OOP EXPERIMENT-3

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SAP-590011794

BATCH-20

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SUBMITTED TO- PROF. Kalluri Shareef Babu

Theory

BufferedReader and InputStreamReader

InputStreamReader(System.in) converts keyboard byte input into character stream.

BufferedReader wraps InputStreamReader for efficient text input.

read() reads a single character and returns its integer code.

readLine() reads an entire line as String.

Integer.parseInt() is used with readLine() to convert text into int.

While mixing read() and readLine(), newline handling is important to avoid skipped input.

Scanner

Scanner (java.util.Scanner) is used for typed keyboard input.

nextInt() reads integers.

nextDouble() reads floating-point values.

nextLine() reads full string lines.

Suitable for reading multiple values in sequence.

System.out Output Functions

System.out.print() prints without newline.

System.out.println() prints with newline.

System.out.printf() prints formatted output.

Common format specifiers used: %d for int, %.2f for decimal precision, %c for char, %b for boolean.

String Methods Used

length() gets string length.

charAt(index) accesses characters.

equals() compares two strings.

These are used in logic like palindrome checking.

Loops

for loop is used for repeated input, average calculation, pattern printing, and multiplication table generation.

Conditional Statements

if-else is used for decisions like even/odd, largest value, and palindrome status.

Type Casting and Conversions

(char) and (int) casting is used to convert between character and numeric code values.

parse methods are used to convert string input to numeric data types.

Math Utility

Math.PI is used in circle calculations (area and circumference).

Command-line Arguments

args[] in main(String args[]) is used to accept values passed during program execution.

Packages

package keyword groups related classes into a namespace.

Helps in code organization and avoids class name conflicts.

If a file declares a package, compile and run using matching folder structure.

Classwork

Exe-3a

```java
import java.io.*;
class exe3a
{
    public static void main(String args[])throws IOException
    {
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("Enter a character:");
        int ch=br.read();
        //char ch=(char)br.read();
        System.out.println("The character you entered is: " + ch);
    }
}
```

```
PS C:\Users\<Anmol> > cd OOPS/exe3
PS C:\Users\<Anmol> > javac exe3a.java
PS C:\Users\<Anmol> > java exe3a
Enter a character:
8
The character you entered is: 56
PS C:\Users\<Anmol> >
```

Observation: The program reads a single character from the user input using BufferedReader and then prints the integer value of that character (which corresponds to its ASCII value) to the user as output. If you want to print the character itself, you can uncomment the line that casts the input to a char and comment out the line that prints the integer value.

Exe-3b

```java
import java.io.*;
public class exe3b
{
    public static void main(String args[])throws IOException
```

```
    {
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("Enter a character:");
        int ch=br.read();
        //char ch=(char)br.read();
        System.out.println("The character you entered is: " + (char)ch);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3b.java
PS C:\Users\<Anmol> > java exe3b
Error: Could not find or load main class exe3b
Caused by: java.lang.NoClassDefFoundError: exe3b (wrong name: exe3/exe3b)
PS C:\Users\<Anmol> > javac exe3b.java
PS C:\Users\<Anmol> > java exe3b
Enter a character:
1
The character you entered is: 1
PS C:\Users\<Anmol> >
```

Observation: The program reads a single character from the user input using BufferedReader and then prints the character itself to the user as output by casting the integer value to a char. If you want to print the ASCII value instead, you can comment out the line that casts to char and uncomment the line that prints the integer value.

Exe-3c

```
import java.io.*;
class exe3c
{
    public static void main(String args[])throws IOException
    {
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("Enter a String:");
        String str=br.readLine();
        System.out.println("The String you entered is: "+str);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3c.java
PS C:\Users\<Anmol> > java exe3c
Enter a String:
HI MY NAME IS ANMOL
The String you entered is: HI MY NAME IS ANMOL
PS C:\Users\<Anmol> >
```

Observation: The program reads a string from the user input using BufferedReader and then prints the string to the user as output.

Exe-3d

```
import java.io.*;
public class exe3d
{
    public static void main(String args[]) throws IOException
    {
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("Enter a Integer:");
        int n=Integer.parseInt(br.readLine());
        System.out.println("The Integer you entered is: "+n);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3d.java
PS C:\Users\<Anmol> > java exe3d
Enter a Integer:
56
The Integer you entered is: 56
PS C:\Users\<Anmol> >
```

Observation: The program reads an integer from the user input using BufferedReader and then prints the integer to the user as output.

Exe-3e

```
import java.io.*;
class exe3e
```

```java
{
    public static void main(String args[])throws IOException
    {
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println("Enter Roll no:");
        int r=Integer.parseInt(br.readLine());
        System.out.println("Enter Section(A/B):");
        char sec=(char)br.read();// ends the read command so the NEXT read
command wont work
        System.out.println("Enter name:");
        String name=br.readLine();
        System.out.println("-------------");
        System.out.println("Roll no: "+r);
        System.out.println("Section: "+sec);
        System.out.println("Name: "+name);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3e.java
PS C:\Users\<Anmol> > java exe3e
Enter Roll no:
590011794
Enter Section(A/B):
A
Enter name:
-------------
Roll no: 590011794
Section: A
Name:
PS C:\Users\<Anmol> >
```

Observation: The program reads an integer (roll number), a character (section), and a string (name) from the user input using BufferedReader. However, there is an issue with reading the character for the section. After reading the integer, the newline character is still in the input buffer, which causes the next read command for the section to read that newline instead of waiting for user input. To fix this, you can add an extra readLine() after reading the integer to consume the leftover newline character before reading the section.

Exe-3f

```java
public class exe3f
{
    public static void main(String args[])
    {
        System.out.printf(args[0]);
        System.out.println(args[1]);
        System.out.print(args[2]);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3f.java
PS C:\Users\<Anmol> > java exe3f
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Index 0 out of bounds for length 0
        at exe3f.main(exe3f.java:5)
PS C:\Users\<Anmol> > java exe3f Java Test Hello
JavaTest
Hello
PS C:\Users\<Anmol> >
```

Observation: The program takes command-line arguments and prints them using different print functions. It uses System.out.printf() to print the first argument (args[0]), System.out.println() to print the second argument (args[1]) with a newline, and System.out.print() to print the third argument (args[2]) without a newline. The output is displayed to the user as specified by each print function when the program is executed with appropriate command-line arguments.

Classwork

exe3_1a

```
//using inputstream reader and buffered reader Write a program to read a
single character and display its ASCII value.
import java.io.*;
class exe3_1a
{
    public static void main(String args[]) throws IOException
    {
        InputStreamReader in = new InputStreamReader(System.in);
        BufferedReader br = new BufferedReader(in);
        System.out.print("Enter a single character: ");
        char ch = (char)br.read();
        int a = (int)ch;
        System.out.println("ASCII value of '"+ch+"' is: "+a);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_1a.java
PS C:\Users\<Anmol> > java exe3_1a
Enter a single character: a
ASCII value of 'a' is: 97
PS C:\Users\<Anmol> >
```

Observation: The program reads a single character from the user input and then converts it to its corresponding ASCII value using type casting. The ASCII value is then displayed to the user as output.

exe3_1b

```
//using inputstream reader and buffered reader, Read two integers using
BufferedReader and print their sum.
import java.io.*;
class exe3_1b
{
    public static void main(String args[]) throws IOException
    {
        InputStreamReader in=new InputStreamReader(System.in);
        BufferedReader br=new BufferedReader(in);
        System.out.print("Enter first integer: ");
```

```
        int num1=Integer.parseInt(br.readLine());
        System.out.print("Enter second integer: ");
        int num2=Integer.parseInt(br.readLine());
        int sum=num1+num2;
        System.out.println("The sum of "+num1+" and "+num2+" is: "+sum);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_1b.java
PS C:\Users\<Anmol> > java exe3_1b
Enter first integer: 56
Enter second integer: 758
The sum of 56 and 758 is: 814
PS C:\Users\<Anmol> >
```

Observation: The program prompts the user to enter two integers, reads them using BufferedReader, converts the input strings to integers using Integer.parseInt(), calculates their sum, and then displays the result to the user as output.

