TESTING TOOL DOCUMENTATION

NOVEMBER 11, 2025

BANGLADESH UNIVERSITY OF PROFESSIONALS

Tools Available:

For unit and integration testing in a **Next.js + React** project, the top competitors are:

Tool	Type	Pros	Cons
Jest	Unit & Integration	Zero-config, snapshot testing, built-in mocks, coverage reporting, works for frontend & backend, fast	Not full E2E, needs Cypress/Playwright for browser tests
Mocha + Chai + Sinon	Unit & Integration	Flexible, widely used, works with many libraries	Requires configuration, separate mocking library, slower setup, no snapshot testing
Vitest	Unit & Integration	Modern, fast, Vite/Next.js optimized, Jest-compatible API	Smaller community, fewer plugins, less mature

What is Jest?

- Jest is a **JavaScript testing framework** maintained by Meta (Facebook).
- It is primarily used for **unit testing**, **integration testing**, and **snapshot testing** of JS/TS code.
- Works **seamlessly with Node.js**, React, Next.js, and other JS frameworks.
- Provides a **zero-configuration setup** for most projects.

ShebaBondhu uses **Next.js as backend**, and React for frontend:

Feature	Jest Advantage for ShebaBondhu
Integration with Next.js	Jest works smoothly with Next.js API routes, serverless functions, and React components.
Full-stack JS testing	You can test backend (API endpoints) and frontend (React components) in the same framework.
Snapshot testing	Useful for UI regression testing — you can detect accidental changes in components like dashboards, forms, charts.
Mocking	Jest has built-in mocks for functions, modules, and timers. Helps test parts of the system independently.
Speed	Runs tests in parallel, fast for large JS codebases.
Community & support	Huge community: tons of tutorials, plugins, and integration guides for Next.js and React.

Why Jest is the best choice for ShebaBondhu

- **Stack is Next.js**:Jest has official support and works out-of-the-box.
- **Team size**: Fewer dependencies; zero-config reduces setup time.
- **You want unit + integration tests for both frontend/backend** :Jest covers both.
- **Snapshot testing for UI components** : Helps catch visual regressions in dashboards, forms, interactive elements.
- **Community support** : Lots of plugins for mocking databases, API calls, timers, etc.

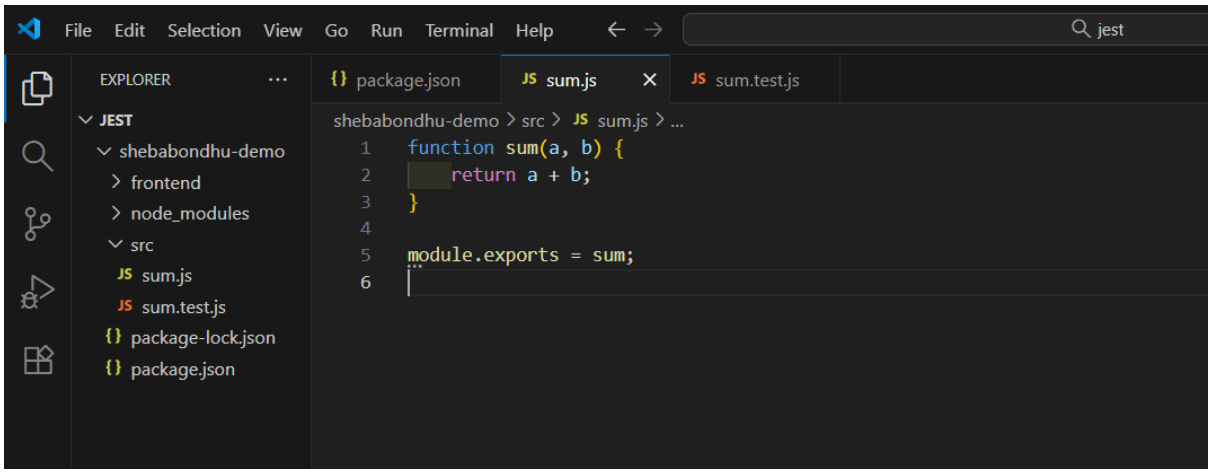
Jest is **fast, easy, full-featured**, and a perfect fit for a **Next.js-based ShebaBondhu project**. For unit & integration testing, Jest alone is sufficient.

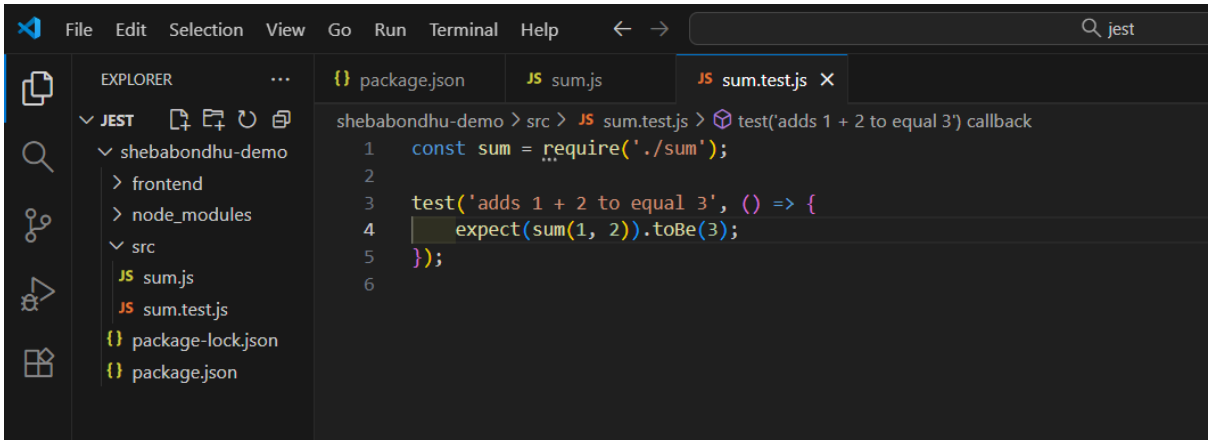
HOW TO IMPLEMENT JEST?

```
PS D:\Academic\year4sem1\STM lab\jest\jest> mkdir shebabondhu-demo
>> cd shebabondhu-demo
>>


    Directory: D:\Academic\year4sem1\STM lab\jest\jest


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        11/12/2025   6:04 AM                shebabondhu-demo

                                                        npm init -y
>> D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo>
PS D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo> npm init -y
>>
Wrote to D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo\package.json:

{
  "name": "shebabondhu-demo",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
```

