1. Difference between Manual and Automation testing:

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| **Parameter** | **Manual Testing** | **Automation Testing** |
| **Definition** | Software testing done by engineers to ensure that the software application has all the functionalities required by the customer. | Software testing involves the use of tools to ensure that an application meets quality standards. |
| **Doer** | Human resources | Testing tools |
| **Operating System (OS) compatibility** | Depends on the tester | Works with different platforms and coding languages |
| **Frequent Changes** | Small changes do not need drastic execution level changes | Scripts must be modified for the smallest changes |
| **Use Case** | Usability, Exploratory, Ad hoc Testing, frequently changing application under test (AUT). | Performance Testing, Regression Testing, Load Testing, repetitive functional test cases. |
| **Parallel Execution** | Yes, but requires more human resources | Yes, can execute on different operating platforms |
| **Feasibility** | When test cases are run a few times, like exploratory testing | When test cases are run repeatedly over time, like in regression testing |
| **Build Verification Testing (BVT)** | Difficult to implement | Very useful in execution |
| **Framework** | None. Uses checklists, guidelines, processes, etc. | Keyword, Data Driven, Hybrid, etc. |
| **Test Reports** | Not available easily, stored in Word/ Excel | Easy access to results for all stakeholders. |
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2.Most common automation tools in the market

* Appium
  + Appium is an open-source tool for automation testing supported across platforms. It is used for testing mobile applications on both Android and iOS. Appium is also suitable for testing Web Apps and hybrid mobile apps. As a user you get the ability to use your preferred programming language with Appium and frameworks like JUnit and TestNG.
* Katalon
  + Katalon is another solution for your automation testing needs. It is very desired as this supports Mobile, Web, and API testing all in a single package. Katalon has features like test recording, test execution, and script generation. It supports programming languages like Java and Groovy.
* Test complete
  + - TestComplete is an automation testing tool well-known for automating Web and Desktop applications. Along with extensive support for multiple programming languages like JavaScript, Python, and VBScript.
* IBM Rational functional tester
  + - IBM Rational Functional Tester lets you test .NET, Java, and Web-based applications. This Automation Testing Tool provides you with a wide set of features. The features such as Regression, Functional, and GUI testing make it a feature-packed testing application.
* Cucumber
  + - Cucumber is an automation tool used for the testing of Web Applications. This open-source tool provides you with a lot of features. It provides you with behaviour-driven development and acceptance testing, along with things like test automation. Besides, it supports various programming languages, it supports Java, Python, and also Ruby.
* Apache JMeter
  + - Apache is an automation testing tool that is open-source and widely used during performance testing. JMeter supports Web Applications, Databases, and APIs. The user can simulate heavy loads onto a cluster of servers to analyze the performance of the system under different loads. JMeter also allows functional testing and stress testing.

3.Cross browser testing:

Cross Browser Testing is a type of testing to verify if an application works across different browsers as expected. It is the process to verify your application’s compatibility with different browsers.

4. TDD and BDD

Test-Driven Development (TDD) is an approach in software development that involves designing and implementing codes based on written tests. It implements a cycle of a written failing test that prescribes a specific function or an improvement, writing the least amount of code possible to make the test pass, and then refactoring the code and keeping the test passing.

Behaviour-driven development (BDD) is an approach to agile methodologies that goes a step further than test-driven development (TDD) and involves not only technical people like developers and testers but also business people like analysts. It is concentrated on building consensus about the expected interaction with the system and providing precise documentation for that in the form of scenarios. Such scenarios are usually documented using templates like the ‘Given-When-Then’ format which defines the state, event and expected result of that feature.