School of Computer Science Engineering and Information Systems

Code-a-thon

on

"Spring Boot WebDev Sprint: J2EE Application Design Challenge"

01-11-2025 and 02-11-2025

Problem Statements

Develop a J2EE-driven web application for the given theme. Ensure the project adheres to the basic Model-View-Controller pattern. Students are advised to use below tools only for application development:

- Thymeleaf for Front End Design and server-side rendering
- Use the Spring Boot Framework to develop a complete MVC-based Web Application.
- Use any relational database of your choice (MySQL, PostgreSQL, or Oracle) with JDBC.
- Use any IDE of your choice. Preferably Apache Netbeans

Contact the faculty **Dr.Mareeswari V,** if any queries**.**

Select any one

1. MedTrack: AI-Driven Patient Monitoring System

Scenario: A rural hospital network lacks real-time patient monitoring and predictive alerts for critical conditions.
Challenge: Architect a scalable MedTech platform using Spring Boot and JDBC that integrates wearable data, triggers alerts, and supports role-based dashboards for doctors, nurses, and administrators.

Bonus: Integrate anomaly detection using external AI APIs.

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2. GreenCart: Sustainable Local Marketplace

Scenario: Local farmers and artisans struggle to reach eco-conscious buyers. **Challenge:** Build a Java-based e-commerce platform using Spring Boot that promotes sustainable products, tracks carbon footprint per order, and supports community-based logistics.

Bonus: Include SDG-aligned metrics and gamified buyer incentives.

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3. SkillBridge: Microlearning for Blue-Collar Workers

Scenario: A vocational institute wants to offer bite-sized, skill-based training for electricians, plumbers, and technicians.

Challenge: Design a modular LMS using Spring Boot and Thymeleaf that supports video lessons, quizzes, and certification workflows.

Bonus: Include multilingual support and offline sync.

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4. CivicConnect: Citizen-Government Feedback Portal

Scenario: Municipal bodies lack structured feedback from citizens on public services. **Challenge:** Develop a secure portal using Spring Boot that allows citizens to report issues, track resolution, and rate services.

Bonus: Include sentiment analysis and heatmaps of complaints.

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5. FamCare: Family Mental Health Tracker

Scenario: Families want to track emotional well-being and stress levels across members. **Challenge:** Create a privacy-first journaling and mood-tracking app using Spring Boot and REST APIs, with role-based access and analytics.

Bonus: Include family-level insights and intervention suggestions.

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6. EduMatch: Adaptive Career Pathway Engine

Scenario: Students struggle to align their interests with career paths and academic choices. **Challenge:** Architect a recommendation engine using Java frameworks that maps student profiles to career clusters, courses, and mentors.

Bonus: Integrate SDG-aligned career goals and regional job data.

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7. SecureFileX: Java-Based Secure File Transfer System

Scenario: Sensitive file transfers across distributed systems require strong security and regulatory compliance.

Challenge: Build a secure Java backend that ensures encrypted file transfer, role-based access, audit logging, and real-time threat detection. Include file validation, retry logic, alerts, and an admin dashboard for monitoring and policy management.

Bonus: Support configurable security rules, threat intelligence integration, and automated HIPAA/GDPR compliance reporting.

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8. AccessAble: Inclusive Design Audit Tool

Scenario: SMEs struggle to audit their websites and apps for accessibility compliance.
Challenge: Create a Java-based tool that scans web assets, flags WCAG violations, and suggests fixes.
Bonus: Include a dashboard for tracking accessibility scores over time.

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9. **DataNest: Smart Dataset Marketplace for Researchers**

Scenario: Academic researchers and startups often struggle to find curated, domain-specific datasets for training models or validating hypotheses.

Challenge: Build a Java-based marketplace using Spring Boot and JDBC where users can upload, tag, license, and purchase datasets. Include search filters by domain (healthcare, sustainability, finance), format, and SDG relevance.

Bonus: Implement dataset quality scoring and contributor reputation tracking.

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10. **EventPulse: Real-Time Academic Event Tracker**

Scenario: Universities and tech communities lack a unified platform to track seminars, hackathons, and workshops across departments and regions.
Challenge: Architect a scalable event management system using Spring Boot and REST APIs that supports event creation, RSVP, speaker profiles, and live updates.