Installed jest mocha chai altogether

```
PS D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo> npm install express
>> npm install --save-dev jest mocha chai
>>

added 68 packages, and audited 69 packages in 6s

16 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
npm warn deprecated inflight@1.0.6: This module is not supported, and leaks memory. Do not use it. Check out lru-cache if you want a good and
tested way to coalesce async requests by a key value, which is much more comprehensive and powerful.
npm warn deprecated glob@7.2.3: Glob versions prior to v9 are no longer supported

added 318 packages, and audited 387 packages in 1m

69 packages are looking for funding
  run `npm fund` for details
```

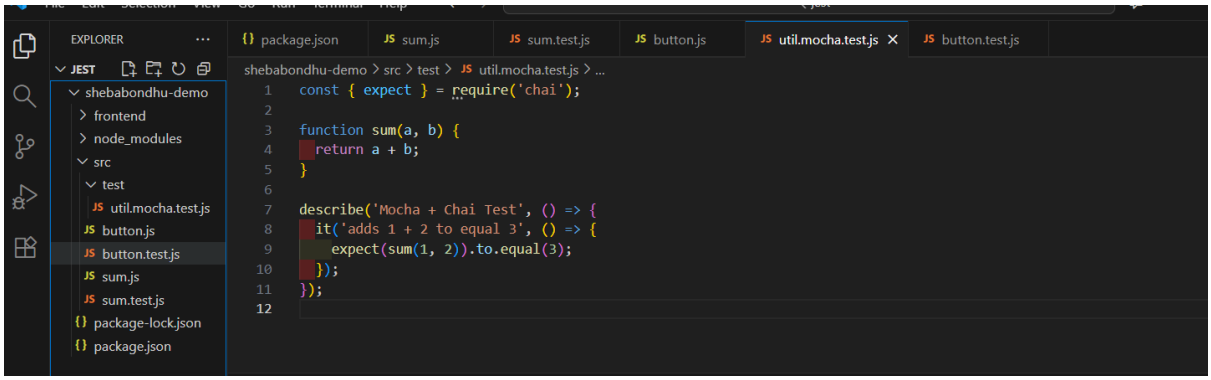


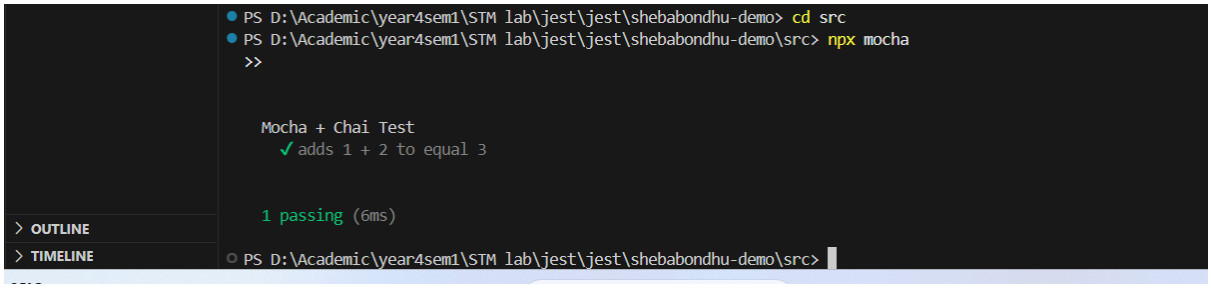



```
PS D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo> npm test
>>

> shebabondhu-demo@1.0.0 test
> jest

 PASS  src/sum.test.js (5.806 s)
  √ adds 1 + 2 to equal 3 (3 ms)

Test Suites: 1 passed, 1 total
Tests:       1 passed, 1 total
Snapshots:   0 total
Time:        7.343 s
Ran all test suites.
PS D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo>
```

HOW TO IMPLEMENT MOCHA+CHAI?

```
PS D:\Academic\year4sem1\STM lab\jest\jest\shebabondhu-demo> npm install mocha chai --save-dev
>>

up to date, audited 387 packages in 4s

69 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```





Feature	Jest	Vitest	Mocha
Speed	Fast, but slower in large projects	Super fast (uses Vite's dev server + hot reload)	Slow (runs sequentially)
Ease of setup	Zero config	Zero config with Vite projects	Manual config + Chai required
Mocking	Built-in (`jest.mock`)	Built-in (`vi.mock`)	Needs extra library (Sinon)
TypeScript support	Good (with Babel or ts-jest)	Native	Requires setup
Integration testing	Possible but verbose	Simpler with Vite ecosystem	Manual setup
Ecosystem support	Huge (older, stable)	Growing fast (modern, active devs)	Legacy (longstanding)
Best for	Node + React/Next apps	Vite/React/TS modern stacks	Legacy JS or minimal Node scripts