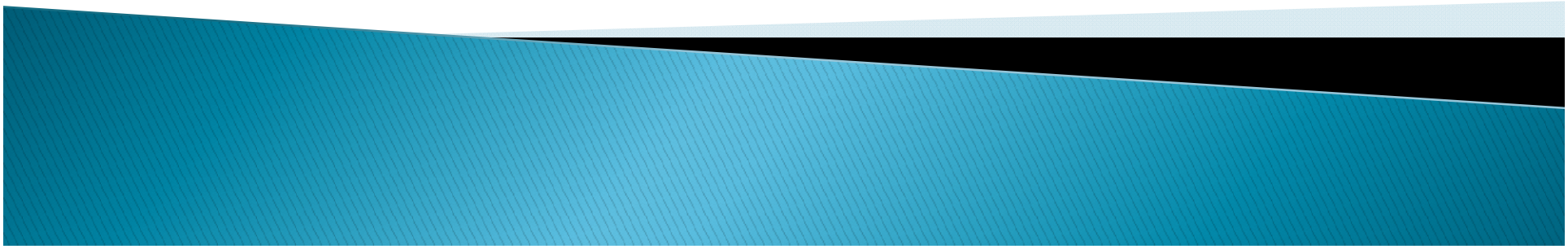
หลักสูตร “Test Driven Development (TDD) with Java and Spring Boot”

โค้ชเอก

Codingthailand.com



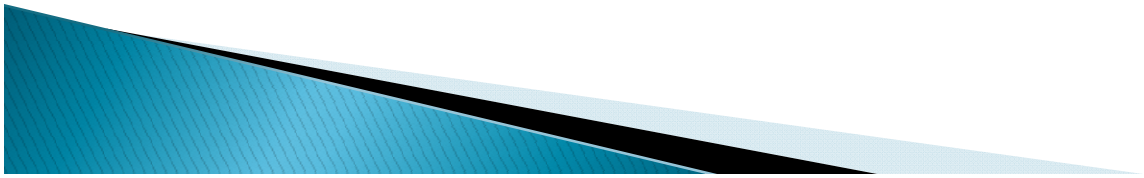
โปรแกรมที่ต้องติดตั้งก่อน

- 1. ติดตั้ง JAVA JDK เวอร์ชัน 8 หรือใหม่กว่า

https://www.oracle.com/java/technologies/javase/javase-jdk8-downloads.html

- 2. ดาวน์โหลด Gradle ที่ลิงก์

  https://gradle.org/next-steps/?version=6.7&format=all



โปรแกรมที่ต้องติดตั้งก่อน

- 3. ติดตั้ง IntelliJ เวอร์ชัน Community

https://www.jetbrains.com/idea/download/#section=windows

หรือ

https://www.jetbrains.com/idea/download/download-thanks.html?platform=windows&code=IIC

- 4. ติดตั้ง Postman

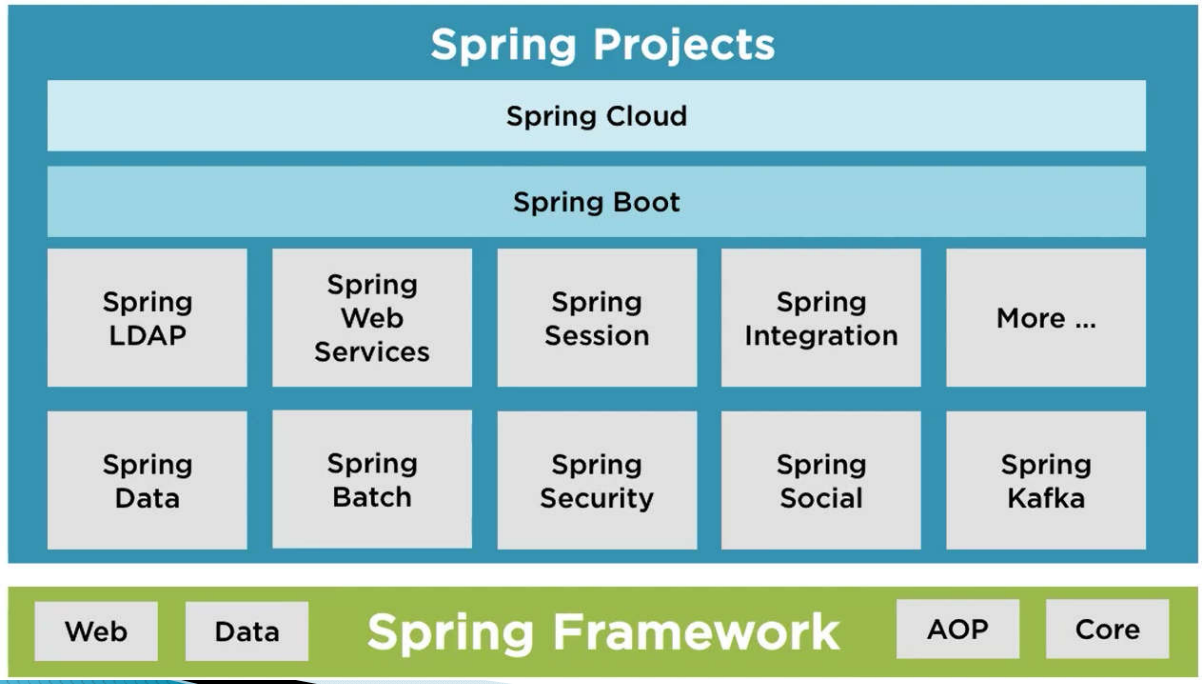
https://www.postman.com/downloads

- 5. ติดตั้ง git ที่นี่ https://git-scm.com/downloads

(คลิกปุ่ม Download 2.x for Windows)

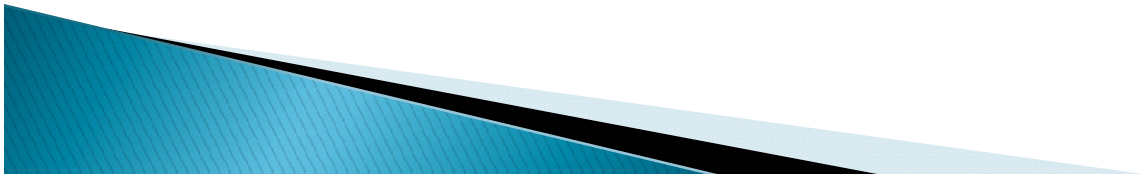
ภาพใหญ่ของ Spring และ Spring Boot

- “Spring” mean the entire family of projects.



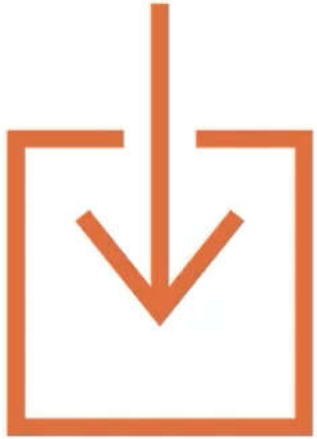
Spring Boot

- Spring Boot makes it easy to create stand-alone, production-grade, Spring-based applications that you can ‘just run’.

