Activity 1.1: Everyday Decisions

Think of three common decisions you make daily.

Write them in the format: If [condition], then [action].

How would a computer represent these decisions using Java syntax?

1.1 Algorithm:

Step 1: Start

Step 2: Check the time

If time < 9:00 PM

Then Sleep Now

Else It will not write anything

Step 3: Check the weather

If it is raining

Then carry an umbrella

Else no need to carry umbrella

Step 4: Check the weather

If it is raining

Then Go with car

Else Go with bike

1.1 Pseudocode:

START

// Decision 1: Sleeping time

SLEEPING TIME

IF time < =9 THEN

DISPLAY " Sleep Now "

ELSE

IT DON'T DISPLAY ANYTHING

```
// Decision 2: Weather check
READ isRaining
IF isRaining = true THEN
    DISPLAY "Carry an umbrella"
ELSE
    DISPLAY "No need to carry an umbrella"
// Decision 3: Weather check for Travel
READ isRaining
IF isRaining = true THEN
    DISPLAY "Go with Car"
ELSE
    DISPLAY "Go with Bike"
```

CODE FOR D1:

```java
import java.util.Scanner;
public class Day21 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       System.out.println("Enter a Time:");
       int time = sc.nextInt();

       if (time >= 9) {
           System.out.println("Sleep now");
       }
   }
}
```

OUTPUT:

```
Enter a Time:
9
Sleep now
PS C:\Users\Admin\OneDrive\Desktop\Stemup>
```

CODE FOR D2:

```
import java.util.Scanner;
public class Day212 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       System.out.println("Is raining true or false:");
       boolean value= sc.nextBoolean();

       if (value == true) {
           System.out.println("Carry Umbrella");
       }else{
            System.out.println("Dont carry umbrella");
           }
       }
   }
```

OUTPUT:

- Is raining true or false:

  TRUE

  Carry Umbrella

- Is raining true or false:

  TRUE

  Don’t Carry Umbrella

CODE FOR D3:

```
import java.util.Scanner;
public class Day213 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       System.out.println("Is raining true or false:");
       boolean value= sc.nextBoolean();

       if (value == true) {
           System.out.println("go with car");
       }else{
            System.out.println("go with bike");
           }
       }
   }
```

OUTPUR:

- Is raining true or false:

  True

  Go with Car

- Is raining true or false:

  False

  Go with Bike

Activity 1.2: Computer's "Thoughts"

Imagine a simple smart home device.

1. Write two decisions it might need to make in daily use.

2. Describe the condition and the corresponding action in pseudocode or Java code.

1.1 Algorithm:

// Decision 1:Room temperature.

Step 1: Set the desired temperature.

Step 2: Get the current room temperature.

Step 3: If current temperature is less than desired temperature:

Turn on the heater.

Else:

Keep the heater off.

// Decision 2:Room Light.

Step 1: Check if motion is detected in the room.

Step 2: If motion is NOT detected AND 10 or more minutes have passed:

Turn off the lights.

Else:

Keep the lights on.

1.2 Pseudocode:

// Decision 1:Room temperature.

START
  SET Temperature = 22
  SET currentTemperature = 20

  IF currentTemperature < Temperature THEN
    DISPLAY "Turning on heater"
  ELSE
    DISPLAY "Heater is off"
  END IF
END

// Decision 2:Room Light.

START
  SET motionDetected = FALSE
   IF motionDetected = FALSE THEN
    DISPLAY "Turning off lights"
  ELSE
    DISPLAY "Lights remain on"
  END IF
END

CODE FOR D1:

```java
import java.util.Scanner;
public class Day221 {
   public static void main(String[] args) {
       Scanner sc = new Scanner(System.in);
       System.out.println("Current Temp:");
       int currentTemp= sc.nextInt();
```

```
        if (currentTemp < 22.00 ) {
            System.out.println("Turning on heater");
        }else{
             System.out.println("Heater is off");
            }
        }
    }
```

OUTPUT:

- Current Temp:

  22

  Heater is off

- Current Temp:

  25

  Turning on Heater

CODE FOR D2:

```
import java.util.Scanner;
public class Day222 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("!motion Detected true or false:");
        boolean value= sc.nextBoolean();

        if (value == false) {
            System.out.println("Turning off lights.");
        }else{
             System.out.println("Lights remain on.");
            }
        }}
```

OUTPUT:

- !MOTION IS DETECTED TRUE OR FALSE:

  YES[TRUE]

  Lights remain one344

- !MOTION IS DETECTED TRUE OR FALSE:

  NO[FALSE]

  Turning off lights.

