#Introduction

Unit testing, a testing technique using which individual modules are tested to determine if there are any issues by the developer himself. It is concerned with functional correctness of the standalone modules.

The main aim is to isolate each unit of the system to identify, analyze and fix the defects.

#Unit Testing - Advantages:

- Reduces Defects in the Newly developed features or reduces bugs when changing the existing functionality.

- Reduces Cost of Testing as defects are captured in very early phase.

- Improves design and allows better refactoring of code.

- Unit Tests, when integrated with build gives the quality of the build as well.

#Tools

- xUnit

- JUnit

- NUnit

- TestNG

##xUnit

###Advantages

- It Free, open source, community-focused unit testing tool for the .NET Framework

- These frameworks derive their structure and functionality from Smalltalk’s SUnit. Following its introduction in Smalltalk, the framework was ported to Java and it gained wide popularity

- Works with CodeRush, TestDriven.NET, ReSharper and Xamarin.

###Disadvantages

- XUnit does not appear to have explicit built-in support for external data source-based testing.

##JUnit

###Advantages

- Programmers become more productive

- Increase the Quality of the developed code.

- Easily run regression tests, i.e. run your tests again and again.

- You could write the tests before writing the code.

- Can be composed into a hierarchy of test suits.

###Disadvantages

- JUnit has disadvantages in different testing areas, a major one being that it can only run tests on one JVM (Java virtual machine).

##TestNG

###Advantages

- It gives the facility to produce HTML Reports of implementation.

- Annotation have made testers life easier.

- Test case can be Prioritized and Grouped more easily.

- It makes Parallel testing easier.

- Logs can be generated.

- It makes Data Parameterization possible.

###Disadvantages

- simple

##NUnit

###Advantages

- fast

- test isolation

- environment isolation - use Mock Object-s

- unit testing gives you a safety net when programmers refactor or add functionality

- unit tests can be used as documentation for other programmers

development process becomes more flexible.

###Disadvantages

- Unnecessary Unit Tests can lead to considerably high maintenance cost to your overall project.

##Others:

Some language has built in support on unit testing like Python, Matlab , Apex , Ruby, Rust and D. In built in support it is easier to develop the project and complete unit testing at same interface.

Disadvantage would be not being to do developing efficiently.