



FINAL EXAMINATION

DIPLOMA IN COMPUTER SCIENCE

COURSE : OBJECT-ORIENTED PROGRAMMING

COURSE CODE : SWC2673

DURATION : 2 HOURS AND 30 MINUTES

INSTRUCTIONS TO CANDIDATES:

1. This question paper consists of **TWO (2)** parts. : PART A (30 questions)
: PART B (4 questions)
2. Answer **ALL** questions from PART A and PART B.
 - i. Answer PART A in the Objective Answer Sheet
 - ii. Answer PART B 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
 - iii. An Objective Answer Sheet
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 13 printed pages including the front page

PART A: MULTIPLE CHOICE QUESTIONS

Choose the **CORRECT** answer.

1. The above statement is closely related to _____.

A procedure for solving a mathematical problem in a finite number of steps that frequently involves recursive operations.

- A. formula
 - B. data flow
 - C. algorithm
 - D. pseudocode
2. What is the **programming approach** that conceptualizes a program as interacting objects?
- A. Algorithm.
 - B. Operation procedure.
 - C. Artificial Intelligence (AI).
 - D. Object-oriented programming (OOP).
3. Which **Object-oriented programming(OOP) principle** allows a class to inherit the properties and methods of another class (the parent, base, or super-class)?
- A. Abstraction.
 - B. Inheritance.
 - C. Polymorphism.
 - D. Encapsulation.
4. Select the **INCORRECT** statement about class in Java.
- A. Class contain the attributes and methods of an object.
 - B. Programmer develops objects and instances in separate class.
 - C. Class can be thought of as a template used to create a set of objects.
 - D. One or more objects described by the class are instantiated at runtime.

5. How does the creation of class **support the concept of Encapsulation**?
- A. By requiring that all classes have complex, real-world analogies.
 - B. By eliminating the need for object attributes and methods to be defined together.
 - C. By discouraging developers from using real-world analogies in their classes and object code.
 - D. By allowing the creation of instances of the same class that can have the same set of attributes and methods.
6. Select the **TRUE** statement regarding the array of objects.
- A. Stored in separate memory locations.
 - B. A collection of elements, all of the same type.
 - C. To store and manage only a single instance of a class.
 - D. Unable to store primitive data types (e.g., int, float) or objects.
7. Which one is the **CORRECT** way to declare arrays of objects?
- A. `Vehicle() car;`
 - B. `Vehicle car();`
 - C. `Vehicle[ ] car;`
 - D. `Vehicle car[ ];`
8. Which one is the **CORRECT** way to instantiate arrays of objects as below?
- ```
car[0] = new Car("Toyota Camry", 2020);
car[1] = new Car("Honda Accord", 2019);
car[2] = new Car("Tesla Model 3", 2021);
```
- A. `car = new Vehicle[3];`
  - B. `car = new Vehicle[2];`
  - C. `car[3] = new Vehicle;`
  - D. `car[2] = new Vehicle;`

9. Below are the benefits of using arrays of superclass and subclass **EXCEPT**:
- A. Enables the storage and manipulation of different types of objects in a single array.
  - B. Allows you to treat objects of different subclasses uniformly through their common superclass.
  - C. Promotes code reuse by leveraging common functionality defined in the superclass.
  - D. Simplifies code in the calling method by allowing the creation of a double array in a separate method.
10. Managing and organizing collections of objects to allow efficient data handling and processing, includes the below activities **EXCEPT**:
- A. Adding exception handling in a method.
  - B. Updating elements in the array.
  - C. Adding elements to the array.
  - D. Sorting arrays of objects.
11. What is the **role** of the `static` keyword in Java programming?
- A. To compile Java source code into machine code.
  - B. To check for static syntax errors in Java programs.
  - C. To provide a graphical user interface for Java applications.
  - D. To create class-level variables and methods that can be shared.
12. What is the **CORRECT** way to extend other interfaces?
- A. `interface Car extends Vehicle{ }`
  - B. `interface Car extending Vehicle{ }`
  - C. `addInterface Car extends Vehicle{ }`
  - D. `addinterface Car extending Vehicle{ }`

