# Nunit Unit Testing

# What I Learned

This document summarizes my learning and implementation experience of NUnit-based unit testing for a simple calculator project using .NET 9 in Visual Studio Code.

## Key Concepts I Learned

* Unit Testing is testing the smallest testable parts (units) of an application independently.
* Functional Testing tests the entire system behavior, while Unit Testing focuses on internal code correctness.
* NUnit is a popular testing framework for C#/.NET.
* Mocking dependencies is key to isolate the unit for true unit testing.
* Various testing types include Unit Testing, Functional Testing, Automated Testing, and Performance Testing.
* Automated Testing allows quick feedback and easier code changes.
* Loosely Coupled design helps in making code easily testable (no hard class dependencies).
* [TestFixture], [Test], [SetUp], [TearDown], [Ignore] and [TestCase] are important NUnit attributes.
* Parameterized test cases make it easy to test multiple scenarios using [TestCase] attribute.

## Steps I Followed

1. Created a solution with two projects: CalcLibrary (class library) and CalcLibrary.Tests (NUnit test project).
2. Set both projects to target .NET 9.0 in their respective .csproj files.
3. Added reference of CalcLibrary in CalcLibrary.Tests.
4. Installed NUnit, NUnit3TestAdapter, and Microsoft.NET.Test.Sdk packages.
5. Wrote the Calculator class with an Add method.
6. Created CalculatorTests class with [TestFixture] attribute.
7. Used [SetUp] and [TearDown] to manage initialization and cleanup.
8. Wrote [Test] methods using [TestCase] for parameterized testing.
9. Used Console.WriteLine to print output inside test methods since .NET 9 is not fully supported by VS Code Test Explorer.
10. Ran tests using 'dotnet test' and validated successful execution in the terminal.

## Sample Output from dotnet test

[Example Output]

Test summary: total: 4, failed: 0, succeeded: 3, skipped: 1

Console Output:

Add(1, 2) = 3  
Add(-1, -2) = -3  
Add(0, 0) = 0

## Output Screenshot:

