Homework 2: Practice TDD by adding functions to Calc

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Steps

1. Make a fail test
2. Modify the code to pass the test
3. Refactor the code
4. Repeat the process

Test cases

> ADD

1. Add tests

```
// Calc_test.js
test('測試加法功能', async (t) => {
    await t.test('兩個正數相加', () => {
        assert.strictEqual(Calc.add(2, 3), 5);
    });
    await t.test('兩個負數相加', () => {
        assert.strictEqual(Calc.add(-2, -3), -5);
    });
    await t.test('一個正數一個負數相加', () => {
        assert.strictEqual(Calc.add(2, -3), -1);
    });
});
```

```
node --test --experimental-test-coverage
⏎
▶ 測試加法功能
  ✔ 兩個正數相加 (0.490833ms)
  ✔ 兩個負數相加 (0.120792ms)
  ✔ 一個正數一個負數相加 (0.039959ms)
✔ 測試加法功能 (1.042417ms)
ℹ tests 4
ℹ suites 0
ℹ pass 4
ℹ fail 0
ℹ cancelled 0
ℹ skipped 0
ℹ todo 0
ℹ duration_ms 60.323791
```

```
ⅈ start of coverage report
ⅈ ----------------------------------------------------------------
ⅈ file            | line % | branch % | funcs % | uncovered lines
ⅈ ----------------------------------------------------------------
ⅈ Calc_test.js    | 100.00 |  100.00 |  100.00 |
ⅈ Calc.js         | 100.00 |  100.00 |  100.00 |
ⅈ ----------------------------------------------------------------
ⅈ all files       | 100.00 |  100.00 |  100.00 |
ⅈ ----------------------------------------------------------------
ⅈ end of coverage report
```

```
ⅈ start of coverage report
ⅈ ----------------------------------------------------------------
ⅈ file            | line % | branch % | funcs % | uncovered lines
ⅈ ----------------------------------------------------------------
ⅈ Calc_test.js    | 100.00 |  100.00 |  100.00 |
ⅈ Calc.js         | 100.00 |  100.00 |  100.00 |
```

SUBTRACT

1. Add fail tests

```javascript
// Calc_test.js
test('測試減法功能', async (t) => {
    await t.test('兩個正數相減', () => {
        assert.strictEqual(Calc.subtract(5, 3), 2);
    });
    await t.test('兩個負數相減', () => {
        assert.strictEqual(Calc.subtract(-2, -3), 1);
    });
    await t.test('一個正數一個負數相減', () => {
        assert.strictEqual(Calc.subtract(2, -3), 5);
    });
    await t.test('一個負數一個正數相減', () => {
        assert.strictEqual(Calc.subtract(-2, 3), -5);
    });
});
```

```
node --test --experimental-test-coverage
  ┘
▶ 測試加法功能
  ✔ 兩個正數相加 (0.5545ms)
  ✔ 兩個負數相加 (0.119916ms)
  ✔ 一個正數一個負數相加 (0.042042ms)
✔ 測試加法功能 (1.090458ms)
▶ 測試減法功能
  ✖ 兩個正數相減 (0.08ms)
  ✖ 兩個負數相減 (0.414125ms)
  ✖ 一個正數一個負數相減 (0.03725ms)
  ✖ 一個負數一個正數相減 (0.030958ms)
✖ 測試減法功能 (0.7275ms)
ℹ tests 9
ℹ suites 0
ℹ pass 4
ℹ fail 5
ℹ cancelled 0
ℹ skipped 0
ℹ todo 0
ℹ duration_ms 64.004458
ℹ start of coverage report
ℹ --------------------------------------------------------------------
ℹ file            | line % | branch % | funcs % | uncovered lines
ℹ --------------------------------------------------------------------
ℹ Calc_test.js    | 100.00 |   100.00 |  100.00 |
ℹ Calc.js         | 100.00 |   100.00 |  100.00 |
ℹ --------------------------------------------------------------------
```

```
ℹ all files      |  100.00 |   100.00 |  100.00 |
ℹ ----------------------------------------------------------------
ℹ end of coverage report

✖ failing tests:

test at Calc_test.js:18:13
✖ 兩個正數相減 (0.08ms)
  TypeError [Error]: Calc.subtract is not a function
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:19:33)
      at Test.runInAsyncScope (node:async_hooks:211:14)
      at Test.run (node:internal/test_runner/test:979:25)
      at Test.start (node:internal/test_runner/test:877:17)
      at TestContext.test (node:internal/test_runner/test:307:20)
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:18:13)
      at Test.runInAsyncScope (node:async_hooks:211:14)
      at Test.run (node:internal/test_runner/test:979:25)
      at Test.processPendingSubtests
(node:internal/test_runner/test:677:18)
      at Test.postRun (node:internal/test_runner/test:1090:19)

test at Calc_test.js:21:13
✖ 兩個負數相減 (0.414125ms)
  TypeError [Error]: Calc.subtract is not a function
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:22:33)
      at Test.runInAsyncScope (node:async_hooks:211:14)
      at Test.run (node:internal/test_runner/test:979:25)
      at Test.start (node:internal/test_runner/test:877:17)
      at TestContext.test (node:internal/test_runner/test:307:20)
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:21:13)
      at async Test.run (node:internal/test_runner/test:980:9)
      at async Test.processPendingSubtests
(node:internal/test_runner/test:677:7)

test at Calc_test.js:24:13
✖ 一個正數一個負數相減 (0.03725ms)
  TypeError [Error]: Calc.subtract is not a function
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:25:33)
      at Test.runInAsyncScope (node:async_hooks:211:14)
      at Test.run (node:internal/test_runner/test:979:25)
      at Test.start (node:internal/test_runner/test:877:17)
      at TestContext.test (node:internal/test_runner/test:307:20)
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:24:13)
      at async Test.run (node:internal/test_runner/test:980:9)
      at async Test.processPendingSubtests
(node:internal/test_runner/test:677:7)

test at Calc_test.js:27:13
```

