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Quick Answer

This page offers Uncodemy's TestNG guide as a PDF download. TestNG is a Java testing framework widely used with Selenium for organising, running and reporting automated tests. The guide covers the main annotations, assertions, data providers, grouping, parallel execution and the testng.xml suite file.

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What is TestNG?

TestNG is an open-source testing framework for Java, inspired by JUnit and NUnit, with extra features that suit end-to-end and integration testing. It provides annotations to mark test methods and setup steps, assertions to check results, flexible grouping and ordering, data-driven testing and built-in support for running tests in parallel. TestNG itself does not drive a browser; it is typically paired with Selenium WebDriver, which controls the browser, while TestNG structures the tests and reports the results. Many automation testing job descriptions for Java still mention TestNG, so it is worth understanding even if you later learn newer tools.

Common TestNG annotations

Annotation	Runs	Typical use
@Test	As a test method	Marks a method as a test
@BeforeSuite / @AfterSuite	Once before or after the whole suite	Global setup such as reading configuration
@BeforeTest / @AfterTest	Before or after tests in a testng.xml test tag	Group-level setup
@BeforeClass / @AfterClass	Once before or after the class	Start and close a browser for the class
@BeforeMethod / @AfterMethod	Before or after each test method	Open a page, take screenshots on failure
@DataProvider	Supplies data to a test	Data-driven testing
@Parameters	Receives values from testng.xml	Browser name or base URL

A simple TestNG test with Selenium

Illustrative structure only. It assumes Selenium and TestNG are on the project classpath and uses a public demo site; adapt locators to your application.

```
import org.openqa.selenium.By;
import org.openqa.selenium.WebDriver;
import org.openqa.selenium.chrome.ChromeDriver;
import org.testng.Assert;
import org.testng.annotations.*;

public class LoginTest {
    private WebDriver driver;

    @BeforeMethod
    public void setUp() {
        driver = new ChromeDriver();
        driver.get("https://example.com/login");
    }

    @Test(groups = {"smoke"})
    public void validLoginShowsDashboard() {
        driver.findElement(By.id("email")).sendKeys("test.user@example.com");
        driver.findElement(By.id("password")).sendKeys("your-test-password");
        driver.findElement(By.id("login")).click();
        Assert.assertTrue(driver.getCurrentUrl().contains("dashboard"),
            "User should land on the dashboard");
    }

    @AfterMethod(alwaysRun = true)
    public void tearDown() {
        if (driver != null) driver.quit();
    }
}
```

Assertions

Type	Behaviour	Use when
Hard assert (Assert class)	Stops the test at the first failure	A later step makes no sense if this fails
Soft assert (SoftAssert)	Collects failures and reports them at assertAll()	Several independent checks on one page
assertEquals, assertTrue, assertNotNull	Common checks	Comparing values, conditions and objects

Data-driven testing with a DataProvider

A data provider supplies rows of data, and the test method runs once for each row.

```
@DataProvider(name = "loginData")
public Object[][] loginData() {
    return new Object[][] {
        {"valid.user@example.com", "ValidPass#1", true},
        {"valid.user@example.com", "wrong-pass", false},
        {"", "", false}
    };
}

@Test(dataProvider = "loginData")
public void loginScenarios(String email, String password, boolean shouldSucceed) {
    // enter credentials, submit, then assert the expected outcome
}
```

A testng.xml suite file

The suite file selects which tests, groups or classes run, and can set parallel execution.

```
<!DOCTYPE suite SYSTEM "https://testng.org/testng-1.0.dtd">
<suite name="RegressionSuite" parallel="classes" thread-count="3">
  <test name="Smoke">
    <groups>
      <run><include name="smoke"/></run>
    </groups>
    <classes>
      <class name="tests.LoginTest"/>
    </classes>
  </test>
</suite>
```

Useful TestNG features

- **Groups:** tag tests such as smoke or regression and run only those.
- **Dependencies:** dependsOnMethods can order tests, though independent tests are preferable.
- **Priority:** controls order within a class; use sparingly.
- **Parallel execution:** run methods, classes or tests in parallel to save time; keep tests independent and drivers thread-safe.
- **Listeners:** react to events such as failure, for example to capture a screenshot.
- **Retry analyzer:** re-run failed tests a limited number of times, visibly.

Parallel execution and thread safety

Running tests in parallel can cut execution time sharply, but only if tests do not share mutable state. A single static WebDriver shared across threads will cause tests to interfere with each other. A common approach is to store the driver in a ThreadLocal so each thread has its own browser, and to keep test data unique per test. Start with a small thread count, watch for instability and increase carefully.

Reports

Output	Notes
Default HTML and XML reports	Generated in the output folder after every run
Surefire reports	Produced when TestNG runs through Maven
Third-party report tools	Many teams add richer HTML reports with screenshots

Common mistakes

- **One shared static driver** with parallel tests.
- **Heavy use of dependsOnMethods** creating fragile chains.
- **Fixed sleeps** instead of explicit waits.
- **Credentials in the code** instead of configuration or secrets.
- **Tests that depend on execution order.**

Selenium waits compared

Wait type	Behaviour	Advice
Implicit wait	Global polling for elements to appear	Avoid mixing with explicit waits
Explicit wait	Waits for a specific condition on one element	Preferred for most cases
Fluent wait	Explicit wait with custom polling and ignored exceptions	Use for special timing cases
Thread.sleep	Fixed pause	Avoid; slows tests and still fails randomly

Interview-style quick answers

- **Difference between @BeforeTest and @BeforeMethod:** the first runs once before the testng.xml test tag, the second before every test method.
- **How to skip a test:** use enabled=false or throw SkipException.
- **How to run only some tests:** use groups or select classes in testng.xml.

Folder structure that scales

- src/main/java/pages: page objects.
- src/test/java/tests: test classes.
- src/test/resources: testng.xml, configuration and test data.
- utils: driver factory, readers, listeners.

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Frequently Asked Questions

What is TestNG?

TestNG is a Java testing framework that organises, runs and reports automated tests, often used together with Selenium WebDriver.

What is the difference between TestNG and JUnit?

Both are Java test frameworks. TestNG offers built-in groups, data providers, flexible dependency and parallel configuration, while JUnit 5 has its own extension model and parameterised tests. Many teams use either.

What is testng.xml?

It is a suite configuration file that defines which classes, groups and tests to run and how, including parallel execution.

What is a DataProvider in TestNG?

A DataProvider is a method that supplies multiple sets of data to a test method, which runs once for each set.

How do I run TestNG tests in parallel?

Set the parallel and thread-count attributes in testng.xml, and make sure tests are independent and each thread has its own WebDriver.

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