

# **SECTION 2:**

## **Test-Driven Development Approach**

# Test-Driven Development Approach: Roadmap

- Definition of Test-Driven Development
- Workflow of Test-Driven Development Process
- Unit test Framework – Introduction
- TDD Kata

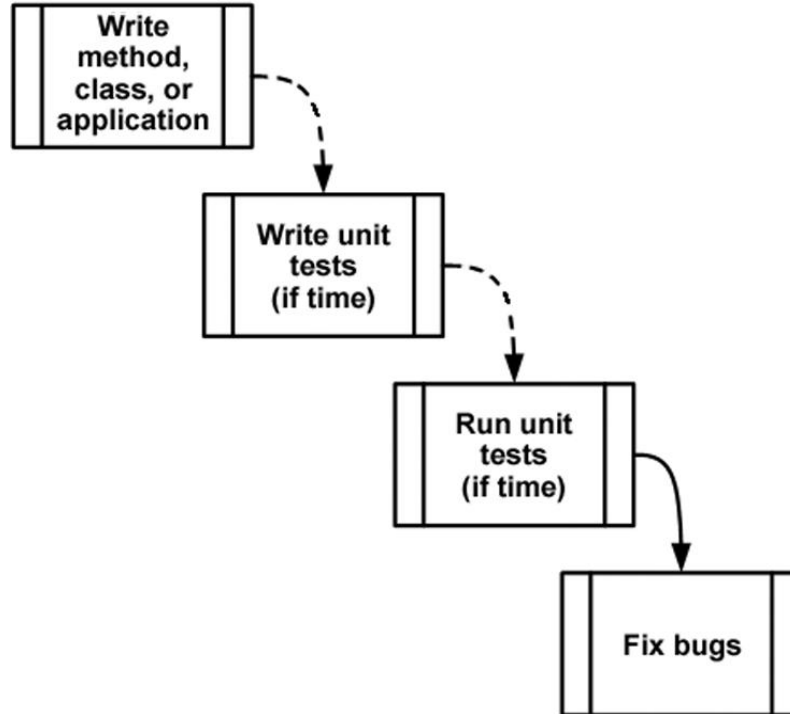
# Test-Driven Development Approach: Roadmap

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# Test-Driven Development Approach:

## Definition of Test-Driven Development

- The standard process of software development:



# Test-Driven Development Approach:

## Definition of Test-Driven Development



**99 little bugs in the code.  
99 little bugs in the code.  
Take one down, patch it around.**

**127 little bugs in the code...**

# Test-Driven Development Approach:

## Definition of Test-Driven Development

- **Test-Driven development (TDD)** is a software development process that relies on the repetition of a very short development cycle: requirements are turned into very specific test cases, then the software is improved to pass the new tests, only. This is opposed to software development that allows software to be added that is not proven to meet requirements

# Test-Driven Development Approach:

## Definition of Test-Driven Development

- Test-Driven development is related to the test-first programming concepts of extreme programming, begun in 1999, but more recently has created more general interest in its own right

# Test-Driven Development Approach:

## Definition of Test-Driven Development

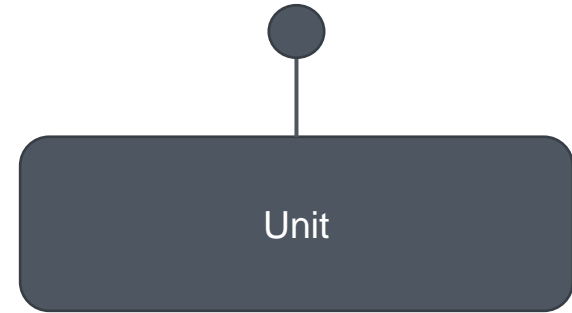
- Test-Driven Development using:
  - The Black Box testing
  - The Unit testing
- Test-Driven Development can be using in:
  - Testing of small piece of program (Module)
  - Integration Testing
  - System Testing



