



# SKILL WORKBOOK

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**19TS3101S – JAVA FULL STAC DEVELOPMENT (JFSD)**

TEAM JFSD

K L UNIVERSITY | JAVA FULL STACK DEVELOPMENT – 19TS3101S



# SKILLING WORKBOOK

<b>STUDENT NAME</b>	
<b>REG NO</b>	
<b>YEAR</b>	
<b>SEMESTER</b>	
<b>SECTION</b>	
<b>FACULTY NAME</b>	

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## 2021-22 ODD SEMESTER JFSD CONTINUOUS EVALUATION

Task No.	Date	Logic (10M)	Implementation (25M)	Result (10M)	Viva Voce (5M)	Total (50M)	Faculty Signature
1							
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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**COURSE CODE: 19TS3101S**  
**Technical Skill – JFSD**

**Date of the Session:** \_\_/\_\_/\_\_

**Time of The Session:** \_\_\_\_ to \_\_\_\_

**#SKILL – 1 → JDBC & JUNIT**

**Prerequisites:**

- **How a java program is connected to database**
- **Basic SQL commands to perform ‘CRUD’ operations.**
- **Basic Knowledge on Junit**

1. Develop a JDBC application where KL University students will be able to choose their specialization. But there will be limited slots for each specialization which must be stored and queried from database. After successfully selecting a specialization, Specialization along with student details must be stored in the database.
  - a) Limit the slots for specialization
  - b) User should be able to choose a specialization
  - c) Once chose, Slots must be updated then student data must be saved in the database.
  - d) View the Students data.
2. We are entering into the 3rd year of our B. Tech; we all are aware that CRT (Campus Recruitment Training) starts from the sixth semester. Students are instructed to clear all the backlogs and try to increase their CGPA (Cumulative Grade Point Average) to get selected in CRT Programming. For that our Management wants to maintain the data in a database. Our Management wants you to create a table containing the details of students (Student ID Number, Student name, Gender, Year of Study, Department, K L Mail, CGPA, No of Backlogs present). Store at least 5 records in the database.
  - a. As per the instructions, few students cleared their backlogs and increased their CGPA, so you are instructed to update their backlogs and CGPA
  - b. Based on CGPA, if the CGPA is greater than 7.5 they are eligible to CRT Program and remaining students are not eligible. Delete the list of students who are not eligible and print the eligible students in console.
  - c. Apply Junit test cases for the above database.

**Note:** Use Scrollable and Updatable Result Set

### VIVA QUESTIONS:

1. What is the main difference between a Statement and a Prepared Statement and Callable Statement?
2. What is BLOB and CLOB? What is the difference between them?
3. What are the useful JUNIT extensions?
4. What are the uses of JUNIT?
5. What are the different types of annotations used?

*(For Evaluator's use only)*

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**#SKILL – 2 → JDBC**

**Prerequisites:**

- **How a java program is connected to database**
- **Basic SQL commands to perform ‘CRUD’ operations.**
- **Basic Knowledge on Updatable Concept**

1.

a) Pranathi is a Student in KL University, as situations are not good, she does not want to travel, so she wants to stay in Hostel from this year. There are many more students who are facing the same issue, so our KL University Hostel Management Came to a decision to create a table which includes KL ID Number (Primary Key), First Name, Last Name, Year of Study, Gender, Department, Mobile Number, Date of Birth (Must use “Date” data type), Parent Name, Parent Mobile Number, Address, proof (Photo of KL ID Card) and the Payment Receipt (PDF). Help the K L Hostel Management to Manage Database with their requirements.

b) Assume you are a student who opted to stay in Hostel at the time of registrations and fill the details that are required to book a room in a hostel.

