Faculty of Information and Communication Technology
ICT First Years and Foundation Unit

Tshwane University of Technology
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Signature

Principles of Programming and Introduction to Programming (Extended) (Year 1)

PPAF05D & TROF05D
CLASS TEST 2
MEMO

14 June 2023 Duration: 70 min Total: 35 Full Marks: 35 Number of Pages:	Examiner: KS Tshehla Moderator: TA Maseko	
	Number on Class List	
	GROUP	

$\frac{\quad}{35} = \_\_\_\%$

Student Number

Surname	Initials

Instructions:

Read instructions at the beginning of each question.

All questions must be answers on the question paper.

Only blue and black pens are allowed. Answers in pencil will not be marked.

Scientific, non-programmable calculators are allowed.

Cellular Phones are not allowed.

No sharing of calculators and/or stationery.

Round decimal answers to 2 decimal places.

Show all calculations when requested.

Question 1 (TRUE or FALSE) **[6]**

State whether the following statements are TRUE or FALSE

	Statements	Answer
1.1	All variables in Java must be explicitly declared with their data types before they can be used.	**True**
1.2	An object in object-oriented programming is an instance of a class.	**True**
1.3	In Java, the print() method always adds a new line after printing the output.	**False**
1.4	In Java, the + operator is used for both addition of numbers and joining (concatenation) of strings.	**True**
1.5	The statement '**int MAX_VALUE = 100;**' accurately represents the declaration of constants in Java.	**False**
1.6	Void methods in Java can accept arguments.	**True**

Question 2 (MULTIPLE CHOICE) **[6]**

Select the correct answer for the following questions. Mark with an X.

2.1	Which of the following best describes a method that returns a value in Java?	
	A. It is a method that does not perform any calculations.	A
	B. It is a method that does not accept any arguments.	B
	C. It is a method that provides an output or result after performing calculations.	C
	D. It is a method that can only be called from within a constructor.	D
2.2	Which of the following statements about constructors in Java is true?	
	A. Constructors have a return type.	A
	B. Constructors are used to create objects from a class blueprint.	B
	C. Constructors are inherited from the superclass.	C
	D. Constructors can be called explicitly from any method.	D

2.3	What is the output for the following statement? **System.out.print("11"+"1");**	
	A. "11"+"1"	A
	B. 111	B
	C. 12	C
	D. Error message	D
2.4	What can be done to avoid the problem of **nextLine( )** skipping the input after a next method?	
	A. Call **nextLine( )** once after each next method.	A
	B. Use a delimiter with **nextLine( ).**	B
	C. Use a different Scanner object for each input.	C
	D. Stop using the **nextLine( )** method.	D
2.5	What is the equivalent Java assignment statement of this mathematical equation? $$w = 2xy - \frac{x-y}{x+2}$$	
	A. $rW = 2rX * rY - rX - rY/rX + 2$	A
	B. $rW = 2 * rX * rY - (rX - rY/rX + 2)$	B
	C. $rW = 2rX * rY - (rX - rY)/(rX + 2)$	C
	D. $rW = 2 * rX * rY - (rX - rY)/(rX + 2)$	D
2.6	The order of steps required to run a Java program is:	
	A. Save -> Compile -> Run	A
	B. Click the green flag	B
	C. Java programs run automatically	C
	D. Compile -> Save -> Run	D

Question 3 (Pseudocode to Java code) [8]

- **Open Notepad++ and write Java code solution, compile, test it, and fix all errors.**
- **Copy and paste your code into EC.**

Translate this into a Java program.

The pseudocode that follows calculate BMI (Body Mass Index), a measure of body fat based on height and weight that applies to adults.