Problem 1.1: Age Checker

Declare an int variable myAge and assign your age to it.

Write expressions using comparison operators to check if:

- myAge is equal to 25.
- myAge is greater than 18.
- myAge is less than or equal to 65.
- myAge is not equal to 30.

Print the Boolean result of each expression using System.out.println().

1.1 Pseudocode:

Start

declare myAge as integer

set myage = 21

display "myAge == 25: "

display "mAge > 18: "

display "myAge <= 65: "

display "myAge != 30: "

End

1.1 Algorithm:

Step 1: Start

Step 2: Declare an integer variable myAge and assign your age.

Step 3: Check if myAge is equal to 25

Step 4: Check if myAge is greater than 18

Step 5: Check if myAge is less than or equal to 65

Step 6: Check if myAge is not equal to 30

Step 7: Display the result (true or false) of each comparison

Step 8: Stop

CODE FOR Age Checker:

```
public class Day2Age {
    public static void main(String[] args) {
        int myAge = 21;

        System.out.println("myAge == 25: " + (myAge == 25));
        System.out.println("myAge > 18: " + (myAge > 18));
        System.out.println("myAge <= 65: " + (myAge <= 65));
        System.out.println("myAge != 30: " + (myAge!=30));}
}
```

OUTPUT:

- myAge == 25: false
- myAge > 18: true
- myAge <= 65: true
- myAge != 30: true

Problem 1.2: Login Credentials

Declare two String variables: username = "admin" and password = "password123".

Declare two more variables: enteredUsername and entered Password, and assign some test values.

Write a logical expression that returns true only if both username and password match.

1.2 Pseudocode:

start

set username ← "admin"

set password ← "password123"

display "enter your username"

read username1

display "enter your password"

read password1

if username = username1 and password = password1 then

  display "true"

else

  display "false"

End

1.2 Algorithm:

Step1: Start

Step 2: Declare username as "admin"

Step 3: Declare password as "password123"

Step 4: Prompt the user to enter their username

Step 5: Read input and store it in username1

Step 6: Prompt the user to enter their password

Step 7: Read input and store it in password1

Step 8: Compare username with username1 using string comparison

Step 9: Compare password with password1 using string comparison

Step 10: If both match:

Display "true"

Else:

Display "false"

Step 11: End

CODE:

```
import java.util.Scanner;

public class Day2login {
	public static void main(String[] args) {
	 String username="admin";
	 String password="password123";
	 Scanner sc= new Scanner(System.in);
	 System.out.println("Enter your username");
	 String username1=sc.nextLine();
	 System.out.println("Enter your password");
	 String password1=sc.nextLine();
	 if((username.equals(username1))&&password.equals(password1)){
	     System.out.println("true ");
	 }else{
	     System.out.println("false");
	 }
 }
}
```

OUTPUT:

- Enter your username

  admin

- Enter your password

  password123

  True

➢ Enter your username

  admin

➢ Enter your password

  password123

  False

Problem 1.3: Operator Precedence Challenge

Given the expression: 5+3*2>10&&!(7==7)

Break it down step-by-step.

