LABORATORY MANUAL
FOR
OBJECT ORIENTED PROGRAMMING USING JAVA

3RD Semester

Diploma in Computer Science & Engineering

Department of Computer Science & Engineering

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(Affiliated to SCTE&VT: Approved by AICTE)

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Experiment 1:-

Write a Java program to print 'Hello' on screen and then print your name on a separate line.

Source Code:

```
public class Exercise1
 {
public static void main(String[] args)
{
System.out.println("Hello\nSaumya Ranjan Sahu!");
 }
}
```

OUTPUT:-

```
Hello
Saumya Ranjan Sahu
```

Experiment 2:-

Write a Java program to print the sum of two numbers.

Source Code:

```
importjava.util.Scanner;
public class Main {
public static void main(String[] args)
  {
    Scanner input = new Scanner (System.in);
System.out.print("Input the first number: ");
int num1 = input.nextInt();
System.out.print("Input the second number: ");
int num2 = input.nextInt();
int sum = num1 + num2;
System.out.println();
System.out.println("Sum: "+sum);
  }
}
```

OUTPUT:-

```
Input the first number:  256
Input the second number:  326
Sum: 582
```

Experiment 3:-

Write a Java program that takes a number as input and prints its multiplication table upto 10.

Source Code:

```
importjava.util.Scanner;
public class Exercise7 {
public static void main(String[] args) {
  Scanner in = new Scanner(System.in);
System.out.print("Input a number: ");
int num1 = in.nextInt();
for (inti=0; i< 10; i++){
System.out.println(num1 + " x " + (i+1) + " = " +
    (num1 * (i+1)));
  }
 }
}
```

OUTPUT:-

```
Input a number: 8
8 x 1 = 8
8 x 2 = 16
8 x 3 = 24
8 x 4 = 32
8 x 5 = 40
8 x 6 = 48
8 x 7 = 56
8 x 8 = 64
8 x 9 = 72
8 x 10 = 80
```

Experiment 4:-

Write a Java program to print the area and perimeter of a rectangle.

Source Code:

```
importjava.util.Scanner;
public class Area_Perimeter
{
public static void main(String[] args)
   {
int l, b, perimeter, area;
      Scanner s = new Scanner(System.in);
System.out.print("Enter length of rectangle:");
      l = s.nextInt();
System.out.print("Enter breadth of rectangle:");
      b = s.nextInt();
perimeter = 2 * (l + b);
System.out.println("Perimeter of rectangle:"+perimeter);
area = l * b;
System.out.println("Area of rectangle:"+area);
   }
}
```

OUTPUT:-

```
Enter length of rectangle:4
Enter breadth of rectangle:5
Perimeter of rectangle:18
Area of rectangle:20
```

Experiment 5:-

Write a Java program to swap two variables.

Source Code:

```
importjava.util.Scanner;
public class Main {
public static void main(String[] args) {
int x, y, z;
  Scanner in = new Scanner(System.in);
System.out.println("Input the first number: ");
   x = in.nextInt();
System.out.println("Input the second number: ");
   y = in.nextInt();
   z = x;
   x = y;
   y = z;
System.out.println("Swapped values are: " + x + " and " + y);
  }
}
```

OUTPUT:-

```
Input the first number:
 36
Input the second number:
 44
 Swapped values are:44 and 36
```

Experiment 6:-

Write a Java program to convert a decimal number to binary number.

Source Code:

```
importjava.util.Scanner;
public class Exercise19 {
public static void main(String args[]) {

intdec_num, quot, i = 1, j;
intbin_num[] = new int[100];
      Scanner scan = new Scanner(System.in);
System.out.print("Input a Decimal Number: ");
dec_num = scan.nextInt();
quot = dec_num;
while (quot != 0) {
bin_num[i++] = quot % 2;
quot = quot / 2;
      }
System.out.print("Binary number is: ");
for (j = i - 1; j > 0; j--) {
System.out.print(bin_num[j]);
      }
System.out.print("\n");
   }
}
```

OUTPUT:-

```
Input a Decimal Number: 5
Binary number is: 101
```

Experiment 7:-

Write a Java program to compare two numbers.