Bonus: Include analytics on participation trends, SDG alignment, and accessibility features.

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11. EcoAudit: Carbon Footprint Tracker for SMEs

Scenario: Small businesses lack tools to measure and report their carbon emissions across operations.
Challenge: Build a Java-based platform using Spring Boot and JDBC that allows SMEs to input operational data and receive automated carbon footprint reports.
Bonus: Include SDG mapping, emission reduction suggestions, and exportable ESG reports.

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12. ReWaste: Smart Waste Segregation & Pickup Scheduler

Scenario: Urban households struggle with waste segregation and timely pickups.
Challenge: Architect a scheduling and tracking system using Spring Boot and REST APIs that lets users classify waste, schedule pickups, and earn eco-points.

Bonus: Integrate with local municipal APIs and include gamified community leaderboards.

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13. GreenLease: Eco-Rating System for Rental Properties

Scenario: Renters want to choose homes based on energy efficiency and sustainability. **Challenge:** Create a Java-based listing platform using Servlets and JDBC that rates properties on insulation, solar usage, water conservation, and proximity to green spaces.

Bonus: Include landlord incentives and tenant feedback loops.

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14. AgriChain: Transparent Farm-to-Table Supply Tracker

Scenario: Consumers and retailers want to verify the sustainability of agricultural products. **Challenge:** Build a traceability system using Spring Boot and REST APIs that tracks produce from farm to shelf, including pesticide usage, water footprint, and transport emissions.

Bonus: Include blockchain-style audit logs and farmer dashboards.

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15. SolarSync: Community Solar Grid Optimizer

Scenario: A semi-urban community wants to optimize shared solar energy usage across homes and schools.
Challenge: Develop a Java-based energy management dashboard using Spring Boot that tracks generation, consumption, and surplus sharing.

Bonus: Include predictive analytics and SDG-aligned energy savings reports.

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16. **RuleBot: Chatbot-Driven Business Rule Execution**

Scenario: Enterprises often struggle to automate complex decision-making workflows that depend on dynamic business rules and multilingual user interactions.

Challenge: Architect a chatbot-driven platform using Java frameworks that integrates NLP tools (e.g., Dialogflow, Rasa), a rule engine (e.g., Drools), and secure REST APIs to execute business logic based on user queries. The system must support contextual memory, multilingual responses, and a responsive UI for both mobile and web.

Bonus: Include a rule authoring dashboard for business users and real-time rule impact simulation.

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17. EcoBudget: Sustainable Budget Planner for Local Governments

Scenario: Municipalities face pressure to fund infrastructure projects that align with sustainability goals, but lack tools to evaluate long-term impact.

Challenge: Build a rule-based logic engine using Java frameworks (e.g., Spring Boot + Drools) that prioritizes infrastructure proposals based on carbon footprint, community impact, and ROI. Include modular budget input forms, scoring algorithms, and visualization dashboards.

Bonus: Integrate external sustainability APIs and implement role-based access for different municipal departments.

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18. GreenMiles: Commuting Incentive Tracker

Scenario: Cities want to encourage eco-friendly commuting but lack a system to track and reward behavior.
Challenge: Develop a GPS-enabled mobile/web platform using Java frameworks that tracks user commutes, assigns points for green transport modes (cycling, walking, public transit), and maintains secure user profiles.

Bonus: Include an admin dashboard for configuring reward policies, real-time analytics, and gamified leaderboards.

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19. RiskLens: Transaction Risk Scoring System

Scenario: Financial institutions need a backend service to detect and score risky transactions in real time.
Challenge: Architect a secure Java-based service using rule engines and anomaly detection algorithms to evaluate transaction risk. Include secure logging, real-time scoring, alerting mechanisms, and an analyst dashboard for reviewing flagged transactions and audit trails.

Bonus: Support configurable rule sets and integration with fraud intelligence feeds.

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20. FlexiPrice: Dynamic Pricing Based on Demand and Inventory

Scenario: E-commerce platforms struggle to optimize pricing based on fluctuating demand and inventory levels.

Challenge: Build a pricing logic engine using Java frameworks that ingests real-time data, applies elasticity models, and adjusts product prices dynamically. Include an admin panel for rule configuration and integration with e-commerce APIs.

Bonus: Support predictive pricing simulations and seasonal demand forecasting.