13. In the coding below, the **static modifiers** used are as a \_\_\_\_\_.

```
public class Student {
 static {
 System.out.println("Welcome to UPTM!");
 }
}
```

- A. static field  
B. static void  
C. static block  
D. static method
14. Lists below are the elements that can be included in an interface **EXCEPT**:
- A. Method signature.  
B. Static method.  
C. Constructors.  
D. Constants.
15. Which keyword is related to use an **inheritance** in a class?
- A. implements  
B. extends  
C. void  
D. run

- *An event that disrupts the normal flow of a program's execution*
- *Abnormal condition that arises at the runtime*

16. The above statement is closely related to \_\_\_\_\_.

- A. downtime  
B. exception  
C. crashing  
D. error

17. The \_\_\_\_\_ statement ensures that the program can continue running smoothly even when an error occurs.

- A. try-catch
- B. run-error
- C. exception
- D. void-throw

18. Below are the functions of exception handling **EXCEPT**:

- A. Ensures that the program can continue running smoothly.
- B. Prevent the program from crashing.
- C. To avoid virus and bug attack.
- D. To gracefully handle errors.

19. When the following Java code is executed, what will be displayed on the console?

```
public static void main(String[] args) {
 int[] data = {4, 5, 6};

 try {
 System.out.println(numbers[4]);
 } catch (ArrayIndexOutOfBoundsException e) {
 System.out.println("The Array index is out of bounds!");
 } catch (Exception e) {
 System.out.println("An error occurred: " + e.getMessage());
 }
 System.out.println("The Program continues after the
 exception.");
}
```

- A. The array index is out of bounds!
- B. The array index is out of bounds!  
The program continues after the exception.
- C. The program continues after the exception.
- D. An error occurred: Index 5 was out of bounds for length 4  
The program continues after the exception.

20. The \_\_\_\_\_ keyword is used in the method signature to declare that a method may throw an exception.

- A. try
- B. final
- C. throws
- D. catch

21. Select the **CORRECT** statement about the purpose of nested classes.
- A. To make the code harder to understand and maintain.
  - B. To increase the overall memory consumption of the application.
  - C. To enforce stricter security by preventing any access from other classes.
  - D. To logically group classes that are only used in one place, which helps to make coding more readable and maintainable.
22. **TWO (2)** types of nested classes in Java are \_\_\_\_\_ and \_\_\_\_\_.
- A. static nested classes, inner classes
  - B. public nested classes, private nested classes
  - C. abstract nested classes, static nested classes
  - D. synchronized nested classes, unsynchronized nested classes
23. Select the **CORRECT** statement about advantages of the ability to access an inner class from the outside in Java.
- i. Encapsulating the logic that is closely related to the outer class.
  - ii. Allow us to use inner classes in a controlled and structured manner.
  - iii. Provide enhanced thread safety by default when accessed from the outside.
- A. i and ii only
  - B. i and iii only
  - C. ii and iii only
  - D. i, ii and iii only

Question 24 and 25 are based on the Java coding below:

```
class Marks {
 int number = 60;

 class InnerMarks {
 int number = 78;
 void display() {
 System.out.println("Inner class amount: " + number);
 System.out.println("Outer class amount: " +
 Marks.this.number);
 }
 }

 public static void main(String[] args) {
 Marks marks1 = new Marks();
 Marks.InnerMarks marks2 = marks1.new InnerMarks();
 marks2.display();
 }
}
```

24. Select the **CORRECT** statement about shadowed variables.
- A. Increases performance by reducing memory usage.
  - B. Automatically synchronize their values with the original variables.
  - C. Have a unique identifier that ensures they can be accessed from anywhere in the code.
  - D. Occurs when a variable declared within a certain scope (such as a method or inner class) has the same name as a variable declared in an outer scope (such as the enclosing class).
25. What is the **output** of the segment code?
- A. Inner class amount: 60  
Outer class amount: 78
  - B. Inner class amount: 78  
Outer class amount: 60
  - C. Inner class amount: 60
  - D. Outer class amount: 78
26. Which Java feature **allows multiple sequences of instructions** to be executed concurrently?
- A. Multitasking.
  - B. Multithreading.
  - C. Compilation error.
  - D. Parallel processing.
27. Below are the correct states in the Programming Thread Life Cycle **EXCEPT**:
- A. New: A thread object is created.
  - B. Runnable: The thread is ready to run.
  - C. Blocked: The thread is waiting for a monitor lock.
  - D. Waiting: The thread is waiting for another thread to act for up to a specified waiting time.