Source Code:

```
importjava.util.Scanner;

public class Exercise32 {
public static void main(String args[]) {
            Scanner input = new Scanner(System.in);
int number1;
int number2;
System.out.print("Input first integer: ");
      number1 = input.nextInt();
System.out.print("Input second integer: ");
      number2 = input.nextInt();
if (number1 == number2)
System.out.printf("%d == %d\n", number1, number2);
if (number1 != number2)
System.out.printf("%d != %d\n", number1, number2);
if (number1 < number2)
System.out.printf("%d < %d\n", number1, number2);
if (number1 > number2)
System.out.printf("%d > %d\n", number1, number2);
if (number1 <= number2)
System.out.printf("%d <= %d\n", number1, number2);
if (number1 >= number2)
System.out.printf("%d >= %d\n", number1, number2);
   }
}
```

OUTPUT:-

```
Input first integer: 25
Input second integer: 39
25 != 39
25 < 39
25 <= 39
```

Experiment 8:-

Write a Java program and compute the sum of the digits of an integer.

Source Code:

```
importjava.util.Scanner;
public class Exercise6 {
public static void main(String[] args)
   {
     Scanner in = new Scanner(System.in);
System.out.print("Input an integer: ");
int digits = in.nextInt();
        System.out.println("The sum is " + sumDigits(digits));
   }
public static intsumDigits(long n) {
                int result = 0;
                while(n > 0) {
                        result += n % 10;
                        n /= 10;
                }
                return result;
        }
        }
```

OUTPUT:-

```
Input an integer: 25
The sum is 7
```

Experiment 9:-

Write a Java program to count the letters, spaces, numbers and other characters of an input string.

Source Code:

```
importjava.util.Scanner;
public class Exercise38 {
public static void main(String[] args) {
      String test = "Aakiu, I swdskieo 236587. GH kiu: sieo?? 25.33";
count(test);
   }
public static void count(String x) {
char[] ch = x.toCharArray();
int letter = 0;
int space = 0;
intnum = 0;
int other = 0;
for (inti = 0; i<x.length(); i++) {
if (Character.isLetter(ch[i])) {
letter++;
          }
else
          if (Character.isDigit(ch[i])) {
num++;
          }
else
          if (Character.isSpaceChar(ch[i])) {
space++;
          }
else
           {
other++;
          }
      }
System.out.println("The string is : Aa kiu, I swdskieo 236587. GH kiu: sieo?? 25.33");
System.out.println("letter: " + letter);
System.out.println("space: " + space);
System.out.println("number: " + num);
System.out.println("other: " + other);
```

```
    }
}
```

OUTPUT:-

```
The string is :  Aa kiu, I swdskieo 236587. GH kiu: sieo?? 25.33
letter: 23
space: 9
number: 10
other: 6
```

Experiment 10:-

Write a Java program to reverse a string.

Source Code:

```
importjava.util.Scanner;
public class Exercise37 {
public static void main(String[] args) {
            Scanner scanner = new Scanner(System.in);
System.out.print("Input a string: ");
char[] letters = scanner.nextLine().toCharArray();
System.out.print("Reverse string: ");
for (inti = letters.length - 1; i>= 0; i--) {
System.out.print(letters[i]);
      }
System.out.print("\n");
   }
}
```

OUTPUT:-

```
Input a string: The quick brown fox
Reverse string: xofnworbkciuqehT
```

Experiment 11:-

Write a Java program to accept a number and check the number is even or not. Prints 1 if the number is even or 0 if the number is odd.

Source Code:

```
importjava.util.*;

public class Exercise49 {
public static void main(String[] args) {
      Scanner in = new Scanner(System.in);
System.out.print("Input a number: ");
int n = in.nextInt();

if (n % 2 == 0) {
System.out.println(1); // If the number is even, print 1
      } else {
System.out.println(0); // If the number is odd, print 0
      }
   }
}
```

OUTPUT:-

```
Input a number: 20
1
```

Experiment 12:-

Write a Java program that accepts two integer values from the user and return the larger values. However if the two values are the same, return 0 and return the smaller value if the two values have the same remainder when divided by 6.