# Test-Driven Development Approach:

## Definition of Test-Driven Development

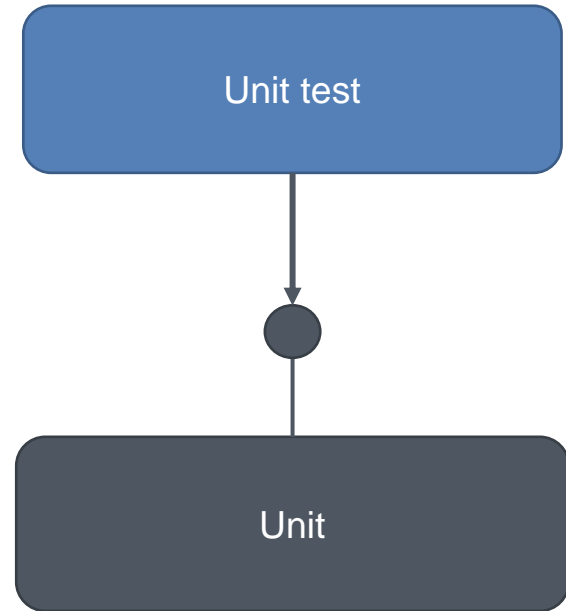
- What is a unit?
  - The Function
  - The Class
  - The Component



# Test-Driven Development Approach:

## Definition of Test-Driven Development

- What is unit test?
  - A piece of code that call unit code (function/class/component) and verify actual result with expected result
  - If actual and expected result is equal the test will passed, otherwise it fails



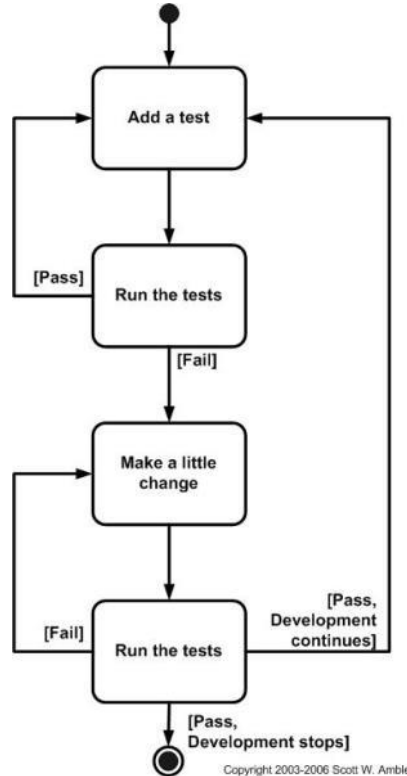
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# Test-Driven Development Approach:

## Workflow of Test-Driven Development process

- Test-First process:



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# Test-Driven Development Approach:

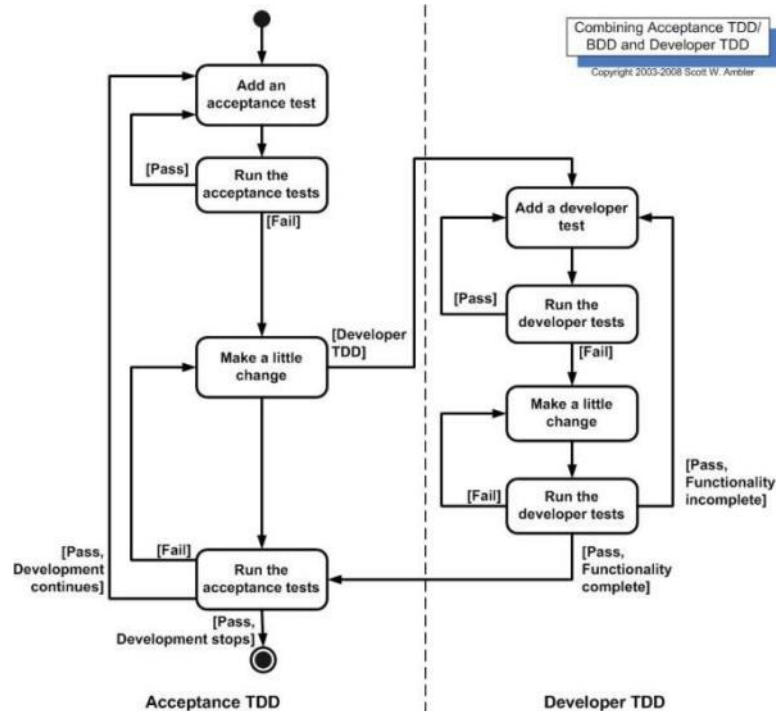
## Workflow of Test-Driven Development process