28. The following statement describes \_\_\_\_\_.

*Ensures that only one thread can execute a block of code at a time.*

- A. overriding method
  - B. synchronized
  - C. lock ordering
  - D. timeout
29. Key methods available in Thread class as part of the `java.lang` package are among the below **EXCEPT**:
- A. `start()`
  - B. `void()`
  - C. `join()`
  - D. `run()`
30. In Java multithreading, what is the condition called when two or more threads are permanently waiting for each other?
- A. Block
  - B. Thread
  - C. Throws
  - D. Deadlock

(TOTAL: 30 MARKS)

**PART B: STRUCTURED QUESTIONS**

**Answer ALL questions.**

**QUESTION 1**

- a. Explain the **concept of a static field** in Object-Oriented Programming (OOP).  
(2 marks)
- b. Illustrate the **usage of static field** with a suitable example within a class.  
(2 marks)
- c. Define an **interface** in Java coding.  
(2 marks)
- d. Discuss the **purpose** of interface in supporting OOP principles.  
(2 marks)
- e. You are designing a Vehicle Management System.
  - i. Define an interface named `Vehicle` which contains methods `getModel()` and `getManufacturer()`.  
(2 marks)
  - ii. Define a class `Car` implements `Vehicle`. Provide the appropriate methods and attributes in the class. The class also has additional method named `getRegistrationNumber()`.  
(10 marks)

(Total: 20 marks)

**QUESTION 2**

- a. Explain **THREE (3)** error types that could happen in a system or program.  
(6 marks)
- b. Give **TWO (2)** differences of checked and unchecked exception.  
(4 marks)
- c. Illustrate a `try-catch` statements for the below situations.
  - i. If the file is not found, print a message indicating that the file does not exist. Assume the file name searched is `"data.txt"`.  
(4 marks)
  - ii. If the user enters an invalid input (non-integer), handle the exception and print an error message.  
(6 marks)

(Total: 20 marks)

## QUESTION 3

You need to develop a simple coffee shop application that includes a `CoffeeShop` class. This class will have a **static nested class** called `Product` that records details about coffee products.

Based on the situation above, describe how you would structure the following requirements in Java code.

- a. A class `CoffeeShop` with a field `shopName (String)`, a constructor, a setter and a getter method.  
(6 marks)
- b. A static nested class `Product` inside the `CoffeeShop` class. The `Product` class should have the following fields: `productId (String)`, `productName (String)`, `price (double)`. The `Product` class should have a constructor to initialize its fields.  
(5 marks)
- c. Assume the `Product` class also contains a method named `setProduct (String, String, double)` to set the `productId`, `productName` and `price`. In a main method, write the statement(s) to create an instance of `Product` and set all the `productId`, `productName` and `price`.  
(4 marks)

(Total: 15 marks)

**QUESTION 4**

- a. Discuss **THREE (3)** advantages of using threads in Java programming. (6 marks)
- b. Based on the following scenario, explain how a Thread can be created in Java by extending the Thread class. Provide a simple Java example code to support your understanding.
- i. The thread should print " No thoughts, just vibes!" to the console. (3 marks)
  - ii. The thread implements the Runnable interface and prints " Coding never sleeps!" to the console. (3 marks)
  - iii. The thread should print the message " Thread is executing now!" **five times**. Use the Thread class to create and start the thread. (3 marks)

(Total: 15 marks)

(TOTAL: 70 MARKS)

(TOTAL:100 MARKS)

**END OF QUESTION PAPER**

