norms of the agency for offer
```

5.Mother prepares chapati for her kids. Mother makes chapati and stacks it up in a vessel, and kids eats from it. The max capacity of the vessel is 10. If chapati in the vessel is empty, kids wait for mother to prepare new chapati. Write a Java program to illustrate the given scenario using multithreading.

Code:

```
class Chapathi
{
  int n=10;
  synchronized void child()
   {
    for(int i=0;i<=this.n;i++)
     {
       if(this.n<1)
       {
          System.out.println("wait for mother there are no chapathis");
          try{
              wait();
             }catch(Exception e){}
       }
       else
       {
         System.out.println("chapathi is taken from stack");
         this.n=this.n-n;
        }
      }
   }
   synchronized void mother()
   {
      System.out.println("mother places chapathi");
```

```
      this.n=this.n+1;
      notify();
    }
}
class Chapathinew
{
   public static void main(String args[])
   {
       Chapathi c=new Chapathi();
       Thread t1 =new Thread()
       {
         public void run()
         {
           c.child();
          }
       };
       Thread t2 =new Thread()
       {
          public void run()
         {
           c.mother();
          }
       };
      t1.start();
      t2.start();
   }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac Chapathinew.java

C:\vit\kandra ksheeraj\AS-5>java Chapathinew
chapathi is taken from stack
mother places chapathi
```

6.Write a Java program to create a class Student with Registration number, name, CGPA and Proctor Name as its data members. Store the state of objects of this class in a file. Write another class that reads the objects of the Student class from the file. For each object of the class stored in the file, check the CGPA of the student.? If the CGPA of a student exceeds 90, then categorize the student grade is “A”.? If the CGPA of a student is between 70 and 90, then categorize the

student grade is “B”.? If the CGPA of a student is between 50 and 70, then categorize the student grade is “C”.

Code:

Student.java

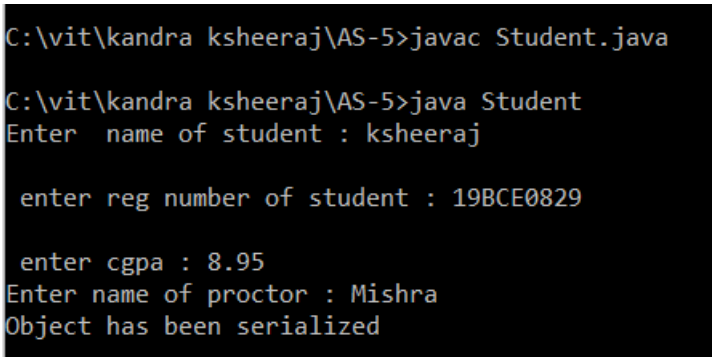
```
import java.util.*;
import java.io.*;
class Student implements Serializable
{
 String name;
 String reg_no;
 float cgpa;
 String proctor;
 char grade;
 void get()
 {
  Scanner sc = new Scanner(System.in);
  System.out.print("Enter  name of student : ");
  String name = sc.nextLine();
  System.out.print("\n enter reg number of student : ");
  this.reg_no=sc.nextLine();
  System.out.print("\n enter cgpa : ");
  this.cgpa=sc.nextFloat();
  sc.nextLine();
  System.out.print("Enter name of proctor : ");
  String proctor = sc.nextLine();
 }
 public static void main(String args[])
 {
   Student object=new  Student();
   object.get();
   try
        {
           FileOutputStream file = new FileOutputStream("f.ser");
           ObjectOutputStream out = new ObjectOutputStream(file);
            out.writeObject(object);
            out.close();
            file.close();
            System.out.println("Object has been serialized");
        }
        catch(IOException ex)
```

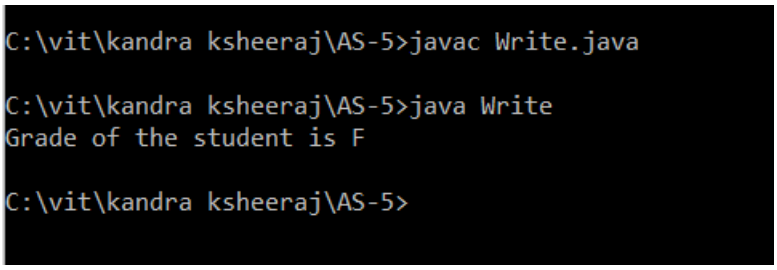
```
        {
            System.out.println("IOException is caught");
        }
   }
}
```

Write.java