Source Code:

```
importjava.util.*;
public class Exercise63 {
public static void main(String[] args)
   {
      Scanner in = new Scanner(System.in);
System.out.print("Input the first number : ");
int a = in.nextInt();
                System.out.print("Input the second number: ");
                int b = in.nextInt();
                System.out.println("Result: "+result(a, b));
   }
        public static int result(int x, int y)
    {
        if(x == y)
                return 0;
        if(x % 6 == y % 6)
                return (x < y) ? x : y;
        return (x > y) ? x : y;
    }
}
```

OUTPUT:-

```
Input the first number: 12
Input the second number: 13
Result: 13
```

Experiment13:-

Write a Java program to get the larger value between first and last element of an array (length 3) of integers.

Source Code:

```
importjava.util.Arrays;
public class Exercise80 {
public static void main(String[] args)
 {
int[] array_nums = {20, 30, 40};
        System.out.println("Original Array: "+Arrays.toString(array_nums));
        intmax_val = array_nums[0];
        if(array_nums[2] >= max_val)
                max_val = array_nums[2];
        System.out.println("Larger value between first and last element: "+max_val);
 }
}
```

OUTPUT:-

```
Original Array: [20, 30, 40]
Larger value between first and last element: 40
```

Experiment 14:-

Design a class to represent a bank account. Include the following members:
Data members:

- Name of the depositor
- Account Number
- Type of account
- Balance amount in the account

Methods:

- To assign initial values
- To deposit an amount
- To withdraw an amount
- To display the name and balance

Source Code:

```
package practice;
import java.io.*;
importjava.util.*;
importjava.util.Scanner;
importjava.util.Random;

class Bank
{
public String nameOfDepositor;
publicintaccNumber;
public String accType;
public double balanceAmount;
public void assignValues(String nameOfDepositor, String accType, double balanceAmount)
   {
this.nameOfDepositor=nameOfDepositor;
this.accType=accType;
this.balanceAmount=balanceAmount;

      Random random = new Random();
this.accNumber=random.nextInt(1000000);
System.out.println("Your new account number is: "+accNumber);
   }
public void depositAmount(double amount)
   {
```

```
if(accNumber==0)
System.out.println("!You don't have bank account to deposit\nNote:please assign values to create an account");
else
        {
balanceAmount+=amount;
System.out.println("Amount deposited successfully...");
        }
    }
public void withdrawAmount(double amount)
    {
if(accNumber==0)
System.out.println("!You don't have bank account to credit\nNote:please assign values to create an account");
else if(balanceAmount>amount)
        {
balanceAmount-=amount;
System.out.println("Amount credited successfully...");
        }
else
System.out.println("! Insufficient balance");
    }
public void displayDetails()
    {
if(accNumber==0)
System.out.println("!You don't have bank account\nNote:please assign values to create an account");
else
        {
System.out.println("Name of the Depositor: "+nameOfDepositor);
System.out.println("Balance amount in the account: "+balanceAmount);
        }
    }
public void getInput()
    {
System.out.println("How can i help you?");
System.out.println("1. Open account");
System.out.println("2. Deposit amount");
System.out.println("3. Withdraw amount");
System.out.println("4. Account details");
```

```
System.out.println("5. Exit");
System.out.print("Please choose from above (Eg.2): ");
   }
}
class  Main
{
public static void main(String[] s)  throws IOException
   {
System.out.println("::::::::::WELCOME TO ICICI BANK::::::::::");
       Bank newAccount=new Bank();

try (Scanner scan = new Scanner(System.in)) {
intcontinueState=0;

while(continueState==0)
          {
newAccount.getInput();
intcurrentProcess=scan.nextInt();

if(currentProcess==1)
              {
System.out.print("Enter your name: ");
                  String nameOfDepositor=scan.next();
System.out.print("Enter your account type: ");
                  String accType=scan.next();
System.out.print("Enter your opening balance: ");
double  balanceAmount=scan.nextDouble();
newAccount.assignValues(nameOfDepositor, accType, balanceAmount);
              }
else if(currentProcess==2)
              {
System.out.print("Enter amount to deposit: ");
newAccount.depositAmount(scan.nextDouble());
              }
else if(currentProcess==3)
              {
System.out.print("Enter amount to withdraw: ");
newAccount.withdrawAmount(scan.nextDouble());
              }
else if(currentProcess==4)
```

```
            {
newAccount.displayDetails();
            }
else if(currentProcess==5)
            {
continueState=1;
System.out.println("THANK YOU");
            }

System.out.print ("press 0 to continue... ");
continueState=scan.nextInt();
          }
       }
   }
}
```

