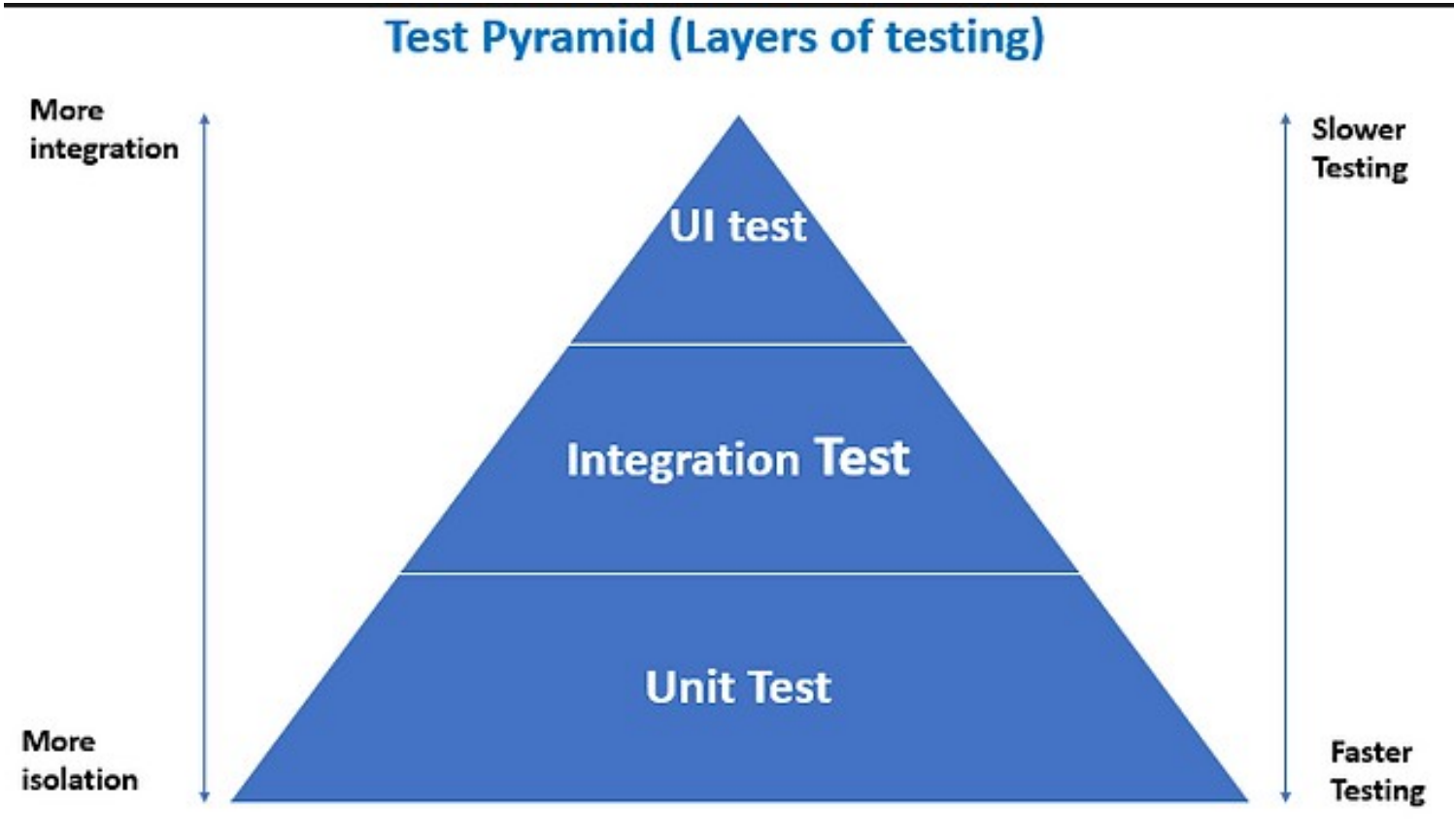


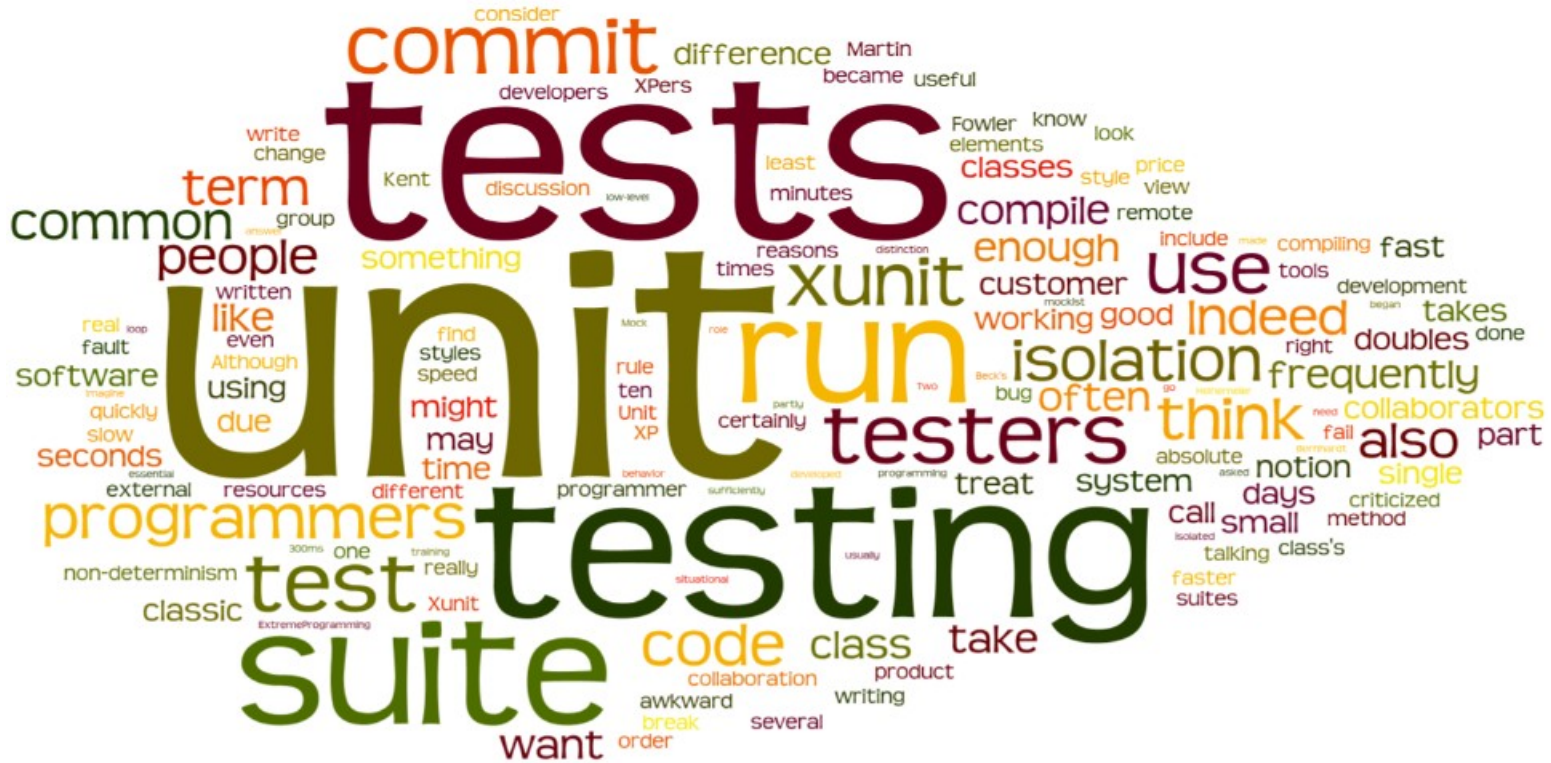
Unit Testing

- 01. Testing pyramid?
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Testing Pyramid



What is Unit Testing



Advantages of unit testing?

- Improve Quality and Performance
- Allows for Documentation
- Find software bugs early
- Reduce the costs

Disadvantages of Unit Testing?

- Unit testing takes time
- Unit testing is difficult for legacy code
- Unit testing is difficult for GUI code
- Unit testing can't catch all errors

Install Git + TortoiseGit, JAVA 17 JDK, IDE Eclipse, Lombok

1. Git -> <https://git-scm.com/>

2. TortoiseGit -> <https://tortoisegit.org/download/>

3. JAVA JDK 17 ->

<https://www.oracle.com/java/technologies/downloads/#jdk17-windows>

4.

https://www.eclipse.org/downloads/download.php?file=/technology/epp/downloads/release/2023-09/R/eclipse-jee-2023-09-R-win32-x86_64.zip

5. Install lombok →

- <https://projectlombok.org/download>

- Run lombok JAR with the command: **java -jar lombok.jar**

Testing Frameworks - JUNIT

- Junit is the most widely used testing framework in Java.
- Junit comes bundled with many popular IDEs such as IntelliJ IDEA, Eclipse, NetBeans, and Visual Studio Code and build tools such as Maven, Gradle, and Ant
- Junit is the default testing module in Spring Boot Framework
- Junit serves as a foundation for developing and launching testing framework on the JVM
- Junit provides basic assertion methods.

JUNIT - How to Write the First Test

- Assertions.assertEquals()

```
public int compare(int n1, int n2) {  
    if (n1 > n2) return 1;  
    else if (n1 < n2) return -1;  
    return 0;  
}
```


The AAA Pattern - Arrange/Act/Assert

```
@Test
@DisplayName("Compare two numbers, first number is bigger than the
second, then return 1")
public void compareTwoNumbers_whenFirstIsBiggerThanSecond_return1() {
    // Arrange
    Basic basic = new Basic();

    // Act
    int result = basic.compare(5, 3);

    // Assert
    Assertions.assertEquals(1, result);
}
```

JUNIT 5 Assertions

- `Assertions.assertEquals()`
- `Assertions.assertArrayEquals()`
- `Assertions.assertTrue()`
- `Assertions.assertFalse()`
- `Assertions.assertAll()`

Annotations

- `@Test`
- `@DisplayName`
- `@RepeatedTest`
- `@BeforeEach`
- `@AfterEach`
- `@BeforeAll`
- `@AfterAll`
- `@Disabled`
- `@ParameterizedTest`

JUNIT 5 with HARMCREST

While the assertion methods in JUnit5 greatly improved compared to JUnit4, Hamcrest assertions are still better. Luckily you can use them together with JUnit5 even if JUnit5 dropped the `assertThat(...)` method that is necessary for invoking a Hamcrest matcher.