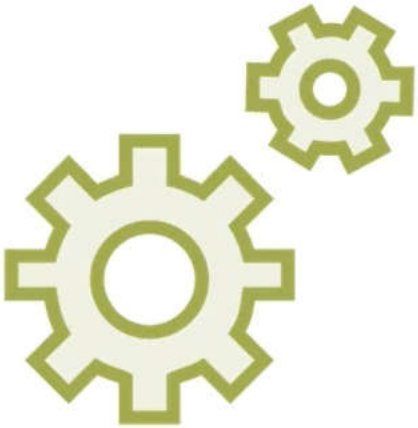


Typical Process for Running Java Web Applications

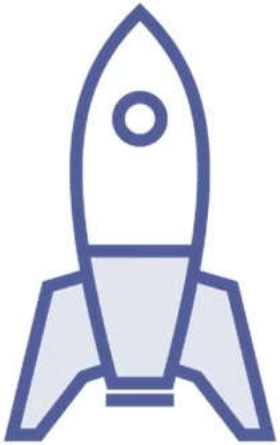
Package Application



Choose & Download Webserver



Configure Webserver



Deploy Application & Start Webserver

```
java -jar my-application.jar
```

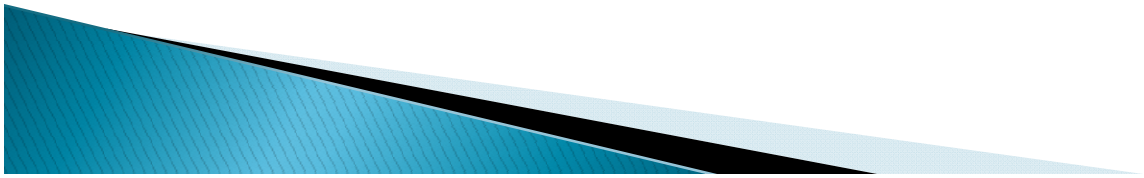
Applications That "Just Run"

1. **Package application**
2. **Run the application**

แบบฝึกหัด

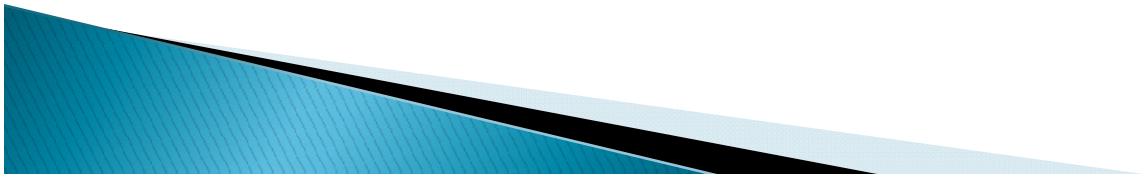
- ทดลองสร้างโปรเจค Spring Boot

- https://start.spring.io/



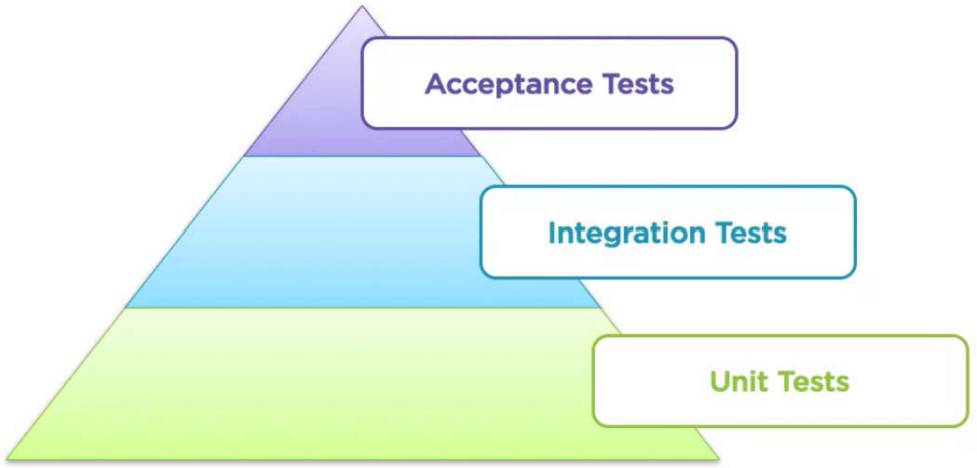
ทำไมต้องเขียน Test?

- เพิ่มคุณภาพให้กับ software
- มั่นใจว่าโค้ดที่เขียนเป็นไปตามที่เราต้องการจริงๆ
- มั่นใจว่าเมื่อแก้โค้ดแล้วไม่กระทบกับส่วนอื่นๆ
- เป็นแนวปฏิบัติที่ดีสำหรับหลายๆ องค์กร
- เปลี่ยนโค้ดที่มีอยู่แล้วด้วยความมั่นใจ
- ได้รับข้อแนะนำ ผลตอบรับที่รวดเร็วว่าเขียนโค้ดได้ถูกต้อง



