Assignment 1: Software testing manual

**What is Software Testing?**

**Software testing** is the process of checking if a software application works correctly or not. It helps find mistakes (called **bugs or defects**) in the software before it is released to users.

**Why is Software Testing Necessary in Software Development?**

Software testing is important because:

* It ensures the software works as expected.
* It helps find and fix bugs before users see them.
* It improves the quality of the software.
* It helps avoid costly problems after the software is released.

**Why is Early Detection of Bugs Important in Software Testing?**

Finding bugs early in the development process is important because:

* **Fixing early bugs is cheaper and faster.**
* It prevents small issues from becoming big problems.
* It helps developers stay on schedule.
* It improves the overall quality of the software.

**How Early Bug Detection Benefits the Development Process:**

* Reduces the cost of fixing bugs.
* Saves time during later stages.
* Makes the software more stable from the beginning.
* Increases team confidence in the product.

**Key Principles of Software Testing (In Simple Terms):**

1. **Testing shows the presence of defects:** Testing helps find bugs, not prove that the software is bug-free.
2. **Exhaustive testing is impossible:** You can't test everything, so test the most important things.
3. **Early testing saves time and money:** Start testing as soon as possible in the development process.
4. **Defect clustering:** Most bugs are usually found in a few key areas.
5. **Pesticide paradox:** Running the same tests won’t find new bugs. Tests must be updated regularly.
6. **Testing is context-dependent:** Different types of software need different testing methods.
7. **Absence-of-errors fallacy:** A software that has no bugs but doesn’t meet user needs is still a failure.

**Difference Between Manual Testing and Automated Testing:**

| **Manual Testing** | **Automated Testing** |
| --- | --- |
| Done by a human tester | Done using tools/scripts |
| Slower and time-consuming | Faster and repeatable |
| Good for exploratory and ad-hoc testing | Good for repetitive and large tests |
| Needs human effort every time | Runs automatically once set up |

**Difference Between Black Box, White Box, and Grey Box Testing:**

| **Type** | **What Tester Knows** | **Focus Area** | **Example** |
| --- | --- | --- | --- |
| **Black Box Testing** | Tester doesn’t know the code | Tests the output based on input | Checking if login works with correct username/password |
| **White Box Testing** | Tester knows the code | Tests internal code and logic | Checking if each function or loop works properly |
| **Grey Box Testing** | Tester knows some parts of the code | Mix of both approaches | Tester knows database but tests through UI |