Introduction to Computer Programming (CSE1001)

Assignment-3

Conditional Statements

Question No	Questions	Course Outcome
1.	Write a **Java Program** to input the age of a person and check if the age of the person is greater than or equal to 18 then print the message: "You are eligible to cast your vote". **Sample Run:** Enter the age of the person: 25 You are eligible to cast your vote	CO3
2.	A person should walk at least 10,000 steps daily for good health. Write a **Java Program** to input the steps walked. If the steps are greater than or equal to 10,000, print "Good job! You are active today". Otherwise, print "You need to walk more for good health" **Sample Run:** Enter the number of steps walked: 12000 Good job! You are active today	CO3
3.	Write a **Java program** that reads three integers from the user and prints "Increasing" if the numbers are in increasing order, "Decreasing" if the numbers are in decreasing order, and "Neither increasing nor decreasing order" otherwise. **Sample Run:** Input first number: 241 Input second number:345 Input third number: 4563 "Increasing" Input first number: 345 Input second number:145 Input third number: 563 "Neither Increasing nor decreasing" Input first number: 45 Input second number:14 Input third number: 3 "Decreasing"	CO3
4.	Make a simple game involving a computer and a user. The computer first guesses a number between 1 and 9 inclusive, then ask the user to enter a number between 1 and	CO3

	9 inclusive. If the user guess is correct then display "You got it right", if the guess is close (+1, -1) "Almost got it ", Otherwise "You got it wrong".
	
	Sample Run:
	`Enter user number: 2`
	`Computer guesses: 3`
	`"Almost got it"`
	
	`Enter user number: 4`
	`Computer guesses: 4`
	`"You got it right"`
	
	`Enter user number: 1`
	`Computer guesses: 5`
	`"You got it wrong"`	

5.	Write a **Java program** to input the three sides of a triangle and determine its type using **nested if–else** statements.
	
	Your program should first check whether the given sides can form a valid triangle using the triangle inequality rule:
	
	The sum of any two sides must be greater than the third side.
	
	If the sides form a valid triangle, determine whether it is:
	• Equilateral – all three sides are equal
	• Isosceles – any two sides are equal
	• Scalene – all three sides are different
	
	If the sides do not satisfy the triangle condition, display a message that they do not form a valid triangle.
	
	Sample Run:
	`Enter first side: 5`
	`Enter second side: 5`
	`Enter third side: 5`
	`The triangle is Equilateral.`
	
	`Enter first side: 5`
	`Enter second side: 7`
	`Enter third side: 5`
	`The triangle is Isosceles.`
	
	`Enter first side: 4`
	`Enter second side: 5`
	`Enter third side: 6`
	`The triangle is Scalene.`
	
	`Enter first side: 2`
	`Enter second side: 3`
	`Enter third side: 6`
	`The given sides do not form a valid triangle.`
		CO3

6.	The two roots of a quadratic equation $ax^2 + bx + c = 0$ can be obtained using the following formula:	CO3

	$r1 = \frac{-b+\sqrt{b^2-4ac}}{2a}$, *and* $r2 = \frac{-b-\sqrt{b^2-4ac}}{2a}$
	b^2 - 4ac is called the discriminant of the quadratic equation.
	
	• If it is positive, the equation has two real roots.
	• If it is zero, the equation has one root.
	• If it is negative, the equation has no real roots.
	
	Write a **Java Program** that prompts the user to enter values for a, b, and c and displays the result based on the discriminant.
	
	If the discriminant is positive, display two roots. If the discriminant is 0, display one root. Otherwise, display "The equation has no real roots"
	
	Note that you can use *Math.pow(x, 0.5)* to compute $\sqrt{x}$
	
	Sample Run:
	`Enter a, b, c: 1.0 3 1`
	`The equation has two roots -0.381966 and -2.61803`
	
	`Enter a, b, c: 1 2.0 1`
	`The equation has one root -1`
	
	`Enter a, b, c: 1 2 3`
	`The equation has no real roots`	

7.	Write a **Java program** to check whether a given year is a leap year or not using the following three approaches:
	(a) Using *nested if–else* statements
	(b) Using *if–else if ladder*
	(c) Using the *conditional (ternary) operator*
	
	Note:
	A year is considered a leap year if:
	1. It is divisible by 4, and
	2. It is not divisible by 100, unless it is also divisible by 400.
	
	Sample Run:
	`Enter a year: 2024`
	`2024 is a Leap Year.`
	
	`Enter a year: 1900`
	`1900 is NOT a Leap Year.`
	
	`Enter a year: 2000`
	`2000 is a Leap Year.`
	
	`Enter a year: 2023`
	`2023 is NOT a Leap Year.`
		CO3

8.	Write a **Java Program** to calculate the monthly electricity bill for a consumer based on the following tariff:	CO3

Unit Range	Rate per Unit
First 50 units	₹3.00
51–200 units	₹4.80
201–400 units	₹5.80
Above 400 units	₹6.20

After calculating the total bill, ask the consumer whether they want to pay the bill **online**.
If the consumer pays **online**, they get a **3% discount** on the total amount.