Note: Use Statement and Prepared Statements

**VIVA QUESTIONS:**

1. Class.forName is used for?
2. What is the return type of execute(), executeQuery() and executeUpdate()?
3. What are the types of ResultSet?
4. What is the difference between ResultSet and RowSet?
5. Mention the ways of updating a ResultSet

*(For Evaluator's use only)*

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**#SKILL – 3 → XML**

**Prerequisites:**

- Designing of Well-formed XML documents
  - Knowledge on XML document validation against DTD & XSD
  - Idea on XML documents and Tags
  - Basic idea on XML Stylesheet Language Transformations
1. Hermione wants to know more about XML before attending classes. So, she visited professors and each of them gave her some questions regarding XML.
- a. As Hermoine requested Professor Trelawney he gave her a task to check the OWL test papers. He asked her to check the XML written by a student in Owl's test and correct it according to XML syntax rules help her out in doing this task

```
<?xml version="1.0" encoding="UTF-8">
<Diary>
  <Monday>
    <Monday date="31 "July"" year=1994/>
    <name>Harry Potter</name>
    <Heading>My birthday</heading>
    <body>Aunt Marge spoiled my day. <body><! --My-- notes -->
  </Diary>
</Monday>
```

- b. Then Hermione went to Professor Rubeus Hagrid who gives his utmost care for his magical creatures. As We cannot predict the weather in Hogwarts, she was asked to Create a well-formed XML for reporting weather forecasts in the wizarding world from Monday to Saturday for Professor Rubeus Hagrid to provide shelter for his magical creatures. Write the place, date, report, and add an internal dtd to validate the elements

- c. She is much more excited after completing the task given by Professor Trelawney. Then she visited A wizarding bank that wants to store some data regarding wizards and goblins. Hogwarts is a place where almost every person knows everything, the wizarding bank staff came to know that Hermione is studying XML, so they requested her to Create a well-formed XML for displaying the details of the wizards and goblins of the bank and provide some additional information about the details like gender, address etc. and link to the CSS stylesheet.

**VIVA QUESTIONS:**

1. What are the advantages of XML?
2. How many ways are there to style XML? What are they?
3. Differentiate between CDATA and PCDATA?
4. What are the Rules for well- formed XML?
5. Differentiate between XML Schema (XSD) and DTD?

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**#SKILL – 4 → Servlets**

**Prerequisites:**

- **Servlets and its applications**
- **‘CRUD’ Operations in SQL**

1. Shanmukh has 10 theatres in AP. Every theatre is managed by a manager. Due to covid19 the risk of virus spread may increase among the customers and theatre staff. So, Shanmukh wants to digitalize the ticket booking process so that there will be no rush at the ticket counter and the risk of spread was minimal.

As you are a computer science student, he approached you to help him out to build a web application where customers can book tickets online.

Shanmukh’s requirements are as below:

- a. Shanmukh (super admin) can add the managers of his theatres(admin)
- b. Admin can login with their own credentials and add movie details into database
- c. Customer should login with his registered credentials.
- d. Customers must have a provision to book the ticket(s) (He can update no of tickets) for a respective movie. At the last moment, if customer is not willing to go to theatre, he should have a provision to cancel the ticket he booked
- e. Shanmukh must have a provision to view how many tickets are sold and how much money earned.

Create a web application as per his requirements by using servlets.

(Note: This skill is meant for 2 weeks)

**VIVA QUESTIONS:**

1. What is the difference between Generic Servlet and HTTP Servlet?
2. What are the differences between HttpSession and Cookies?
3. List out the steps in life cycle of servlet?
4. What is Session Tracking?
5. Differentiate between ServletContext and ServletConfig?

*(For Evaluator's use only)*

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**#SKILL – 5 → JSP**

**Prerequisites:**

- **Knowledge on JSP**
- **Basic SQL commands to perform ‘CRUD’ Operations.**

1. Using JSP Concepts try to execute the following scenario. Which consist of two tasks.

**Task 1:**

Create a table in the database containing the columns to store book details like book name, authors, description, price, and URL (Uniform Resource Locator) of the book’s cover image. Using JSP (Java Server Pages) and JDBC retrieve the details in the table and display them on the webpage.

**Task 2:**

Create a catalogue page containing the book’s details like cover image, book name, authors, description, price and an add to cart button. Also create a cart page which shows details like book name, price, quantity, amount, and total amount to be paid. Using JSP display the content in the cart page dynamically by retrieving the data from sessions.

