

## **Assignment 2 Assessment – Structured Integrated Test – 3 Questions (60 Marks)**

### **QUESTION 1: (20 MARKS)**

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1. Define what is meant by a Graphical User Interface (GUI). Describe the purpose of Java's AWT (Abstract Window Toolkit) and Swing frameworks in the context of GUI development. (4 Marks)
2. Identify and explain three essential components of Java Swing that are used to create graphical user interfaces. (3 Marks)
3. Using an example, demonstrate how event handling is carried out in a Swing application. Include a step-by-step explanation for creating and managing a button click event with an ActionListener. (5 Marks)
4. Contrast the event-handling approaches used by AWT and Swing, and highlight two benefits of using Swing for event-driven programming. (4 Marks)
5. Outline the process of creating a basic Swing application that allows a user to input data through a text field, then displays that input on a label when a button is clicked. (4 Marks)

### **QUESTION 2: (20 MARKS)**

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1. Explain what servlets are in Java and detail their lifecycle, including the primary methods invoked during the lifecycle stages. (5 Marks)
2. Discuss how session tracking is maintained through HTTP sessions in servlets, with an example scenario where it is crucial to manage user-specific data. (4 Marks)
3. Compare session tracking methods using cookies and URL rewriting. Highlight one advantage and one limitation for each method. (4 Marks)
4. Describe the role of servlets in processing form data submitted by a user through a web page. (2 Marks)
5. Suppose you need to maintain stateful interactions in a multi-step web form using servlets. Propose a suitable approach for managing data across requests and explain your reasoning. (5 Marks)

### **QUESTION 3: (20 MARKS)**

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1. Define Java Database Connectivity (JDBC) and outline its significance in connecting Java applications with relational databases. (3 Marks)
2. Describe the process of connecting to a database and executing an SQL query using JDBC. List each step, from loading the driver to closing the connection. (4 Marks)

3. What is a PreparedStatement in JDBC, and how does it differ from a standard Statement object? Explain how PreparedStatement helps mitigate SQL injection risks. (4 Marks)
4. Imagine you have a students table in a database. Detail how you would use JDBC's ResultSet and ResultSetMetaData classes to retrieve and display information about each student. (5 Marks)
5. Propose a solution for efficiently executing a stored procedure from a Java application using JDBC. Include an example scenario where stored procedures can optimize database operations. (4 Marks)