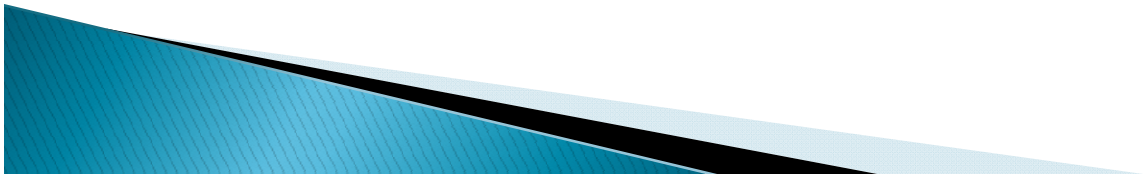
Type of Testing

- Software Testing
  - Unit Testing
  - Integration Testing
  - Acceptance Testing



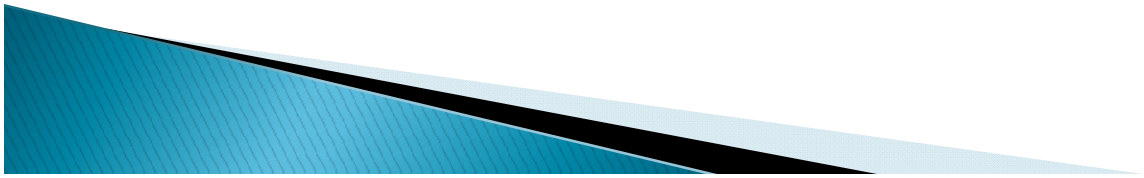
Unit Tests / Unit Testing

- Designed to test specific sections of code
  - Percentage of lines of code tested is code coverage
  - Ideal coverage is in the 70-80% range
  - Should be ‘unity’ and execute very fast
  - Should have no external dependencies
  - ie no database, no Spring context, etc



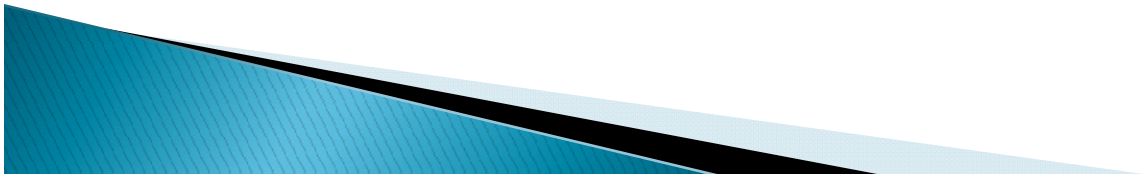
Integration Tests

- Designed to test behaviors between objects and parts of the overall system
  - Much larger scope
  - Can include the Spring Context, database, and message brokers
  - Will run much slower than unit tests

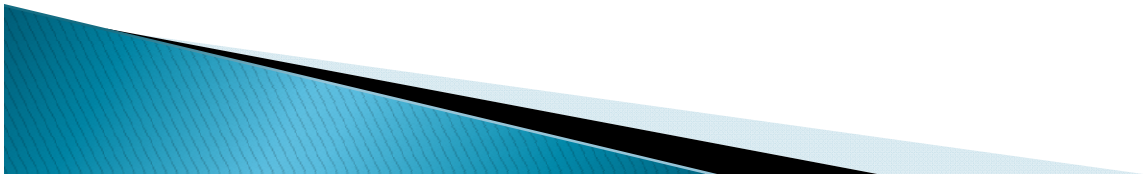


Acceptance Testing / Functional Test

- Typically means you are testing the running application
  - Application is live, likely deployed in a known environment
  - Functional touch points are tested - (i.e. Using a web driver, calling web services, sending / receiving messages, etc)