```
import java.util.*;
import java.io.*;
class Write implements Serializable
{
 public static void main(String args[])
 {
  Student n=new  Student();
  try{
  FileInputStream filein = new FileInputStream("f.ser");
  ObjectInputStream in=new ObjectInputStream(filein);
  n=(Student)in.readObject();
  in.close();
  }catch(Exception e){System.out.println(e);}
  if(n.cgpa>90)
  {
  n.grade='A';
  }
  else if(n.cgpa<90 &&n.cgpa>70 )
  {
  n.grade='B';
  }
  else if(n.cgpa>50 && n.cgpa<70)
  {
  n.grade='C';
  }
  else
  {
  n.grade='F';
  }
  System.out.println("Grade of the student is "+n.grade);
 }
}
```

Sample Output:





7, Write a Java program to define a class 'CovaxinVaccineCamp to store the below mentioned details for those who were vaccinated at VIT health center.? Emp-id, Name, age, address, mobile number, blood group, Allergy (yes/no), Date of faculty vaccinated, Create 'n' objects of this class for all the vaccinated. faculty at VIT, Vellore. Write these objects into a file. Read these objects from the file and display the faculty details those who are having allergy.

Code:

```
import java.util.*;
import java.io.*;
class CovaxinVaccineCamp  implements Serializable
{
 int emp_id;
 String name;
 int age;
 String address;
 long mobileno;
 String bgroup;
 String allergy;
 String date;
 void get()
 {
   Scanner sc =new Scanner(System.in);
   System.out.print("\nEnter employee id :");
```

```
   this.emp_id=sc.nextInt();
   System.out.print("Enter name of employee :");
   this.name=sc.next();
   System.out.print("Enter age of employee :");
   this.age=sc.nextInt();
   System.out.print("Enter address of employee : ");
   this.address=sc.next();
   System.out.print("Enter mobile no of employee : ");
   this.mobileno=sc.nextLong();
   System.out.print("Enter blood group of employee : ");
   this.bgroup=sc.next();
   System.out.print("Enter yes if employee has any allergies else no
  ");
   this.allergy=sc.next();
   System.out.print("Enter Date of employee vaccinated : ");
   this.date=sc.next();
 }
 void print()
 {
   System.out.println("employee id : "+this.emp_id);
   System.out.println("name of employee : "+ this.name);
   System.out.println("age of employee : "+this.age);
   System.out.println("address of employee : "+ this.address);
   System.out.println("mobile no of employee : "+this.mobileno);
   System.out.println("blood group of employee : "+this.bgroup);
   System.out.println("previous allergies history : "+this.allergy);
   System.out.println("Date of employee vaccinated : "+this.date);
 }
}
class Covaxin
{
  public static void main(String args[])
 {
   int n;
   Scanner sc =new Scanner(System.in);
   System.out.println("enter no.of employess :");
   n=sc.nextInt();
   CovaxinVaccineCamp[] v =new CovaxinVaccineCamp[n];
   for(int i=0;i<n;i++)
   {
    v[i]=new CovaxinVaccineCamp();
    System.out.print("\nenter Details of Employee "+ (i+1) );
    v[i].get();
```

```
   }
  try
    {
     FileOutputStream fos =new FileOutputStream("abc.ser");
     ObjectOutputStream oos =new ObjectOutputStream(fos);
     for(int i=0;i<n;i++)
     {
       oos.writeObject(v[i]);
     }
      oos.close();
      fos.close();
    }catch(Exception e){
      System.out.println("caught");
    }

  try
    {
     FileInputStream fis =new FileInputStream("abc.ser");
     ObjectInputStream ois =new ObjectInputStream(fis);
     for(int i=0;i<n;i++)
     {
      CovaxinVaccineCamp a= null;
      a=(CovaxinVaccineCamp)ois.readObject();
      if(a.allergy.equals("yes"))
        {
      System.out.print("\n----Details of Employee- has alergies------
  \n");
          a.print();
        }
     }
      ois.close();
      fis.close();
    }catch(Exception e){
      System.out.println("caught");
    }
 }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac Covaxin.java

C:\vit\kandra ksheeraj\AS-5>java Covaxin
enter no.of employess :
2

enter Details of Employee 1
Enter employee id :85
Enter name of employee :sankar
Enter age of employee :85
Enter address of employee : vellore
Enter mobile no of employee : 8575958557
Enter blood group of employee : o+
Enter yes if employee has any allergies else no no
Enter Date of employee vaccinated : 26-05-21

enter Details of Employee 2
Enter employee id :145
Enter name of employee :murugan
Enter age of employee :65
Enter address of employee : Tirupati
Enter mobile no of employee : 7568546854
Enter blood group of employee : A-
Enter yes if employee has any allergies else no yes
Enter Date of employee vaccinated : 27-05-21

