Object Oriented Programming (23CSE111)

Assignment

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PROGRAM-1

AIM:

Write a java program with class named "book". The class should contain various attributes such as "title, author, yearofpublication". It should also contain a "constructor" with parameters which initializes "title", "author", and "yearofpublication".Create a method which displays the details of the book i.e. "author, title, yearofpublication".(Display the details of two books i.e. create 2 objects and display their details).

CODE:

```java
public class Book {

    String title;

    String author;

    int year_of_publication;


    public Book(String title, String author, int year_of_publication ) {

        this.title = title;

        this.author = author;

        this.year_of_publication = year_of_publication;

    }
public void displayDetails() {

        System.out.println(this.title);
```

```
m.akshaya@Akshaya-MacBook-Air Myprojects4 % java Bookstore
M.Akshaya
CSE-C
AV.SC.U4CSE24218
Book one details:
The First Frost
Anand Sharma
2016

Book two details:
The Rebel kid
Ruthvika Bose
2020
```

```java
System.out.println(this.author);

    System.out.println(this.year_of_publication);

    System.out.println();

  }
}
public class Bookstore {
  public static void main(String[]args) {
    System.out.println("M.Akshaya");
    System.out.println("CSE-C");
    System.out.println("AV.SC.U4CSE24218");
    Book book_one = new Book("The First Frost", "Anand Sharma", 2016);
    Book book_two = new Book("The Rebel kid", "Ruthvika Bose", 2020);
    System.out.println("Book one details: ");
    book_one.displayDetails();
    System.out.println("Book two details: ");
    book_two.displayDetails();
    }
}
```

OUTPUT:

ERROR TABLE:

Code Error	Code rectification
1. Not putting the semi-colon; after calling the function. 2. After Start, Stop, Service not giving the parenthesis ( ).	1. Put the semi-colon after the writing the code. 2. After every method, put the parenthesis ( ).

IMPORTANT POINTS

1. While defining two classes for a code, we must be sure that we save both the classes in separate files.
2. While defining a method we should also define a function to call that method.

PROGRAM -2

AIM:

Write a java program with class named "MyClass", with a static variable "count" of "int" type, initialized to "0" and a constant variable "PI" of type "double" initialized to 3.14159 as attributes of that class. Now define a constructor for "MyClass" that increments the "count" variable each time an object of "MyClass" is created.Finally print the final values of "count" and "PI" variables.

CODE:

```
public class myclass {
    static int count = 0;
```

```java
    final double pi = 3.14;
    public myclass() {
        count++;
    }
    public static void main(String[] args) {
        myclass obj1 = new myclass();
        myclass obj2 = new myclass();
        myclass obj3 = new myclass();

        System.out.println("M.Akshaya");
        System.out.println("CSE-C");
        System.out.println("AV.SC.U4CSE24212");
        System.out.println("count: " + count);
        System.out.println("Value of pi: " + obj1.pi);
        System.out.println("Value of pi: "+  obj2.pi);
        System.out.println("Value of pi: " + obj3.pi);
    }
}
```

OUTPUT:

```
m.akshaya@Akshaya-MacBook-Air Myprojects4 % java myclass
M.Akshaya
CSE-C
AV.SC.U4CSE24218
count: 3
Value of pi: 3.14
Value of pi: 3.14
Value of pi: 3.14
```

ERROR TABLE:

Code Error	Code rectification

1. Incorrect datatype entered. 2. Not giving the indentation properly.	1. Enter the correct input during the run-time. 2. All the indentation must be correct to run the code correct.

IMPORTANT POINTS:

1. We must declare the initial value of the variable before declaring the final one.
2. Here the main objective is to increase the count according to the number of objects we make, i.e the count increases when the no.of objects are increasing.

PROGRAM-4

AIM:

Write a Java program that takes a number from the user and generates an integer between 1 and 7. It displays the weekday name (Use Conditional Statements).

> *Ex: Sample Input*
> Input number: 3
> *Expected Output* :
> Wednesday

CODE:

```
import java.util.Scanner;
public class Algebra {
    public static void main(String[]args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Enter a number(1-7): " );
        int n = input.nextInt();
        String day = null;
        if (n==1) {
            day = "Monday";
        } else if (n==2) {
```

```java
        day = "Tuesday";

    } else if (n==3) {

        day = "Wednesday";

    } else if (n==4) {

        day = "Thursday";

    } else if  (n==5) {

        day = "Friday";

    } else if (n==6) {

        day = "Saturday";

    } else if  (n==7) {

        day = "Sunday";

    } else {

        System.out.println("invalid number");

    }

    System.out.println("M.Akshaya");

    System.out.println("AV.SC.U4CSE24218");

    System.out.println("CSE-C");

    System.out.println("the weekday is: " + day );


    input.close();

  }

}
```

OUTPUT:

ERROR TABLE:

Code Error	Code rectification
1. While printing the variable not giving + sign. 2. Not closing the scanner.	1. We should give correct indentation. 2. Closing the scanner is must.