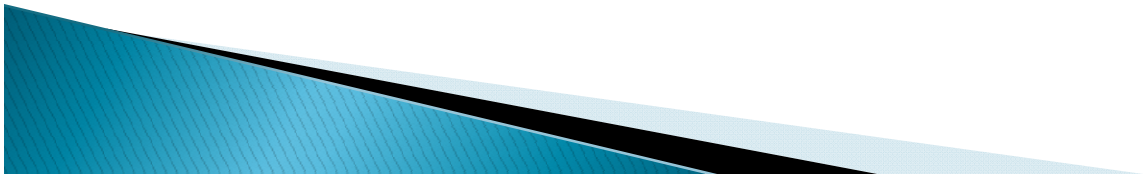


Agile Testing Methods



Agile Testing Methods

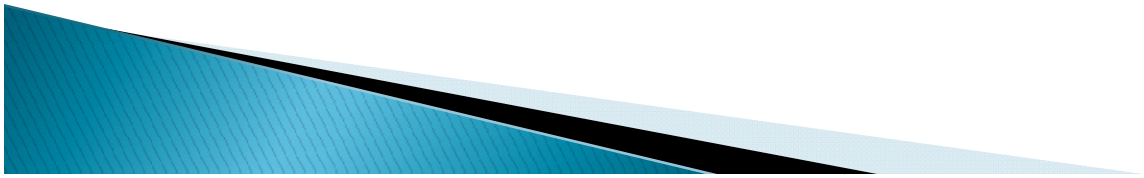
- **TDD - Test Driven Development**
  - Write tests firsts, code to ‘fix’ tests, refactor code to cleanup, improve etc
- **BDD - Behavior Driven Development**
  - Very similar to TDD
  - Describes the expected behavior of software
  - Often expressed as: when / then; given / when / then



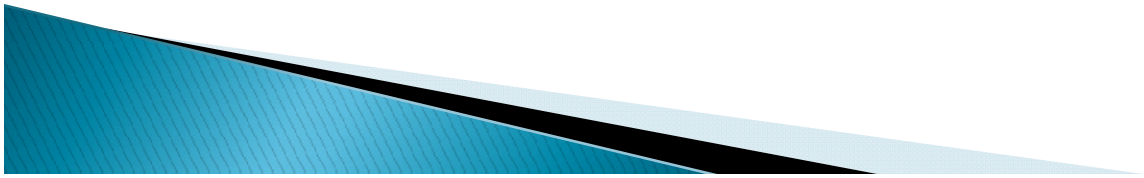
Testing Components

- **Mocks** - A fake implementation of a class used for testing
  - A test double for dependent objects - like a datasource
  - Can provide expected responses
  - Can verify expected interactions

- **Spy** - Like a mock, but real object is used
  - Mocks completely replace expected object
  - Spys are wrappers, but with real object inside

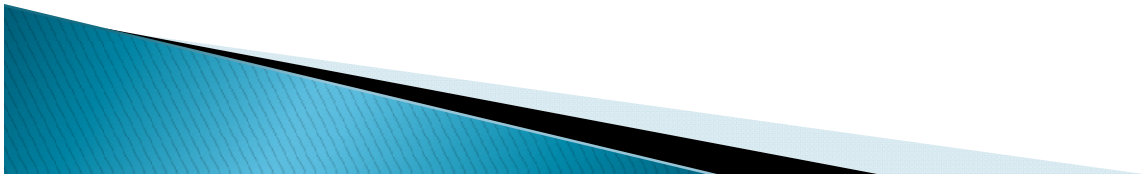


Framework สำหรับ Testing



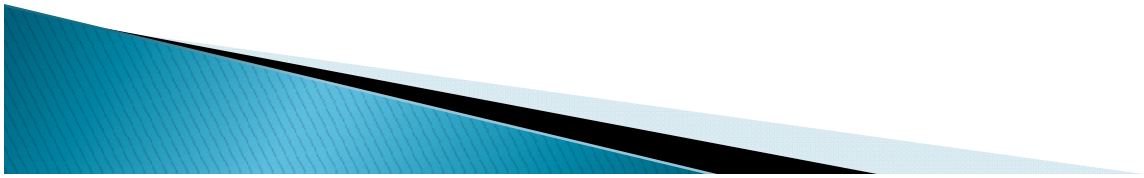
JUnit

- The most popular testing framework for Java.
- Currently JUnit 4 is widely used in the industry
- JUnit 5 was released in September of 2017
  - Rapidly gaining popularity
- JUnit 5 will be the primary focus in this course