----Details of Employee- has alergies------
employee id : 145
name of employee : murugan
age of employee : 65
address of employee : Tirupati
mobile no of employee : 7568546854
blood group of employee : A-
previous allergies history : yes
Date of employee vaccinated : 27-05-21
```

8.Create a map to store book-Id and cost with five sample values with keys associated with it, like (B1,100), (B2, 200), (B3, 300), (B4, 400) and (B5, 500). Remove the third Key and Value pair from the Map, also update the cost of B4 value as 800. Traverse through the Map elements using lambda expression.

Code:

```
import java.util.*;
class BookidMaping
{
  public static void main(String args[])
  {
```

```
    Map<String,Integer> map =new HashMap<String,Integer>();
    map.put("B1",50);
    map.put("B2",100);
    map.put("B3",200);
    map.put("B4",300);
    map.put("B5",400);
    map.remove("B3",350);
    map.replace("B4",880);
    Set set =map.entrySet();
    map.forEach((k,v)->System.out.println( k + " "+ v));
  }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac BookidMaping.java

C:\vit\kandra ksheeraj\AS-5>java BookidMaping
B2 100
B3 200
B4 880
B5 400
B1 50
```

9. Write a Java program using generic method reverseArray that reverses the order of elements in an array of different types. Print each array before and after calling reverseArray method.(6)(ii) Write a Java program to read book id, author and publisher details and add books to list and printing all the books using ArrayList and Iterator.

Code:

ReverseArray.java

```
import java.util.*;
class ReverseArray
{
 public static <T> T[] reverseArray(T[] array)
 {
      Collections.reverse(Arrays.asList(array));
      return array;
 }
 public static void main(String args[])
  {
```

```
        int n;
        Scanner sc =new Scanner(System.in);
        System.out.println("enter no.of elements in array :");
        n=sc.nextInt();
        Integer[] array =new Integer[n];
        System.out.println("enter elements of  array :");
        for(int i=0;i<n;i++)
        {
          array[i]=sc.nextInt();
        }
        System.out.println("original Array:" + Arrays.asList(array));
        array=reverseArray(array);
        System.out.println("reversed Array:" + Arrays.asList(array));
  }
}
```

Book.java

```
import java.util.*;
class Book
{
  String bookid;
  String author;
  String publisher;
 void get()
 {
   Scanner sc =new Scanner(System.in);
   System.out.print("enter Book Id : ");
   this.bookid=sc.nextLine();
   System.out.print("enter Book Author :");
   this.author=sc.nextLine();
   System.out.print("enter Book publisher :");
   this.publisher=sc.nextLine();
 }
 void print()
 {
   System.out.println("Book Id : " + this.bookid);
   System.out.println("Book Author : " +this.author);
   System.out.println("Book publisher : "+this.publisher);
 }
}
class ReadBooks
{
 public static void main(String args[])
```

```
 {
    Scanner sc =new Scanner(System.in);
    System.out.println("enter no of Books :");
    int n =sc.nextInt();
    ArrayList <Book> bok =new ArrayList<Book>();
    for(int i=0;i<n;i++)
    {
      Book now =new Book();
      System.out.println("enter details of Book "+(i+1)+);
      now.get();
      bok.add(now);
    }
     Iterator itr=bok.iterator();
    while(itr.hasNext())
    {
    Book bk=(Book)itr.next();
    bk.print();
    }
 }
}
```

Sample Output:

```
C:\vit\kandra ksheeraj\AS-5>javac ReverseArray.java

C:\vit\kandra ksheeraj\AS-5>java ReverseArray
enter no.of elements in array :
3
enter elements of  array :
8
4
9
original Array:[8, 4, 9]
reversed Array:[9, 4, 8]
```

```
C:\vit\kandra ksheeraj\AS-5>javac ReadBook.java

C:\vit\kandra ksheeraj\AS-5>java ReadBook
enter no of Books :
3
enter details of Book 1
enter Book Id : 8945
enter Book Author :archemedis
enter Book publisher :wiley
enter details of Book 2
enter Book Id : 1200
enter Book Author :savitha
enter Book publisher :tmh
enter details of Book 3
enter Book Id : 6785
enter Book Author :mooney
enter Book publisher :pearson
Book Id : 8945
Book Author : archemedis
Book publisher : wiley
Book Id : 1200
Book Author : savitha
Book publisher : tmh
Book Id : 6785
Book Author : mooney
Book publisher : pearson
```

10. Simple calculator using JavaFx

Code:

```
import javafx.application.Application;
import javafx.event.ActionEvent;
import javafx.geometry.Pos;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.control.Label;
import javafx.scene.control.TextField;
import javafx.scene.layout.GridPane;
import javafx.stage.Stage;
public class CalculatorFX extends Application {

 TextField tfNum1;
 TextField tfNum2;
 Button btnDivide;
 Button btnMultiply;
 Button btnAddition;
 Button btnSubtraction;
 Button btnClear;
 Label lblAnswer;
```

```
@Override
public void start(Stage primaryStage) {

tfNum1 = new TextField();
tfNum2 = new TextField();
btnDivide = new Button("/");
btnMultiply = new Button("*");
btnAddition = new Button("+");
btnSubtraction = new Button("-");
btnClear = new Button("Clear");
lblAnswer = new Label("?");

lblAnswer.setAlignment(Pos.CENTER);
lblAnswer.setStyle("-fx-border-color: #000; -fx-padding: 5px;");

GridPane root = new GridPane();
root.setAlignment(Pos.CENTER);

root.setHgap(10);
root.setVgap(10);

root.add(btnDivide, 0, 0);
root.add(btnMultiply, 1, 0);
root.add(btnAddition, 0, 1);
root.add(btnSubtraction, 1, 1);
root.add(btnClear, 0, 4, 2, 1);

root.add(tfNum1, 0, 2); root.add(tfNum2, 1, 2);
root.add(lblAnswer, 0, 3, 2, 1);

setWidths();
attachCode();

Scene scene = new Scene(root, 300, 250);
primaryStage.setTitle("CalculatorFX 1.0");
primaryStage.setScene(scene);
primaryStage.show();
}
private void setWidths() {
tfNum1.setPrefWidth(70);
tfNum2.setPrefWidth(70);
btnDivide.setPrefWidth(70);
btnMultiply.setPrefWidth(70);
```

```
 btnAddition.setPrefWidth(70);
 btnSubtraction.setPrefWidth(70);
 btnClear.setPrefWidth(150);
 lblAnswer.setPrefWidth(150);
 }
 public void attachCode() {
 btnAddition.setOnAction(e -> btncode(e));
 btnSubtraction.setOnAction(e -> btncode(e));
 btnMultiply.setOnAction(e -> btncode(e));
 btnDivide.setOnAction(e -> btncode(e));
 btnClear.setOnAction(e -> btncode(e));
 }
 public void btncode(ActionEvent e) {
 int num1, num2, answer;
 char symbol;
 if (e.getSource() == btnClear) {
 tfNum1.setText("");
 tfNum2.setText("");
 lblAnswer.setText("?");
 tfNum1.requestFocus();
 return;
 }
 num1 = Integer.parseInt(tfNum1.getText());
 num2 = Integer.parseInt(tfNum2.getText());
 if (e.getSource() == btnAddition) {
 symbol = '+';
 answer = num1 + num2;
 } else if (e.getSource() == btnSubtraction) {
 symbol = '-';
 answer = num1 - num2;
 } else if (e.getSource() == btnMultiply) {
 symbol = 'x';
 answer = num1 * num2;
 } else {
 symbol = '/';
 answer = num1 / num2; }
 lblAnswer.setText("" + num1 + symbol + num2 + "=" + answer);
 }

 public static void main(String[] args) {
 launch(args);
 }
}
```

Sample Output:

11. Create menu(menubar, menu and menuitems) and event handler using JavaFx

Code:

```
import javafx.application.Application;
import javafx.scene.Scene;
import javafx.scene.control.Button;
import javafx.scene.layout.*;
import javafx.event.ActionEvent;
import javafx.event.EventHandler;
import javafx.scene.control.*;
import javafx.stage.Stage;
import javafx.scene.control.Alert.AlertType;
import java.time.LocalDate;
public class MenuBar extends Application {

 public void start(Stage s)
 {
 s.setTitle("creating MenuBar");

 Menu m = new Menu("Menu");

 MenuItem m1 = new MenuItem("menu item 1");
 MenuItem m2 = new MenuItem("menu item 2");
 MenuItem m3 = new MenuItem("menu item 3");

 m.getItems().add(m1);
 m.getItems().add(m2);
 m.getItems().add(m3);

 MenuBar mb = new MenuBar();

 mb.getMenus().add(m);

 VBox vb = new VBox(mb);
```

```
Scene sc = new Scene(vb, 500, 300);

s.setScene(sc);

s.show();
}

public static void main(String args[])
{
launch(args);
}}
```

Sample Output: