Real Developers Don’t Need Unit Tests

Mythbusting TDD myths

John Ferguson Smart
Wakaleo Consulting Ltd.

http://www.wakaleo.com

Email: john.smart@wakaleo.com
Twitter: wakaleo

Introduction

- Real Developers Don’t Need Unit Tests

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Bugs?

Introduction

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Bugs?

Chuck Norris’s code doesn’t have bugs

Introduction

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Bugs?

Chuck Norris’s code doesn’t have bugs

His code always work. ALWAYS.

Introduction

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Bugs?

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Bugs?

Emergent design?

Introduction

- Real Developers Don't Need Unit Tests

Bugs?

Emergent design?

Chuck Norris's code is perfectly designed the first time round

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Bugs?

Emergent design?

Chuck Norris’s code is perfectly designed the first time round

His favorite design pattern is the Roundhouse Kick

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Emergent design?

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Bugs?

Emergent design?

Technical documentation?

Introduction

- Real Developers Don’t Need Unit Tests

Bugs?

Emergent design?

Technical documentation?

Chuck Norris doesn’t need technical documentation

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Bugs?

Emergent design?

Technical documentation?

Chuck Norris doesn't need technical documentation

He just stares down the code until it tells him everything he wants to know

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Executable requirements?

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Executable requirements?

Chuck Norris doesn’t need requirements to be executable

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- Real Developers Don’t Need Unit Tests

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Chuck Norris doesn’t need requirements to be executable

He can execute whatever he wants

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Acceptance Tests?

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Acceptance Tests?

Chuck Norris doesn’t need acceptance tests

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Acceptance Tests?

Chuck Norris doesn’t need acceptance tests

No one refuses to accept Chuck

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OK, so Chuck Norris doesn’t need Unit Tests

Introduction

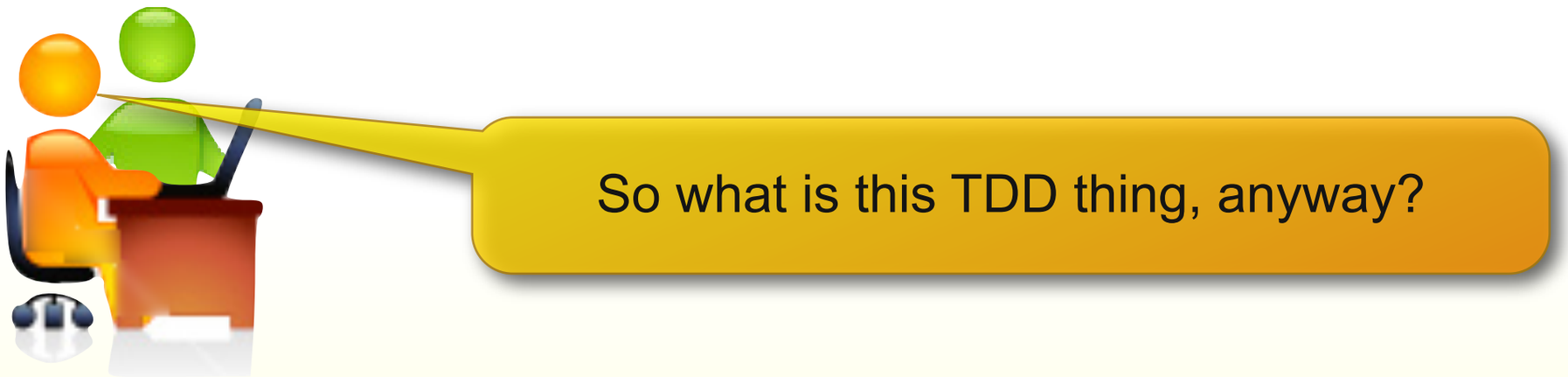
- Real Developers Don’t Need Unit Tests

OK, so Chuck Norris doesn’t need Unit Tests

But what about the rest of us?

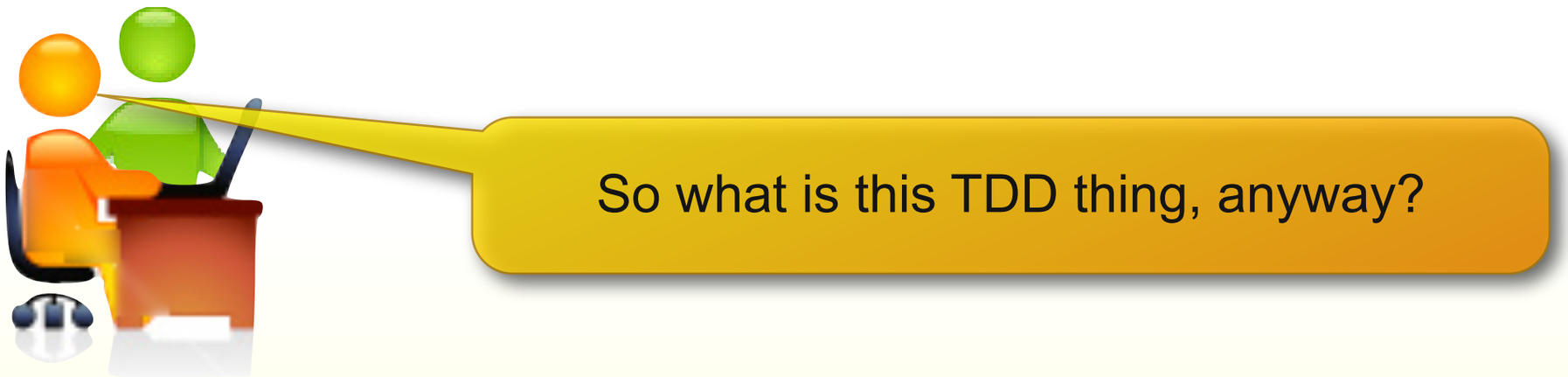
TDD Basics

TDD Basics



TDD Basics

- TDD is *not* about writing tests



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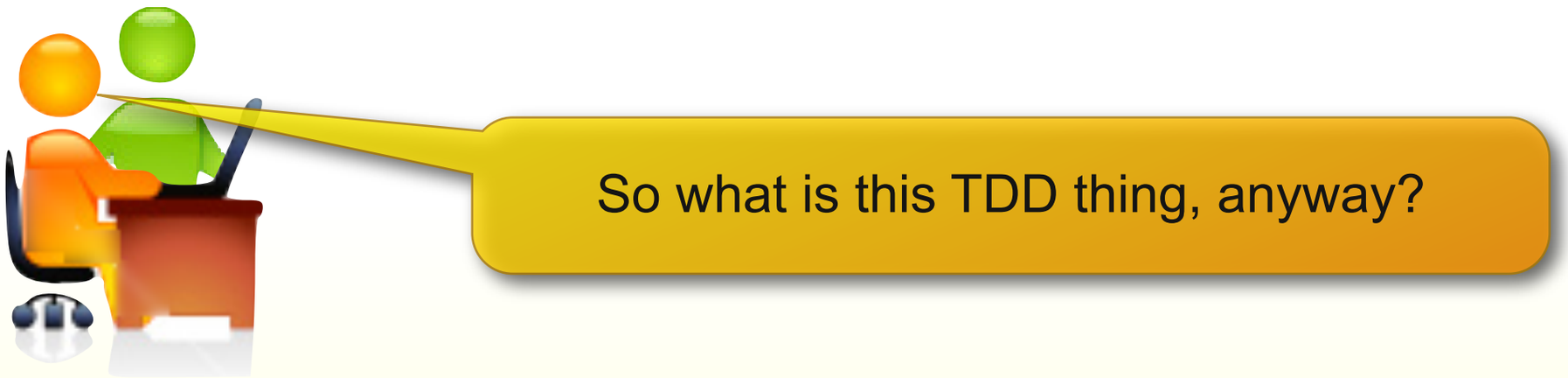

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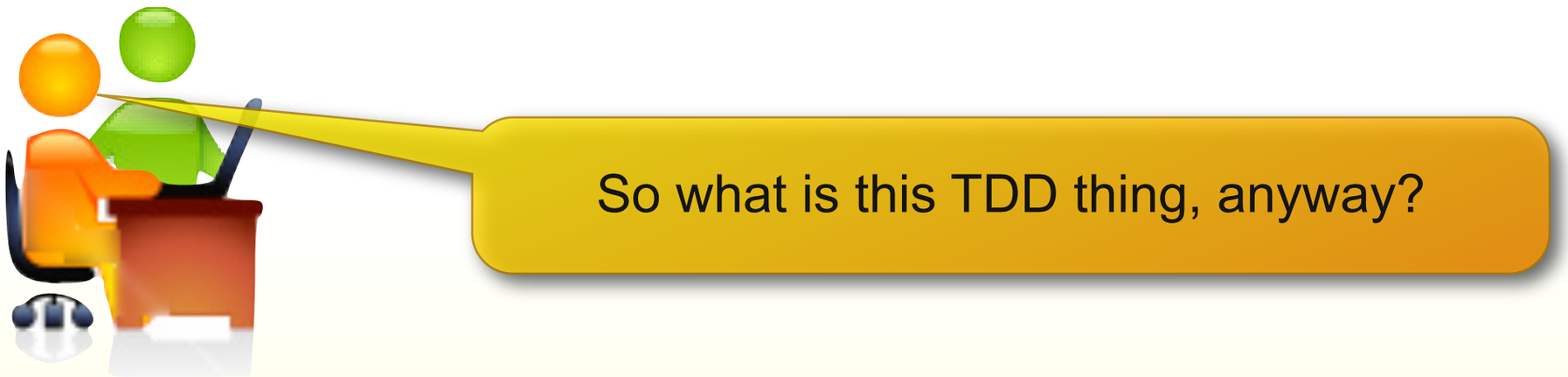
  - Write better-designed code



TDD Basics

- TDD is *not* about writing tests
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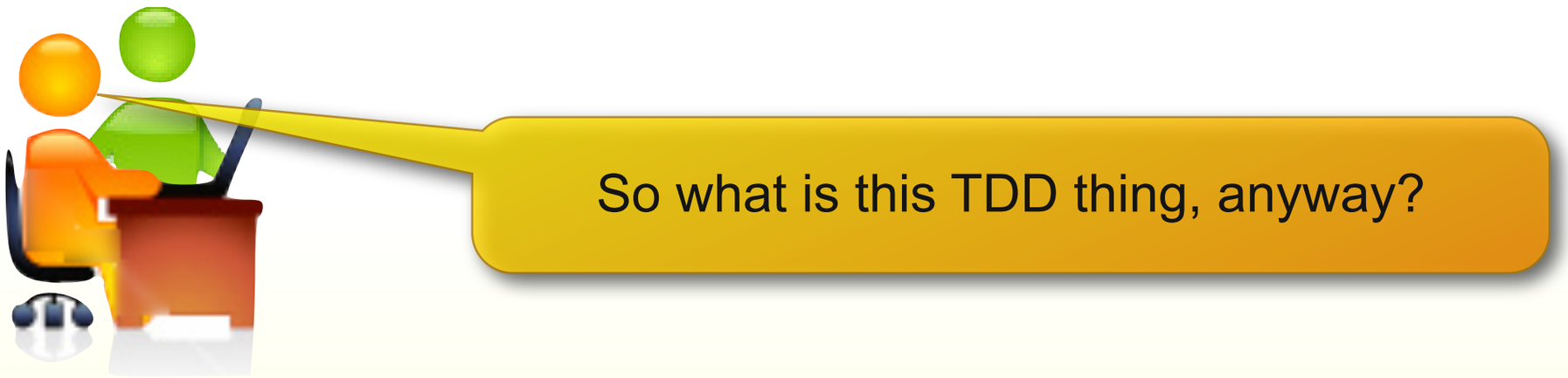
  - Write better-designed code
  - Have more confidence in our code