- There are two levels of TDD:
  - **Acceptance TDD (ATDD).** With ATDD you write a single acceptance test, or behavioral specification depending on your preferred terminology, and then just enough production functionality/code to fulfill that test. ATDD is also called Behavior Driven Development (BDD).
  - **Developer TDD.** With developer TDD you write a single developer test, sometimes inaccurately referred to as a unit test, and then just enough production code to fulfill that test.. Developer TDD is often simply called TDD.

# Test-Driven Development Approach:

## Workflow of Test-Driven Development process

- There are two level of TDD

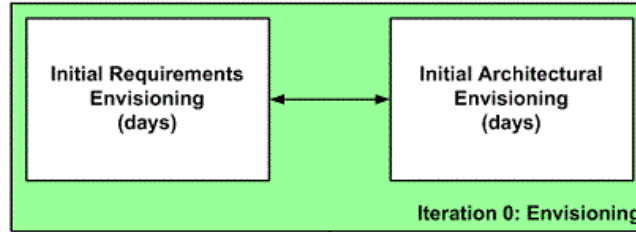


# Test-Driven Development Approach:

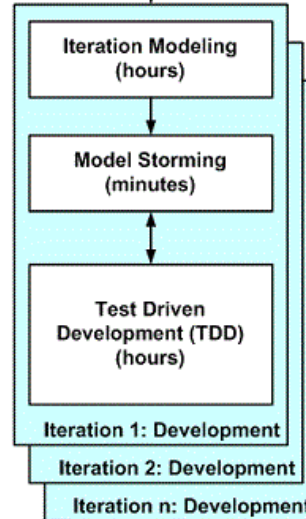
## Workflow of Test-Driven Development process

- Scaling TDD via Agile Model-Driven Development (AMDD):

- Identify the high-level scope
- Identify initial "requirements stack"
- Identify an architectural vision



- Modeling is part of iteration planning effort
- Need to model enough to give good estimates
- Need to plan the work for the iteration
- Work through specific issues on a JIT manner
- Stakeholders actively participate
- Requirements evolve throughout project
- Model just enough for now, you can always come back later
- Develop working software via a test-first approach
- Details captured in the form of executable specifications



# Test-Driven Development Approach:

## Workflow of Test-Driven Development process

- Comparing TDD and AMDD

TDD	AMDD
It shortens the programming feedback loop	It shortens the modeling feedback loop
It provides detailed specification (tests)	It is better for thinking through bigger issues
It promotes the development of high-quality code	It promotes high-quality communication with your stakeholders and other developers
It provides concrete evidence that your software works	It supports your team, including stakeholders, in working toward a common understanding
It “speaks” to programmers	It speaks to business analysts, stakeholders, and data professionals
It provides very finely grained concrete feedback on the order of minutes	It enables verbal feedback on the order minutes
helps to ensure that your design is clean by focusing on creation of operations that are callable and testable	It provides an opportunity to think through larger design/architectural issues before you code
It is non-visually oriented	It is visually oriented
It support evolutionary development	It supports evolutionary development.



