REVATURE

# Java DevOps/SRE v2 (AWS)

| | MON | TUE | WED | THU | FRI | ENVIRONMENT |
|---|---|---|---|---|---|---|
| **Week 1**<br>**SRE Fundamentals / OOP** | • Installation: Git<br>• Installation: Java 8<br>• Hardware Fundamentals<br>• CPU/Processor/OS<br>• First Java program: Hello World, new, naming conventions<br>• JVM, JRE, JDK<br>• Garbage collection (high level)<br>• Stack & Heap<br>• Profiling a Java Application<br>• Control flow statements<br>• Operators<br>• Packages and imports<br>• Constructors<br>• Methods and Parameters<br>• Intro to git (add, push, pull, commit, clone)<br>• Introduction to SRE<br>• Week 1 Day 1 Hackerrank Activity | • Java Performance - JVM & GC Details<br>• Access modifiers<br>• Scopes of a variable<br>• Object class<br>• Order of initialization<br>• Var-args<br>• Arrays<br>• Annotations<br>• OOP Concepts in-depth: Abstraction, Polymorphism, Encapsulation, Inheritance<br>• Interfaces<br>• Method overloading & overriding<br>• Introduction to Maven<br>• Maven Project Object Model (POM)<br>• Maven Repositories<br>• Introduction to unit testing & TDD<br>• J-Unit - Annotations & Assertions | • File I/O: FileReader/FileWriter<br>• BufferedReader / BufferedWriter<br>• Object Serialization<br>• Marker Interfaces - Serializable<br>• Scanner class<br>• Service-level agreements (SLAs)<br>• Error Budget<br>• String API<br>• StringBuilder and StringBuffer<br>• Wrapper classes<br>• Abstract classes<br>• In-depth with Git (branching structure, merging, merge conflicts, advanced commands, code reviews with pull requests) | • Java 8 concepts - Lambda & Functional Interfaces<br>• Exceptions class hierarchy<br>• Checked vs unchecked exceptions<br>• Handling or declaring checked exceptions<br>• Custom Exceptions<br>• Intro to Paired Programming - Exercise<br>• Javalin Basics | • Creational design patterns: Singleton, Factory, Abstract Factory, Builder<br>• Design pattern: Dependency Injection<br>• Logging with Logback<br>• SonarLint | • JDK 1.8<br>• JUnit 4.X<br>• Maven 3.X<br>• Eclipse: Spring Tools Suite<br>• GIT |

| | MON | TUE | WED | THU | FRI | ENVIRONMENT |
|---|---|---|---|---|---|---|
| **Week 2**<br>**Cloud /Database / Unix** | Written evaluations<br>Individual interviews<br>Quality Control Audit<br>• Intro to AWS & Cloud Computing<br>• Elastic Cloud Compute (EC2)<br>• Introduction to SSH<br>• Connecting with Private Keys<br>• Amazon Machine Image (AMI)<br>• Elastic Block Store (EBS)<br>• Introduction to Unix<br>• Unix / Linux introductory concepts & commands<br>• Week 2 Day 1 Hackerrank Activity | • Unix File System<br>• Files and Directories<br>• Package Management<br>• User Management<br>• Environment Variables<br>• Introduction to Shell Scripting (Bash)<br>• Variables<br>• Calling OS Commands<br>• Thread vs process | • Introduction to DBMS<br>• SQL data types<br>• DML, DDL, DQL, DCL, TCL<br>• Basic SQL Queries<br>• Schema<br>• Constraints<br>• Multiplicity<br>• AWS - RDS | • Referential Integrity<br>• Properties of Transactions<br>• Database Joins<br>• Isolation levels & read phenomena<br>• Set Operations<br>• Sub-queries | • Introduction to JDBC<br>• DriverManager, DataSource, Connection, Statement, PreparedStatement, CallableStatement, ResultSet<br>• Parameterization via Properties file<br>• Design Pattern: Data Access Object (DAO)<br>• SQL vs NoSQL | • PostgreSQL<br>• Unix<br>• AWS - RDS |
| **Week 3**<br>**Web Architecture & Logging** | Written Evaluation<br>Interview - group / solo based on performance<br>Quality Control Audit<br>• HTML Fundamentals<br>• HTML 5<br>• HTML forms<br>• Introduction to CSS<br>• Selectors: class vs ID<br>• Week 3 Day 1 Hackerrank Activity | • Client/server communication<br>• HTTP - requests, reponses, status codes, verbs<br>• Intro to Spring Boot<br>• Dependency Injection<br>• Intro Spring MVC<br>• Controller Mapping<br>• Handling form submission<br>• Session Management<br>• Design Patterns: MVC, Front Controller<br>• Simple Storage Service (S3) | • Intro to Spring Data<br>• Jpa Repositories<br>• @Query<br>• Structured Logs w/ Logstash Encoder<br>• Exporting Logs w/ Promtail<br>• Log Aggregation w/ Loki | Project 1<br>• Intro to REST<br>• Exposing/consuming REST<br>• REST with XML (JAXB)<br>• REST with JSON (Jackson) | Project 1<br>• Exception/Error handling<br>• Design Patterns: Business Delegate<br>• Agile/Scrum concepts<br>• Week 3 Day 5 Hackerrank Activity | • Tomcat<br>• Spring Boot |