TDD Basics

- TDD is *not* about writing tests
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  - Write better-designed code
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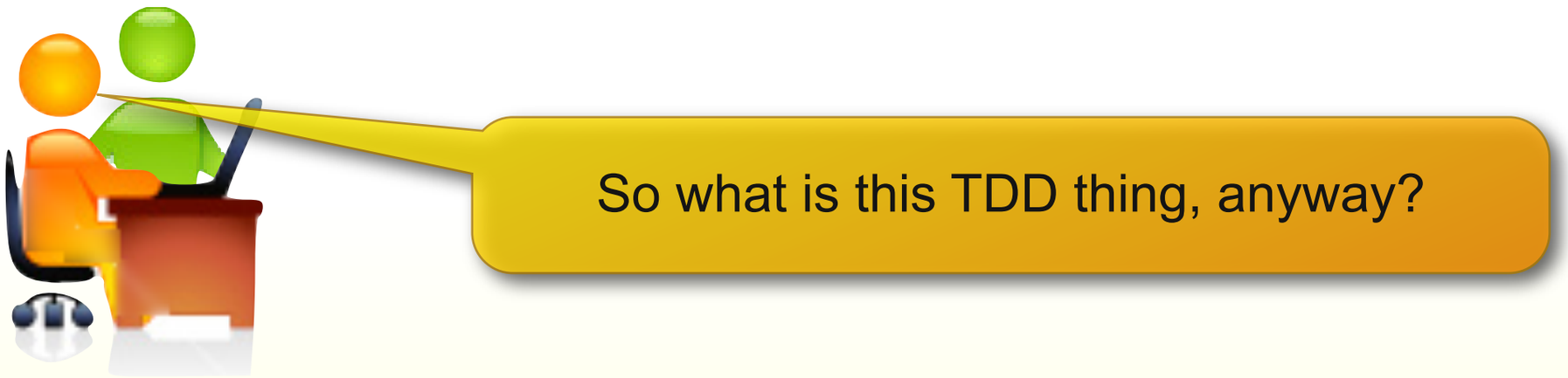
  - Make changes more easily



TDD Basics

- TDD is *not* about writing tests
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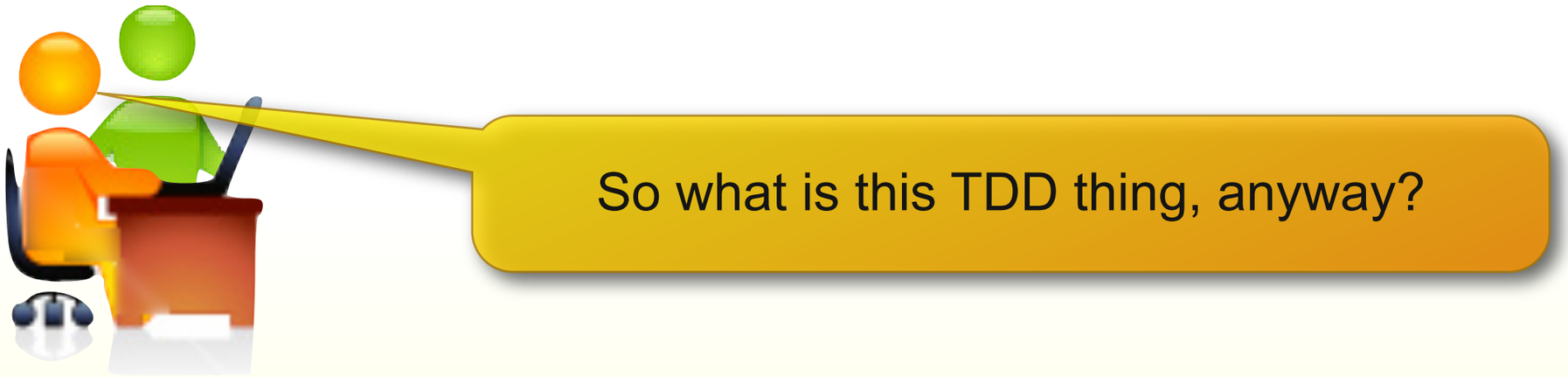
  - Make changes more easily
  - Write code that meets user requirements more accurately



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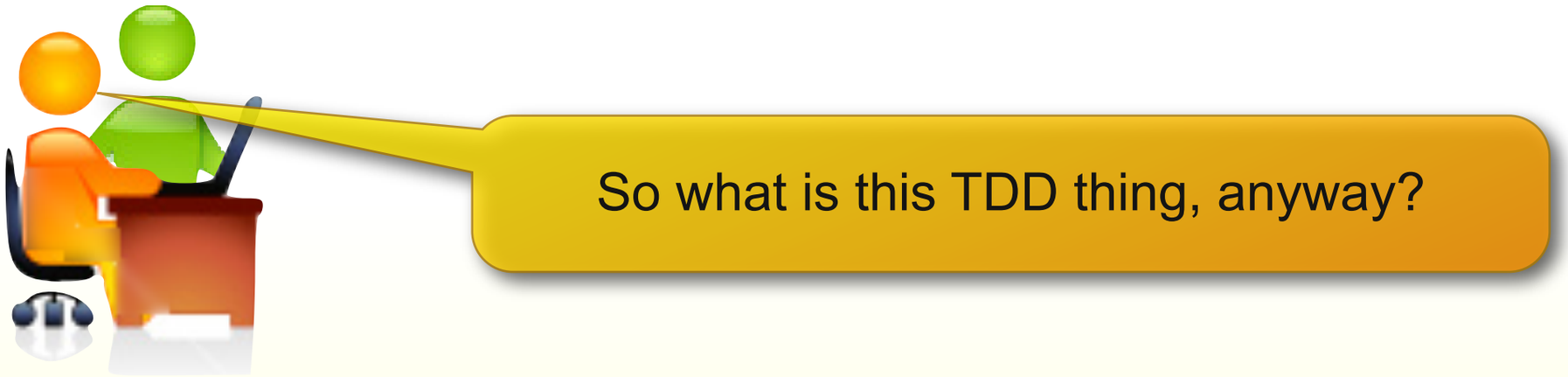

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- TDD is a design strategy:
  - Write better-designed code
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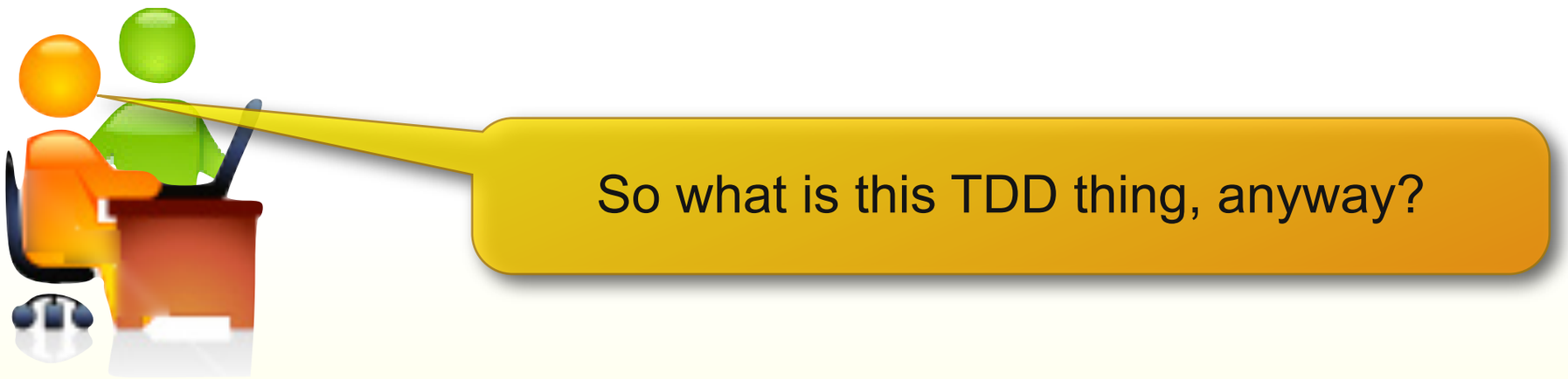
  - Write code that meets user requirements more accurately

  (and incidentally...)
  - Build up a comprehensive set of automated tests



TDD Basics

- The TDD development process

> *“Never write a single line of code unless you have a failing automated test. Eliminate duplication.”*
>
> **- Kent Beck**

TDD Basics

- The TDD development process

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TEST — Write a failing unit test. Ensure that it fails.

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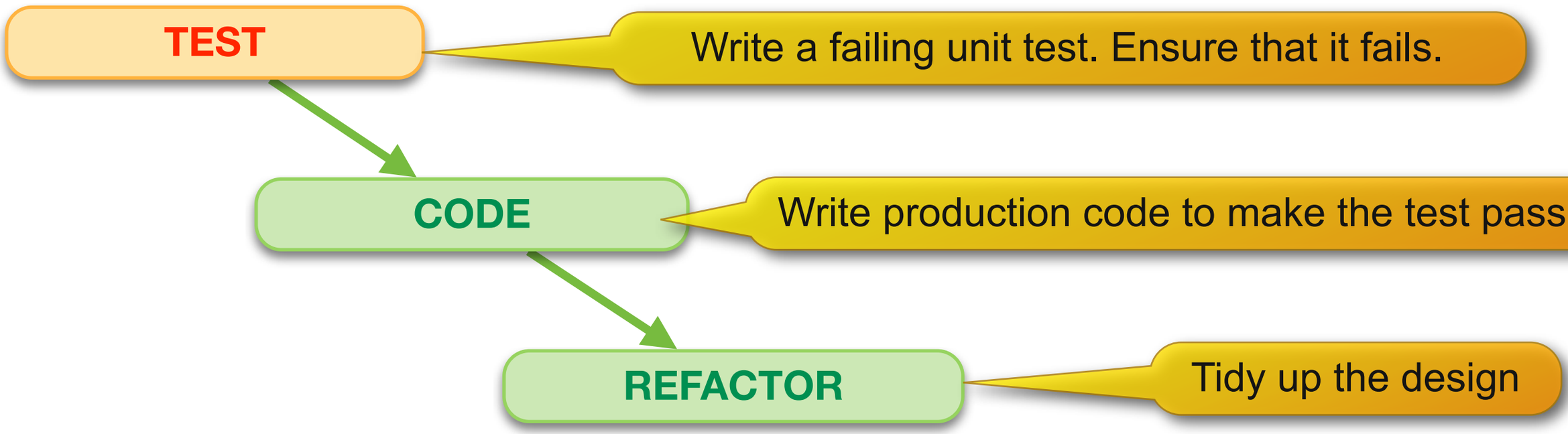

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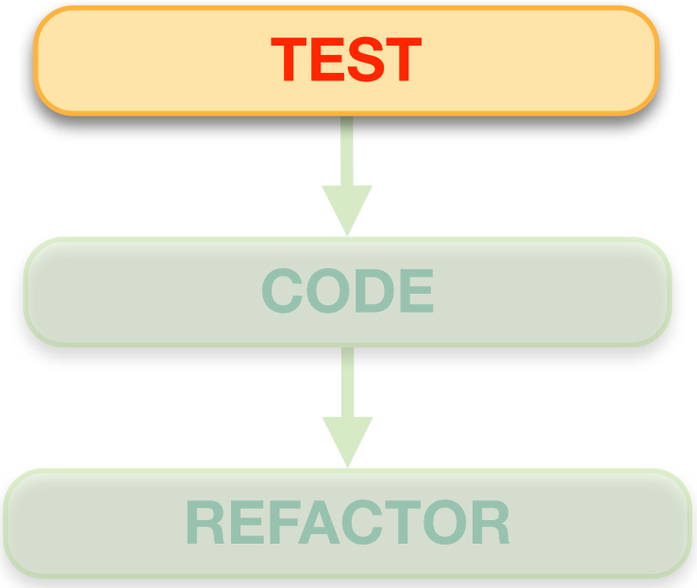
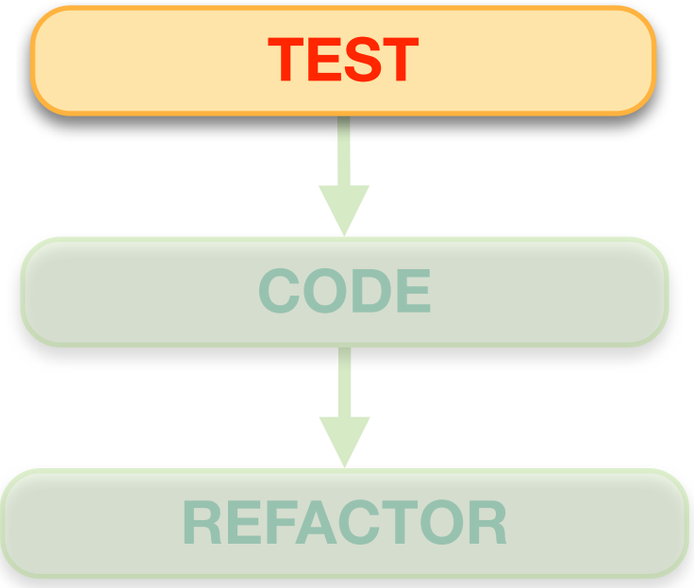


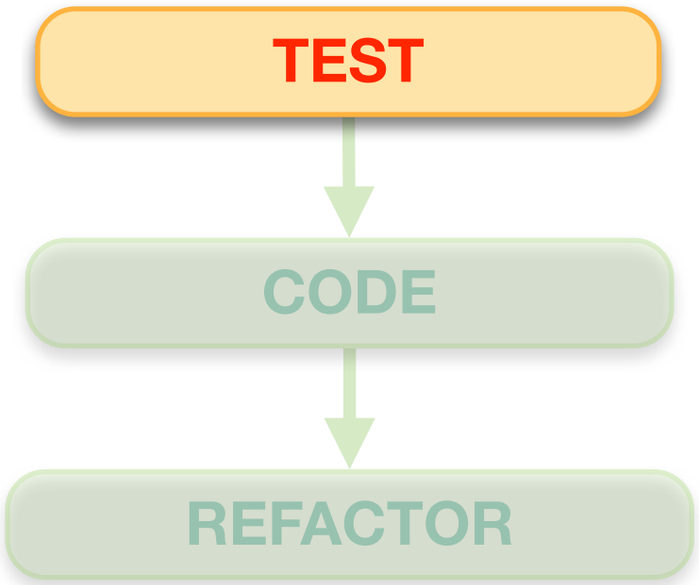
TDD Basics

- **Step 1) Write a test**



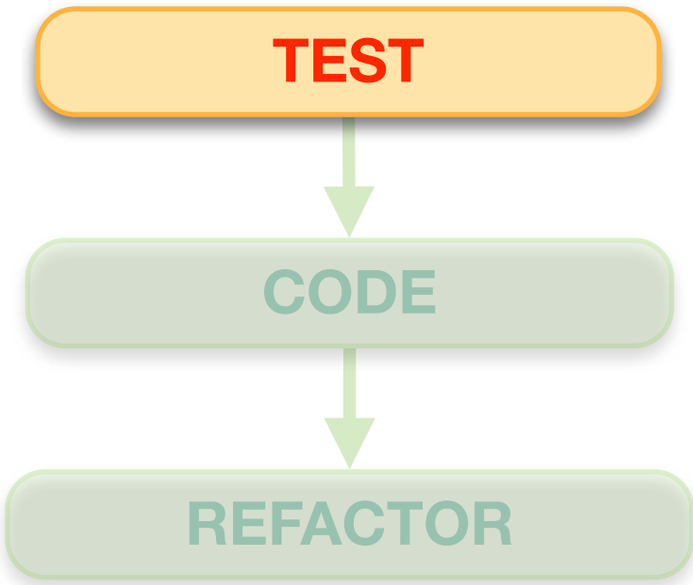
TDD Basics

- **Step 1) Write a test**
  - Design your code from the outside-in



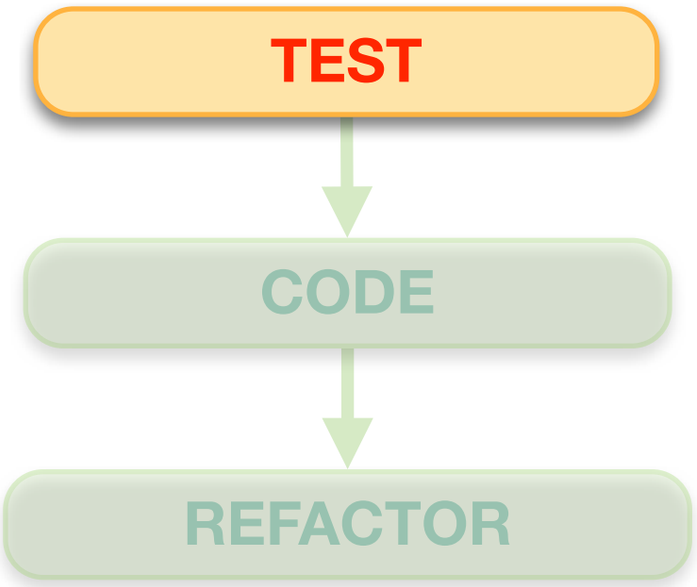
TDD Basics

- **Step 1) Write a test**
  - Design your code from the outside-in
    - How will your code be used?