exe3_1c

```
//using inputstream reader and buffered reader,Read three integers and find
the l number.
import java.io.*;
class exe3_1c
{
    public static void main(String args[]) throws IOException
    {
        InputStreamReader in=new InputStreamReader(System.in);
        BufferedReader br=new BufferedReader(in);
        System.out.print("Enter first integer: ");
        int num1=Integer.parseInt(br.readLine());
        System.out.print("Enter second integer: ");
        int num2=Integer.parseInt(br.readLine());
        System.out.print("Enter third integer: ");
        int num3=Integer.parseInt(br.readLine());

        int l=num1;
        if(num2>l)
```

```
        {
            l=num2;
        }
        if(num3>l)
        {
            l=num3;
        }

        System.out.println("The largest number among "+num1+","+num2+",and
"+num3+" is: "+l);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_1c.java
PS C:\Users\<Anmol> > java exe3_1c
Enter first integer: 17
Enter second integer: 89
Enter third integer: 56
The largest number among 17,89,and 56 is: 89
PS C:\Users\<Anmol> >
```

Observation: The program prompts the user to enter three integers, reads them using BufferedReader, converts the input strings to integers using Integer.parseInt(), compares the three integers to find the largest one, and then displays the largest number to the user as output using System.out.println().

exe3_1d

```
//using inputstream reader and buffered reader,Read a string and check whether
it is a palindrome.
import java.io.*;
class exe3_1d
{
    public static void main(String args[]) throws IOException
    {
        InputStreamReader in=new InputStreamReader(System.in);
        BufferedReader br=new BufferedReader(in);
        System.out.print("Enter a string: ");
        String str=br.readLine();
```

```
        String rev="";
        for(int i=str.length()-1;i>=0;i--)
        {
            rev=rev+str.charAt(i);
        }
        if(str.equals(rev))
        {
            System.out.println("'"+str+"' is a palindrome.");
        }
        else
        {
            System.out.println("'"+str+"' is not a palindrome.");
        }
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_1d.java
PS C:\Users\<Anmol> > java exe3_1d
Enter a string: hey nic to meet ya
'hey nic to meet ya' is not a palindrome.
PS C:\Users\<Anmol> > java exe3_1d
Enter a string: lol
'lol' is a palindrome.
PS C:\Users\<Anmol> >
```

Observation: The program reads a string from the user input, reverses the string by iterating through it from the end to the beginning, and then compares the original string with the reversed string to determine if it is a palindrome. The result is displayed to the user as output.

exe3_2a

```
//using Scanner class,Read student name, roll number, and marks using Scanner
and display them.
import java.util.*;
class exe3_2a
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter student name: ");
```

```
        String name=sc.nextLine();
        System.out.print("Enter roll number: ");
        int roll=sc.nextInt();
        System.out.print("Enter marks: ");
        int marks=sc.nextInt();
        System.out.println("Name: "+name);
        System.out.println("Roll number: "+roll);
        System.out.println("Marks: "+marks);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_2a.java
PS C:\Users\<Anmol> > java exe3_2a
Enter student name: Anmol
Enter roll number: 590011794
Enter marks: 85
Name: Anmol
Roll number: 590011794
Marks: 85
PS C:\Users\<Anmol> >
```

Observation: The program uses the Scanner class to read the student's name, roll number, and marks from the user input. It then displays the entered information to the user as output using System.out.println().

exe3_2b

```
//using scanner class,Read radius of a circle and calculate area and
circumference.
import java.util.*;
class exe3_2b
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter radius of the circle: ");
        double r=sc.nextDouble();
        double a=Math.PI*r*r;
        double c=2*Math.PI*r;
        System.out.println("Area of the circle: "+a);
        System.out.println("Circumference of the circle: "+c);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_2b.java
PS C:\Users\<Anmol> > java exe3_2b
Enter radius of the circle: 5.9
Area of the circle: 109.35884027146072
Circumference of the circle: 37.07079331235956
PS C:\Users\<Anmol> >
```