| | MON | TUE | WED | THU | FRI | ENVIRONMENT |
|---|---|---|---|---|---|---|
| **Week 4**<br>**Containerization / Monitoring** | Project 1<br>Written Evaluation<br>Interviews<br>Quality Control Audit<br>• Containerization - Docker<br>• Week 4 Day 1 Hackerrank Activity | Project 1<br>• Dockerfiles<br>• Docker workflow<br>• Docker commands<br>• Introduction to Docker Registry<br>• DockerHub<br>• Docker Compose | Project 1<br>• Grafana Dashboard<br>• Importing Dashboards<br>• Custom Dashboards<br>• Integrating Grafana w/ Loki | Project 1<br>• Monitoring Basics<br>• Monitoring with Prometheus<br>• PromQL Basics<br>• Scraping Application Metrics w/ Micrometer<br>• Integrating Grafana w/ Prometheus<br>• Prometheus Alert Manager | Project 1<br>• Introduction to incident management<br>• Post mortem analysis<br>• Post mortem checklist | • Docker<br>• Unix<br>• Prometheus<br>• AWS |
| **Week 5**<br>**Kubernetes** | Project 1<br>Written evaluation<br>Quality Control Audit<br>• Orchestration - Introduction to Kubernetes<br>• Kubernetes Architecture<br>• Kubernetes scheduling Overview<br>• Introduction to application Monitoring<br>• Week 5 Day 1 Hackerrank Activity | Project 1<br>• Kubernetes concepts - pods, services, volumes, nodes, clusters<br>• Kubernetes controllers - ReplicaSets and Deployments<br>• Kubernetes Objects - names, namespaces, labels and selectors<br>• YAML Configuration files<br>• Master-node communication<br>• Load balancing in Kubernetes | Project 1<br>• AWS EKS<br>• Working with MiniKube<br>• Setting up single-node local cluster<br>• kubectl commands<br>• Kubernetes CronJobs | Project 1<br>• Ingress/egress rules & configuration<br>• TLS communication between microservices and Ingress/egress<br>• Kubernetes security, networking | Project 1<br>Project 2<br>• Introduction to Helm<br>• Working with Helm charts<br>• Prometheus in Kubernetes w/ Prometheus Operator<br>• Application Health Check: Health and monitoring of Kubernetes cluster<br>• Week 5 Day 5 Hackerrank Activity | • Kubernetes |
| **Week 6**<br>**Release Engineering & Infrastructure Automation** | Project 2<br>Written Evaluation<br>Interview - group or sprint retrospective<br>Quality Control Audit<br>• Intro to DevOps<br>• Continuous Integration<br>• Week 6 Day 1 Hackerrank Activity | Project 2<br>• Maven Lifecycle<br>• Jenkins setup / configuration<br>• Jenkins job<br>• Jenkins build | Project 2<br>• Pipeline as code<br>• Pipeline integration with git repo (GitHub, GitLab, etc)<br>• SonarQube / SonarCloud architecture & integration<br>• SRE pre-production checklist | Project 2<br>• Continuous Delivery and Deployment<br>• Deployment strategies - blue/green, canary, rolling | Project 2<br>• Introduction to Terraform<br>• Working with Terraform | • Jenkins<br>• Kubernetes<br>• SonarQube |

| | MON | TUE | WED | THU | FRI | ENVIRONMENT |
|---|---|---|---|---|---|---|
| **Week 7**<br>**Performance Testing & Observability** | Project 2<br>• Application Profiling - JProfiler<br>• Hackerrank Individual Evaluation | Project 2<br>• Load Testing with JMeter<br>• JMeter API Overview | Project 2<br>• Post mortem analysis example<br>• Shakespeare Sonnet++ Postmortem (incident #465) | Project 2<br>• Incident Management Lab | Project 2<br>• Performance Monitoring w/ Pinpoint | • Pinpoint |
| **Week 8**<br>**Project 3 work** | Project 3 | Project 3 | Project 3 | Project 3 | Project 3 | |
| **Week 9**<br>**Project 3 / Panel Interviews** | Project 3<br>Panel Interviews | Project 3<br>Panel Interviews | Project 3<br>Panel Interviews | Project 3<br>Panel Interviews | Project 3<br>Panel Interviews | |
| **Week 10**<br>**Project showcase** | Project 3 | Project 3 | Project 3 | Project 3 | Project 3 | |

| PROJECT | TECHNOLOGIES |
|---|---|
| Project 3 | Jenkins, Kubernetes, Docker, Helm, DevOps CD Pipeline, Prometheus, Log Aggregation, Grafana, Pinpoint, AWS |
| Project 1 | Maven, Git, Java, Grafana, Log Aggregation, Docker, Linux |
| Project 2 | Docker, Kubernetes, DevOps CI Pipeline, Prometheus, AWS |

REVATURE