TDD Basics

- **Step 1) Write a test**
  - Design your code from the outside-in
    - How will your code be used?
    - Design a clean interface for your code



TDD Basics

- **Step 1) Write a test**
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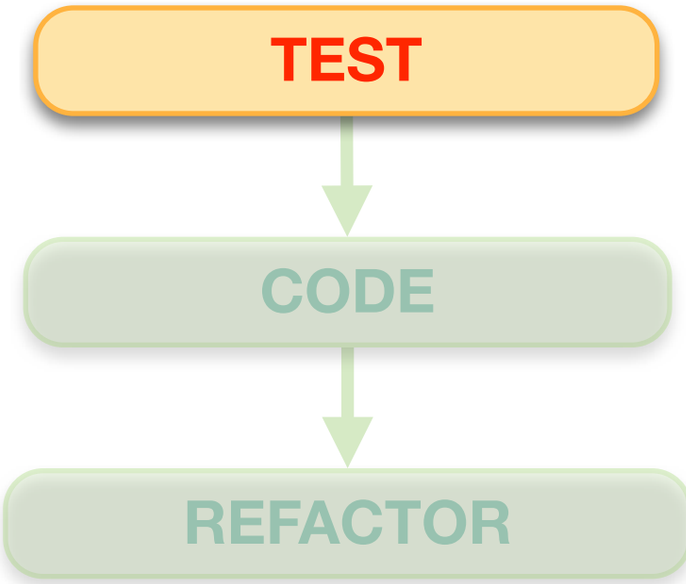
    - Implement *only* features that are really needed



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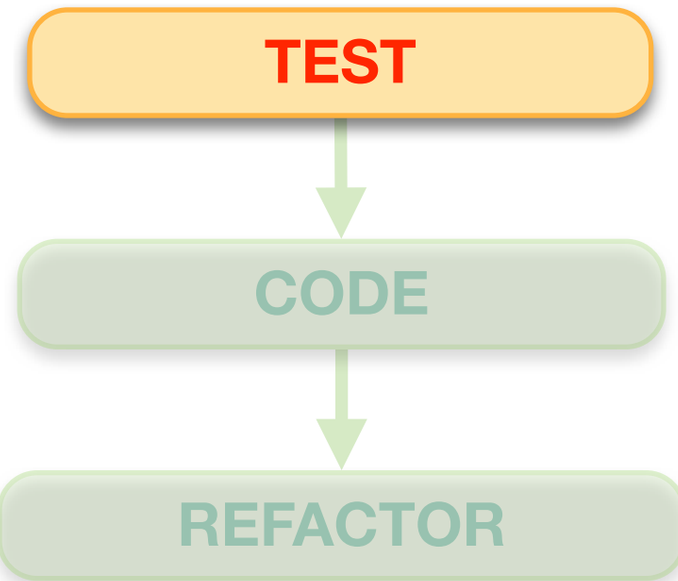

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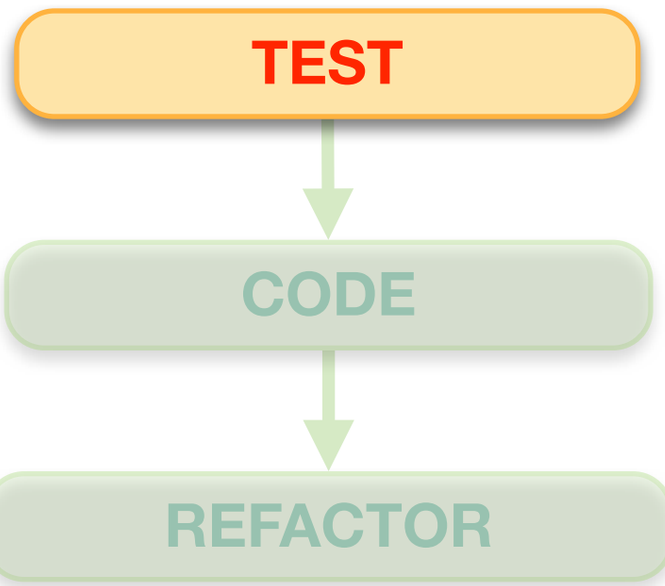

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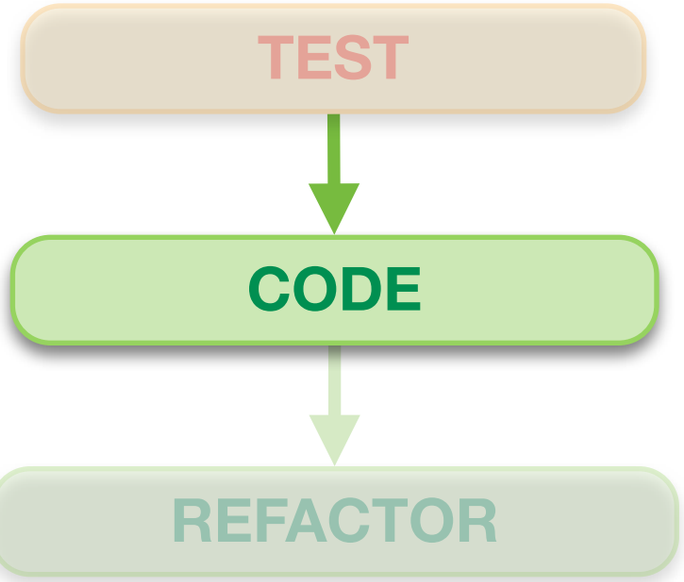

