Topics SWA midterm exam

Lesson 1: SWA overview

- What is software architecture
- Difference enterprise architecture and software architecture
- Difference architecture in a waterfall and agile project
- Characteristics of software qualities
- Architecture principles

Lesson 2: Layering & Spring boot

- Different layers and their corresponding classes
- Service class
- Client centric vs server centric web frameworks
- Data access: stored procedures, JDBC, ORM
- Integration possibilities and their characteristics
- Spring boot
- Dependency injection @Autowired
- @RestController
- @Service
- @Component
- @Repository
- REST: GET, PUT, POST, DELETE : idempotent
- RestTemplate
- JMS : jmsTemplate and @JmsListener

You need to be able to write a simple Spring Boot application including the necessary classes and their annotations and the necessary dependency injection.

Lesson 3: Domain Driven Design

- Principles of DDD
- Anemic and rich domain model
- Orchestration and choreography
- DDD patterns: entity, value object (and its characteristics), domain service and domain event

You need to be able to design a rich domain model in UML with StarUML where you specify for each domain class what DDD type it is

Lesson 4: Databases

- Scaling databases
  - Horizontal, vertical
  - Scaling load
  - Scaling data
  - Sharding
  - replication
  - Brewers CAP theorem
- Relational databases
  - Characteristics, Advantages and disadvantages
  - Problems of relational databases
- Key-value store(Redis)
  - Characteristics, Advantages and disadvantages
- Document store (mongodb)
  - Characteristics, Advantages and disadvantages
- Column family store (cassandra)
  - Characteristics, Advantages and disadvantages
- Graph database (neo4j)
  - Characteristics, Advantages and disadvantages
- When do you choose which database
- How is the data structured in each of these databases

Lesson 5: Component based design

- What are components
- Why do we need components
- API design best practices
- Component design
- DTO's

You need to be able to design one or more components in UML with StarUML

Lesson 6: SOA and spring integration

- Hub and spoke
  - Characteristics, advantages, disadvantages
- SOA
  - Characteristics, advantages, disadvantages
- Integration patterns

You need to understand all given patterns. You do not need to draw the given pictures, but you need to understand them.

- Spring integration

You need to understand the concepts of how spring integration works.
You need to be able to understand the XML configuration for the following patterns

- Service activator
- Gateway
- Channels
- Point-to-point vs. Publish-subscribe
- Synchronous vs asynchronous
- Custom router
- Filter

You do not need to write XML configuration (but you need to understand a given XML file).
You do need to know how to write Java implementation of the following patterns:

- Custom router
- Filter

Lesson 7

Monolith: advantages and disadvantages
Characteristics of a microservice
Advantages and disadvantages of a microservice
Microservice and database
Microservice and UI, micro-front-ends
Microservice boundaries
Domains: core, supporting and generic
Microservice in the organization:
devops team
Conways law

Feign
Registry
You do not need to write feign or registry code or configuration. You do need to understand the core principles of these techniques.