



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology

First year, Second Semester Examination – 2022

HNDIT 2012– Fundamentals of Programming

Instructions for Candidates:
Answer any **five (05)** questions.

No. of questions: six (06)
No. of pages : 03
Time : Three (03) hours

Question 01

(20 marks)

- i. Provide two key features of the Java programming language. (02 marks)
- ii. Discuss the differences between primitive data types and reference data types in Java providing example for each. (04 marks)
- iii. Derive the answer for the following Java expressions. (06 marks)
 - a. $20 / 4 * 3 - 2 + 5 \% 2$
 - b. $8 \% 3 * 4 > 5 \parallel 4 \% 2 * 5 < -7$
 - c. $25 / 5 + 3 * (8 - 6) - 4 \% 2$
- iv. Write a Java program to calculate the volume of a cylinder. Prompt the user to enter the radius of the cylinder and its height. Calculate the volume using the formula:
volume = π * radius² * height, where π (pi) is a constant with the approximate value of 3.14. Display the result. (08 marks)

Question 02

(20 marks)

- i. Write the syntax of switch case control structure. (02 marks)
- ii. Provide two (02) limitations of switch-case statements in Java. Which data types are not supported as case values? (04 marks)
- iii. Explain how to handle multiple conditions within a single if statement using logical operators (AND, OR). Provide examples to demonstrate each operator. (06 marks)
- iv. Write a Java program that takes an integer input from the user and prints "Positive" if the number is greater than zero, "Negative" if it is less than zero, and "Zero" if it is exactly zero. (08 marks)

Question 03**(20 marks)**

- i. Explain the concept of loop control variable using for loop. (02 marks)
- ii. Discuss the differences between the while loop and the do-while loop in Java. (04 marks)
- iii. Write a Java program to print the multiplication table of a given number up to 10 using a for loop. (06 marks)
- iv. Explain how to use loops to read multiple inputs from the user until a sentinel value is entered. Provide a coding example using a do while loop. (A sentinel value is a special value to terminate a loop, etc.) (08 marks)

Question 04**(20 marks)**

- i. Write the syntax and usage of the try-catch block in Java. (02 marks)
- ii. Explain how an Arithmetic Exception can occur when working with calculations in Java. Provide an example on how to handle it. (04 marks)
- iii. Write a java code segment to store the matrix shown below in a two-dimensional array.

Java	OpenAI
Python	ChatGPT
C#	ANN

(06 marks)

- iv. Write a java code segment to define an integer array and get the average of values stored in it. (08 marks)

Question 05**(20 marks)**

- i. Write four (04) object-oriented concepts. (04 marks)
- ii. Define a Java class Student with the following private attributes/properties and public methods/behaviors. (08 marks)
 - a. Private Attributes: name (String), age (int), grade (char)
 - b. Public Methods:

- **setName(String), setAge(int), and setGrade(char):** to set the values to the attributes.
- **getName(), getAge(), and getGrade():** to get the values of the attributes.
- **displayInfo():** to display the student's information including name, age, and grade.
- **isAdult():** to check if the student is an adult. This method should return true if the student's age is 18 or above, otherwise false.

ii. Write a Java class MainStudent with the main method and write code to do the followings

(08 marks)

- Create an object of the Student class defined above.
- Assign values to the name, age, and grade instance variables.
- Call the displayInfo() method to display the student's information.
- Call the isAdult() method to check if the student is an adult and print the result.

Question 06

(20 marks)

- List four (04) key components of Java Swing. (04 marks)
- Compare and contrast Java Swing with AWT (Abstract Window Toolkit). (06 marks)
- Create the following user interface using Java Swing. (User interface only) (10 marks)

The image shows a Java Swing window titled "Buttons". Inside the window, there are three text input fields arranged vertically. The first field is labeled "First Number" and contains the value "7". The second field is labeled "Second Number" and contains the value "3". The third field is labeled "Sum" and contains the value "10". Below these fields is a button labeled "Compute". The window has standard Windows-style title bar controls (minimize, maximize, close) in the top right corner.