Observation: The program uses the Scanner class to read the radius of a circle from the user input. It then calculates the area using the formula A = πr^2 and the circumference using the formula C = 2πr. Finally, it displays the calculated area and circumference to the user as output using System.out.println().

exe3_2c

```java
//using scanner class,Read two floating point numbers and print their product.
import java.util.*;
class exe3_2c
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter first floating point number: ");
        double num1=sc.nextDouble();
        System.out.print("Enter second floating point number: ");
        double num2=sc.nextDouble();
        double p=num1*num2;
        System.out.println("The product of "+num1+" and "+num2+" is: "+p);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_2c.java
PS C:\Users\<Anmol> > java exe3_2c
Enter first floating point number: 5.987
Enter second floating point number: 2.365
The product of 5.987 and 2.365 is: 14.159255000000002
PS C:\Users\<Anmol> >
```

Observation: The program uses the Scanner class to read two floating point numbers from the user input. It then calculates their product by multiplying the two numbers and displays the result to the user as output using System.out.println().

exe3_2d

```java
//using scanner class,Read an integer and check whether it is even or odd.
import java.util.*;
class exe3_2d
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter an integer: ");
        int num=sc.nextInt();
        if(num%2==0)
        {
            System.out.println(num+" is even.");
        }
        else
        {
            System.out.println(num+" is odd.");
        }
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_2d.java
PS C:\Users\<Anmol> > java exe3_2d
Enter an integer: 709
709 is odd.
PS C:\Users\<Anmol> >
```

Observation: The program uses the Scanner class to read an integer from the user input. It then checks if the number is even or odd by using the modulus operator (%) to determine if the number is divisible by 2. The result is displayed to the user as output using System.out.println().

exe3_2e

```java
//using scanner class,Read N numbers and find their average.
import java.util.*;
class exe3_2e
```

```
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.print("Enter the number of elements: ");
        int n=sc.nextInt();
        double sum=0;
        for(int i=0;i<n;i++)
        {
            System.out.print("Enter number "+(i+1)+": ");
            sum+=sc.nextDouble();
        }
        double avg=sum/n;
        System.out.println("The average is: "+avg);
    }
}
```

```
PS C:\Users\<Anmol> > java exe3_2e
Enter the number of elements: 5
Enter number 1: 1
Enter number 2: 2
Enter number 3: 3
Enter number 4: 4
Enter number 5: 5
The average is: 3.0
PS C:\Users\<Anmol> >
```

Observation: The program uses the Scanner class to read the number of elements (N) from the user input. It then uses a for loop to read N numbers from the user, calculating their sum. Finally, it computes the average by dividing the sum by N and displays the result to the user as output using System.out.println().

exe3_3a

```
//output using system.out,Use different print functions.
class exe3_3a
{
    public static void main(String args[])
    {
        System.out.print("This is using print function. ");
        System.out.println("This is using println function.");
```

```
        System.out.printf("This is using printf function. %d", 2024);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_3a.java
PS C:\Users\<Anmol> > java exe3_3a
This is using print function. This is using println function.
This is using printf function. 2024
PS C:\Users\<Anmol> >
```

Observation: The program demonstrates the use of different print functions in Java. It uses System.out.print() to print a message without a newline, System.out.println() to print a message with a newline, and System.out.printf() to format and print a message with an integer value (2024) using a format specifier (%d). The output is displayed to the user as specified by each print function.

exe3_3b

```
//Print your name and branch using System.out.print().
class exe3_3b
{
    public static void main(String args[])
    {
        System.out.print("Name:Anmol Thapliyal, Branch: Computer Science
Engineering AIML");
    }
}
```