BMICalculator

begin

main method

begin

double rWeight, rHeight, rBMI.

display "Welcome to the BMI Calculator!"

display "Please enter your weight in kilograms:"

enter rWeight

display "Please enter your height in meters:"

enter rHeight

//Calculate BMI using the equation:

rBMI = rWeight / (rHeight * rHeight)

display "Your BMI is: " + rBMI

end//main

end // class

Possible Solution

```java
import java.util.Scanner;
public class BMICalculator
{
    public static void main(String[] args)
    {
        Scanner keyboard = new Scanner(System.in);
        double rWeight,rHeight,rBMI;

        System.out.println("Welcome to the BMI Calculator!");
        System.out.print("Please enter your weight in kilograms: ");
        rWeight = scanner.nextDouble();

        System.out.print("Please enter your height in meters: ");
        rHeight = scanner.nextDouble();

        rBMI = rWeight / (rHeight * rHeight);
        System.out.println("Your BMI is: " + rBMI);
    }
}
```

Question 5 (Java program) [15]

- **Open Notepad++ and write Java code solution, compile, test it, and fix all errors.**
- **Copy and paste your code into EC.**

Five-Skippas company is a customised online T-shirts store. The company wants to streamline the process of calculating the total cost of a customer's order of custom t-shirts. They need a program that takes the following inputs: the number of t-shirts ordered, the cost of the base t-shirt, the cost of each custom design added to the t-shirt, and the number of custom designs added to each t-shirt. The program should then process the inputs and calculate the total cost of the order, including the cost of the base t-shirts, the cost of the custom designs, and the VAT amount. Finally, the program should display the total cost of the customer's order as the output. VAT percentage must be declared as a constant.

To achieve this, you must write a Java program that performs the following steps:

- Prompt the user to enter the number of t-shirts ordered.
- Prompt the user to enter the cost of the base t-shirt.
- Prompt the user to enter the cost of each custom design added to the t-shirt.
- Prompt the user to enter the number of custom designs added to each t-shirt.
- Calculate the total cost of the base t-shirts.
- Calculate the total cost of the custom designs.
- Calculate the subtotal before VAT.
- Calculate the total VAT amount.
- Calculate the total cost of the order.
- Display the total cost of the customer's order, including the cost of the base t-shirts, the cost of the custom designs, and the tax, as the output.

NB: Streamline (to make an organization or system more efficient and effective by employing faster or simpler working methods)

Example output:

```
-------- Five Skippas Custom Design T-Shirts ---------
Enter the number of t-shirts ordered: 50
Enter the cost of the base t-shirt: R120
Enter the cost of each custom design: R35.89
Enter the number of custom designs added to each t-shirt: 2

------------------- Order Summary ----------------------
Total base t-shirt cost: R6000.0
Total custom design cost: R3589.0
Subtotal: R9589.0
Total tax: R1438.35
Total cost of the order: R11027.35
```

```java
import java.util.Scanner;
public class TShirtOrderCalculator {
    public static void main(String[] args) {
        // Create a Scanner object for user input
        Scanner keyboard = new Scanner(System.in);
        final double VAT = 0.15;
        int iNumShirts, iNumDesigns;
        double rCost1Shirt, rCostDesign, rTotCostShirts, rTotDesignCost;
        double rSubTotal, rTax, rTotalCost;

        System.out.println("-------- Five Skippas Custom Design T-Shirts ---------");
        // Ask the user for input
        System.out.print("Enter the number of t-shirts ordered: ");
        iNumShirts = keyboard.nextInt();
        System.out.print("Enter the cost of the base t-shirt: R");
        rCost1Shirt = keyboard.nextDouble();
        System.out.print("Enter the cost of each custom design: R");
        rCostDesign = keyboard.nextDouble();
        System.out.print("Enter the number of custom designs added to each t-shirt: ");
        iNumDesigns = keyboard.nextInt();


        rTotCostShirts = iNumShirts * rCost1Shirt;// Calculate the total cost of the base t-shirts
        rTotDesignCost = iNumShirts * rCostDesign * iNumDesigns;// Calculate the total cost of the custom designs
        rSubTotal = rTotCostShirts + rTotDesignCost;// Calculate the subtotal
        rTax = rSubTotal * VAT;// Calculate the total tax
        rTotalCost = rSubTotal + rTax;// Calculate the total cost of the order

        // Display the result
        System.out.println();
        System.out.println("------------------- Order Summary ----------------------");
        System.out.println("Total base t-shirt cost: R" + rTotCostShirts);
        System.out.println("Total custom design cost: R" + rTotDesignCost);
        System.out.println("Subtotal: R" + rSubTotal);
        System.out.println("Total tax: R" + rTax);
        System.out.println("Total cost of the order: R" + rTotalCost);
    }
}
```

4 inputs = 4 marks

3 marks for output