Show the result after each stage of the operation and determine its final Boolean value

1.3 Algorithm:

Step 1: Evaluate the arithmetic expression 5 + 3 * 2

Step 2: Check if the result is greater than 10

Step 3: Evaluate the logical NOT of the expression 7 == 7

Step 4: Combine both conditions using the logical AND (&&) operator

Step 5: Store the final result in a boolean variable result

Step 6: Print the result with a descriptive message

1.3 Pseudocode:

start

compute expression ← 5 + 3 * 2 > 10 and not (7 == 7)

set result ← value of expression

print "result of the expression 5 + 3 * 2 > 10 && !(7 == 7): " + result

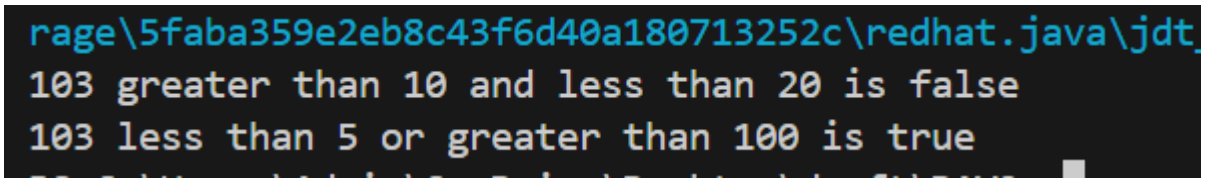
Stop

CODE FOR Operator Precedence Challenge:

```
public class Day2operator {
    public static void main(String[] args) {
        int num=103;

        System.out.println(num+" greater than 10 and less than 20 is " +
(num>10 && num<20));
        System.out.println(num+" less than 5 or greater than 100 is " + (num<5
|| num>100));
}
}
```

OUTPUT:



Problem 1.4: Positive, Negative, or Zero

- Get an integer input from the user using Scanner.

- Write an if-else if-else structure that:

  - Prints "Positive" if the number is greater than 0.

  - Prints "Negative" if the number is less than 0.

  - Prints "Zero" if the number is exactly 0.

1.4 Pseudocode:

start

create scanner object to read input

print "enter the number:"

read num1

if num1 > 0 then

  print "the value is positive " + num1

else if num1 < 0 then

print "the value is negative " + num1

else

print "the value is equal to 0"

end if

Stop

1.4 Algorithm:

Step 1: Create a Scanner object to take input from the user

Step 2: Display the message “Enter the number:”

Step 3: Read the integer input and store it in variable num1

Step 4: If num1 > 0, then

Step 5: Print “The value is positive” along with the number

Step 6: Else if num1 < 0, then

Step 7: Print “The value is negative” along with the number

Step 8: Else

Step 9: Print “The value is equal to 0”

CODE FOR Positive, Negative, or Zero:

```
import java.util.Scanner;

class Day2_positive_negaatve
{
      public static void main(String[] args) {
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter the number:");
            int num1=sc.nextInt();

            if(num1>0){
                System.out.println("the value is positive "+num1);
            }else if(num1<0){
                System.out.println("the value is negative "+num1);
            }else{
                System.out.println(" the value is equal to 0");
            }
        }}
```

OUTPUT:

CASE 1:I/P=7

```
Enter the number:
7
the value is positive 7
```

CASE 2:I/P=-38

```
Enter the number:
-38
the value is negative -38
```

CASE 3:I/P=0

```
Enter the number:
0
 the value is equal to 0
```

Problem 1.5: Driving Eligibility

- Ask the user to input their age.

- Use an if-else structure to determine if they are eligible to drive (age >= 18).

1.5 Algorithm:

Step 1: Start

Step 2: Create a Scanner object to take input from the user

Step 3: Display the message "Enter your age:"

Step 4: Read the integer input and store it in num1

Step 5: Check if num1 is less than 0

If true, display "age can't be negative"

Step 6: Else if num1 is greater than or equal to 18

Display "You are eligible to drive"

Step 7: Else

Display "You are not eligible to drive"

Step 8: Stop

1.5 Pseudocode :

START

Create Scanner object

Print "Enter your age:"

Read num1

If num1 < 0 then

Print "age can't be negative"

Else if num1 >= 18 then

Print "You are eligible to drive"

Else

Print "You are not eligible to drive"

STOP

```
import java.util.Scanner;

public class Day2Driving18 {
        public static void main(String[] args) {
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter your age:");
            int num1=sc.nextInt();

            if(num1<0){
                System.out.println("age can't be negative ");
            }else if(num1>=18){
                System.out.println("You are eligible to drive ");
            }else{
                System.out.println("You are not eligible to drive");
```

```
    }
}
}
```

OUTPUT:

CASE 1:I/P=18

```
Enter your age:
18
You are eligible to drive
```

CASE 2:I/P=9

```
Enter your age:
9
You are not eligible to drive
```

CASE 3:I/P=-8

```
Enter your age:
-8
age can't be negative
```

Problem 1.6: Simple Calculator

- Get two double inputs and an operator (+, -, *, /) from the user.