2. Write a java program/JSP to connect to the database and extract data from the tables and display them using various SQL queries. Insert the details of the users who register with the website, to the database. and authenticate the user when he/she submits the login form using the username and password from the database using JSP and give the user authority to change his/her password.

**Note:** Use JSP MVC for these tasks

**VIVA QUESTIONS:**

1. List out the life – cycle methods for a JSP?
2. What are the implicit objects in JSP?
3. How is JSP used in MVC Model?
4. How can I implement a thread safe JSP page? What are the advantages and Disadvantages of using it?
5. What is meant by Static Block?

*(For Evaluator's use only)*

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**#SKILL – 6 → Hibernate**

**Prerequisites:**

- **Basic Idea on Hibernate**

1. Harshith is a manager for an IT (Information Technology) Company who maintains the records of his employees.  
Store the Employee details with the following attributes Empid, Ename, Dept, Age, Salary and use sequence generator class for Empid.  
Develop a separate hibernate applications for the following (should not use Hibernate Query Language). The tasks need to be performed are stated below
  - a. Retrieve the details of an employee whose Empid =1001
  - b. Update the salary of an employee whose Empid = 1004 with Average of all the Employee Salaries
  - c. Delete an employee record from the table whose Salary is Minimum.

**VIVA QUESTIONS:**

1. What is ORM and give some examples for ORM tools?
2. What are the advantages of hibernates over JDBC?
3. What is lazy loading in hibernate?
4. What are the key components of Hibernate?
5. How is SQL query created in Hibernate?

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**#SKILL – 7 → Hibernate**

**Prerequisites:**

- **Basic Idea on Hibernate**
- **Basic Knowledge on HQL to perform ‘CRUD’ Operation**

Perform given tasks taking reference from Skill 6 with Hibernate Query Language

1. Display all the employee details in the organization.
2. Display only names of all employees whose age is greater than 40.
3. Delete an employee whose Empid =1005
4. Update the name of an employee with \*\*\*\*\* whose Empid = 1003

**VIVA QUESTIONS:**

1. What is HQL? What is the difference between SQL and HQL?
2. What is criteria API?
3. How many types of association mapping are possible in hibernate?
4. How can we create an immutable class in hibernate?
5. What is the use of Configuration Interface in Hibernate?

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<p><u>Comment of the Evaluator (if Any)</u></p> <div style="border: 1px solid black; height: 150px; margin-top: 5px;"></div>	<p align="center"><u>Evaluator's Observation</u></p> <p>Marks Secured: _____ out of _____</p> <p>Full Name of the Evaluator:</p> <p>Signature of the Evaluator Date of Evaluation:</p>
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**#SKILL – 8 → Spring MVC**

**Prerequisites:**

- **General Idea on Spring Framework**
- **Modules of Spring Framework**
- **General Idea on Spring MVC**

1. Almost all the students from various colleges/Universities are aware of our National Level Techno- Management Fest “Samyak”. This Year Samyak organizers are planning to conduct an event so that other college students can also participate in it. For that purpose, the Samyak Chief needs a spring MVC application to maintain the details of the participants. He/she who is registering for the event must be currently pursuing a bachelor's degree. A list of events should be provided so that the user can opt based on his/her choice.
  - A. Store the details of the user and display the count of users.
  - B. After registering for any event, the user should have a facility to update his/her profile.
  - C. Display list of members registered for a particular event.
  - D. If a user register to an event and if he wants to register for another event i.e., more than one then the user must delete his current registered event and then only the user can register for the new event.

**Note:** Inform the user in front-end that while the user is registering to another event display "You have registered to ABC event so to register for XYZ event you need to cancel (i.e., Delete) their previous event (ABC) in order to register to another event (XYZ).

**VIVA QUESTIONS:**

1. What are the advantages of using Spring MVC?
2. What are the modules in Spring Framework?
3. How can beans be made singleton or prototype?
4. What are the advantages of DAO module?
5. Mention the types of IOC?

