**JOBSHEET 3**

**Operator, Sequence, Flowchart and Pseudocode**

1. **Learning Outcome**

By the end of this lesson, students must be able to:

* Explain the concept and use of operators.
* Apply sequence structures in Java programming.
* Develop algorithms using pseudocode.
* Develop algorithms using flowcharts.

1. **Labs Activities**
   1. **Experiment 1: The Use of Operators**

**Time Allocation : 45 minutes**

1. Open a text editor.
2. Create a new file and name it OperatorStudentName.java.
3. Write the basic structure of a Java program that contains the main() function.
4. Enter the following code inside the public static void main(String[] args) method.

int x = 10;

**System**.out.**println**("x++ = " + x++);

**System**.out.**println**("After evaluation, x = " + x);

x = 10;

**System**.out.**println**("++x = " + ++x);

**System**.out.**println**("After evaluation, x = " + x);

int y = 12;

**System**.out.**println**(x > y || y == x && y <= x);

int z = x ^ y;

**System**.out.**println**("The result of x ^ y is " + z);

z %= 2;

**System**.out.**println**("Final result = " + z);

1. Run the program you have created and observe the output.

**Questions!**

1. Explain, the difference between x++ and ++x.
2. What is the result of int z = x ^ y;? Please calculate it manually.
   1. **Experiment 2**

**Time Allocation : 45 minutes**

***Case study***

Polinema has a rectangular football field. Create a flowchart and pseudocode to calculate the area of the field.

1. Identify **Input**, **Output**, and **Process**

* **Input:** length, width
* **Output:** area
* **Process:**
* **Read** length, width
* **Compute** area = length × width
* **Display** area

1. Identify **Variables** and **Data** **Types**

|  |  |
| --- | --- |
| **Variabel** | **Data Type** |
| length | int |
| width | Int |
| area | Int |

1. Implement in Flowchart and Pseudocode

|  |  |
| --- | --- |
| A diagram of a diagram  AI-generated content may be incorrect. | **PROGRAM**  calculateAreaOfRectangle |
| **VARIABLE DECLARATION**  length: int  width: int  area: int |
| **ALGORITHM**  **Input** length  **Input** width  area ← length \* width  **Output** area |

1. Create the program code from the algorithm above, by following these steps:
2. Create a new file and name it CalculateAreaOfRectangleStudentName.java
3. Create the basic structure of a Java program consisting of the main() function.
4. At first line, add the Scanner **library** inside the CalculateAreaOfRectangleStudentName class.

import **java**.**util**.**Scanner**;

1. Declare a Scanner object inside the main() function.

**Scanner** input = new **Scanner**(**System**.in);

1. Create the following variables:

int length;

int width;

int area;

1. Get the input value of length and width.

**System**.out.**print**("Enter the length of the rectangle: ");

length = input.**nextDouble**();

**System**.out.**print**("Enter the width of the rectangle: ");

width = input.**nextDouble**();

1. Calculate the area.

area = length \* width;

1. Display the result

**System**.out.**println**("The area of the rectangle is: " + area);

1. Close the input object

input.**close**();

1. Compile, run the code and observe the result!

**Questions!**

1. Explain why it is necessary to declare a Scanner in experiment 2 above!
2. Explain the purpose of the following program snippet.

length = input.**nextDouble**();

width = input.**nextDouble**();

* 1. **Experiment 3**

**Time Allocation : 45 minutes**

***Case Study***

**Ibu Lani** goes shopping at a store and buys clothes priced at Rp. xxx. The store offers a 15% discount on every purchase. Write a program to calculate the discount amount and the total payment Ibu Lani must make.

1. Define input, output, and process

**Input**: price

**Output**: discount, totalPayment

**Other data**: discountCode=0.15

**Process**:

1. **input** price
2. discount=discountCode x price
3. totalPayment = price – discount
4. **output** discount, totalPayment
5. Identify variable and data type

|  |  |
| --- | --- |
| **Variabel** | **Data type** |
| price | int |
| discount | double |
| totalPayment | double |
| discountCode=0.15 | double |

1. Create the flowchart and pseudocode

|  |  |
| --- | --- |
| A diagram of a function  AI-generated content may be incorrect. | **PROGRAM**  CalculateTotalPayment |
| **VARIABLE DECLARATIONS**  price: int  discount: double  totalPayment: double  discountCode=0.15: double |
| **ALGORITHM**  **Input** price  discount ← discountCode \* price  totalPayment ← price - discount  **Output** (discount, totalPayment) |

1. Create the program code by following these steps:
2. Create a new file named CalculateTotalPaymentStudnetName.java.
3. Build the basic structure of a Java program, including the main() function.
4. Add the Scanner library within the CalculateTotalPaymentStudnetName class.

import **java**.**util**.**Scanner**;

