1. Describe the different types of testing (e.g., unit testing, integration testing, system testing, acceptance testing).

Ans:- **Types of Testing**

Software testing is divided into various types based on the scope, objectives, and the stage of development. Each type serves a specific purpose in ensuring software quality. Here's an overview of the main types of testing:

1. Unit Testing

- **Definition:**
  Unit testing focuses on verifying the smallest testable parts of an application, such as individual functions, methods, or classes, to ensure they work as intended in isolation.
- **Purpose:**
  To validate the correctness of code at the granular level and ensure that each unit performs as expected.
- **Example in Python:**
  Using the unittest or pytest libraries to test a single function.
- **Tools Used:**
  - Python: `unittest`, `pytest`, `nose`
  - Others: JUnit (Java), NUnit (.NET)

Example in python:-

```
def add(a, b):
    return a + b

def test_add():
    assert add(2, 3) == 5
```

2. Integration Testing

- **Definition:**
  Integration testing checks the interaction between different components or modules of the system to ensure they work together correctly.
- **Purpose:**
  To identify issues that occur when modules or services integrate, such as incorrect data sharing or communication errors.
- **Tools Used:**
  - Python: pytest, tox
  - Mocking libraries: unittest.mock, pytest-mock
- **Example in Python:**

```
def test_api_with_database():
    response = api_call(data)
    assert response.status_code == 200
    assert database_entry_exists(data)
```

3. System Testing

- **Definition:**
  System testing verifies the application as a whole, ensuring that the integrated system meets the specified requirements. This type of testing evaluates the software in an environment that closely resembles the production setup.
- **Purpose:**
  To test the end-to-end functionality of the application, ensuring that all components work together as intended.
- **Tools Used:**
  - Automation: Selenium, Robot Framework
  - Performance: Locust, JMeter

Example in python:-

```
from selenium import webdriver


def test_web_application():
    driver = webdriver.Chrome()
    driver.get("http://example.com/login")
    assert "Login" in driver.title
```

4. Acceptance Testing

- **Definition:**
  Acceptance testing is conducted to determine whether the software meets the business requirements and is ready for release. It is often performed by the end-users or stakeholders.
- **Purpose:**
  To validate that the software delivers the expected value and satisfies user needs.
- **Subtypes:**
  - **Alpha Testing:** Performed internally by the development or QA team.
  - **Beta Testing:** Performed by real users in a production-like environment.
- **Tools Used:**
  - Python: Behave, Lettuce

- Manual testing for user validation

Example in python:-

```
Feature: User login
  Scenario: Successful login
    Given the user is on the login page
    When the user enters valid credentials
    Then the user should be redirected to the dashboard
```