- Use if-else if-else to perform the operation.

- Handle division by zero using an if check.

Pseudocode 1.6 :

START

CREATE Scanner object

PRINT "Enter first number:"

```
READ num1

PRINT "Enter second number:"
READ num2

PRINT "Enter an operator (+, -, *, /):"
READ operator

IF operator == '+' THEN
   result ← num1 + num2
   PRINT "The result is: " + result
ELSE IF operator == '-' THEN
   result ← num1 - num2
   PRINT "The result is: " + result
ELSE IF operator == '*' THEN
   result ← num1 * num2
   PRINT "The result is: " + result
ELSE IF operator == '/' THEN
   IF num2 ≠ 0 THEN
      result ← num1 / num2
      PRINT "The result is: " + result
   ELSE
      PRINT "Arithmetic Exception: Cannot divide by zero."
   ENDIF
ELSE
   PRINT "Error: Invalid operator."
ENDIF
END
```

1.6 Algorithm:

Step 1: Create a Scanner object to read input from the user

Step 2: Display the message: "Enter first number"

Step 3:Read and store the first number in num1

Step 4: Display the message: "Enter second number"

Step 5: Read and store the second number in num2

Step 6: Display the message: "Enter an operator (+, -, *, /)"

Step 7: Read and store the operator in operator

Step 8: Check the value of operator:

If '+', compute num1 + num2 and display result

If '-', compute num1 - num2 and display result

If '*', compute num1 * num2 and display result

If '/':

Step 9: If num2 is not 0, compute num1 / num2 and display result

Step 10: Else, display "Arithmetic Exception: Cannot divide by zero"

Else, display "Error: Invalid operator"

CODE:

```
import java.util.Scanner;

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

        System.out.print("Enter first number: ");
        double num1 = scanner.nextDouble();

        System.out.print("Enter second number: ");
        double num2 = scanner.nextDouble();

        System.out.print("Enter an operator (+, -, *, /): ");
        char operator = scanner.next().charAt(0);

        double result;

        if (operator == '+') {
            result = num1 + num2;
            System.out.println("The result is: " + result);
        } else if (operator == '-') {
```

```
            result = num1 - num2;
            System.out.println("The result is: " + result);
        } else if (operator == '*') {
            result = num1 * num2;
            System.out.println("The result is: " + result);
        } else if (operator == '/') {
            if (num2 != 0) {
                result = num1 / num2;
                System.out.println("The result is: " + result);
            } else {
                System.out.println("Arithmetic Exception: Cannot divide by
zero.");
            }
        } else {
            System.out.println("Error: Invalid operator.");
        }

    }
}
```

OUTPUT:

CASE 1(+):I/P=7,9

```
Enter first number: 7
Enter second number: 9
Enter an operator (+, -, *, /): +
The result is: 16.0
```

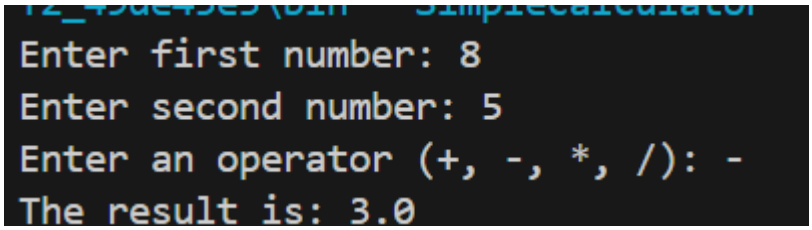
CASE 2(/):I/P=7,8

```
Enter first number: 7
Enter second number: 8
Enter an operator (+, -, *, /): /
The result is: 0.875
```

CASE 3(*):I/P=4,4

```
Enter first number: 4
Enter second number: 4
Enter an operator (+, -, *, /): *
The result is: 16.0
```

CASE 4(-):I/P=8,5



Problem 1.7: Movie Ticket Price

- Get user age (int) and student status (boolean).
- Use nested if or logical operators to determine:
  - If under 5 or over 65: $5
  - If 5-18 and student: $8
  - Otherwise: $12
- Print the result.

