ISO 9001:2008 Certified Institute

JAVA INSTITUTE FOR ADVANCED TECHNOLOGY

Department of Examinations

Course – (Leading To)	BEng (Hons) in Software Engineering
Unit Name	Business Component Development II
Unit Id	JIAT/BCD II
Assignment Id	JIAT/BCD II/EX/01
Assignment Summary	This assignment is based on the developing a robust enterprise java application.
Duration	2 Week
Submission Via	Online (Student Portal)
Document Format	Document Format (Pdf)

GUIDE LINES FOR CANDIDATES

- Your studies will be governed by the Java Institute Academic Regulations on Assessment, Progression and Awards.
- Students are expected to use reference books, the Internet, journals and other similar sources in order to accomplish the task specified above.
- Students are expected to refrain from repeating any content in their research document.
- At the re-assessment attempt, the mark is capped and the maximum mark that can be achieved is 40%.

CHEATING AND PLAGIARISM

Both cheating and plagiarism are totally unacceptable and the Institute maintains a strict policy against them. It is YOUR responsibility to be aware of this policy and to act accordingly.

The basic principles are:

- Don't pass off anyone else's work as your own, including coding examples. This is plagiarism and is viewed extremely seriously by the Institute.
- Don't submit a piece of work in whole or in part that has already been submitted for assessment elsewhere. This is called duplication and, like plagiarism, is viewed extremely seriously by the Institute.
- Always acknowledge all of the sources that you have used in your assignment or project.

- If you are using the exact words of another person, always put them in quotation marks.
- Check that you know whether the assignment is to be produced individually or whether you can work with others.
- If you are doing group work, be sure about what you are supposed to do on your own.
- Never make up or falsify data to prove your point.
- Never allow others to copy your work.
- Never lend disks, memory sticks, or copies of your coursework to any other student. in the Institute; this may lead to you being accused of collusion.

LEARNING OUTCOMES:

This assignment addresses the following unit learning outcomes:

1. Demonstrate a clear understanding regarding the role of time services in Business Component Development while being able to create, integrate and handle the timer services of the application.

2. Identify and define the main concepts relating to Interceptor classes and methods, including the association of multiple business Interceptor methods with an enterprise bean.

3. Clearly describe transaction demarcation management, including the types of transaction, evaluating the most applicable transaction for a given scenario.

4. Undertake a critical analysis of the security architecture required in an application, in addition to the security measures taken to ensure the privacy of a session, while paying special attention to programmatic authorization.

5. Define best practices and state the benefits of using EJB technology best practices while integrating exception handling to the application for further optimization.

6. Distinguish the exception handling methods that are specific to Enterprise Java Beans and be able to optimize the performance of the application through exception handling.

7. Integrate the organisation EJB components in a split directory structure, including the package and deploy where an appropriate deployment tool as well as appropriate packaging have to be selected.

Assignment Title: Designing and Implementing a Logistics Management System

SITUATION:

You are a software engineer working for a transportation logistics company that has recently secured a contract with a global shipping conglomerate. The goal is to develop a state-of-the-art **logistics management system** that will enhance the efficiency of **cargo tracking, optimize route planning, and improve overall supply chain visibility**.

The requirements for the new application are as follows:

1. **Real-Time Cargo Tracking Services (approx. 300 words)**
    a. Develop real-time cargo tracking services to provide accurate and up-to-date information on the location and status of shipments.
    b. Discuss the broader role of real-time tracking in logistics, emphasizing its impact on supply chain visibility, customer satisfaction, and operational efficiency.
2. **Route Optimization with Interceptor Classes (approx. 300 words)**
    a. Implement Interceptor classes and methods to optimize cargo routes dynamically based on real-time data.
    b. Define the concepts of route optimization in logistics and explain how Interceptor methods contribute to efficient and adaptive route planning.
3. **Dynamic Transaction Management (approx. 400 words)**
    a. Ensure the application supports dynamic transaction management to handle changes in cargo requirements, rerouting, and resource reallocation.
    b. Describe the critical role of transaction demarcation management in logistics systems and analyze the potential impact of transaction inaccuracies on delivery timelines and resource utilization.
4. **Cargo Data Security (approx. 400 words)**
    a. Implement a robust security architecture to protect sensitive cargo data and ensure compliance with international shipping regulations.
    b. Conduct a critical analysis of security measures, addressing challenges specific to cargo data, such as data privacy concerns, secure communication channels, and protection against cyber threats.
5. **Exception Handling in Logistics Operations (approx. 300 words)**
    a. Integrate exception handling mechanisms to address potential errors in logistics operations, ensuring timely problem resolution.
    b. Analyze the consequences of errors in logistics, emphasizing the importance of quick and effective response mechanisms to maintain smooth operations.
6. **Modular Component Organization for Logistics Software (approx. 300 words)**
    a. Organize application components in a modular directory structure tailored to the logistics domain.
    b. Define best practices for component organization in logistics software, highlighting the advantages of modularity, ease of maintenance, and scalability in adapting to evolving logistics requirements.

