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CDAC AUGUST 2024 CDAC MUMBAI  
Module 2: OOPJ  
Assignment 1

1)Write a program that checks if a given year is a leap year or not using both if-else and switch-case.

```
// 1)Write a program that checks if a given year is a leap year or not
using both if-else and switch-case

// Using if-else statement:

import java.util.Scanner;

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

        System.out.print("Enter a year: ");
        int year = scanner.nextInt();

        if (year % 4 == 0) {
            if (year % 100 == 0) {
                if (year % 400 == 0) {
                    System.out.println(year + " is a leap year.");
                } else {
                    System.out.println(year + " is not a leap year.");
                }
            } else {
                System.out.println(year + " is a leap year.");
            }
        } else {
            System.out.println(year + " is not a leap year.");
        }

        scanner.close();
    }
}
```

```

// Using Switch-case

import java.util.Scanner;

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

        System.out.print("Enter a year: ");
        int year = scanner.nextInt();

        int divisibleBy4 = (year % 4 == 0) ? 1 : 0;
        int divisibleBy100 = (year % 100 == 0) ? 1 : 0;
        int divisibleBy400 = (year % 400 == 0) ? 1 : 0;

        switch (divisibleBy4) {
            case 1:
                switch (divisibleBy100) {
                    case 1:
                        switch (divisibleBy400) {
                            case 1:
                                System.out.println(year + " is a leap
year.");
                                break;
                            default:
                                System.out.println(year + " is not a leap
year.");
                                break;
                        }
                    default:
                        System.out.println(year + " is a leap year.");
                        break;
                }
            default:
                System.out.println(year + " is not a leap year.");
        }

        scanner.close();
    }
}

```



2) Implement a program that calculates the Body Mass Index (BMI) based on height and weight input using if-else to classify the BMI into categories (underweight, normal weight, overweight, etc)

```
// BMI
import java.util.Scanner;
import javax.sql.rowset.spi.SyncResolver;
public class BMI {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter your weight in kilogram: ");
        double weight = scanner.nextDouble();
        System.out.println("Enter your height in meters: ");
        double height = scanner.nextDouble();
        double bmi = weight / (height * height);
        System.out.printf("Your BMI is: %.2f\n", bmi);
        if(bmi < 18.5) {
            System.out.println("You are underweight.");
        }else if (bmi >= 18.5 && bmi <24.9) {
            System.out.println("You are a normal weight");
        }else if (bmi >= 25 && bmi < 29.9) {
            System.out.println("You are overweight");
        }else if(bmi >=30 && bmi < 34.5) {
            System.out.println("You are in Obese class I");
        }else if(bmi >= 35 && bmi <39.9) {
            System.out.println("You are in Obese class II");
        }else {
            System.out.println("You are in Obesity class III");
        }
        scanner.close();
    }
}
```