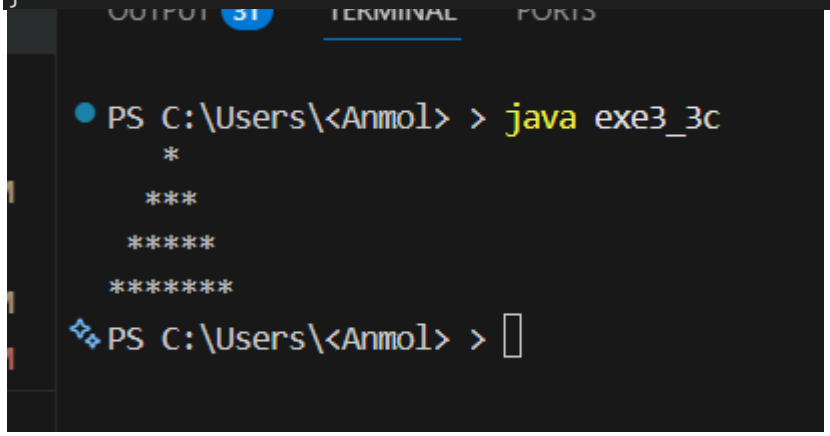
```
OUTPUT 34   TERMINAL   PORTS

PS C:\Users\<Anmol> > javac exe3_3b.java
PS C:\Users\<Anmol> > java exe3_3b
Name:Anmol Thapliyal, Branch: Computer Science Engineering AIML
PS C:\Users\<Anmol> >
```

Observation: The program uses System.out.print() to display the name and branch of the user in a single line without a newline at the end. The output is displayed to the user as specified in the print statement.

exe3_3c

```java
//Print a pattern using System.out.println().
class exe3_3c
{
    public static void main(String args[])
    {
        System.out.println("   *   ");
        System.out.println("  ***  ");
        System.out.println(" ***** ");
        System.out.println("*******");
    }
}
```



Observation: The program uses System.out.println() to print a pattern of asterisks (*) in the shape of a pyramid. Each line of the pattern is printed on a new line, creating a visual representation of the pyramid when the program is executed. The output is displayed to the user as specified in the print statements.

exe3_3d

```java
//Use System.out.printf() to print:Name:ravi,Marks (85.50)
class exe3_3d
{
    public static void main(String args[])
    {
        System.out.println("Name:Ravi");
        System.out.printf("Marks: %.2f", 85.50);
    }
}
```

```
OUTPUT 34   TERMINAL   PORTS

PS C:\Users\<Anmol> > javac exe3_3c.java
PS C:\Users\<Anmol> > javac exe3_3d.java
PS C:\Users\<Anmol> > java exe3_3d
Name:Ravi
Marks: 85.50
PS C:\Users\<Anmol> >
```

Observation: The program uses System.out.println() to print the name "Ravi" on a new line. It then uses System.out.printf() to format and print the marks (85.50) with two decimal places using the format specifier %.2f. The output is displayed to the user as specified in the print statements.

exe3_4

```java
//Print a table of a number using formatted output.
class exe3_4
{
    public static void main(String args[])
    {
        int i,n=5;
        for(i=1;i<=10;i++)
        {
            System.out.println(n+"*"+i+"="+n*i);
        }
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_4.java
PS C:\Users\<Anmol> > java exe3_4
5*1=5
5*2=10
5*3=15
5*4=20
5*5=25
5*6=30
5*7=35
5*8=40
5*9=45
5*10=50
PS C:\Users\<Anmol> >
```

Observation: The program uses a for loop to iterate from 1 to 10, printing the multiplication table of the number 5. The output is formatted as "5*i=product" for each value of i, where product is the result of multiplying 5 by i. The output is displayed to the user as specified in the print statement within the loop.

exe3_5

```java
//Print values of int, float, char, boolean using printf().
class exe3_5
{
    public static void main(String args[])
    {
        int a=17;
        float b=3.14f;
        char c='A';
        boolean d=true;
        System.out.printf("Integer: %d\n", a);
        System.out.printf("Float: %.2f\n", b);
        System.out.printf("Character: %c\n", c);
        System.out.printf("Boolean: %b\n", d);
    }
}
```

```
PS C:\Users\<Anmol> > javac exe3_5.java
PS C:\Users\<Anmol> > java exe3_5
Integer: 17
Float: 3.14
Character: A
Boolean: true
PS C:\Users\<Anmol> >
```

Observation: The program uses System.out.printf() to format and print the values of different data types (int, float, char, boolean) using appropriate format specifiers (%d for int, %.2f for float, %c for char, and %b for boolean). The output is displayed to the user as specified in the print statements.