✖ 一個負數一個正數相減 (0.030958ms)
  TypeError [Error]: Calc.subtract is not a function
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:28:33)
      at Test.runInAsyncScope (node:async_hooks:211:14)
      at Test.run (node:internal/test_runner/test:979:25)
      at Test.start (node:internal/test_runner/test:877:17)
      at TestContext.test (node:internal/test_runner/test:307:20)
      at TestContext.<anonymous> (/Users/ysyang/Documents/NYCU/113-
2/Software_Testing/113-spring-software-testing/HW2/Calc_test.js:27:13)
      at async Test.run (node:internal/test_runner/test:980:9)
      at async Test.processPendingSubtests
(node:internal/test_runner/test:677:7)

2. Modify the code to pass the test

```
test('測試減法功能', async (t) => {
    await t.test('兩個正數相減', () => {
        assert.strictEqual(Calc.subtract(5, 3), 2);
    });
    await t.test('兩個負數相減', () => {
        assert.strictEqual(Calc.subtract(-2, -3), 1);
    });
    await t.test('一個正數一個負數相減', () => {
        assert.strictEqual(Calc.subtract(2, -3), 5);
    });
    await t.test('一個負數一個正數相減', () => {
        assert.strictEqual(Calc.subtract(-2, 3), -5);
    });
});
```

```
node --test --experimental-test-coverage
⏎
▶ 測試加法功能
  ✔ 兩個正數相加 (0.563333ms)
  ✔ 兩個負數相加 (0.128583ms)
  ✔ 一個正數一個負數相加 (0.044709ms)
✔ 測試加法功能 (1.143541ms)
▶ 測試減法功能
  ✔ 兩個正數相減 (0.052542ms)
  ✔ 兩個負數相減 (0.411959ms)
  ✔ 一個正數一個負數相減 (0.043625ms)
  ✔ 一個負數一個正數相減 (0.037708ms)
✔ 測試減法功能 (0.675083ms)
ℹ tests 9
ℹ suites 0
ℹ pass 9
ℹ fail 0
ℹ cancelled 0
ℹ skipped 0
ℹ todo 0
ℹ duration_ms 66.933
ℹ start of coverage report
ℹ --------------------------------------------------------------------
ℹ file          | line % | branch % | funcs % | uncovered lines
ℹ --------------------------------------------------------------------
ℹ Calc_test.js  | 100.00 |   100.00 |  100.00 |
ℹ Calc.js       | 100.00 |   100.00 |  100.00 |
ℹ --------------------------------------------------------------------
ℹ all files     | 100.00 |   100.00 |  100.00 |
ℹ --------------------------------------------------------------------
ℹ end of coverage report
```