Experiment No.1

Date: 02-02-2024

Aim: Fundamentals of Java Programming

CO Mapping – CO 1

Objective:

- To understand declaration of Classes, and Methods with its all features such as Constructors, Access Specifier
- To understand Classes, Instance variables, Methods, Constructors, Access
- Specifiers as basic fundamentals
- Implement Abstract Classes and Wrapper Classes for given problem statement
- Design and implement Inheritance, Polymorphism in JAVA
- Demonstrate Use of Static, final, super and this keyword
- Demonstrate creating user defined package, Access control protection,
- Defining interface, Implementing interface

Code & Output:

1. To Generate Multiplication Table

Code:

```
import java.util.Scanner;
public class MultiTable1 {
  public static void main(String args [])
  {
     Scanner s = new Scanner(System.in);
     int i, a;
     System.out.println("To Print a multiplication Table");
     System.out.println("Enter a Number: ");
     a = s.nextInt();
     for(i = 1; i <=a; i++)
     {
        System.out.printf("%d * %d = %d \n", a , i, a * i);
     }
  }
}
```

Output:

```
To Print a multiplication Table
Enter a Number:
9
9 * 1 = 9
9 * 2 = 18
9 * 3 = 27
9 * 4 = 36
9 * 5 = 45
9 * 6 = 54
9 * 7 = 63
9 * 8 = 72
9 * 9 = 81
------------------------------------------------------------------------
BUILD SUCCESS
```

2. To Find GCD of two Numbers

Code:

```
import java.util.Scanner;
public class GCD3 {
   public static void main(String args[])
   {
      int num1, num2, result;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter first number: ");
      num1 = s.nextInt();
```

```
        System.out.println("Enter the second number: ");
        num2 = s.nextInt();
        result = Math.min(num1,num2);
        while(result>0)
        {
           if(num1%result == 0 && num2%result==0)
           {
              break;

           }
           result--;
        }
        System.out.println("The GCD is: "+result);
     }
}
```

Output:

```
--- exec:3.1.0:exec (default-cli) @ Prac1 ---
Enter first number:
54
Enter the second number:
24
The GCD is: 6
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```

3. Calculator Program in Java

Code:

```
import java.util.Scanner;
public class Calculator3 {
   public static void main(String args[])
   {
      int num1, num2,result,calculator;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter the first number: ");
      num1 = s.nextInt();
      System.out.println("Enter the second number: ");
      num2 = s.nextInt();
      System.out.println("Enter your choice: ");
      calculator = s.nextInt();
      switch(calculator)
      {
         case 1:
           result = num1 + num2;
           System.out.println("The addition of the two numbers is: "+result);
           break;
         case 2:
            if(num1>num2)
            {
```

```
                result = num1 - num2;
                System.out.println("The subtraction of the given numbers is: "+result);
            }
            else{
                result = num2 - num1;
                System.out.println("The subtraction of the given numbers is: "+result);
            }
             break;
        case 3:
            result = num1 * num2;
            System.out.println("The multiplication of the given numbers is: "+result);
            break;
        case 4:
            if (num2 == 0)
            {
                System.out.println("Please enter a non zero value");
            }
            else
            {
                result = num1/num2;
                System.out.println("The division of the two numbers is: "+result);
            }
            break;
    }
  }
}
```

Output:

```
Enter the first number:
9
Enter the second number:
6
Enter your choice:
 1. Addition
 2. Subtraction
 3. Multiplication
 4. Division
3
The multiplication of the given numbers is: 54
------------------------------------------------------------------------
BUILD SUCCESS
```

4. To calculate Fibonacci Series up to n numbers.

Code:

```
import java.util.Scanner;
public class Fibo4 {
   public static void main(String args[])
   {
      int n1=0,n2=1,n3, n;
      Scanner s = new Scanner(System.in);
```

```
        System.out.println("Enter the value of N: ");
        n = s.nextInt();
        for(int i = 0;i<n;i++)
        {
           n3 = n1+n2;
           System.out.println("The Fibonacci series is:  "+n1);
           n1 = n2;
           n2 = n3;

        }
     }
}
```

Output:

```
The Fibonacci series is:  0
The Fibonacci series is:  1
The Fibonacci series is:  1
The Fibonacci series is:  2
The Fibonacci series is:  3
---------------------------------
BUILD SUCCESS
```

5. W.A.P to reverse your First Name using Strings.

Code:

```
import java.util.Scanner;
public class ReverseName5 {
   public static void main(String args[])
   {
      String name;
      Scanner s = new Scanner(System.in);
      System.out.println("Please enter your name: ");
      name = s.nextLine();
      System.out.print("The reversed name is: ");
      for( int i=name.length()-1;i>=0; i--)
      {
         System.out.print(name.charAt(i));
      }
   }
}
```

Output:

```
Please enter your name:
Vivek
The reversed name is: keviV
----------------------------
BUILD SUCCESS
```

6. W.A.P to Print one number at a time, input must be from the user

Code:

```
import java.util.Scanner;
public class userNum6 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter a number: ");
      String number = s.next();
      System.out.println("Printing each digit:");
      for (int i = 0; i < number.length(); i++) {
         System.out.println(number.charAt(i));
      }
   }
}
```

Output:

```
Enter a number:
69
Printing each digit:
6
9
------------------------------
BUILD SUCCESS
```

7. W.A.P to print your Personal details (Name , Gender, Address , Phone No.,College Name)

Code:

```
import java.util.*;
public class PersonalDetailsP7 {
   public static void main (String args[])
   {
      String name, gender, address, PhoneNum, college;
      Scanner s = new Scanner(System.in);
      System.out.println("Please enter your name:");
      name = s.nextLine();
      System.out.println("Please enter your gender:");
      gender = s.nextLine();
      System.out.println("Please enter your address:");
      address = s.nextLine();
      System.out.println("Please enter your Phone Number");
      PhoneNum = s.nextLine();
      System.out.println("Please enter the name of your college");
      college = s.nextLine();
      System.out.println("Name: " +name+ " Gender: " +gender+ " Address: "
+address+ " Phone Number: " +PhoneNum+ " College: " +college);
```

```
    }
}
```

Output:

```
Please enter your name:
Vivek
Please enter your gender:
Male
Please enter your address:
Vasai
Please enter your Phone Number
9763212410
Please enter the name of your college
SPIT
Name: Vivek Gender: Male Address: Vasai Phone Number: 9763212410 College: SPIT
------------------------------------------------------------------------
BUILD SUCCESS
```

8. W.A.P to check whether a number is Odd or even

Code:

```
import java.util.Scanner;
public class OddEve8 {
   public static void main(String args[])
   {
      int a;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter a number: ");
      a = s.nextInt();
      if(a%2 == 0)
      {
         System.out.println( a+ "is an even number. ");
      }
      else
      {
         System.out.println( a+ " is an odd number");
      }
   }
}
```

Output:

```
Enter a number:
20
20is an even number.
------------------------------------
BUILD SUCCESS
```

9. W.A.P to check whether a number is palindrome or Not.

Code:

```
import java.util.Scanner;
public class Palindrome9 {
   public static void main(String args[]){
      int r,sum=0,temp;
      Scanner s = new Scanner (System.in);
      System.out.println("Please enter a number: ");
      int n = s.nextInt();
      temp=n;
      while(n>0)
      {
         r=n%10;  //getting remainder
         sum=(sum*10)+r;
         n=n/10;
      }
      if(temp==sum)
         System.out.println(temp+" is a palindrome number.");
      else
         System.out.println(temp+ " is not palindrome number.");
   }
}
```

Output:

```
Please enter a number:
919
919 is a palindrome number.
------------------------------
BUILD SUCCESS
------------------------------
```

10. W.A.P to add 10 numbers of one series (Example :- If the user inputs 3 then it should take numbers from 3,4,5……..12)

Code:

```
import java.util.Scanner;

public class sumofNum10 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);

      System.out.println("Enter the starting number of the series: ");
      int startNumber = s.nextInt();
      int sum = 0;
      System.out.println("Adding the next 10 numbers in the series:");
      for (int i = startNumber; i < startNumber + 10; i++) {
         System.out.print(i + " ");
         sum += i;
      }
      System.out.println("\nSum of the series: " + sum);
```

```
    }
}
```

Output:

```
Enter the starting number of the series:
9
Adding the next 10 numbers in the series:
9 10 11 12 13 14 15 16 17 18
Sum of the series: 135
------------------------------------------------
BUILD SUCCESS
```

11. W.A.P to print your Age based on your Birth date

Code:

```
import java.util.Scanner;
public class Age11 {
    public static void main(String args[])
    {
        int num1, num2, num3;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter the current year: ");
        num1 = s.nextInt();
        System.out.println("Enter your Birth Year: ");
        num2 = s.nextInt();
        num3 = num1 - num2;
        System.out.println("Your age is: "+num3);
    }
}
```

Output:

```
Enter the current year:
2024
Enter your Birth Year:
2001
Your age is: 23
------------------------------------
BUILD SUCCESS
```

12. W.A.P to create the following output :-

1

11

111

1111

11111

Code:

```
import java.util.Scanner;
public class pattern12 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);
      System.out.println("Enter the numbers of rows for the pattern");
      int n = s.nextInt();
      for (int i = 0; i < n; i++) {
         for (int j = 0; j < i + 1; j++) {
            System.out.print(1);
         }
         System.out.println();
      }
   }
}
```

Output:

```
Enter the numbers of rows for the pattern

6
1
11
111
1111
11111
111111
------------------------------------------------
```

13. W.A.P to accept any two numbers and perform division on it (If the number is in decimal value then convert them into a whole number)

Code:

```
import java.util.Scanner;
public class division13 {
   public static void main(String args[])
   {
      double num1, num2;
      int result;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter Number 1: ");
```

```
        num1 = s.nextDouble();
        System.out.println("Enter Number 2");
        num2 = s.nextDouble();
        if(num2!=0)
        {
          result = (int) (num1/num2);
        System.out.println("The division of the given numbers is: "+result);
        }
        else
        {
           System.out.println("Cannot divide by 0");
        }
    }
}
```

Output:

```
Enter Number 1:
10
Enter Number 2
5
The division of the given numbers is: 2
------------------------------------------------
BUILD SUCCESS
```

14. W.A.P to convert number in characters (E.g. 123, Output One Two Three)

Code:

```
import java.util.Scanner;
public class words14 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter a single-digit number: ");
      int num = s.nextInt();
      String[] arr = {"zero", "one", "two", "three", "four", "five", "six", "seven",
"eight", "nine"};
      if (num >= 0 && num <= 9) {
         System.out.println(arr[num]);
      } else {
         System.out.println("Invalid input. Please enter a single-digit number.");
      }
   }
}
```

Output:

```
Enter a single-digit number: 9
nine
------------------------------------
BUILD SUCCESS
```

15. To convert Number to word

Code:

```
import java.util.Scanner;
public class words14 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter a single-digit number: ");
      int num = s.nextInt();
      String[] arr = {"zero", "one", "two", "three", "four", "five", "six", "seven",
"eight", "nine"};
      if (num >= 0 && num <= 9) {
         System.out.println(arr[num]);
      } else {
         System.out.println("Invalid input. Please enter a single-digit number.");
      }
   }
}
```

Output:

```
Enter a single-digit number: 9
nine
------------------------------------
BUILD SUCCESS
```

16. Java Program to Check Whether a Number is Prime or Not using different control structure

Code:

```
import java.util.Scanner;

public class PrimeNum16 {
   public static void main(String args[]) {
      int i, num;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter a Number:");
      num = s.nextInt();
      for (i = 2; i <= num / 2; i++) {
         if (num % i == 0) {
            System.out.println("The given number is not a prime number");
            return;
         }
      }
      System.out.println("It is a prime number");
   }
}
```

Output:

```
Enter a Number:
7
It is a prime number
------------------------------
BUILD SUCCESS
```

17. To Check a Leap year

Code:

```
import java.util.Scanner;
public class LeapYear17 {
   public static void main(String args[])
   {
      int year;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter a year: ");
      year = s.nextInt();
      if(year%4 == 0 && year%100!=0 || (year%400 == 0))
      {
         System.out.println("The year "+year+" is a leap year.");
      }
      else
      {
         System.out.println("It is not a leap year.");
      }
   }
}
```

Output:

```
Enter a year:
2012
The year 2012 is a leap year.
------------------------------
BUILD SUCCESS
```

18. To check whether a number is positive or negative

Code:

```
import java.util.Scanner;
public class check18 {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.print("Enter a number: ");
      int number = scanner.nextInt();
      if (number > 0) {
         System.out.println("The number is positive.");
      } else if (number < 0) {
         System.out.println("The number is negative.");
      } else {
```

```
            System.out.println("The number is zero.");
        }
    }
}
```

Output:

```
Enter a number: -10
The number is negative.
------------------------------------------
BUILD SUCCESS
```

19. To calculate the sum of Natural Numbers

Code:

```
import java.util.Scanner;
public class SumofNaturalNum19 {
    public static void main(String args[])
    {
        int num1, num2;
        Scanner s = new Scanner(System.in);
        System.out.println("Enter a number: ");
        num1 = s.nextInt();
        num2 = num1*(num1+1)/2;
        System.out.println("The Sum of " +num1+ " natural numbers is: " +num2);
    }
}
```

Output:

```
Enter a number:
10
The Sum of first 10 natural numbers is: 55
------------------------------------------
BUILD SUCCESS
```

20. To Find the factorial of a Number

Code:

```
import java.util.Scanner;

public class fact20 {
    public static void main(String[] args) {
        int num = 1;
        int n;
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number: ");
        n = scanner.nextInt();
        for (int i = 1; i <= n; i++) {
            num *= i;
        }
        System.out.println("The factorial of number " + n + " is: " + num);
    }
}
```

Output:

```
Enter the number: 5
The factorial of number 5 is: 120
------------------------------------
BUILD SUCCESS
```

21. To display all prime numbers from 1 to N.

Code:

```
import java.util.Scanner;
public class prime21 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int num = scanner.nextInt();

        System.out.print("Prime numbers up to " + num + ": ");
        for (int i = 2; i < num; i++) {
            boolean isPrime = true;
            for (int j = 2; j < i; j++) {
                if (i % j == 0) {
                    isPrime = false;
                    break;
                }
            }
            if (isPrime) {
                System.out.print(i + " ");
            }
        }
        System.out.println();
    }
}
```

Output:

```
Enter the number: 20
Prime numbers up to 20: 2 3 5 7 11 13 17 19
------------------------------------------------------------
BUILD SUCCESS
```

22. To check whether Input character is Vowel or Not.

Code:

```
import java.util.Scanner;
public class Vowel22 {
    public static void main(String args[])
    {
        char ualphabet, lalphabet;
        Scanner s = new Scanner(System.in);
        System.out.println("Please enter an alphabet.");
        ualphabet = s.next().charAt(0);
        lalphabet = Character.toLowerCase(ualphabet);
```

```
        if(lalphabet == 'a' || lalphabet == 'i' ||lalphabet == 'e' || lalphabet == 'o' ||
lalphabet == 'u')
        {
           System.out.println(lalphabet+" is a vowel.");
        }
        else
        {
           System.out.println(lalphabet+"is not a vowel");
        }
    }
}
```

Output:

```
Please enter an alphabet.
e
e is a vowel.
------------------------------
BUILD SUCCESS
```

23. To calculate simple Interest

Code:

```
import java.util.Scanner;
public class SimpleInt23 {
   public static void main(String args[])
   {
      int FinalAmount,Principal,InterestRate,time;
      Scanner s = new Scanner(System.in);
      System.out.println("Enter the Principal Amount: ");
      Principal = s.nextInt();
      System.out.println("Enter the interest rate: ");
      InterestRate = s.nextInt();
      System.out.println("Enter the tenure of the loan: ");
      time = s.nextInt();
      FinalAmount = Principal + (Principal * InterestRate * time)/100;
      int SimpleInterest = FinalAmount - Principal;
      System.out.println("The interest amount is: "+SimpleInterest);
   }
}
```

Output:

```
Enter the Principal Amount:
100000
Enter the interest rate:
12
Enter the tenure of the loan:
3
The interest amount is: 36000
---------------------------------------
BUILD SUCCESS
```

24. To convert octal to decimal conversion

Code:

```
import java.util.Scanner;
public class OctDev24 {
   public static void main(String[] args) {
      Scanner s = new Scanner(System.in);
      System.out.print("Enter an octal number: ");
      String octalNumber = s.next();
      int decimalNumber = 0;
      int power = 0;
      for (int i = octalNumber.length() - 1; i >= 0; i--) {
         int digit = Character.getNumericValue(octalNumber.charAt(i));
         decimalNumber += digit * Math.pow(8, power);
         power++;
      }
      System.out.println("Decimal equivalent: " + decimalNumber);
   }
}
```

Output:

```
Enter an octal number: 011
Decimal equivalent: 9
------------------------------
BUILD SUCCESS
```

Academic Year: 2023-24 **Semester: II** **Class: FYMCA**
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Observation:

Feature	C++
Memory Management	Manual memory management using new and delete operators
Platform Independence	Platform-dependent; requires recompilation for different platforms.
Syntax and Features	Rich feature set including pointers, manual memory management, and operator overloading.
Compilation	Typically compiled into native machine code.
Object-Oriented Programming	Supports both OOP and procedural programming; features multiple inheritance and templates.
Exception Handling	Exception handling with try, catch, and throw but does not enforce it.
Threading	Requires platform-specific threading libraries; standard support introduced in C++11.
Standard Libraries	Comprehensive standard library, including the Standard Template Library (STL) for generic programming.

Feature	Java
Memory Management	Automatic garbage collection managed by JVM
Platform Independence	Platform-independent; runs on any device with a JVM.
Syntax and Features	Simpler syntax; lacks pointers and operator overloading.
Compilation	Compiled into bytecode, interpreted by JVM.
Object-Oriented Programming	Strict OOP principles; supports interfaces, abstract classes, and single inheritance.
Exception Handling	Built-in exception handling; enforces checked exceptions.
Threading	Built-in support for multithreading with Thread class and java.util.concurrent package.
Standard Libraries	Extensive standard library; rich functionality in the Java API.