

CONFIDENTIAL

DECEMBER 2025/SET A/SWC2493



FINAL EXAMINATION

**BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN COMPUTER
APPLICATION DEVELOPMENT
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN CYBER SECURITY
BACHELOR OF INFORMATION TECHNOLOGY (HONOURS) IN DATA ANALYTICS**

COURSE : PROGRAMMING FUNDAMENTALS

COURSE CODE : SWC2493

DURATION : 3 HOURS

INSTRUCTIONS TO CANDIDATES :

1. This question paper consists of **TWO (2)** main questions. : PART A (30 questions)
: PART B (4 questions)
2. Answer **ALL** questions in the Answer Booklet provided.
3. Please check to make sure that this examination pack consists of :
 - i. The Question Paper
 - ii. An Answer Booklet
4. Do not bring any material into the examination hall. Electronic calculator is allowed.
5. Please write your answer using permanent ink.

MYKAD/ PASSPORT NO. : _____
ID. NO. : _____
LECTURER : _____
SECTION : _____

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

This question paper consists of 16 printed pages including the front page

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PART A: MULTIPLE CHOICES QUESTIONS

Instruction: Choose the **CORRECT** answer.

1. Which statement about the main method is **TRUE**?
 - A. `static` means it returns nothing
 - B. `public` means only the class can access it
 - C. `String[] args` stores the output of the program
 - D. `static` allows the JVM to run it without creating an object

2. What is an **algorithm** in programming?
 - A. A software application.
 - B. A programming language.
 - C. A step-by-step procedure to solve a problem.
 - D. A set of syntax rules for a programming language.

3. Which pairing is **INCORRECT**?
 - A. Low-level language → Assembler
 - B. JRE → Converts .java to .class
 - C. Java → Platform independent via JVM
 - D. High-level language → Compiler/Interpreter

4. Which statement about Assembly language is **TRUE**?
 - A. It runs directly on the JVM
 - B. It uses English-like statements
 - C. It is a high-level language and portable
 - D. It uses mnemonics and requires an assembler

5. Which comparison between compiled and interpreted languages is **CORRECT**?
- A. Interpreted languages are always faster than compiled
 - B. Compiled languages detect errors during execution only
 - C. Interpreted languages produce an executable file before running
 - D. Compiled languages translate the whole program before running
6. Which situation **BEST** shows correct application of *Single Responsibility Principle (SRP)*?
- A. One function only validates user input
 - B. One function manages UI, logic, and storage
 - C. One function calculates marks and prints results
 - D. One function handles login, validation, and database update
7. A program repeats the same price calculation logic for Item A, B, and C. Which **TWO (2)** techniques together most directly support the DRY principle?
- A. Loops and variables
 - B. Functions and arrays
 - C. If-else and constants
 - D. Printing and input statements
8. A developer chooses Assembly language to build a modern mobile e-wallet app. Which statement best explains why this is a poor design decision?
- A. Assembly does not support loops
 - B. Assembly cannot access databases
 - C. Assembly cannot perform calculations
 - D. Assembly is hardware-dependent and harder to maintain for modern apps
9. Which situation **MOST** clearly violates *Keep It Simple and Straight Forward (KISS)* but does **NOT** violate *Don't Repeat Yourself (DRY)*?
- A. Same calculation copied into five places
 - B. One simple function reused everywhere
 - C. One function with a clear name and simple logic
 - D. One complex formula used everywhere in the program

10. Which characteristic **CORRECTLY** matches a LOW-LEVEL language?
- A. Easier to learn and use
 - B. Hardware-independent
 - C. Designed mainly for AI applications
 - D. Uses binary or mnemonics and is hardware-dependent
11. A company wants to build an AI-based chatbot and data analysis system quickly. Which language choice **BEST** fits modern programming languages?
- A. COBOL
 - B. Python
 - C. Assembly
 - D. Machine language
12. A system that directly uses binary instructions will **MOST** likely be classified as:
- A. High-level language
 - B. 5th generation language
 - C. Object-oriented language
 - D. Low-level language (machine language)
13. A developer uses one complex formula everywhere in a system to calculate discounts. The logic is reused but difficult to understand. Which statement is **MOST** accurate?
- A. DRY is applied, KISS is violated
 - B. SRP is applied, DRY is violated
 - C. KISS is applied, SRP is violated
 - D. DRY and SRP are both violated
14. Which of the following practices does **NOT** follow the **KISS** (*Keep It Simple and Straightforward*) principle?
- A. Writing short and clear logic for calculations
 - B. Using simple structures first such as `if-else` and loops
 - C. Using clear variable names such as `totalMarks` instead of `tm1`
 - D. Using advanced design patterns and complex algorithms for simple problems

