LESSON 12



Java

Build a Real App

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JAVA PROGRAMMING

LESSON 12

Project: Build Tools, Testing and a Real App

Maven and Gradle, JUnit 5, packaging a JAR, and next steps

Maven and Gradle

terminal

```
gradebook/
├── pom.xml                (Maven)  or  build.gradle.kts
├── src/main/java/edu/mwu/GradeBook.java
└── src/test/java/edu/mwu/GradeBookTest.java
$ mvn package        # or: ./gradlew build
```

- Real projects use a build tool. Maven and Gradle download libraries, compile, run tests and …
- Both use the same standard layout: source code in src slash main slash java, and tests in …

01

The Gradebook App

GradeBook.java

```
record Student(String name, String city, double score) {
    static Student parse(String line) {
        String[] p = line.split(",");
        return new Student(p[0], p[1], Double.parseDouble(p[2]));
    }
}
Map<String, Double> avg = Files.lines(Path.of(args[0]))
    .skip(1).map(Student::parse)
    .collect(groupingBy(Student::city, averagingDouble(Student::score)));
```

- Our project reads a CSV of students, computes averages per city with streams, and prints a …
- It combines a record, Files dot lines, Collectors and Optional, all from this course.

02

Testing with JUnit 5

GradeBookTest.java

```java
class GradeBookTest {
    @Test
    void parsesLine() {
        var s = Student.parse("Mariam,Kabul,95");
        assertEquals("Kabul", s.city());
        assertEquals(95.0, s.score());
    }
    @Test
    void rejectsBadScore() {
        assertThrows(NumberFormatException.class, () -> Student.parse("A,B,x"));
    }
}
```

- JUnit is Java's standard testing framework. Mark methods with at-Test and check results …
- Parameterized tests run one test with many inputs.

03

Packaging and Running

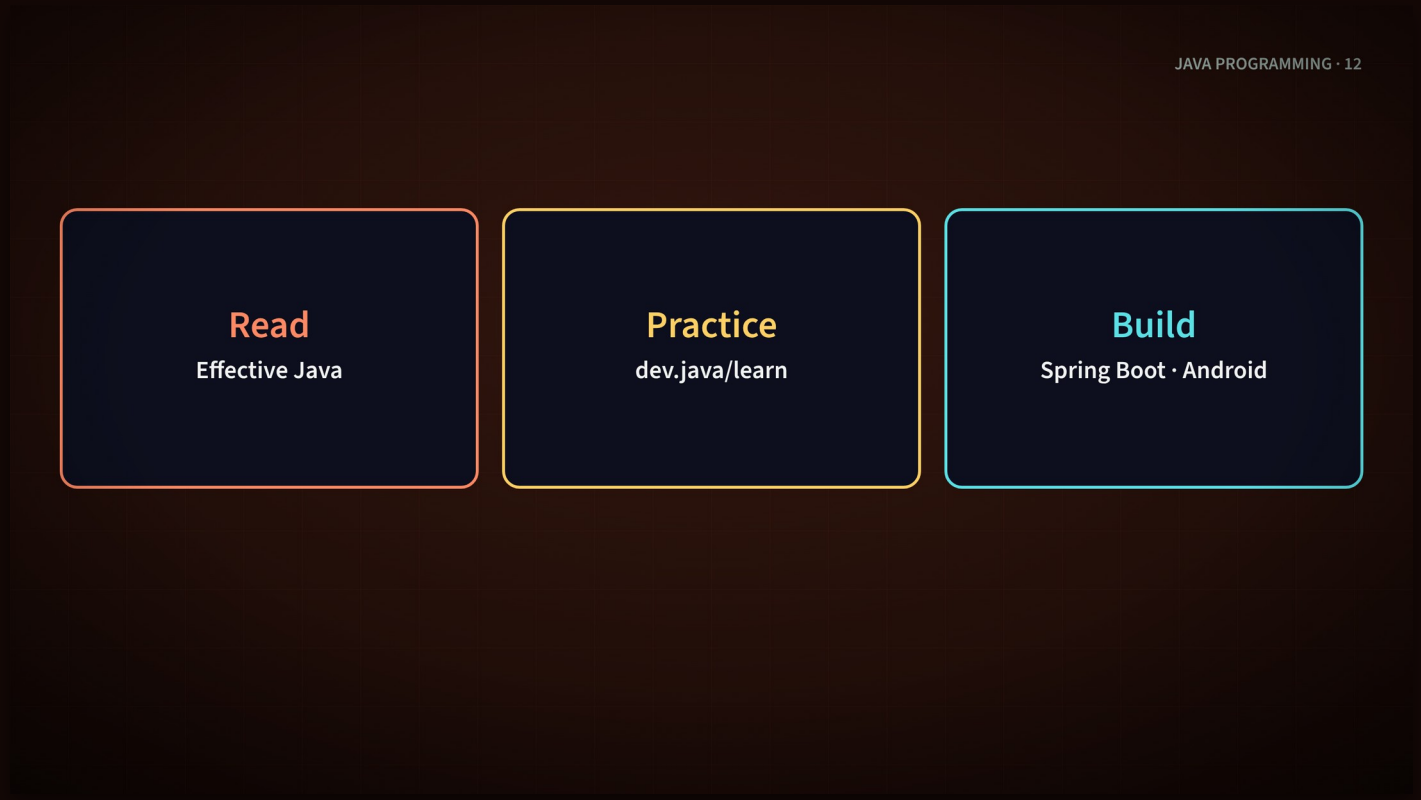
terminal

```
$ mvn package
[INFO] Tests run: 2, Failures: 0, Errors: 0
[INFO] BUILD SUCCESS
$ java -jar target/gradebook.jar students.csv
Kabul  91.5
Herat  87.0
```