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**#SKILL – 9 → Spring Boot**

**Prerequisites:**

- **General Idea on Spring Boot**
- **General Idea on JDBC**

1. The chairperson of the K L Hospital wants to manage the data of the hospital in such way i.e., which patients are consulting which doctor, what prescription is been giving to them, when doctors are coming and leaving the hospital. Along with this store the complete patient details like Full Name, Age, Gender, Any Previous Health Issues, Address. And when it comes to doctor details to be stored are Full Name, Graduation Details, Age, Gender, Address. Develop a spring framework application which implements setter-based dependency injection using bean factory as Spring IoC Container to display all the details of the hospital and its staff.  
(Use Setter and Constructor Dependency Injection)
2.
  - A. Innovation Anywhere is a technical fest conducted by Ed Informatics. Help the organization in building a Spring Boot Application where it has the records of the organizer details who conducts the fest, the details of the fest and the details of the participants who attended the fest.
  - B. The fest has two technical rounds based on the results of each round the participants should be segregated in the database. If the participants have cleared the first round with result '> 70%' then the developer of this project need to create marks along with participants details (i.e., Name, Result) in new table that shows the details along with second round.

**VIVA QUESTIONS:**

1. What is the role of Actuator in Spring Boot?
2. What are the advantages of Spring Boot?
3. What are the Spring Boot Features?
4. Differences between Spring and Spring Boot?
5. What are the Basic Annotations in Spring Boot?

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**#SKILL - 10 → Spring Boot with API**

**Prerequisites:**

- **General Idea on Spring Boot**
- **General Idea on JDBC**

1. One of your friends who is from a non-technical background has joined a company after his education. He went to Italy for some years and came back to India. Now he has earned a lot of money. He thought of using that money now, so he wants to do some business. The trending thing in the new age development of technology is the IT Industry and Online Food Management. So, he thought to create a Web Application on Online Food Order Management System. But the problem is he wants someone to do that job as he is from non-technical background. So, He asked you to create a Web Application with the following tasks
  - a. Admin portal and include the details of the hotels, food and the details of the orders placed by the users.
  - b. The user should be able to order the food from the menu updated by the admin from time to time.
  - c. User should be able to pay the bill from the application (use restful API)

Help him out in making his idea successful.

**NOTE:** [Use Restful API (Application Programming Interface) for this skill]

**VIVA QUESTIONS:**

1. What are safe REST Operations?
2. What is an HTTPMessageConverter in Spring REST?
3. What is difference between @Controller and @RestController?
4. What is Spring Boot CLI?
5. What are the differences between @SpringBootApplication and @EnableAutoConfiguration annotation?

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**#SKILL -11 → Spring Boot with API**

**Prerequisites:**

- **Basic Idea on Spring Boot**
- **Basic Idea on API's used in Spring Boot**

1. We KLUian's are very familiar with various kinds of Hackathons that are being conducted in our university. We also know that organizing such kind of activities is a bit of tough task for a Mundane. Your friend who is part of organizing these Hackathons wants to develop a Spring Boot Application using RESTful API to manage all the things. He wants you to help him to build an application such that he can manage the student details who are participating in Hackathon.

**Requirements for the Hackathon Application:**

- a. **GET** - All Student's, Particular Student (By ID)
  - b. **POST** - Add a Student.
  - c. **PATCH** - Update a Student by ID
  - d. **DELETE** - Delete a Student by ID
2. Since your friend is an organizer of a Hackathon, He asked you to participate. So, you have participated in the Hackathon, as a result you will be getting a Certificate which is required as part of your Continuous Evaluation. For evaluation of the marks for a course your faculty asked you to upload all your participation certificates through 3<sup>rd</sup> party sites like Google forms, Microsoft forms etc. Now, they do not want to depend on those sites and want to build their own API. So, they told you to build an API which majorly features file uploading and file downloading.