15. Which component of the **JDK** is responsible for converting `.java` files into `.class` files?
- A. JVM
 - B. JRE
 - C. `java` (launcher)
 - D. `javac` (compiler)
16. The main method header is written as:
- A. `public static void main(string[] args)`
 - B. `public static void Main(String[] args)`
 - C. `public static void main(String[] args)`
 - D. `public static main(String[] args)`
17. Which **IDE** feature allows you to pause execution and inspect variable values line-by-line?
- A. Compiler
 - B. Debugger
 - C. Code editor
 - D. Auto-complete
18. Which pairing of **IDE** and typical usage is **CORRECT**?
- A. BlueJ → Large enterprise systems
 - B. Eclipse → Learning basic OOP only
 - C. IntelliJ IDEA → Only for beginners
 - D. NetBeans → Education and industry, including GUI apps
19. A student writes a Java class but the file name does **NOT** match the class name. What is the **MOST** likely result?
- A. The compiler produces an error
 - B. The debugger fixes it automatically
 - C. The program compiles and runs normally
 - D. The program runs but produces wrong output

20. Which code design practice **BEST** demonstrates encapsulation?

- A. Declaring all variables as public
- B. Using global variables for all data
- C. Writing all logic in the main method
- D. Making attributes private and accessing them using getters/setters

21. What is the output of this code?

```
double a = 9.75;  
int b = (int) a;  
System.out.println(b);
```

- A. 9
- B. 9.75
- C. 10
- D. 9.7

22. What is the output of the following code?

```
int age = 20;  
int marks = 40;  
System.out.println((age >= 18) && (marks >= 50));
```

- A. 20.
- B. true
- C. false
- D. 50

23. Which of the following correctly represents the **PROCESS** in the IPO model for a program that calculates the total bill from price and quantity?

- A. Price and quantity
- B. Display the total bill
- C. Total amount to be paid
- D. Multiply price by quantity

24. Which of the following is most appropriate to represent an algorithm during the problem-analysis and design stage, before any code is written?
- A. Pseudocode
 - B. Java source code
 - C. Database schema
 - D. Compiled program output
25. Which statement violates the **unambiguous** property of an algorithm?
- A. "If mark $\geq$ 50, display 'Pass'."
 - B. "Set total = price $\times$ quantity."
 - C. "Process the data appropriately."
 - D. "Repeat steps 2 to 5 exactly three times."
26. Which variable name is **VALID** in Java?
- A. student name
 - B. 2number
 - C. _totalMarks
 - D. total-marks
27. What will be the output of the following code?

```
int x = 8;  
System.out.println(x % 3);
```

- A. 1
- B. 2
- C. 3
- D. 0

28. What will be the output of the following code?

```
int x = 5;  
double y = 2;  
System.out.println(x / y + 1);
```

- A. 3
- B. 3.0
- C. 3.5
- D. 1

29. Which statement about Java class and file naming is **CORRECT**?

- A. A Java file can contain multiple `public` classes
- B. The file name must always match every class name in the file
- C. The file name does not matter as long as the program compiles
- D. The file name must match the class name only if the class is `public`

30. Which assignment will compile without explicit casting?

- A. `int x = 5.5;`
- B. `double y = 10;`
- C. `byte b = 200;`
- D. `char c = 100.5;`

(TOTAL: 30 MARKS)

PART B: STRUCTURED QUESTIONS

QUESTION 1

- a. Explain the difference between **implicit type conversion** and **explicit type casting** in Java. (4 marks)
- b. What will be the **OUTPUT** of the following Java program if the user inputs $n = 3$? Show **ALL** calculation steps clearly, including type casting and operator precedence.

```
import java.util.Scanner;

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

        int a = 5;
        int b = 2;
        double c = 4.5;

        System.out.print("Enter a number:
");
        int n = sc.nextInt();

        double result = a + b * n - (int)
c/b;
        System.out.println("Final Result = "
+ result);
    }
}
```

(4 marks)