IMPORTANT POINTS:

1. While declaring a variable, first we must initialize the variable,
2. Here, we used the Scanner package to take the inputs from the user instead of declaring it beforehand.
3. After using the package we close the scanner package.

PROGRAM-5

CODE:

```java
import java.util.Scanner;
public class algebra2.0 {
    public static void main(String[]args) {
        Scanner input = new Scanner(System.in);
        System.out.println("Table to be calculated: " );
        int x = input.nextInt();
        System.out.println("Enter the number: ");
        int n = input.nextInt();
        for (int i= 0; i<=n; i++) {
            System.out.println( x + "X" + i + "=" + (x*i) );
        }
        System.out.println("M.Akshaya");
        System.out.println("AV.SC.U4CSE24218");
        System.out.println("CSE-C");
```

```
        input.close();

    }

}
```

OUTPUT:

```
m.akshaya@Akshaya-MacBook-Air Myprojects4 % java algebra2
Table to be calculated:
6
Enter the number:
6
6X0=0
6X1=6
6X2=12
6X3=18
6X4=24
6X5=30
6X6=36
M.Akshaya
AV.SC.U4CSE24218
CSE-C
```

ERROR TABLE:

Code Error	Code rectification
1. Error while printing the variables. 2. Incorrect declaration of integer.	1. Give the plus sign while printing. 2. Give input.nextInt(), where I should be capital.

IMPORTANT POINTS:

1. Here, we used the Scanner package to take the inputs from the user instead of declaring it beforehand.
2. After using the package we close the scanner package.

PROGRAM-6

CODE:

import java.util.Scanner;

public class algebra3 {

```java
public static void main(String[]args) {

    Scanner input = new Scanner(System.in);

    System.out.println("Enter a number: ");

    double a = input.nextDouble();

    System.out.println("Enter b number: ");

    double b = input.nextDouble() ;

    if (a == b) {

        System.out.println("They are the same upto three decimal places.");

    } else {

        System.out.println("They are not the same upto three decimal places.");

    }

    System.out.println("M.Akshaya");

    System.out.println("CSE-C");

    System.out.println("AV.SC.U4CSE24218");

    input.close();

    }
}
```

OUTPUT:

ERROR TABLE:

Code Error	Code rectification

1. Invalid datatype. 2. The print statement should be closed at last.	1. Decalre double instead of int. 2. Add the ';' after each and every statement.

IMPORTANT POINTS:

1. The 'double' data type in java states that it can calculate upto any decimal places.
2. Here, the if and else statement is used as if both the floating-point numbers are equal it prints the if statement or else prints the else statement.

PROGRAM-7

CODE:

```java
import java.util.Scanner;
public class algebra4 {
    public static void main(String[]args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int a = input.nextInt();
        System.out.print("Enter b number: ");
        int b = input.nextInt();
        System.out.print("Enter c number: ");
        int c = input.nextInt();
        System.out.println("M.Akshaya");
        System.out.println("CSE-C");
        System.out.println("AV.SC.U4CSE24218");
        if (a<b) {
            if (b<c) {
                System.out.println("Increasing order");
            } else {
                System.out.println("Neither inreasing nor decreasing");
```

```
        }
    } else {
        System.out.println("Decreasing order");
    }
    input.close();
  }
}
```

OUTPUT:

```
m.akshaya@Akshaya-MacBook-Air MyProject % touch algebra4.java
m.akshaya@Akshaya-MacBook-Air MyProject % javac algebra4.java
m.akshaya@Akshaya-MacBook-Air MyProject % java algebra4
Enter a number: 45
Enter b number: 63
Enter c number: 26
M.Akshaya
CSE-C
AV.SC.U4CSE24218
Neither inreasing nor decreasing
```

ERROR TABLE:

Code Error	Code rectification
1. Incorrect data type. 2. Didn't close the input.	1. Declare int instead of Stirng. 2. Close the input at last like 'input.close();'

IMPORTANT POINTS:

1. Here, we are finding whether the given numbers are in the increasing order or decreasing order.
2. We do it by using the if and else statements,.
3. According to the given condition in the question, if a<b and b<c, then it prints in increasing order or it prints in decreasing order or it prints neither increasing nor decreasing.

PROGRAM-8

AIM:

Write a Java program that reads a positive integer and count the number of digits the number (less than ten billion) has (Use Conditional Statements).

> Ex: *Sample Output*
> Input an integer number less than ten billion: 125463
> *Expected Output* :
>
> Number of digits in the number: 6

CODE:

```java
import java.util.Scanner;
public class algebra5 {
    public static void main(String[]args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Enter a number less than ten billion: ");
        int a = input.nextInt();
        int b = a;
        int i = 0;
        while (a>0) {
            a = a/10;
            i++;
        }
        if ( b == 0) {
            i = 1;
        }
        System.out.println("the number of digits in the number is: " +i );
        System.out.println("M.Akshaya");
        System.out.println("CSE-C");
        System.out.println("AV.SC.U4CSE24218");
        input.close();
    }
}
```

}

OUTPUT:

```
m.akshaya@Akshaya-MacBook-Air MyProject % javac algebra5.java
m.akshaya@Akshaya-MacBook-Air MyProject % java algebra5
Enter a number less than ten billion: 475369
the number of digits in the number is: 6
M.Akshaya
CSE-C
AV.SC.U4CSE24218
```

ERROR TABLE:

Code Error	Code rectification
1. Variable I not found. 2. Not giving the value of a to b.	1. Initialize variable I to 0. 2. Giving the value of a to b prints the correct output.