- mvn package runs the tests and builds a JAR file. java dash jar runs it anywhere a JVM is …
- For servers, frameworks like Spring Boot and Quarkus build on everything you learned here.

04

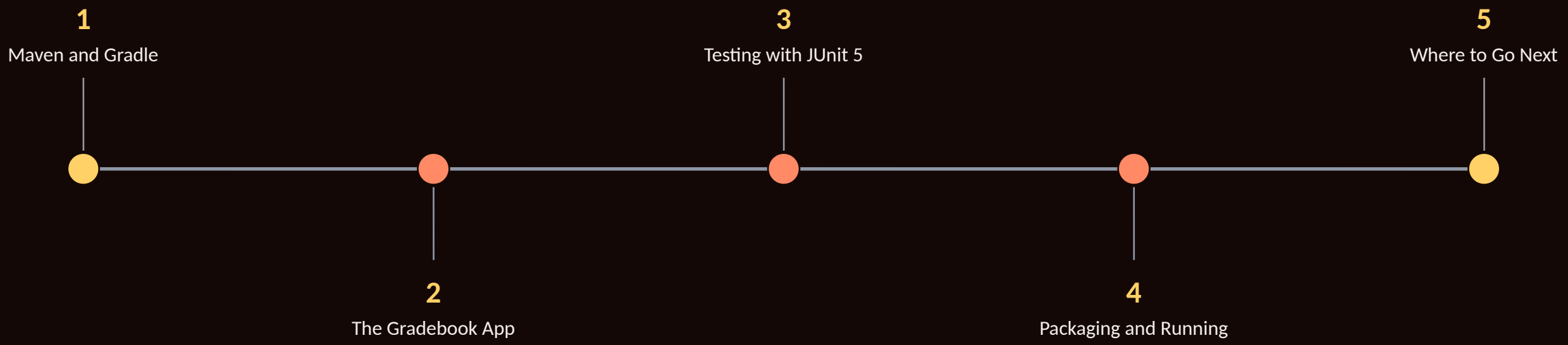
Where to Go Next



- Read — Effective Java
- Practice — dev.java/learn
- Build — Spring Boot · Android

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Lesson Map


1
Maven and Gradle
2
The Gradebook App
3
Testing with JUnit 5
4
Packaging and Running
5
Where to Go Next

Sources and Further Reading

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Thank you for watching

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