OUTPUT:-

```
::::::::::WELCOME TO ICICI BANK::::::::::
How can i help you?
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please choose from above (Eg.2): 1
Enter your name: SaumyaRanjanSahu
Enter your account type: saving
Enter your opening balance: 5000
Your new account number is: 402229
press 0 to continue... 0
How can i help you?
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please choose from above (Eg.2): 2
Enter amount to deposit: 4000
Amount deposited successfully...
press 0 to continue... 0
```

How can i help you?
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please choose from above (Eg.2): 3
Enter amount to withdraw: 3000
Amount credited successfully...
press 0 to continue... 0
How can i help you?
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please choose from above (Eg.2): 4
Name of the Depositor: SaumyaRanjanSahu
Balance amount in the account: 6000.0
press 0 to continue... 0
How can i help you?
1. Open account
2. Deposit amount
3. Withdraw amount
4. Account details
5. Exit
Please choose from above (Eg.2): 5
THANK YOU
press 0 to continue...

Experiment 15:-

Given are two one-dimensional arrays, A and B which are sorted in ascending order. Write a program to merge them into a single sorted array C that contains every item from arrays A and B, in ascending order.

Source Code:

```
importjava.util.Arrays;
public class MergeArrayProgram
{
private static int[] mergeArray(int[] arrayA, int[] arrayB)
   {
int[] mergedArray = new int[arrayA.length + arrayB.length];

inti=0, j=0, k=0;
while (i<arrayA.length&& j <arrayB.length)
      {
if (arrayA[i] <arrayB[j])
         {
mergedArray[k] = arrayA[i];
i++;
k++;
         }
else
         {
mergedArray[k] = arrayB[j];
j++;
k++;
         }
      }
while (i<arrayA.length)
      {
mergedArray[k] = arrayA[i];
i++;
k++;
      }
while (j <arrayB.length)
      {
mergedArray[k] = arrayB[j];
j++;
```

```
k++;
      }
returnmergedArray;
   }

public static void main(String[] args)
   {
int[] arrayA = new int[] {-7, 12, 17, 29, 41, 56, 79};

int[] arrayB = new int[] {-9, -3, 0, 5, 19};

int[] mergedArray = mergeArray(arrayA, arrayB);

System.out.println("Array A : "+Arrays.toString(arrayA));

System.out.println("Array B : "+Arrays.toString(arrayB));

System.out.println("Merged Array : "+Arrays.toString(mergedArray));
   }
}
```

OUTPUT:-

```
Array A : [-7, 12, 17, 29, 41, 56, 79]
Array B : [-9, -3, 0, 5, 19]
Merged Array : [-9, -7, -3, 0, 5, 12, 17, 19, 29, 41, 56, 79]
```

Experiment 16:-

Write a java program implementing multiple inheritance.

Source Code:

```
interfaceMy_restaurents {
void eat();
}
interfaceMy_journey {
void travel();
}
class Holiday implements My_restaurents, My_journey {
public void eat() {
System.out.println("I am trying this food");
  }
public void travel() {
System.out.println("I am trying this route");
  }
}
public class My_trip {
public static void main(String args[]) {
    Holiday my_schedule = new Holiday();
my_schedule.eat();
    my_schedule.travel();
  }
}
```

OUTPUT:-

```
I am trying this food
I am trying this route
```

Experiment 17:-

Write a java program implementing package.