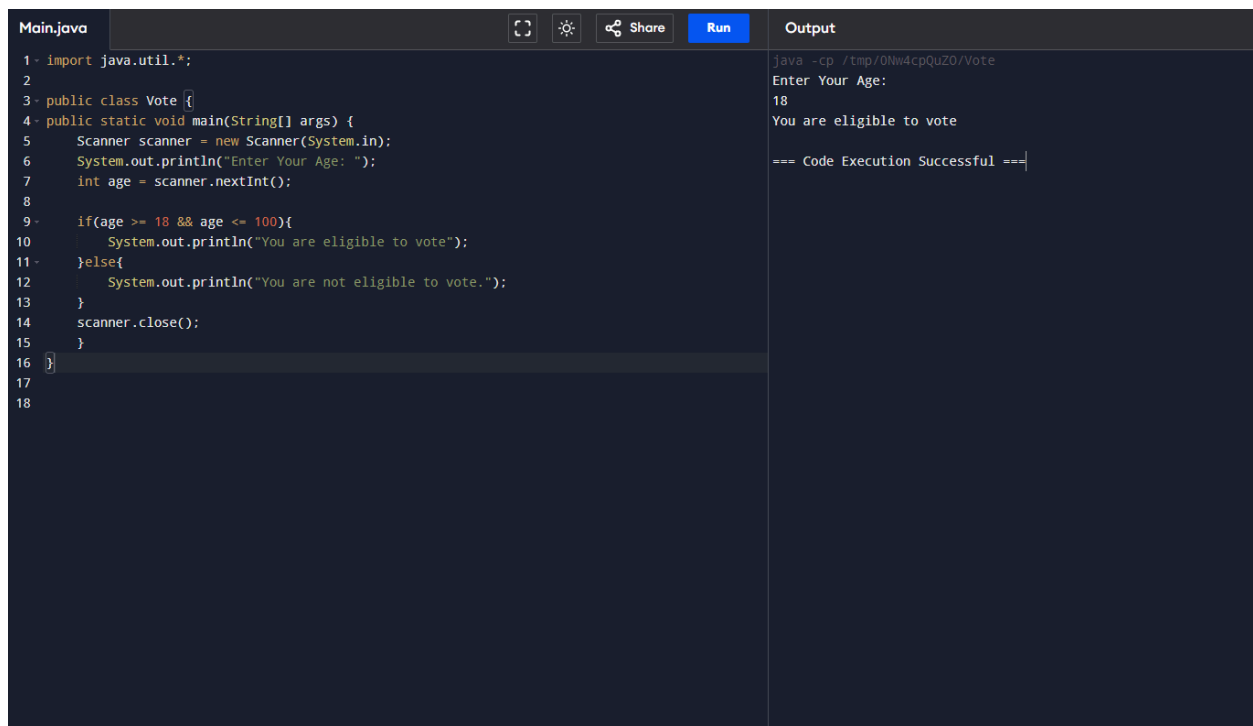
Main.java	Output
<pre>1 import java.util.Scanner; 2 3 import javax.sql.rowset.spi.SyncResolver; 4 5 public class BMI { 6     public static void main(String[] args) { 7         Scanner scanner = new Scanner(System.in); 8         System.out.println("Enter your weight in kilogram: "); 9         double weight = scanner.nextDouble(); 10        System.out.println("Enter your height in meters: "); 11        double height = scanner.nextDouble(); 12        double bmi = weight / (height * height); 13        System.out.printf("Your BMI is: %.2f\n", bmi); 14        if(bmi &lt; 18.5) { 15            System.out.println("You are underweight."); 16        }else if (bmi &gt;= 18.5 &amp;&amp; bmi &lt;24.9) { 17            System.out.println("You are a normal weight"); 18        }else if (bmi &gt;= 25 &amp;&amp; bmi &lt; 29.9) { 19            System.out.println("You are overweight"); 20        }else if(bmi &gt;=30 &amp;&amp; bmi &lt; 34.5) { 21            System.out.println("You are in Obese class I"); 22        }else if(bmi &gt;= 35 &amp;&amp; bmi &lt;39.9) { 23            System.out.println("You are in Obese class II"); 24        }else { 25            System.out.println("You are in Obesity class III"); 26        } 27        scanner.close(); 28    } 29 } 30 31 32</pre>	<pre>java -cp . Temp1615860015/BMI Enter your weight in kilogram: 70 Enter your height in meters: 1.75 Your BMI is: 22.86 You are a normal weight  --- Code Execution Successful ---</pre>

3)Write a program that checks if a person is eligible to vote based on their age

```
import java.util.*;

public class Vote {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter Your Age: ");
        int age = scanner.nextInt();

        if(age >= 18 && age <= 100){
            System.out.println("You are eligible to vote");
        }else{
            System.out.println("You are not eligible to vote.");
        }
        scanner.close();
    }
}
```



The screenshot displays a Java IDE with a dark theme. The left pane shows the source code for 'Main.java', which is a Java program to check if a person is eligible to vote based on their age. The code uses a Scanner to read input from the user and an if-statement to check if the age is between 18 and 100. The right pane shows the output of the program, which includes the prompt 'Enter Your Age:', the user input '18', and the response 'You are eligible to vote'. Below the output, it states '=== Code Execution Successful ==='. The IDE interface includes a toolbar with icons for running, debugging, and sharing, and a 'Run' button.

```
Main.java  [Icons]  Run  Output

1 import java.util.*;
2
3 public class Vote {
4     public static void main(String[] args) {
5         Scanner scanner = new Scanner(System.in);
6         System.out.println("Enter Your Age: ");
7         int age = scanner.nextInt();
8
9         if(age >= 18 && age <= 100){
10             System.out.println("You are eligible to vote");
11         }else{
12             System.out.println("You are not eligible to vote.");
13         }
14         scanner.close();
15     }
16 }
17
18

java -cp /tmp/0Nw4cpQuZ0/Vote
Enter Your Age:
18
You are eligible to vote

=== Code Execution Successful ===
```

4)Write a program that takes a month (1-12) and prints the corresponding season (Winter, Spring, Summer, Autumn) using a switch case

```
import java.util.*;
public class Seasons {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter a month number(1-12): ");
        int month = scanner.nextInt();

        String season;
        switch (month) {
            case 12:
            case 1:
            case 2:
                season = "Winter";
                break;
            case 3:
            case 4:
            case 5:
                season = "Spring";
                break;
            case 6:
            case 7:
            case 8:
                season = "Summer";
                break;
            case 9:
            case 10:
            case 11:
                season = "Autumn";
            default:
                season = "Invalid month";
                break;
        }
        System.out.println("The season is: " + season);
        scanner.close();
    }
}
```