**VIVA QUESTIONS:**

1. What is the role of Actuator in Spring Boot?
2. What are the features of RESTful Webservices?
3. What is meant by statelessness in REST?
4. What is Auto Configuration in Spring Boot?
5. What is Spring Boot Initializer? What are the Advantages of it?

*(For Evaluator's use only)*

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**#SKILL - 12 → Microservices using Spring Boot**

**Prerequisites:**

- **Basic Idea in Spring Boot**
- **Basic Idea on Microservices**

1. Raj is pursuing his B. Tech (CSE) at KLU. In each semester, he is allowed to choose the courses which he needs to complete, but he is not aware of the topics which are going to be covered in a given course. Help him in designing a Java-based microservice with the course API and topic API where each course can contain many topics. The course should display data of all the topics under it.
2. Chetan likes to watch movies and every weekend he invites his friends over to watch a movie and have fun, but he is unable to decide which movie to watch. Help him in developing a Java microservice for the movie catalog where Chetan will be able to see the movies along with their rating and information. The program should contain 3 services which are
  - a. movie\_info for movie information
  - b. rating for movie rating
  - c. movie to display all information together.

**VIVA QUESTIONS:**

1. What are the Advantages of Microservices?
2. State some technologies commonly used to implement microservices?
3. What are the different types of Microservices?
4. What are the characteristics of Microservices?
5. What are the main components in Microservices?

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**#SKILL – 13 → Microservices using Spring Boot**

**Prerequisites:**

- **Basic Idea in Spring Boot**
- **Basic Idea on Microservices**

1. TCS Company Manager was given a task to Amar which is to develop a Spring boot Application using Microservice for an Employee Info service and Employee Project Info service. When Employee ID given to the Employee Info Service it returns all the projects in the company. When Project ID given to the Project Info Service it returns all the Employees working on it.

**VIVA QUESTIONS:**

1. How can we access RESTful in Microservices?
2. What's the difference between a microservices-oriented architecture (MOA) and a service-oriented architecture (SOA)?
3. What does the term "bounded context" mean in relation to microservices?
4. Explain three types of Tests for Microservices?
5. How is distributed tracing used in Microservices?

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**#SKILL - 14 → Spring Cloud**

**Prerequisites:**

- **Basic Idea on Spring Boot**
- **Basic Idea on Spring Cloud**

1. KL University is planning for conducting registrations in online mode for the next academic semester for the students. Students should login to the application with their credentials. They need to select the 5 out of 8 subjects in which they are interested in that respective semester first before registration. When they start their registration, they should be only able to see their selected 5 subjects. Students need to select the sections for respective subjects. Imagine there are 5 sections for every subject. Also, every section will have a maximum of 50 seats available for every subject. Students need to submit their choices after selecting sections for every subject in order to complete their registration. The available seats should be decreased after every successful registration of students. If all seats are filled, then that section should not be visible.

Now divide the entire application into different services. And develop a microservice based application using spring cloud. Also Integrate the application with cloud by using spring cloud GCP or spring cloud AWS or spring cloud Azure.

2. Mr. Nick wants to start his business through web services to get more sales for his products. So, he decided to start to build an e-commerce website for his business. Initially he thought of developing three main services for his application which are:
  - a. Account service which is used to manage user Registrations and login authentications.
  - b. Product Catalog where all the products are shown.
  - c. Order service which manages all the orders of the users.

Also, he wants to host the application using the cloud services. Now develop a microservice based application using spring cloud. Also Integrate the application with cloud by using spring cloud GCP or spring cloud AWS or spring cloud Azure.

**VIVA QUESTIONS:**

1. What are the advantages of using Spring Cloud?
2. What is Spring Cloud Bus? Do we need it?
3. What is the difference between Spring Boot and Spring Cloud?
4. How to deploy Spring Boot Application to PCF?
5. How to deploy Spring Boot + MySQL Application to PCF?
6. What does one mean by Load Balancing?
7. What does service registration and discovery mean? How is Spring Cloud implemented?
8. How does spring cloud register services?

*(For Evaluator's use only)*

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----- All The Best -----  
**Team JFSD**