Assignment Tasks:

- Your assignment tasks are as follows:

  i. Design and develop an enterprise Java application following industry best practices and standards **(5 marks)**.
  ii. Ensure the application is user-friendly, efficient, and complies with logistics management standards **(5 marks)**.
  iii. Design a comprehensive architecture for the enterprise Java application **(5 marks)**.
  iv. Implement time services for task scheduling, demonstrating a clear understanding of their role in Business Component Development **(5 marks)**.
  v. Integrate interceptor classes to log user activity and identify potential issues, including definitions of main concepts related to interceptor classes and methods **(5 marks)**.
  vi. Implement different types of transactions to ensure data consistency and reliability, providing a clear description of transaction demarcation management **(5 marks)**.
  vii. Develop a robust security architecture and undertake a critical analysis, specifying assessment criteria **(10 marks)**.
  viii. Integrate exception handling using best practices to optimize application performance **(5 marks)**.
  ix. Organize EJB components in a split directory structure, define best practices, and state the benefits of using EJB technology, specifying assessment criteria **(5 marks)**.
  x. Test the application using JUnit.
    a. Define comprehensive test scenarios covering functional, performance, and security aspects **(5 marks).**
    b. Utilize JUnit for unit testing to ensure individual components function as expected **(5 marks)**

Deliverables:

- A comprehensive report documenting the design, development, and deployment of the enterprise Java application. The report should include a clear understanding of the role of time services, definitions of Interceptor classes and methods, a description of transaction demarcation management, a critical analysis of the security architecture, and the definition of best practices and benefits of using EJB technology **(40 marks).**

- In-depth documentation of test scenarios, criteria, and tools used for different types of testing.

- Recorded results of testing procedures, highlighting any issues countered and their resolutions.

- Integration of testing documentation into the comprehensive report to ensure transparency in the evaluation process.

Assignment Submission Guidelines for Students

Students are advised to strictly follow the guidelines specified herein when formulating and submitting research assignments.

Important Information for Students

1. The assignment should be submitted only as a soft copy in a PDF format on or before the specified assignment due date.
2. The soft copy of the assignment should be uploaded to the student portal using the NIC.
3. The submission date provided for all assignments are the final dates on which you can hand upload the assignments. Please note that late submissions are not allowed.
4. Plagiarism is treated as a serious offence and the work you produce should be individual and original. However, note that students will have to work in groups in certain scenarios.
5. All sources of information in any assignment must be referenced using the "Harvard referencing" system, where a reference listing should be included at the end of the assignment.
6. Please contact your branch on assignments, re-submission, and related procedures.
7. Students are expected to maintain a backup of all assignments. The Java Institute for Advanced Technology retains all the rights to re-call soft copies of any assignment at any time during the course.
8. Students should use the attached assignment coversheet and declaration of authentication form to the assignment.
9. Students are expected to provide the following information in their assignment coversheet:
    - Student name
    - NIC No
    - Subject name
    - Subject code
    - Branch
10. Assignment Report Rules
    - Paper Size: A4
    - Word Count:2000 words
    - Line Spacing:1.5
    - Printing Margin:1 inch on LHS and RHS
    - Binding Margin: ½ inch
    - Header and Footer:1 inch
    - Printing: Single-sided
    - Basic Font Size:12pt
    - Heading:16pt
    - Sub-headings:14pt, Bold
    - Body:12pt, Justified Aligned
    - Font Style: Times New Roman/Calibri