TDD + Code Coverage

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Before we start…

This is really important.

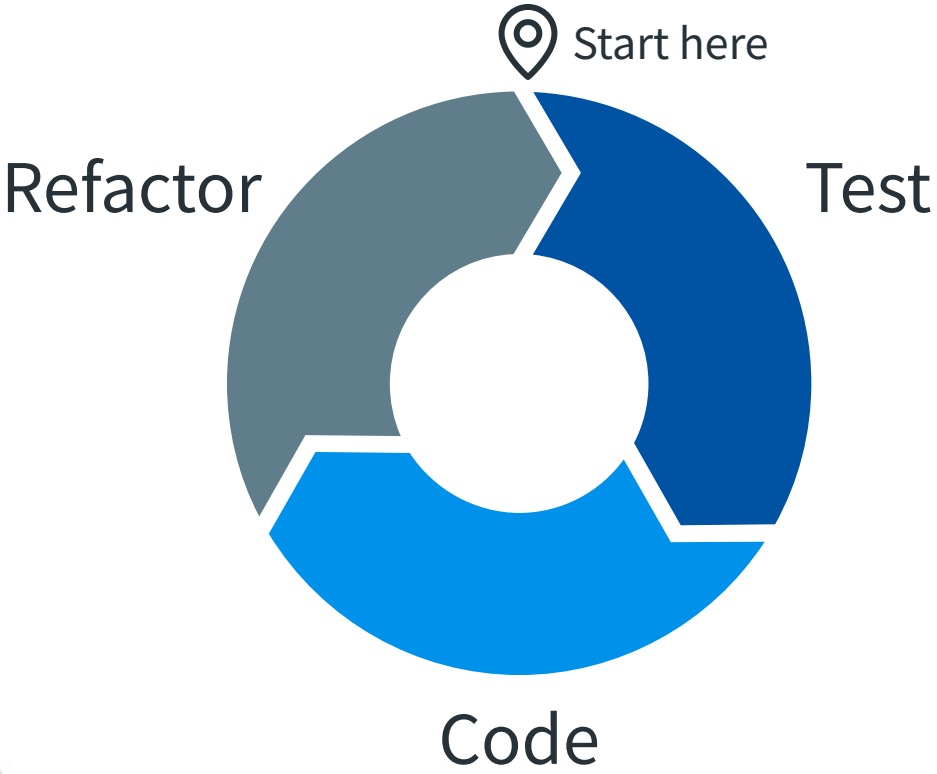
1. TDD

Definition

Test **D**riven **D**evelopment is a software development process that starts with the creation of a test and continues with the implementation of the code that makes it work.

```
1  describe('Sum', () => {
2    test('Sum between two numbers', () => {
3      expect(sumNumbers(2, 3)).toEqual(5);
4    });
5  });
```

TDD's cycle



Why is TDD better than other software development processes?

“Focus to a single feature at a time.”

Modularity

"Developers naturally produce a cleaner, more readable, and manageable code."

Maintenance

“Modular improvement.”

Refactoring

"TDD can reduce your time-to-market speed."

Decreasing costs

“Tests act as documentation and illustrate how the code works.”

Better documentation

“TDD produces a higher overall test coverage”

Less debugging

What about TDD’s cons?

“The team will be busy writing tests first.”

Slow development

“

“Requires skills, persistence, and discipline.”

Difficulty

“Not every developer can make tests before having the code done”

Strange approach

“Tests could change to adapt.”

Changing tests

TDD is easier and challenging to maintain?

Tests ≠ Implementation

- Test maintenance is hard.
- Implementation maintenance is easy.

Conclusions

TDD: Conclusions

- **Code quality.**
- **Difficulty.**
- **Use in companies.**
- **Code coverage.**

2. Code Coverage

Definition

Represents the percentage of code that has been tested.

File	% Stmts	% Branch	% Funcs	% Lines	Uncovered Line #s
All files	100	100	100	100	
nth-prime.js	100	100	100	100	

Criteria

- **Function Coverage**: Has each function been called?
- **Statement Coverage**: Has each statement been executed?
- **Edge Coverage**: Has the control flow been tested completely?
- **Condition Coverage**: Has every condition been evaluated?

Why is Code Coverage useful?

“Higher code coverage finds more bugs”

Quality

How much Code Coverage is necessary?