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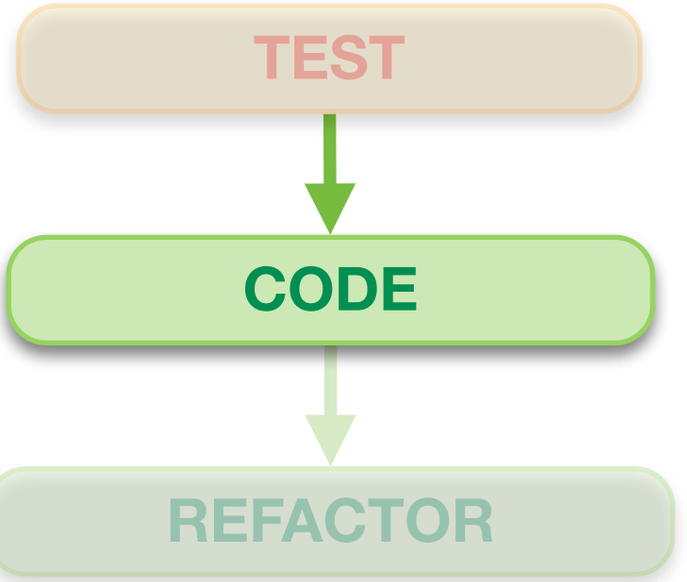
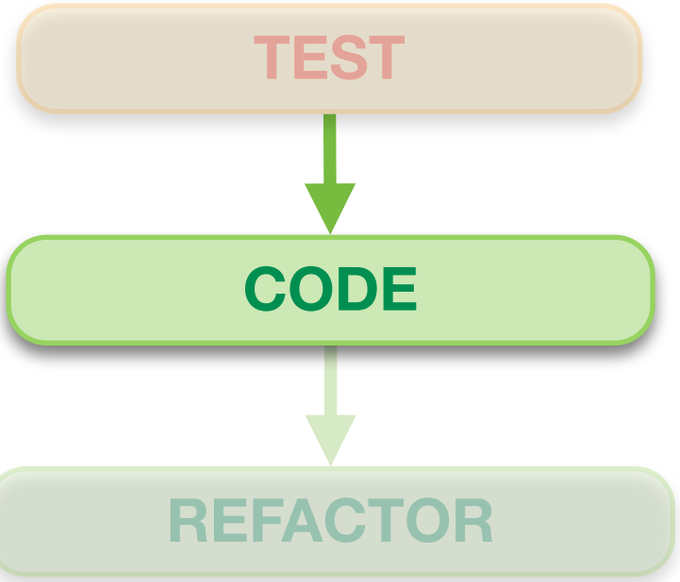
- **Step 2) Write some code**



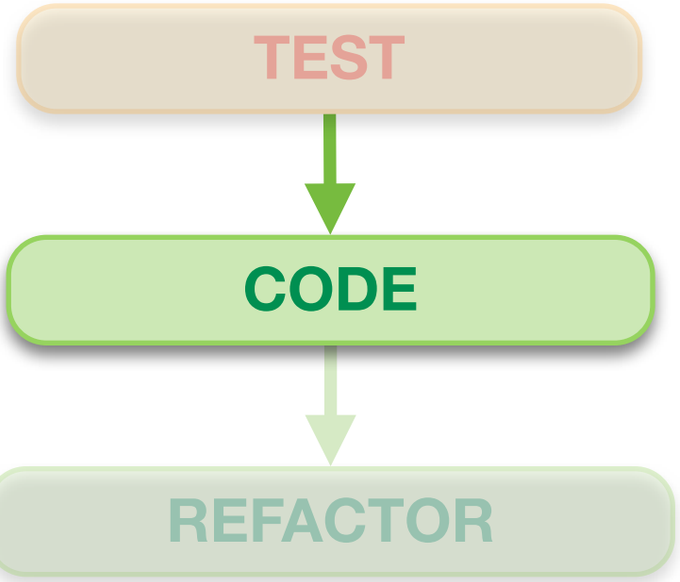
TDD Basics

- **Step 2) Write some code**
  - Just enough code to make the tests pass



TDD Basics

- **Step 2) Write some code**
  - Just enough code to make the tests pass
    - Might mean a non-optimal solution at this stage...



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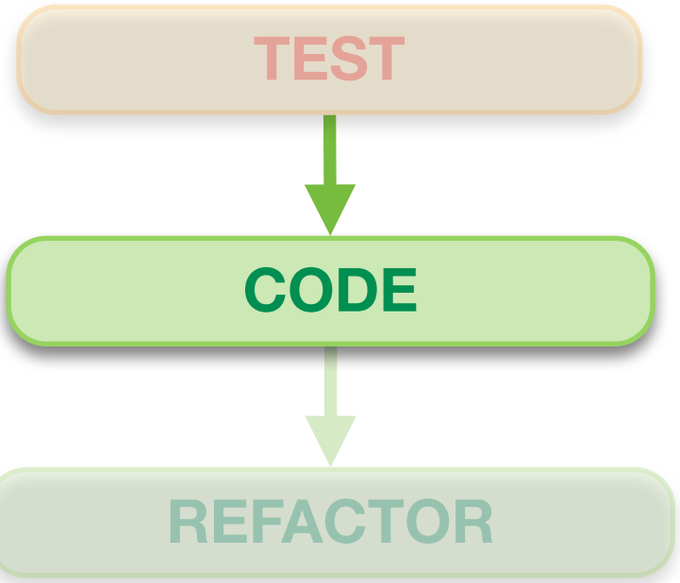