Main.java	Output
<pre>3- public static void main(String[] args) { 4     Scanner scanner = new Scanner(System.in); 5     System.out.println("Enter a month number(1-12): "); 6     int month = scanner.nextInt(); 7 8     String season; 9     switch (month) { 10        case 12: 11        case 1: 12        case 2: 13            season = "Winter"; 14            break; 15        case 3: 16        case 4: 17        case 5: 18            season = "Spring"; 19            break; 20        case 6: 21        case 7: 22        case 8: 23            season = "Summer"; 24            break; 25        case 9: 26        case 10: 27        case 11: 28            season = "Autumn"; 29        default: 30            season = "Invalid month"; 31            break; 32    } 33    System.out.println("The season is: " + season); 34    scanner.close(); 35 } 36 }</pre>	<pre>java -cp /tmp/DCH8n40Iea/Seasons Enter a month number(1-12): 5 The season is: Spring  === Code Execution Successful ===</pre>

5)Write a program that allows the user to select a shape (Circle, Square, Rectangle, Triangle) and then calculates the area based on user-provided dimensions using a switch case.

```
import java.util.*;
```

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

        System.out.println("Select a shape to calculate the area:");
        System.out.println("1. Circle");
        System.out.println("2. Square");
        System.out.println("3. Rectangle");
        System.out.println("4. Triangle");

        System.out.print("Enter the number corresponding to your choice: ");
        int choice = scanner.nextInt();

        double area = 0;
        switch (choice) {
            case 1:
                System.out.print("Enter the radius of the circle: ");
```

```
double radius = scanner.nextDouble();
area = Math.PI * radius * radius;
System.out.printf("The area of the circle is: %.2f\n", area);
break;
```

case 2:

```
System.out.print("Enter the side length of the square: ");
double side = scanner.nextDouble();
area = side * side;
System.out.printf("The area of the square is: %.2f\n", area);
break;
```

case 3:

```
System.out.print("Enter the length of the rectangle: ");
double length = scanner.nextDouble();
System.out.print("Enter the width of the rectangle: ");
double width = scanner.nextDouble();
area = length * width;
System.out.printf("The area of the rectangle is: %.2f\n", area);
break;
```

case 4:

```
System.out.print("Enter the base of the triangle: ");
double base = scanner.nextDouble();
System.out.print("Enter the height of the triangle: ");
double height = scanner.nextDouble();
area = 0.5 * base * height;
System.out.printf("The area of the triangle is: %.2f\n", area);
break;
```

default:

```
System.out.println("Invalid choice. Please select a valid shape.");
break;
```

```
}
```

```
scanner.close();
```

```
}
```

```
}
```



Mon.java

1 import java.util.\*;  
2  
3 public class AreaCalculator {  
4 public static void main(String[] args) {  
5 Scanner scanner = new Scanner(System.in);  
6  
7 System.out.println("Select a shape to calculate the area:");  
8 System.out.println("1. Circle");  
9 System.out.println("2. Square");  
10 System.out.println("3. Rectangle");  
11 System.out.println("4. Triangle");  
12  
13 System.out.print("Enter the number corresponding to your choice: ");  
14 int choice = scanner.nextInt();  
15  
16 double area = 0;  
17 switch (choice) {  
18 case 1:  
19 System.out.print("Enter the radius of the circle: ");  
20 double radius = scanner.nextDouble();  
21 area = Math.PI \* radius \* radius;  
22 System.out.printf("The area of the circle is: %.2f\n", area);  
23 break;  
24  
25 case 2:  
26 System.out.print("Enter the side length of the square: ");  
27 double side = scanner.nextDouble();  
28 area = side \* side;  
29 System.out.printf("The area of the square is: %.2f\n", area);  
30 break;  
31  
32 case 3:  
33 System.out.print("Enter the length of the rectangle: ");  
34 double length = scanner.nextDouble();  
35 System.out.print("Enter the width of the rectangle: ");  
36 double width = scanner.nextDouble();  
37 area = length \* width;  
38 System.out.printf("The area of the rectangle is: %.2f\n", area);  
39 break;  
40  
41 case 4:  
42 System.out.print("Enter the base of the triangle: ");  
43 double base = scanner.nextDouble();  
44 System.out.print("Enter the height of the triangle: ");  
45 double height = scanner.nextDouble();  
46 area = 0.5 \* base \* height;  
47 System.out.printf("The area of the triangle is: %.2f\n", area);  
48 break;  
49  
50 default:  
51 System.out.println("Invalid choice. Please select a valid shape.");  
52 break;  
53 }  
54 scanner.close();  
55 }  
56 }

Output

java -cp /tmp/8C20r1sP0z/AreaCalculator  
Select a shape to calculate the area:  
1. Circle  
2. Square  
3. Rectangle  
4. Triangle  
Enter the number corresponding to your choice: 3  
Enter the length of the rectangle: 5  
Enter the width of the rectangle: 10  
The area of the rectangle is: 50.00  
  
=== Code Execution Successful ===