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# Test-Driven Development Approach:

## Unit test Framework – Introduction

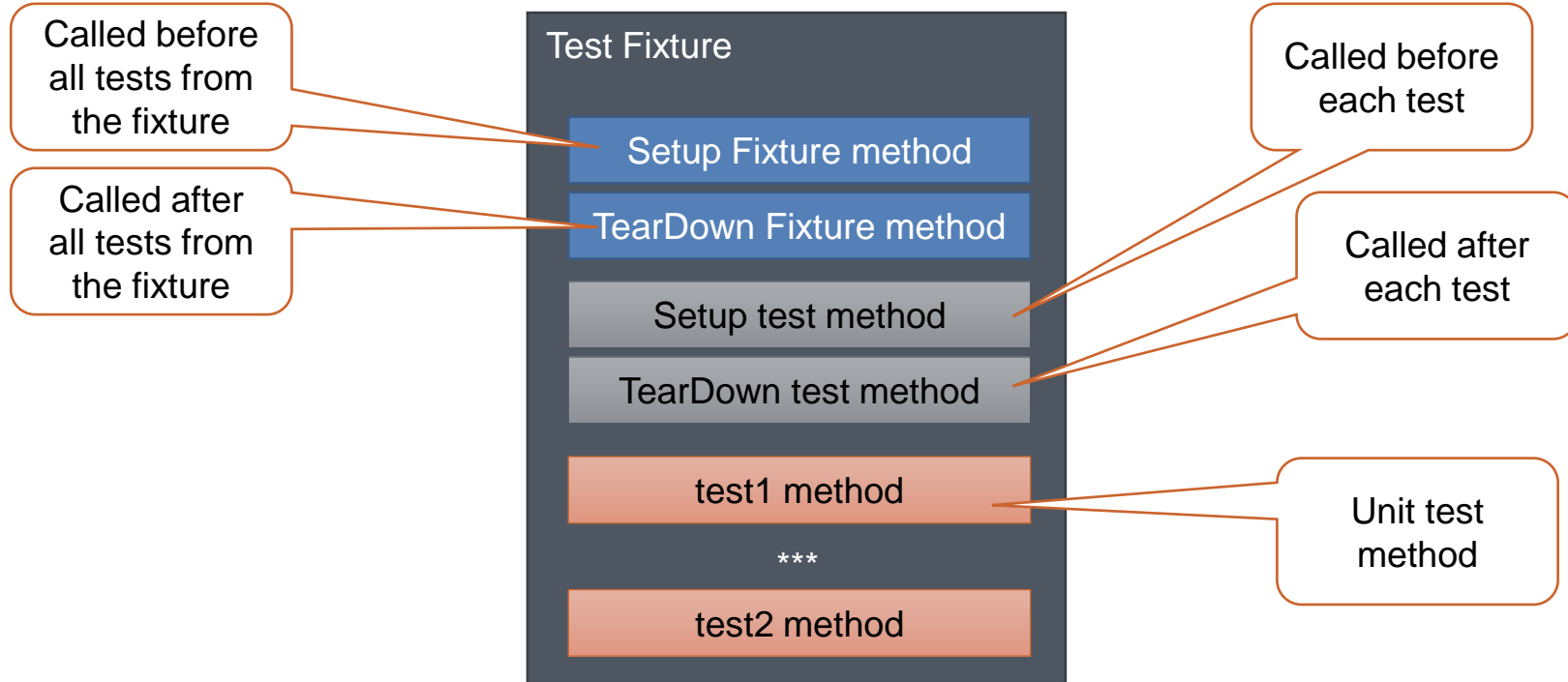
- Most popular framework for unit testing

Platform	Framework
C++	Google Test Framework, CppUnit, UnitTest++
Java	Junit
.NET	Microsoft Test, Nunit
Python	Unittesting, Doctest
JavaScript	Under node.js: Unit.js, Mocha ; YUI Test

# Test-Driven Development Approach:

## Unit test Framework – Introduction

- The unit test structure:



# Test-Driven Development Approach:

## Unit test Framework – Introduction

- The unit test method structure

Arrange

Act

Assert