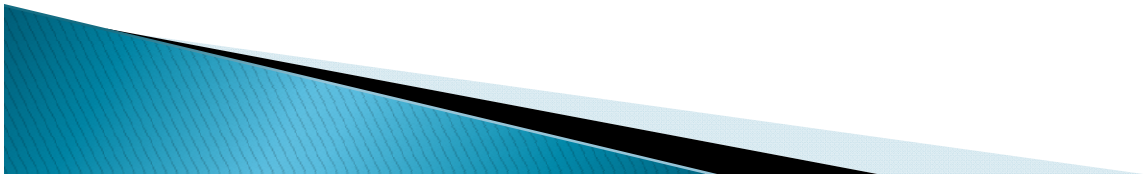
Mockito

- Mocking framework for testing
- Only does mocks
- Need to use with testing framework such as JUnit or TestNG
- Top 10 Java Library
- Very popular for testing Spring applications

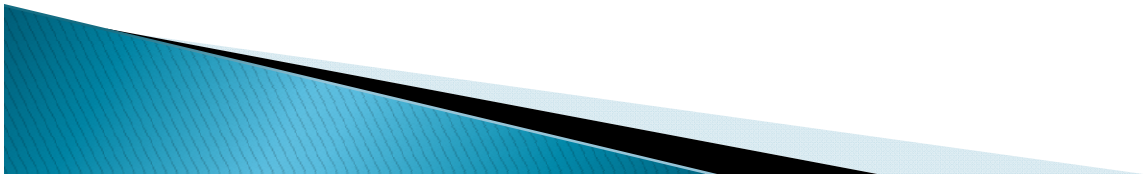


Spring MVC Test

- Testing module found in the Spring Framework
- Very versatile for testing Spring MVC Controllers
- Provides mock Servlet environment
- Used in conjunction with a testing framework such as JUnit, TestNG, or Spock



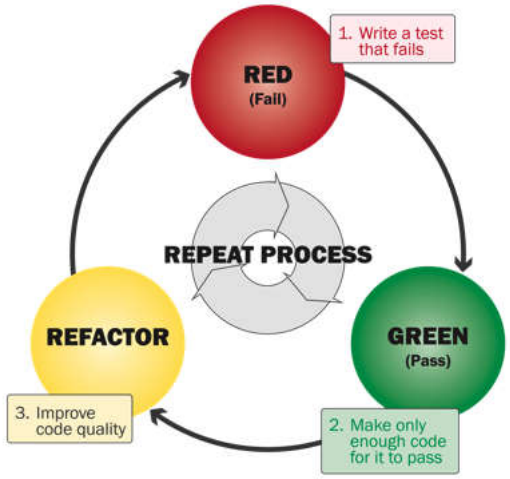
Test-driven Development (TDD)



Test-driven Development (TDD)

- TDD คือ กระบวนการพัฒนาซอฟต์แวร์แบบนึงที่นำ requirements ของซอฟต์แวร์เปลี่ยนไปเป็นชุดทดสอบก่อนจะพัฒนาจริง

- *เขียนโปรแกรมเพื่อ Test ก่อนจะเริ่มเขียน Code โปรแกรมจริง (Coding)*

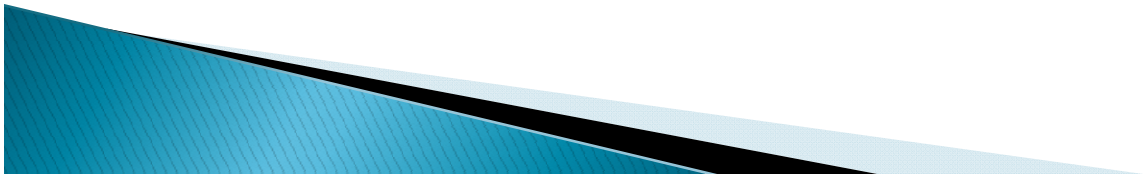


TDD History


JUnit
Kent Beck
Erich Gamma
NASA
"Simple Smalltalk Testing"
SUnit
Kent Beck
eXtreme Programming
Kent Beck
TDD: By Example
Kent Beck
1960s
1994
1999
2002