- c. Given the following java program, complete the missing parts to read input using *JOptionPane*, perform the calculation, and display the output.

```
import _____(i)_____;  
  
public class TicketCalculator  
{  
    public static void main(String[] args)  
    {  
        String movie = JOptionPane._____(ii)_____("Enter  
movie title:");  
        String ticketStr = JOptionPane._____(iii)_____("Enter  
number of tickets:");  
        String priceStr = JOptionPane._____(iv)_____("Enter  
price per ticket (RM):");  
  
        int tickets = _____(v)_____(ticketStr);  
        double price = _____(vi)_____(priceStr);  
  
        double total = _____(vii)_____;  
  
        JOptionPane.showMessageDialog(null,  
            "Movie: " + movie +  
            "\nTickets: " + tickets +  
            "\nTotal Price: RM " + total);  
    }  
}
```

(7 marks)

(Total: 15 marks)

QUESTION 2

- a. Explain the following **THREE (3)** properties of a good algorithm with suitable examples. (6 marks)
- b. List **TWO (2)** algorithm representation techniques. (2 marks)
- c. A shop wants a simple program to determine whether a customer gets a discount based on the total purchase amount.
- The program asks the user to enter the total purchase amount.
 - If the total purchase is RM100 or more, give a 10% discount.
 - Otherwise, no discount is given.
 - Display the final amount to pay.

Write the pseudocode to solve the problem.

(7 marks)

(Total: 15 marks)

QUESTION 3

- a. Explain the **DIFFERENCE** between sequence control structure, selection statements, and loops in Java. (6 marks)
- b. Given the following Java program, display the **OUTPUT** printed by the program and explain how the output is produced.

```
public class TestDoWhileLogic
{
    public static void main(String[] args)
    {
        int i = 1;
        int total = 0;

        do
        {
            total = total + i * 2;
            i = i + 1;
        }
        while (i <= 3);

        System.out.println("Total: " + total);
        System.out.println("Final i: " + i);
    }
}
```

(6 marks)

- c. Complete the missing part of the Java program below so that it works according to the rules:

- If age ≥ 60
 - If status = 1 $\rightarrow$ display "Special Discount"
 - Otherwise $\rightarrow$ display "Senior Discount Only"
- If age $< 60 \rightarrow$ display "No Special Discount"

```
import java.util.Scanner;

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

        System.out.print("Enter age: ");
        int age = sc.nextInt();

        System.out.print("Enter membership status
(1=Member, 2=Non-member): ");
        int status = sc.nextInt();

        //=== FILL IN THE MISSING IF STATEMENT BELOW ===

        _____
        _____
        _____
        _____
        _____

    }
}
```

(8 marks)

(Total: 20 marks)

QUESTION 4

- a. What is array indexing and bounds?
(2 marks)
- b. State **TWO (2)** common operations that can be performed on arrays and explain each operation.
(6 marks)
- c. A cinema wants to store the number of tickets sold for 5 different movies over 7 days (Monday to Sunday). Each movie has ticket sales recorded for each day.
- i. Identify the most suitable type of array to store this data.
(1 mark)
- ii. Write the Java declaration statement to create a suitable array to store the ticket sales.
(3 marks)
- d. Given the following Java program that manages a list of courses offered by a training centre and checks for the presence of a course named **"Python"**. What is the **OUTPUT** of the program below:

```
import java.util.Scanner;

public class TrainingCentre {
    public static void main(String[] args)
    {
        Scanner input = new Scanner(System.in);
        String[] courses = {
            "Java", "Web Design", "Data Science", "Python"
        };
        System.out.println("Courses offered by the training
centre:");
        for (int i = 0; i < courses.length; i++)
            System.out.println((i + 1) + ". " + courses[i]);

        // Assume the user searches for a course named
        "Python"
        System.out.print("\nEnter a course name to check
availability: ");
        String searchCourse = input.nextLine();

        boolean isPresent = false;
        for (String course : courses)
        {
            if (course.equalsIgnoreCase(searchCourse))
            {
                isPresent = true;
                break;
            }
        }
        if (isPresent)
        {
            System.out.println(searchCourse + " is available
in the training centre.");
        }
        else
        {
            System.out.println(searchCourse + " is NOT
available in the training centre.");
        }
        // Display total number of courses
        System.out.println("\nTotal courses offered: " +
courses.length);
    }
}
```

(8 marks)

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(Total: 20 marks)

(TOTAL: 70 MARKS)

(TOTAL: 100 MARKS)

END OF QUESTION PAPER