IMPORTANT POINTS:

1. Here, we are using the while loop to execute our program.
2. In the while loop, we are dividing the number by 10 and then increasing the count number.
3. The loop continues until the value of a becomes zero.

PROGRAM -9

AIM:

Write a Java program to display Pascal's triangle.

Ex: *Sample Output*
Input number of rows: 5
Expected Output :

```
Input number of rows: 5
        1
      1 1
     1 2 1
    1 3 3 1
   1 4 6 4 1
```

CODE:

```java
public class pascaltriangle {
    public static void main(String[]args) {
        int r = 5;
        for(int i = 0; i<r; i++) {
            for(int j = 0; j<(r-i); j++) {
                System.out.print(" ");
            }
            int n = 1;
            for(int j = 0; j <=i; j++) {
                System.out.print(n + " ");
                n = n* (i - j)/(j + 1);
            }
            System.out.println( );
        }
        System.out.println("M.Akshaya");
        System.out.println("AV.SC.U4CSE24218");
        System.out.println("CSE-C");
    }
}
```

OUTPUT:

```
[m.akshaya@Akshaya-MacBook-Air MyProject % touch pascaltriangle.java
[m.akshaya@Akshaya-MacBook-Air MyProject % javac pascaltriangle.java
[m.akshaya@Akshaya-MacBook-Air MyProject % java pascaltriangle
     1
    1 1
   1 2 1
  1 3 3 1
 1 4 6 4 1
M.Akshaya
AV.SC.U4CSE24218
CSE-C
```

ERROR TABLE:

Code Error	Code rectification
1. Wrong comma in the for loop. 2. Using println instead of using print.	1. Put the ';' istead of ',' in the for loop. 2. Thought it runs the code it doesn't give the right output.

IMPORTANT POINTS:

1. The first inner loop controls the spaces before the numbers in each row to ensure the triangle is properly aligned.
2. R – I calculates the number of spaces needed for the current row.
3. The formula n = n*(i-j)/(j+1) is a way of calculating the binomial coefficient c(i,j) which represents the value at the jth position in the ith row.

PROGRAM – 10:

AIM

Write a Java program to display the following character rhombus structure.

Ex: *Sample Output*
Input the number: 7
Expected Output :

```
      A
     ABA
    ABCBA
   ABCDCBA
  ABCDEDCBA
 ABCDEFEDCBA
ABCDEFGFEDCBA
 ABCDEFEDCBA
  ABCDEDCBA
   ABCDCBA
    ABCBA
     ABA
      A
```

CODE:

import java.util.Scanner;

```java
public class rhombus {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
        System.out.print("Input: ");
        int n = input.nextInt();
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= n - i; j++) {
                System.out.print(" ");
            }
            for (char c = 'A'; c < 'A' + i; c++) {
                System.out.print(c);
            }
            for (char c = (char) ('A' + i - 2); c >= 'A'; c--) {
                System.out.print(c);
            }
            System.out.println();
        }
        for (int i = n - 1; i >= 1; i--) {
            for (int j = 1; j <= n - i; j++) {
                System.out.print(" ");
            }
            for (char c = 'A'; c < 'A' + i; c++) {
                System.out.print(c);
            }
            for (char c = (char) ('A' + i - 2); c >= 'A'; c--) {
                System.out.print(c);
            }
            System.out.println();
        }
```

```
    input.close();

    System.out.println("M.Akshaya");

    System.out.println("AV.SC.U4CSE24218");

    System.out.println("CSE-C");

    }

}
```

OUTPUT:

```
[m.akshaya@Akshaya-MacBook-Air MyProject % touch Rhombus.java
[m.akshaya@Akshaya-MacBook-Air MyProject % javac Rhombus.java
[m.akshaya@Akshaya-MacBook-Air MyProject % java Rhombus
Input: 7
        A
       ABA
      ABCBA
     ABCDCBA
    ABCDEDCBA
   ABCDEFEDCBA
  ABCDEFGFEDCBA
   ABCDEFEDCBA
    ABCDEDCBA
     ABCDCBA
      ABCBA
       ABA
        A
M.Akshaya
AV.SC.U4CSE24218
CSE-C
```

ERROR TABLE:

Code Error	Code rectification
1. Declaring the int type instead of char. 2. Sometimes printing 'println' instead of print.	1. Declare char instead of int type. 2. Though it gives the output, it gives the wrong answer.

IMPORTANT POINTS:

1. The program starts by taking an integer n as input, which represents the size of the rhombus.
2. The first for loop iterates from 1 to n. It prints the upper half of the rhombus.
3. Second and third loops handle the printing of the alphabet pattern. The second loop prints from A to the i-th letter, and the third loop prints the decreasing sequence of letters to completer the row.