MCA/MSc. (CS)-I Mid Semester Examination 2025-26
CS204: Object Oriented Programming

Time: 1 hour **20 marks**

1. Write a Java class Student that has multiple constructors. One constructor should accept student name and ID, while another should accept student name, ID, and grades. Implement constructor overloading and ensure the constructors call each other using this(). [5 marks]

2. Explain the different types of constructors (default, parameterized, copy constructors) and their roles in object initialization. Discuss constructor overloading and constructor chaining. [5 marks]

3. [10 marks]

(a) In Java, every application must contain at least one _____ method, which serves as the entry point for the program.

(b) When reading from or writing to files, we should always close the streams in the _____ block to ensure proper resource cleanup.

(c) The _____ keyword is used in method declaration to specify that the method might throw an exception.

(d) A class that cannot be instantiated and may contain abstract methods is called an _____ class.

(e) To make a method that cannot be overridden by subclasses, the method should be declared with the _____ keyword.

(f) The _____ keyword prevents a method from being overridden.

(g) The _____ exception is thrown when a program tries to access a file that doesn't exist.

(h) The _____ class represents mutable sequences of characters.

(i) In a class hierarchy with multiple levels of inheritance, the constructor invocation order follows _____ order, while destructor (finalize) follows _____ order.

(j) Creating your own exception class by extending the _____ class creates a checked exception.

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1. Design and implement an *Employee* class in Java. The class must ensure that every instance (each employee) is assigned a unique numerical identifier (ID). This ID should start from a base value (e.g., 1) and increment sequentially for each new employee object created. [5 marks]

2. Write a Java program that requires the user to enter a single character from the alphabet. Print Vowel or Consonant, depending on user input. If the user input is not a letter (between a and z or A and Z), or is a string of length > 1, print an error message. [5 marks]

3. [10 marks]
   (a) The _____ keyword in Java is used to refer to the current class instance variables when they have the same name as method parameters.
   (b) What will be the output of String result = 50 + 30 + "TEST" + 40 + 60 + "PROG"; when printed?
   (c) When a subclass constructor needs to explicitly call a superclass constructor, we use the _____ keyword.
   (d) Arrays in Java can be declared using _____ and are treated as _____.
   (e) To make a method that cannot be overridden by subclasses, the method should be declared with the _____ keyword.
   (f) Can you call a non-static method directly from a static method without creating an instance?
   (g) In the expression (double)(10 / 4) + 3.5 * 2, the final result is _____ due to _____ and _____ rules.
   (h) In the code *String x = "Test"; String y = "Test"; String z = new String("Test");*, the comparison $x == y$ evaluates to _____ whereas $x == z$ evaluates to _____.
   (i) In a class hierarchy with multiple levels of inheritance, the constructor invocation order follows _____ order, while destructor (finalize) follows _____ order.
   (j) Explain how _____ variables maintain state across all instances vs _____ variables which are instance-specific.