1.7 Pseudocode:

start

create scanner object

print "enter your age"

read age

print "are you a student? type true or false"

read std

if age < 5 or age > 65 then

  print "ticket price is $5"

else if age > 5 and age <= 18 and std == true then

  print "ticket price is $8"

else

  print "ticket price is $12"

endif

Stop

1.7 Algorithm:

Step 1: Start

Step 2: Create a Scanner object to take user input

Step 3: Display the message: "Enter your age"

Step 4: Read the integer input and store it in age

Step 5: Display the message: "Are you a student? type true or false"

Step 6: Read the boolean input and store it in std

Step 7: Check if age < 5 or age > 65

If true, print "ticket price is $5"

Step 8: Else if age > 5 and age ≤ 18 and std is true

Print "ticket price is $8"

Step 9: Else

Print "ticket price is $12"

Step 10: Stop

CODE:

```
import java.util.Scanner;
public class MovieTicket {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter your age");
        int age=sc.nextInt();
        System.out.println("Are you a student? type true or false");
        boolean std=sc.nextBoolean();

        if(age<5||age>65){
            System.out.println("ticket price is $5");
        }
        else if(age>5 && age<=18 && std){
            System.out.println("ticket price is $8");
        }
        else{
            System.out.println("ticket price is $12");
    }
    }
}
```

OUTPUT:

CASE 1:I/P=89 , FALSE

```
Enter your age
89
Are you a student? type true or false
FALSE
ticket price is $5
```

CASE 2:I/P=18 , TRUE

```
Enter your age
18
Are you a student? type true or f
TRUE
ticket price is $8
```

Problem 3.1: Day of the Week

- Ask the user to input an integer from 1-7.

- Use a switch statement to print the corresponding day.

- Include a default case for invalid inputs.

10.1 Algorithm:

Step 1: Start

Step 2: Create a Scanner object to take user input

Step 3: Display the message: "Enter the number:"

Step 4: Read the integer input and store it in variable num1

Step 5: Use a switch statement to check the value of num1

Case 1: Print "Sunday"

Case 2: Print "Monday"

Case 3: Print "Tuesday"

Case 4: Print "Wednesday"

Case 5: Print "Thursday"

Case 6: Print "Friday"

Case 7: Print "Saturday"

Default: Print "Invalid input! Please enter a number from 1 to 7."

Step 6: Stop

10.1 Pseudocode:

```
START
Create Scanner object
Print "Enter the number:"
Read num1
Switch(num1)
   Case 1:
      Print "Sunday"
      Break
   Case 2:
      Print "Monday"
      Break
   Case 3:
      Print "Tuesday"
      Break
   Case 4:
      Print "Wednesday"
      Break
   Case 5:
      Print "Thursday"
      Break
   Case 6:
      Print "Friday"
      Break
   Case 7:
      Print "Saturday"
      Break
   Default:
```

Print "Invalid input! Please enter a number from 1 to 7."

STOP

CODE:

```
import java.util.Scanner;
public class Day2_31 {

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int num1 = scanner.nextInt();

        switch (num1) {
            case 1:
                System.out.println("Sunday");
                break;
            case 2:
                System.out.println("Monday");
                break;
            case 3:
                System.out.println("Tuesday");
                break;
            case 4:
                System.out.println("Wednesday");
                break;
            case 5:
                System.out.println("Thursday");
                break;
            case 6:
                System.out.println("Friday");
                break;
            case 7:
                System.out.println("Saturday");
                break;
            default:
                System.out.println("Invalid input! Please enter a number from
1 to 7.");
        }

        }
```

```
    }
```

OUTPUT:

- Enter the number: 6

  Friday
- Enter the number: 5

  Thursday
- Enter the number: 4

  Wednesday
- Enter the number: 3

  Tuesday
- Enter the number: 2

  Monday

Problem 3.2: Simple Menu Selection

- Simulate an ATM.