Source Code:

```
package data;
public class Demo {

	public void show()
	{
		System.out.println("Hi Everyone");
	}
	public void view()
	{

		System.out.println("Hello");
	}
}
import data.*;
classncj {
	public static void main(String arg[])
	{
		Demo d = new Demo();
		d.show();
		d.view();
	}
}
```

OUTPUT:-

```
Hi Everyone
Hello
```

Experiment 18:-

Write a java program to read a file line by line and print the line on the output screen.

Source Code:

```
importjava.io.File;
importjava.util.Scanner;
class Main {
public static void main(String[] args) {
try {
     File file = new File("input.txt");
     Scanner sc = new Scanner(file);
System.out.println("Reading File Using Scanner:");
while(sc.hasNextLine()) {
System.out.println(sc.nextLine());
     }
sc.close();
   } catch (Exception e) {
e.getStackTrace();
   }
  }
}
```

OUTPUT:-

```
Reading File Using Scanner:
First Line
Second Line
Third Line
Fourth Line
Fifth Line
```

Experiment 19:-

Write a java program to read content from one file and write it into another file.

Source Code:

```
importjava.io.File;
importjava.io.FileInputStream;
importjava.io.FileOutputStream;
importjava.io.IOException;

public class CopyFile {

public static void main(String[] args) {
try {
     File sourceFile = new File("input.txt");
     File destinationFile = new File("output.txt");

FileInputStreaminputStream = new FileInputStream(sourceFile);
FileOutputStreamoutputStream = new FileOutputStream(destinationFile);
byte[] buffer = new byte[8192];
intbytesRead;
while ((bytesRead = inputStream.read(buffer)) != -1) {
outputStream.write(buffer, 0, bytesRead);
     }
inputStream.close();
outputStream.close();
System.out.println("The file has been copied successfully.");
   }
catch (IOException e)
 {
System.out.println("An error occurred while copying the file.");
e.printStackTrace();
   }
  }
}
```

OUTPUT:-

The file has been copied successfully.

Experiment 20:-

Define an exception called “No Match Exception” that is thrown when a string is not equal to “India”. Write a program that uses this exception.

Source Code:

```
importjava.util.Scanner;
public class NoMatchException extends Exception {

publicNoMatchException(String message) {
super(message);
  }
}
public class Main {

public static void main(String[] args) {
   Scanner scanner = new Scanner(System.in);

System.out.print("Enter a string: ");
   String input = scanner.nextLine();

try {
if (input.equals("India")) {
System.out.println("The string is equal to 'India'.");
     } else {
throw new NoMatchException("The string is not equal to 'India'.");
     }
   } catch (NoMatchException e) {
System.out.println(e.getMessage());
   }
  }
}
```

OUTPUT:-

```
Enter a string:
foobar
The string is not equal to 'India'.
```

Experiment 21:

Develop a java project for percentage calculator/temperature conversion tool.

Source Code:

```
import java.util.Scanner;

public class PercentageCalculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter the total value: ");
        double total = scanner.nextDouble();

        System.out.print("Enter the percentage: ");
        double percentage = scanner.nextDouble();

        double result = calculatePercentage(total, percentage);
        System.out.println("Result: " + result + "%");

        scanner.close();
    }

    private static double calculatePercentage(double total, double percentage) {
        return (percentage / 100) * total;
    }
}
```

OUTPUT:

```
Enter the total value: 200
Enter the percentage: 25
Result: 50.0%
```

Source Code:

```
import java.util.Scanner;

public class TemperatureConverter {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);

      System.out.print("Enter temperature in Celsius: ");
      double celsius = scanner.nextDouble();

      double fahrenheit = convertCelsiusToFahrenheit(celsius);
      System.out.println("Temperature in Fahrenheit: " + fahrenheit + "°F");

      scanner.close();
   }

   private static double convertCelsiusToFahrenheit(double celsius) {
      return (celsius * 9/5) + 32;
   }
}
```

OUTPUT:

```
Enter temperature in Celsius: 30
Temperature in Fahrenheit: 86.0°F
```