Day 2 Learning Summary – CI, CD, Jest, GitHub Actions, Jenkins

1. Jest

Jest is a JavaScript testing framework. It runs test files written in normal JavaScript (.js) but executes them in a structured testing environment.

Key points:

- Jest tests are normal .js files
- Jest identifies test files using .test.js or .spec.js
- Tests are written using describe(), test(), and expect()
- Jest replaces manual assertions and process.exit()
- Tests are run using `npm test`, not `node file.js`

2. Why Jest is Important

- Automatically tracks test pass/fail
- Produces readable reports
- Works with CI tools
- Prevents regressions
- Industry standard for Node.js backends

3. CI (Continuous Integration)

CI means automatically running tests whenever code is pushed.

What CI does:

- Pulls latest code
- Installs dependencies
- Runs automated tests
- Blocks broken code from merging

CI answers the question: “Is my code correct?”

4. GitHub Actions

GitHub Actions is a managed CI system provided by GitHub.

Key ideas:

- Uses YAML workflow files
- Runs on GitHub’s servers
- Can spin up services like PostgreSQL

- Runs Jest tests automatically
- No server management required

5. GitHub Actions Workflow Explained

- Triggered on push or pull request
- Creates a fresh Linux machine
- Starts PostgreSQL service
- Installs Node.js
- Installs dependencies
- Runs `npm test`
- Uses DATABASE_URL to connect backend to test DB

6. CD (Continuous Deployment)

CD means automatically deploying tested code to a server.

Flow:

Write code → CI tests → CD deploys

CD answers the question: “Can users use it now?”

7. Continuous Delivery vs Continuous Deployment

- Continuous Delivery: Manual approval before deploy
- Continuous Deployment: Fully automatic deploy

Startups prefer deployment; enterprises prefer delivery.

8. Jenkins

Jenkins is a self-hosted CI/CD tool.

Key points:

- You manage the server
- Highly customizable
- Used in enterprises
- Uses Jenkinsfile instead of YAML
- Same concept as GitHub Actions but more complex

9. Jenkins vs GitHub Actions

- Jenkins: self-hosted, complex, flexible

- GitHub Actions: managed, simple, fast to set up

You correctly chose GitHub Actions for your stage.

10. Big Picture

- Jest ensures correctness
- CI automates testing
- CD automates delivery
- GitHub Actions handles CI easily
- Jenkins is an alternative used in large organizations

Together, these form a professional backend engineering workflow.