1. Declare a Scanner object inside the main() function.

**Scanner** input = new **Scanner**(**System**.in);

1. Define the following variables:

int price;

double discount;

double discountCode = 0.15;

double totalPayment;

1. Get the input value of price

**System**.out.**print**("Enter the price of the clothes (Rp): ");

price = input.**nextDouble**();

1. Calculate discount

discount = price \* discountCode;

1. Calculate totalPayment

totalPayment = price - discount;

1. Display the results

**System**.out.**println**("Original Price: Rp " + price);

**System**.out.**println**("Discount (15%): Rp " + discount);

**System**.out.**println**("Total to be Paid: Rp " + totalPayment);

1. Run and observe the result

**Questions!**

1. Modify the program above by changing the data type of price to double, then run the program and fix any errors until it executes correctly and produces the expected output.
2. If, in the program above, the total payment is calculated first and then the discount is computed afterward, will the program still run and produce the expected output? Explain your answer.
   1. **Experiment 4**

**Time Allocation : 45 minutes**

***Case Study***

Employees of PT. Maju Terus receive a basic salary of Rp. x. In addition, each employee is entitled to a transportation allowance of Rp. 600,000, a meal allowance of Rp. 400,000, and a performance bonus equal to 5% of the basic salary. Employees are also required to pay an income tax of 10% of the basic salary. Write a program to calculate the bonus and the total annual salary received by an employee of PT. Maju Terus.

1. Define input, output, and process!

**Input**: basicSalary

**Output**: bonus, totalSalary

**Other data** = transportAllowance = 600.000, mealAllowance=400.00

**Process**:

1. Input basicSalary
2. Calculate bonus=0.05 x basicSalary
3. Calculate totalSalary = basicSalary + transportAllowance + mealAllowance +bonus-(0.1\* basicSalary)
4. Output bonus, totalSalary
5. Identify variable dan data type!

|  |  |
| --- | --- |
| **Variabel** | **Data Type** |
| basicSalary | Int |
| bonus | double |
| totalSalary | double |
| transportAllowance =600000 | Int |
| mealAllowance =400000 | Int |

1. Create the Flowchart and Pseudocode!

|  |  |
| --- | --- |
| A diagram of a salary  AI-generated content may be incorrect. | **PROGRAM**  Salary |
| **VARIABLE DECLARATION**  basicSalary: int  bonus, totalSalary: double  transportAllowance=600000: double  mealAllowance=400000: double |
| **ALGORITHM**  **Input** basicSalary  bonus ← 0.05 \* basicSalary  totalSalary ← basicSalary + transportAllowance + mealAllowance +bonus-(0.1\* basicSalary)  **Output** bonus, totalSalary |

1. Traansform the algorithm above into program code!
2. Create a new file named TotalSalary.java.
3. Build the basic structure of a Java program consisting of the main() function.
4. Add the Scanner library in the TotalSalary class.

import **java**.**util**.**Scanner**;

1. Declare a Scanner object inside the main() function.

**Scanner** input = new **Scanner**(**System**.in);

1. Create the following variables:

int basicSalary;

double transportAllowance = 600000, mealAllowance = 400000;

double bonus, totalSalary;

1. Get the input value of basicSalary!

**System**.out.**print**("Enter the basic salary (Rp): ");

 basicSalary = input.**nextDouble**();

1. Calculate bonus:

bonus = 0.05 \* basicSalary;

1. Calculate totalSalary:

totalSalary = basicSalary + transportAllowance + mealAllowance +bonus-(0.1\* basicSalary);

1. Display the results!

**System**.out.**println**("\n--- Salary Details ---");

**System**.out.**println**("Basic Salary        : Rp " + basicSalary);

**System**.out.**println**("Transport Allowance : Rp " + transportAllowance);

**System**.out.**println**("Meal Allowance      : Rp " + mealAllowance);

**System**.out.**println**("Performance Bonus   : Rp " + bonus);

**System**.out.**println**("Total Salary   : Rp " + totalSalary);

1. Compile, run and observe the result!

**Questions!**

1. In the following code snippet, what will happen if the parentheses () are removed, and does it affect the output result? Explain your answer!

totalSalary = basicSalary + transportAllowance + mealAllowance +bonus-(0.1\* basicSalary);

1. Modify the program above so that the total salary output is displayed as an integer value!
2. **Assignments**

**Time Allocation: 120 minutes**

1. Pak Ali buys a motorcycle on credit for Rp. x. He makes a down payment of Rp. y, and the remaining amount is paid in installments over z months with a fixed interest rate of 1% per month on the outstanding balance. Write a program to calculate the monthly installment amount that Mr. Ali must pay.
2. A car travels from Malang to Surabaya, covering x km. The car consumes an average of 1 liter of fuel every 2 km. If the fuel price is Rp. 10,000 per liter, write a program to calculate the total fuel cost required for the trip.