Note: Use **nested if–else statements**.

Sample Run:

```
Enter the number of units consumed: 120
Do you want to pay your bill online? (Y/N): Y
You received a 3% online payment discount of Rs. 14.58
Total Electricity Bill: Rs. 486.0
Amount Payable: Rs. 471.42

Enter the number of units consumed: 320
Do you want to pay your bill online? (Y/N): N
Total Electricity Bill: Rs. 1518.0
Amount Payable: Rs. 1518.0
```

9. Write a **Java program** to perform basic arithmetic operations (+, -, *, /) using a **switch statement.** CO3

The user should input two numbers and an operator.

If the operator is invalid or division by zero occurs, display an appropriate message.

Sample Run:

```
Enter first number: 12
Enter second number: 8
Enter operator (+, -, *, /): +
Result: 20.0

Enter first number: 15
Enter second number: 0
Enter operator (+, -, *, /): /
Error: Division by zero is not allowed!

Enter first number: 7
Enter second number: 3
Enter operator (+, -, *, /): *
Result: 21.0

Enter first number: 10
Enter second number: 5
Enter operator (+, -, *, /): @
Invalid operator! Please use +, -, *, or /.
```

10.	A University conducts a 100-mark exam for its student and grades them as follows. Assigns a grade based on the value of the marks. Write a **Java Program** to print the grade according to the mark secured by the student. [Use switch-case].
	Grading Criteria:
	Marks Range / **Grade**
	≥ 90 — O
	≥ 80 and < 90 — A
	≥ 70 and < 80 — B
	≥ 60 and < 70 — C
	≥ 50 and < 60 — D
	≥ 40 and < 50 — E
	< 40 — F
	
	Display an appropriate message if the marks are **invalid** (less than 0 or greater than 100).
	
	Sample Run:
	`Enter marks: 85`
	`Grade: A`
	
	`Enter marks: 72`
	`Grade: B`
	
	`Enter marks: 38`
	`Grade: F`
	
	`Enter marks: 105`
	`Invalid Marks! Please enter marks between 0 and 100.`
		CO3

	HOME ASSIGNMENT	

11.	Write a **Java Program** that prompts the user to enter an integer and determines whether it is divisible by 5 and 6, whether it is divisible by 5 or 6, and whether it is divisible by 5 or 6, but not both.
	
	Sample Run:
	`Enter an integer: 10`
	`Is 10 divisible by 5 and 6? false`
	`Is 10 divisible by 5 or 6? true`
	`Is 10 divisible by 5 or 6, but not both? True`
		CO3

12.	Write a **Java Program** to find the largest among three numbers using the following approaches:
	(a) Using *nested if–else* statements
	(b) Using *if–else if ladder*
	(c) Using the *conditional (ternary) operator*
	
	Sample Run:
	`Enter the value of a, b, c:10 30 50`
	`Largest number: 50`
		CO3

13.	Write a **Java Program** that takes the x – y coordinates of a point in the Cartesian plane and prints a message telling either an axis on which the point lies or the quadrant in which it is found.	CO3

	Sample Run:
	`(-1.0, -2.5) is in quadrant III`
	`(0.0, 4.8) is on the Y-axis`	

14.	Write a **Java program** that randomly generates an integer between 1 and 12 and displays the corresponding month name.
	
	Description:
	• The program should generate a random integer between **1 and 12** (inclusive).
	• Each number represents a month of the year:
	  ○ 1 → January
	  ○ 2 → February
	  ○ 3 → March
	  ○ …
	  ○ 12 → December
	• The program should then display both the **random number** and the **corresponding English month name**.
	
	Sample Run:
	`Randomly generated number: 4`
	`Corresponding month: April`
	`Randomly generated number: 11`
	`Corresponding month: November`
	
	`Randomly generated number: 1`
	`Corresponding month: January`
		CO3

15.	Write a **Java Program** that plays the popular scissor-rock-paper game.
	
	• A scissor can cut a paper
	• A rock can knock a scissor
	• A paper can wrap a rock.
	
	The program randomly generates a number 0, 1, or 2 representing scissor, rock, and paper.
	
	The program prompts the user to enter a number 0, 1, or 2 and displays a message indicating whether the user or the computer wins, loses, or draws.
	
	Sample Run:
	`scissor (0), rock (1), paper (2): 1`
	`The computer is scissor. You are rock. You won`
	
	`scissor (0), rock (1), paper (2): 2`
	`The computer is paper. You are paper too. It is a draw`
		CO3

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