

A&K AKADÉMIA - Junior Java Software Developer course

Java SE

- Variables, operators
- Primitive and reference types
- Loops
- Methods
- Stack and heap
- String and String concatenation
- Handling user input
- File operations
- Exception handling
- Maven / Gradle basics
- Java history and most important milestones
- Debugging

OOP

- OOP principles
- SOLID principles
- Visibility modifiers
- Enums
- Records
- Static vs non-static
- Abstract classes
- Interfaces
- Final, sealed, default and other important keywords
- Garbage collection
- Threading
- Thread, Runnable, Callable
- Executor Framework, ThreadPool
- Virtual threads

Design patterns basics

- Design patterns: Singleton, Factory, Builder, Prototype, Strategy, etc.

Methodology

- Clean code
- TDD, BDD
- Agile, Scrum
- Planning, daily standup, retro and other ceremonies
- Jira, Confluence
- Pair programming, common project works
- How to contribute to open-source projects

Algorithms

- Big O
- Linear + binary search
- Sorting in theory and practice
- Sieve of Eratosthenes
- Sliding window technique

Git

- Centralized vs distributed VCS
- Command line basics
- Git commands: add, commit, push, rebase, pull, fetch, status, cherry-pick, log, aliases, etc.
- Github: pull requests

Testing

- JUnit 5 - Basic assertions - Parameterized testing
- Mockito - Mocking (+stub, spy) - ArgumentCaptor
- API testing with Postman
- Integration testing

AI and software development

- CoPilot and different AI-powered solutions
- The limitations of AI

Data structures

- List, Set, Map and implementations
- Algorithmic complexity of each implementation (Big O)
- Guava (MultiMap and others)

SQL basics

- Relational databases and SQL fundamentals
- Basic SQL queries: SELECT, WHERE, ORDER BY, LIMIT
- Filtering data: WHERE, LIKE, IN, BETWEEN
- Aggregation: GROUP BY, HAVING, COUNT, SUM, AVG, MIN, MAX
- Joins: INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN
- Subqueries and Common Table Expressions (CTE)
- Modifying data: INSERT, UPDATE, DELETE
- Constraints and indexing: Primary key, foreign key, unique, indexes
- Transactions and ACID properties

Projects

- Open source project contribution
- Own back-end or full-stack projects
- Contribution in A&K Academy projects

Spring, Spring boot basics

- Spring vs Spring boot
- Basic annotations: Component, Controller, Service, Repository
- App layers
- JPA and Hibernate basics: mapping entities to tables, relationships (@OneToOne, @OneToMany, @ManyToOne, @ManyToMany)
- Bean scopes
- REST, ResponseEntity
- HTTP responses
- ExceptionHandler

Front-end introduction

- HTML
- CSS
- Javascript
- React

Dev-ops introduction

- CI/CD
- AWS basics

JDBC + JPA / Hibernate

- Statement, PreparedStatement
- SQLi
- Connection
- JpaRepository, CrudRepository