Referensi Cepat Jest

Test, matcher, mocking, async, dan snapshot

Setup

Instalasi

```
npm install --save-dev jest
# package.json: "scripts": { "test": "jest" }
npx jest              # run all tests
npx jest --watch      # re-run on changes
```

Penamaan File

`*.test.js`	File test (pola default)
`*.spec.js`	Pola test alternatif
`__tests__/`	Direktori test (ditemukan otomatis)

Menjalankan Test Tertentu

```
npx jest path/to/file.test.js
npx jest --testNamePattern="adds"
npx jest --verbose     # detailed output
```

Test Dasar

Struktur Test

```
describe("Calculator", () => {
  test("adds 1 + 2 to equal 3", () => {
    expect(add(1, 2)).toBe(3);
  });
});
```

test vs it

```
test("works correctly", () => { /* ... */ });
it("should work correctly", () => { /* ... */ });
// Both are identical; "it" reads like English
```

Lewati & Fokus

`test.skip()`	Lewati test ini
`test.only()`	Jalankan hanya test ini
`describe.skip()`	Lewati seluruh suite
`describe.only()`	Jalankan hanya suite ini

Matcher

Kesamaan

`.toBe(val)`	Kesamaan ketat (`===`)
`.toEqual(val)`	Kesamaan mendalam (objek/array)
`.toStrictEqual(val)`	Mendalam + tipe + props undefined
`.not.toBe(val)`	Negasi matcher mana pun

Truthiness

`.toBeTruthy()`	Nilai truthy
`.toBeFalsy()`	Nilai falsy
`.toBeNull()`	Tepat **`null`**
`.toBeUndefined()`	Tepat **`undefined`**
`.toBeDefined()`	Bukan **`undefined`**

Angka

`.toBeGreaterThan(n)`	Lebih besar dari n
`.toBeLessThanOrEqual(n)`	Kurang dari atau sama dengan
`.toBeCloseTo(0.3, 5)`	Perbandingan float (5 digit)

String, Array, Objek

`.toMatch(/regex/)`	String cocok dengan regex
`.toContain(item)`	Array/iterable mengandung item
`.toHaveLength(n)`	Panjang array/string
`.toHaveProperty(key, val)`	Objek memiliki properti
`.toMatchObject(obj)`	Objek mengandung subset

Test Async

async / await

```
test("fetches data", async () => {
  const data = await fetchData();
  expect(data).toEqual({ id: 1 });
});
```

Promise

```
test("resolves to data", () => {
  return expect(fetchData())
    .resolves.toEqual({ id: 1 });
});
```

Rejection

```
test("rejects with error", async () => {
  await expect(fetchBad())
    .rejects.toThrow("Not Found");
});
```

Exception

```
test("throws on invalid input", () => {
  expect(() => validate(null)).toThrow();
  expect(() => validate(null)).toThrow("invalid");
});
```

Mocking

Fungsi Mock

```
const fn = jest.fn();
fn("hello");
expect(fn).toHaveBeenCalledWith("hello");
expect(fn).toHaveBeenCalledTimes(1);
```

Nilai Kembalian Mock

```
const fn = jest.fn()
  .mockReturnValue(42)
  .mockReturnValueOnce(99);
fn(); // 99 (first call)
fn(); // 42 (subsequent)
```

Mocking Module

```
jest.mock("./api");
const { fetchUser } = require("./api");
fetchUser.mockResolvedValue({ name: "Alice" });
```

Matcher Mock

`.toHaveBeenCalled()`	Dipanggil setidaknya sekali
`.toHaveBeenCalledTimes(n)`	Dipanggil tepat n kali
`.toHaveBeenCalledWith(args)`	Dipanggil dengan argumen tertentu
`.toHaveBeenLastCalledWith(args)`	Panggilan terakhir dengan argumen ini

Spy

Memata-matai Method

```
const spy = jest.spyOn(Math, "random")
  .mockReturnValue(0.5);
expect(Math.random()).toBe(0.5);
spy.mockRestore();  // restore original
```

Memata-matai Method Objek

```
const obj = { greet: (n) => `Hi ${n}` };
const spy = jest.spyOn(obj, "greet");
obj.greet("Alice");
expect(spy).toHaveBeenCalledWith("Alice");
```

Snapshot

Snapshot Testing

```
test("renders correctly", () => {
  const tree = renderer.create(<App />).toJSON();
  expect(tree).toMatchSnapshot();
});
```

Inline Snapshot

```
test("formats name", () => {
  expect(formatName("alice"))
    .toMatchInlineSnapshot(`"Alice"`);
});
```

Memperbarui Snapshot

```
npx jest --updateSnapshot   # update all
npx jest --updateSnapshot --testNamePattern="renders"
```

Setup & Teardown

Hook Siklus Hidup

```
beforeAll(() => { /* once before all tests */ });
afterAll(() => { /* once after all tests */ });
beforeEach(() => { /* before each test */ });
afterEach(() => { /* after each test */ });
```

Scoping

```
describe("Database", () => {
  beforeEach(() => db.connect());
  afterEach(() => db.disconnect());
  test("reads data", () => { /* ... */ });
});
```

Hook di dalam describe hanya berlaku untuk blok tersebut

Konfigurasi

jest.config.js

```
module.exports = {
  testEnvironment: "node",
  coverageThreshold: {
    global: { branches: 80, lines: 80 }
  },
};
```

Opsi Umum

`testEnvironment`	**`"node"`** atau **`"jsdom"`** (DOM)
`roots`	Direktori untuk mencari test
`collectCoverage`	Aktifkan pelaporan coverage
`coverageDirectory`	Direktori output untuk coverage
`moduleNameMapper`	Alias path (mis. prefiks **`@/`**)
`transform`	Transformasi file (Babel, TS, dll.)
`setupFilesAfterFramework`	Jalankan setup sebelum setiap suite

Coverage

```
npx jest --coverage
npx jest --collectCoverageFrom="src/**/*.js"
```

Referensi Cepat Jest

Pola Umum

Testing Panggilan API

```
jest.mock("./api");
test("loads users", async () => {
  api.getUsers.mockResolvedValue([{id: 1}]);
  const users = await loadUsers();
  expect(users).toHaveLength(1);
});
```

Mock Timer

```
jest.useFakeTimers();
test("delays execution", () => {
  const cb = jest.fn();
  setTimeout(cb, 1000);
  jest.advanceTimersByTime(1000);
  expect(cb).toHaveBeenCalled();
});
```

Test Terparameterisasi

```
test.each([
  [1, 1, 2],
  [2, 3, 5],
])("add(%i, %i) = %i", (a, b, expected) => {
  expect(add(a, b)).toBe(expected);
});
```

Custom Matcher

```
expect.extend({
  toBeWithinRange(received, floor, ceil) {
    const pass = received >= floor
      && received <= ceil;
    return { pass, message: () =>
      `expected ${received} in [${floor},${ceil}]` };
}});
```