สรุป หลักการเขียน TDD

1. นำ test cases แปลงเป็นโค้ด แล้ว run ให้มัน fail ก่อน
2. แก้ไขโค้ดที่ fail ให้มันผ่าน โดยออกแรงให้น้อยที่สุด หรือไม่จำเป็นต้องเขียนโค้ดให้ดีมากก็ได้
3. หลังจากรันผ่านแล้ว ก็ให้แก้ไขโค้ดทำมันเป็นโค้ดที่ดีขึ้นกว่าเดิม โดยหลังจากที่แก้แล้วโค้ดจะต้องรันแล้วผ่านเหมือนเดิม



Testing Frameworks and Tools

SUnit (Smalltalk)

↓

JUnit (Java)

NUnit **RUnit** **CppUnit** **EUnit** **PerlUnit** **PHPUnit** **xUnit.net**

Mocha **AVA** **py.test** **minitest** **FsTest**

https://en.wikipedia.org/wiki/List_of_unit_testing_frameworks

Verification Concepts

Assert

```
Assert.IsTrue(someBoolean);
Assert.IsFalse(someBoolean);
```

```
someBoolean.Should().BeTrue();
```

```
Assert.IsNull(someValue);
```

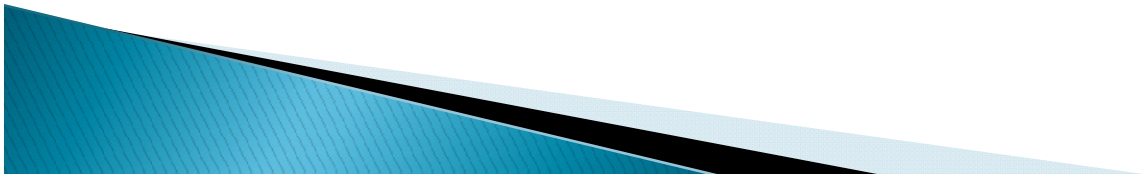
```
someList.Should().HaveCount(4);
```

```
Assert.AreEqual(3, someValue);
```

```
Assert.Contains(obj, someCollection);
```

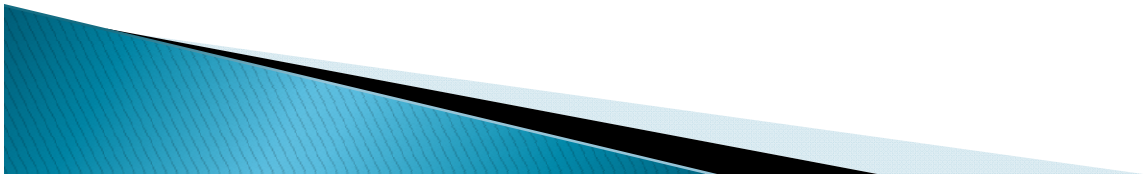
```
someString.Should()
    .StartWith("Hello")
    .And
    .EndWith("World");
```

```
Assert.StartsWith("foo", someString);
```



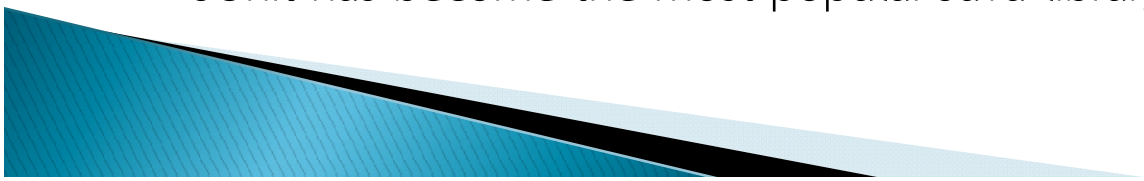
Junit

https://junit.org



JUnit History

- **Kent Beck** - known as the creator of Extreme Programming and one of the 17 original signers of the Agile Manifesto and well known for being a proponent of Test Driven Development:
  - "Write new code only if an automated test has failed."
- Kent Beck in the 1990's wrote SUnit, a testing framework for Smalltalk.
- Using SUnit as a starting point Beck partnered with Erich Gamma to write JUnit in 1998
- Gamma is one of the Gang of Four (aka GoF)
- JUnit has become the most popular Java library in history