- Get user input: 1 = Check Balance, 2 = Withdraw, 3 = Deposit, 4 = Exit.

- Use switch to print the action.

- Handle invalid input with a default case.

3.2 Algorithm:

Step 1: Start

Step 2: Create a Scanner object to take user input

Step 3: Display the ATM menu options:

Check Balance,Withdraw,Deposit,Exit

Step 4: Ask the user to enter their choice (1–4)

Step 5: Read the user input and store it in choice

Step 6: Use a switch statement to handle different options:

If choice is 1, display "Checking balance..."

If choice is 2, display "Withdrawing money..."

If choice is 3, display "Depositing money..."

If choice is 4, display "Exiting... Thank you!"

If choice is not between 1 and 4, display "Invalid choice. Please select between 1 and 4."

Step 7: Stop

3.2 Pseudocode:

```
Create Scanner object
Print "ATM Menu:"
Print "1. Check Balance"
Print "2. Withdraw"
Print "3. Deposit"
Print "4. Exit"
Print "Enter your choice (1-4):"
Read choice
Switch(choice)
   Case 1:
      Print "Checking balance..."
      Break
   Case 2:
      Print "Withdrawing money..."
      Break
   Case 3:
      Print "Depositing money..."
      Break
   Case 4:
      Print "Exiting... Thank you!"
```

Break

Default:

Print "Invalid choice. Please select between 1 and 4."

CODE:

```
import java.util.Scanner;

public class Day2_32 {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.println("ATM Menu:");
        System.out.println("1. Check Balance");
        System.out.println("2. Withdraw");
        System.out.println("3. Deposit");
        System.out.println("4. Exit");

        System.out.print("Enter your choice (1-4): ");
        int choice = sc.nextInt();

        switch (choice) {
            case 1:
                System.out.println("Checking balance...");
                break;
            case 2:
                System.out.println("Withdrawing money...");
                break;
            case 3:
                System.out.println("Depositing money...");
                break;
            case 4:
                System.out.println("Exiting... Thank you!");
                break;
            default:
                System.out.println("Invalid choice. Please select between 1
and 4.");
        }

    }
}
```

OUTPUT:

CASE1:

```
ATM Menu:
1. Check Balance
2. Withdraw
3. Deposit
4. Exit
Enter your choice (1-4): 2
Withdrawing money...
```

CASE2:

```
ATM Menu:
1. Check Balance
2. Withdraw
3. Deposit
4. Exit
Enter your choice (1-4): 1
Checking balance...
```

CASE 3

```
ATM Menu:
1. Check Balance
2. Withdraw
3. Deposit
4. Exit
Enter your choice (1-4): 3
Depositing money...
```

CASE 4:

```
ATM Menu:
1. Check Balance
2. Withdraw
3. Deposit
4. Exit
Enter your choice (1-4): 4
Exiting... Thank you!
```

Problem 3.3: Grade Remarks (Why switch is not ideal)

- Input score (0-100).

- Use if-else if-else to print:

  - 90-100: "Excellent"

  - 80-89: "Very Good"

  - 70-79: "Good"

  - 60-69: "Pass"

  - Below 60: "Fail"

- Explain why switch would not be appropriate here.

CODE:

```java
import java.util.Scanner;


public class Day2_33 {
    public static void main(String[] args) {
            Scanner sc=new Scanner(System.in);
            System.out.println("Enter your marks:");
            int num=sc.nextInt();
            if(num>100){
                System.out.println("invalid marks");
            }
            else if(num>=90 && num<100){
                System.out.println("Excellent");

            }
            else if(num>=80 && num<89){
                System.out.println("Very Good");
            }
            else if(num>=70 && num<79 ){
                System.out.println("Good");
            } else if(num>=60 && num<69 ){
```

```
                System.out.println("Pass");
            } else{
                System.out.println("Sorry! You have failed!");
            }
}
}
```

OUTPUT:

CASE 1:

Enter your marks:

67

Pass

CASE 2:

Enter your marks:

32

Sorry! You have failed!

CASE 3:

Enter your marks:

90

Excellent

CASE 4:

Enter your marks:

122

invalid marks