The Open University of Sri Lanka
Faculty of Natural Sciences
B.Sc./ B. Ed Degree Programme
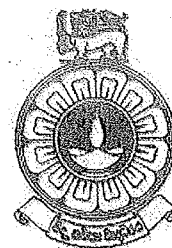
Department	: Computer Science
Level	: 04
Name of the Examination	: CONTINUOUS ASSESSMENT TEST (CAT)
Course Code – Title	: CSU4301/CSU4616 - OBJECT ORIENTED PROGRAMMING
Academic Year	: 2024/2025
Date	: 23.08.2024
Time	: 02.30 p.m. – 03.30 p.m.
Duration	: One hour only

General Instructions

1. Read all instructions carefully before answering the questions.

2. This question paper consists of **(02)** questions in **(03)** pages.

3. Answer all questions, in the provided answer book.

4. Answer to each question should commence from a **new page.**

5. Involvement in any activity that is considered as an exam offense will lead to punishment.

7. Use **blue or black ink** to answer the questions.

8. Clearly state your **Registration Number** for B.Sc/B.Ed Degree Programme in your answer script.

QUESTION 01

a) Write **five (05)** major phases of the Object-Oriented Software Development process.

[Marks 05]

b) List **five (05)** differences between Procedure Oriented Programming (POP) and Object-Oriented Programming (OOP).

[Marks 05]

c) Explain the role of the Java Virtual Machine (JVM) in executing Java programs.

[Marks 05]

d) Fill in the blanks in each of the following statements. Use the words given inside brackets underneath. Write answer as i(a), i(b), etc.

(Association, law, objects, machine code, Composition, final, static, dot, Aggregation, interpreter, constructor, high)

i) Software crises can be attributed to issues such as late completions, exceeding budget, and_____quality.

ii) A Class is a blueprint for creating_____, which defines attributes and behaviors.

iii) The bytecode runs through an (a)_____, which translates the bytecode into (b)_____.

iv) The Java keyword used to declare a constant is `_____`.

v) The `_____` keyword in Java is used to declare a class variable.

vi) To create a new object in Java, you use the_____operator.

vii)(a)_____, (b)_____, Inheritance and (c)_____are the relationships available in OOP.

[Marks 10]

e) State whether the following JAVA statements are valid or invalid. If it is **invalid**, **justify** your answer and **rewrite** the statement correctly.

[Marks 25]

i) `boolean isValid = True;` is a valid variable declaration.

ii) `public void static main(String[] args) { }` is a valid declaration of a main method.

iii) `boolean flag = (5 > 3) && (4 < 2);` is a valid variable declaration.

iv) The following code chunk is a valid class method declaration.
```
public static void mod(int a;b) {
     return a%b;
}
```

v) The following code chunk is a valid function declaration to print a number of series.
```
public static void printNumbers(int n) {
     for(int i = 0; i < n; i++) {
          System.out.print(i + " ");
     }
}
```

vi) `String name = new String;` is a valid object creation.

vii) `protected class FindingGPA{ }` is a valid class declaration.

viii) `int[] OddList = new (1, 3, 5);` is a valid array declaration.

QUESTION 02

a) What is the difference between a Class and an Object in Object Oriented Programming?

[Marks 05]

b) Write **four (04)** basic concepts of OOP.

[Marks 04]

c) Explain the difference between instance variables and class variables in Java.

[Marks 05]

d) Compare and contrast methods and constructors.

[Marks 05]

e) State whether the following statements are **True** or **False**.

[Marks 06]

i) The Problem-Solving Phase involves converting the pseudo-code into executable source code.
ii) One of the main advantages of Object-Oriented Programming is its ability to model real-world problems more effectively than Procedure Oriented Programming.
iii) Inheritance enables a Class to have attributes and methods from another Class.
iv) Java is a platform dependent language that requires different versions of code for different operating systems.
v) The expression `x++` increments `x` after its value is used in the expression.
vi) The `continue` statement skips the remaining code in the current iteration and proceeds with the next iteration of the loop.

f) Develop a Java program that processes a set of 10 numbers:
    (12, 24, 47, 63, 95, 32, 84, 36, 51, 72)

[Marks 25]

i) What is the appropriate data structure that can be used to store the above numbers? Justify your choice of data structure.
ii) Create a function to store these numbers in an appropriate data structure.
iii) Write a function to iterate through the data structure and compute the sum of the numbers. Ensure your function uses a repetitive structure (loop).
iv) Write another function to calculate the average of the numbers. Use the sum obtained from the previous step in your calculation.
v) Modify the function to handle any set of numbers, not just the predefined set, by accepting input from the user.

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