Testing is the process of checking the functionality of an application to ensure it runs as per requirements. Unit testing comes into picture at the developers’ level; it is the testing of single entity (class or method).

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| **Manual Testing** | **Automated Testing** |
| Executing a test cases manually without any tool support is known as manual testing. | Taking tool support and executing the test cases by using an automation tool is known as automation testing. |
| **Time-consuming and tedious** − Since test cases are executed by human resources, it is very slow and tedious. | **Fast** − Automation runs test cases significantly faster than human resources. |
| **Huge investment in human resources** − As test cases need to be executed manually, more testers are required in manual testing. | **Less investment in human resources** − Test cases are executed using automation tools, so less number of testers are required in automation testing. |
| **Less reliable** − Manual testing is less reliable, as it has to account for human errors. | **More reliable** − Automation tests are precise and reliable. |
| **Non-programmable** − No programming can be done to write sophisticated tests to fetch hidden information. | **Programmable** − Testers can program sophisticated tests to bring out hidden information. |

What is JUnit ?

JUnit is a unit testing framework for Java programming language. It plays a crucial role test-driven development, and is a family of unit testing frameworks collectively known as xUnit.

**Features of JUnit**

* JUnit is an open source framework, which is used for writing and running tests.
* Provides annotations to identify test methods.
* Provides assertions for testing expected results.
* Provides test runners for running tests.
* JUnit tests allow you to write codes faster, which increases quality.
* JUnit is elegantly simple. It is less complex and takes less time.
* JUnit tests can be run automatically and they check their own results and provide immediate feedback. JUnit tests can be organized into test suites containing test cases and even other test suites.
* JUnit shows test progress in a bar that is green if the test is running smoothly, and it turns red when a test fails.

## What is a Unit Test Case ?

A Unit Test Case is a part of code, which ensures that another part of code (method) works as expected. To achieve the desired results quickly, a test framework is required. JUnit is a perfect unit test framework for Java programming language.

JUnit is a **Regression Testing Framework** used by developers to implement unit testing in Java, and accelerate programming speed and increase the quality of code.

Features of JUnit Test Framework

JUnit test framework provides the following important features −

* Fixtures
* Test suites
* Test runners
* JUnit classes

## Assert class

The org.junit.Assert class provides methods to assert the program logic.

#### Methods of Assert class

The common methods of Assert class are as follows:

1. **void assertEquals(boolean expected,boolean actual)**: checks that two primitives/objects are equal. It is overloaded.
2. **void assertTrue(boolean condition)**: checks that a condition is true.
3. **void assertFalse(boolean condition)**: checks that a condition is false.
4. **void assertNull(Object obj)**: checks that object is null.
5. **void assertNotNull(Object obj)**: checks that object is not null.

#### **Annotations for Junit testing**

The Junit 4.x framework is annotation based, so let's see the annotations that can be used while writing the test cases.

**@Test** annotation specifies that method is the test method.

**@Test(timeout=1000)** annotation specifies that method will be failed if it takes longer than 1000 milliseconds (1 second).

**@BeforeClass** annotation specifies that method will be invoked only once, before starting all the tests.

**@Before** annotation specifies that method will be invoked before each test.

**@After** annotation specifies that method will be invoked after each test.

**@AfterClass** annotation specifies that method will be invoked only once, after finishing all the tests.