Nice Code Coverage

Small projects

- Aim to 100%

Large projects

- Aim to 70-80%

High risk systems

- Aim to the highest possible value.

Code Coverage in Jest

What is Jest?

Jest

Making a test

```
describe('Description of the tests', () => {
  test('Description of the unit', () => {
    expect(operation).toEqual(objective);
    expect(operation).not.toEqual(objective);
  });
});
```

Matchers

- toBeGreaterThan
- toBeLessThan
- toBe
- toEqual

- toBeNull
- toBeDefined
- toBeUndefined
- toBeTruthy
- toBeFalsy

- toMatch
- toContain
- toThrow

Now, how to do coverage with Jest?

Noob mode

Just add *--coverage*

Medium mode

Using a *package.json*

```
"scripts": {
  "test": "jest"
},
"jest": {
  "collectCoverage": true,
  "collectCoverageFrom": ["./src/**"]
},
```

Pro mode

Using a good package.json.

```
"scripts": {
  "test": "jest"
},
"jest": {
  "collectCoverage": true,
  "collectCoverageFrom": ["./src/**"],
  "coverageThreshold": {
    "global": {
      "lines": 120
    }
  }
},
```

Pro mode

Using a good package.json.

```
--------------|---------|----------|---------|---------|-------------------
File          | % Stmts | % Branch | % Funcs | % Lines | Uncovered Line #s
--------------|---------|----------|---------|---------|-------------------
All files     |     100 |      100 |     100 |     100 |
 division.js  |     100 |      100 |     100 |     100 |
 product.js   |     100 |      100 |     100 |     100 |
 substract.js |     100 |      100 |     100 |     100 |
 sum.js       |     100 |      100 |     100 |     100 |
--------------|---------|----------|---------|---------|-------------------
Jest: "global" coverage threshold for lines (120%) not met: 100%
```

Code Coverage in CodeCov

What is CodeCov?

Use CodeCov

1. Give CodeCov permission to your Github.
2. Choose a repository (Token creation).

Use CodeCov

3. Create the coverage directory with Jest.
4. Setup the CI with Github Actions.

Use CodeCov

5. Download the CodeCov Uploader.
6. Upload coverage with ./codecov -t [Token]

Conclusions

Code Coverage: Conclusions

- **Code quality.**
- **Code safety.**

Bibliography: TDD

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3. **Benefits of TDD**: https://fortegrp.com/test-driven-development-benefits/#:~:text=Developers%20have%20less%20debugging%20to,quality%20of%20the%20final%20product
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Bibliography: Code Coverage

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2. **Why is Code Coverage important?**: https://about.codecov.io/blog/who-cares-about-code-coverage-and-why/#:~:text=Code%20coverage%20is%20a%20simple,the%20quality%20of%20your%20code
3. **Use Code Coverage with Jest**: https://www.valentinog.com/blog/jest-coverage/
4. **Jest's Code Coverage Documentation**: https://jestjs.io/docs/configuration#coveragethreshold-object
5. **CodeCov Quick Start**: https://docs.codecov.com/docs

Thanks!

Any questions?

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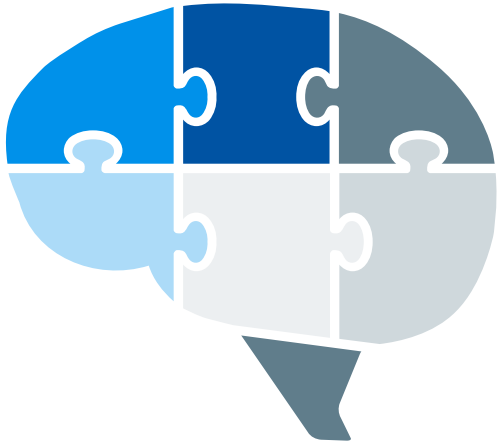


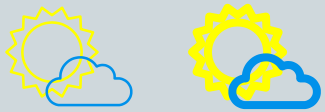
SlidesCarnival icons are editable shapes.

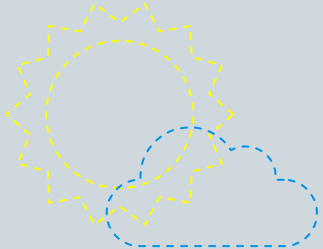
This means that you can:

- Resize them without losing quality.
- Change line color, width and style.

Isn’t that nice? :)

Examples:





Diagrams and infographics