**Phase 4: Testing**

The testing phase ensures that the Notes App functions correctly, is reliable, and provides a smooth user experience by identifying and fixing bugs before deployment.

**🎯 Objectives of Testing**

* Verify that all features (create, read, delete notes) work as expected.
* Ensure synchronization between frontend and backend is consistent.
* Identify and fix UI, functionality, and performance issues.
* Validate error handling and edge cases.

**🧪 Testing Types**

1. **Unit Testing:**
   * Test individual React components using tools like Jest and React Testing Library.
   * Test backend API routes using frameworks like Mocha or Jest.
2. **Integration Testing:**
   * Verify that frontend components correctly interact with backend APIs.
   * Test Axios requests and API responses for correctness.
3. **End-to-End (E2E) Testing:**
   * Use tools like Cypress or Selenium to simulate real user interactions.
   * Test workflows such as adding a note, viewing it, and deleting it.
4. **Manual Testing:**
   * Conduct manual UI testing on different browsers and devices.
   * Check responsiveness, layout, and user experience.

**🛠️ Testing Tools**

| **Testing Type** | **Tools** |
| --- | --- |
| Unit Testing | Jest, React Testing Library |
| Backend Testing | Mocha, Chai, Jest |
| E2E Testing | Cypress, Selenium |
| Manual Testing | Browser DevTools, Mobile Devices |

**✅ Outcome of Testing**

* All CRUD operations perform reliably.
* Frontend and backend states stay synchronized.
* The app is stable across browsers and devices.
* Bugs and inconsistencies are resolved prior to deployment.