Road to JUnit 5

- Started as a project called JUnit Lambda
- Crowdfunding campaign in 2015 raised €54,000
- Corporate Sponsors include Pivotal and American Express
- First GA Release of JUnit 5 was on September 10th, 2017
- Leverage features of Java 8
  - Lambda expressions
  - Streams
  - Java 8 or higher is required
- Redesigned for better integration and extensibility

JUnit Annotations

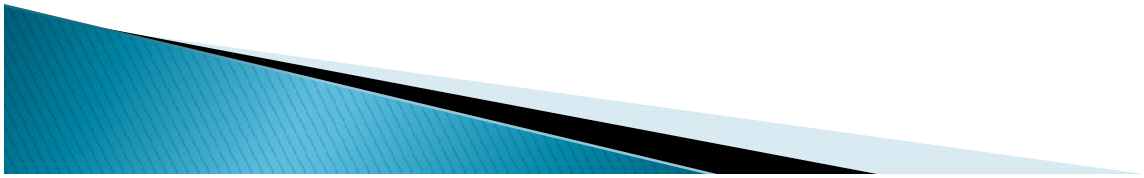
Annotation	Description
@Test	Marks a method as a test method
@ParameterizedTest	Marks method as a parameterized test
@RepeatedTest	Repeat test N times
@DisplayName	Human friendly name for test
@BeforeEach	Method to run before each test case
@AfterEach	Method to run after each test case

https://junit.org/junit5/docs/current/user-guide/#writing-tests-annotations

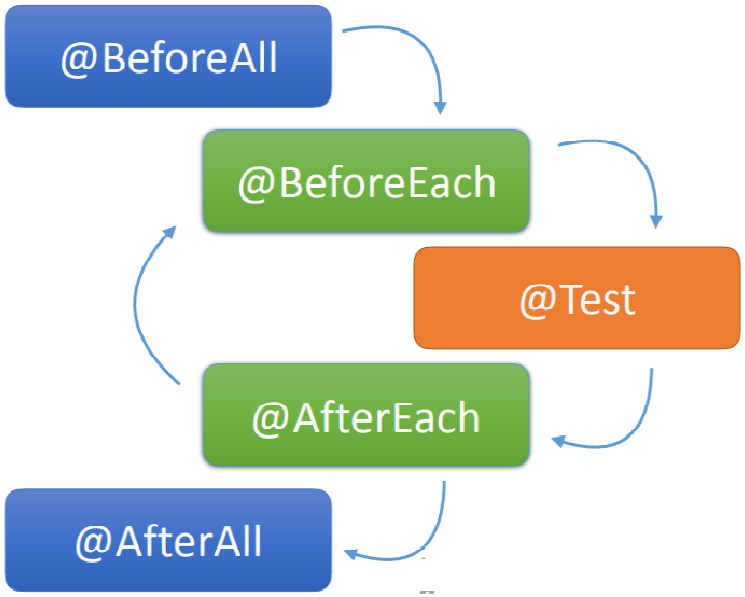
JUnit Annotations

Annotation	Description
@BeforeAll	Static method to run before all test cases in current class
@AfterAll	Static method to run after all test cases in current class
@Disabled	Disable test or test class
@ExtendWith	Used to register extensions

https://junit.org/junit5/docs/current/user-guide/#writing-tests-annotations

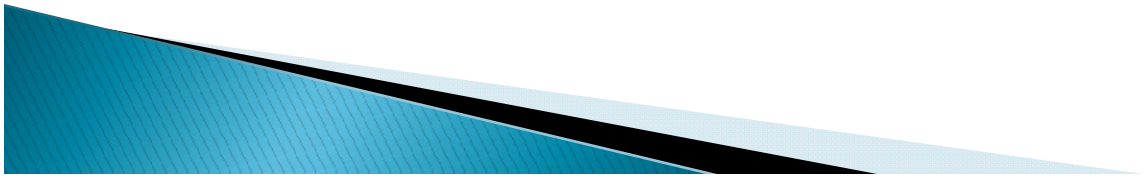


JUnit Test Lifecycle



ทดลองเขียน JUnit

- แบบฝึกหัด JUnit



The end