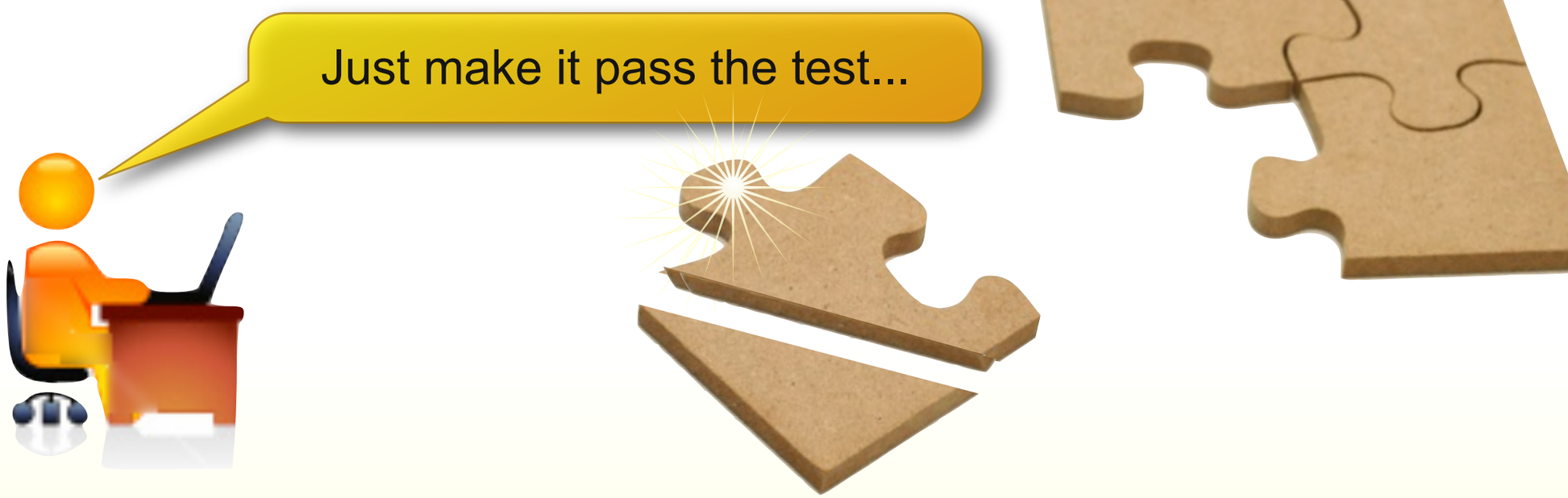

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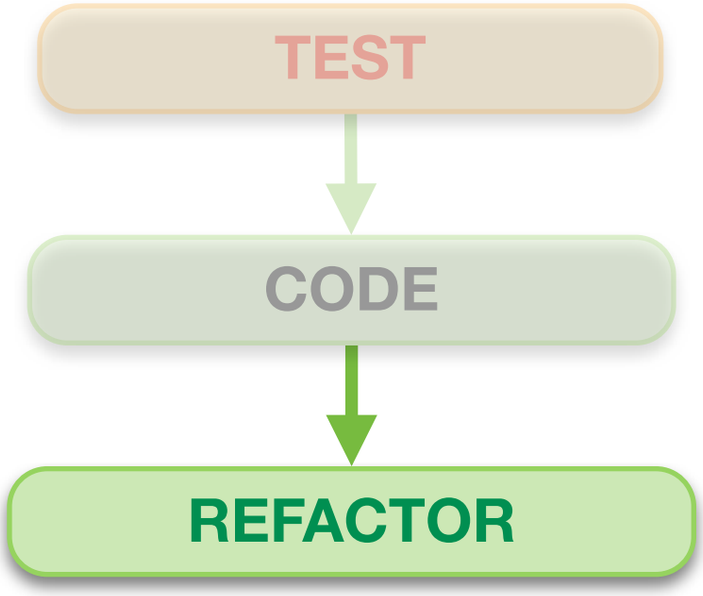

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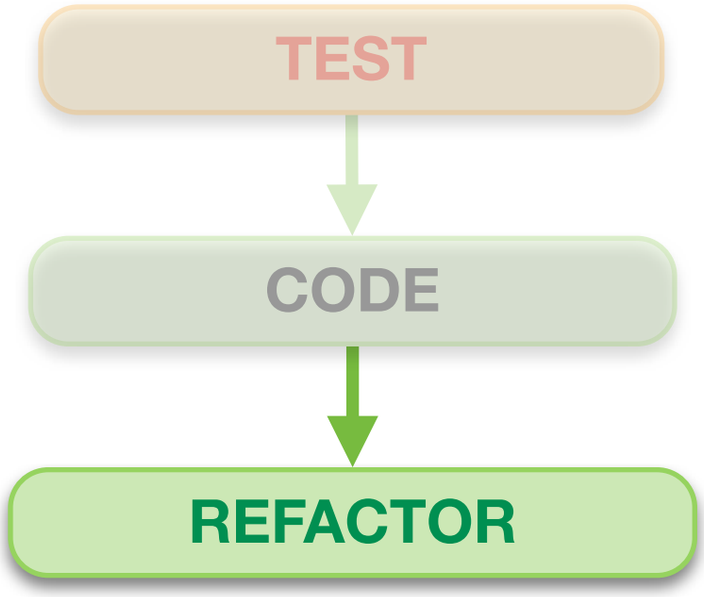
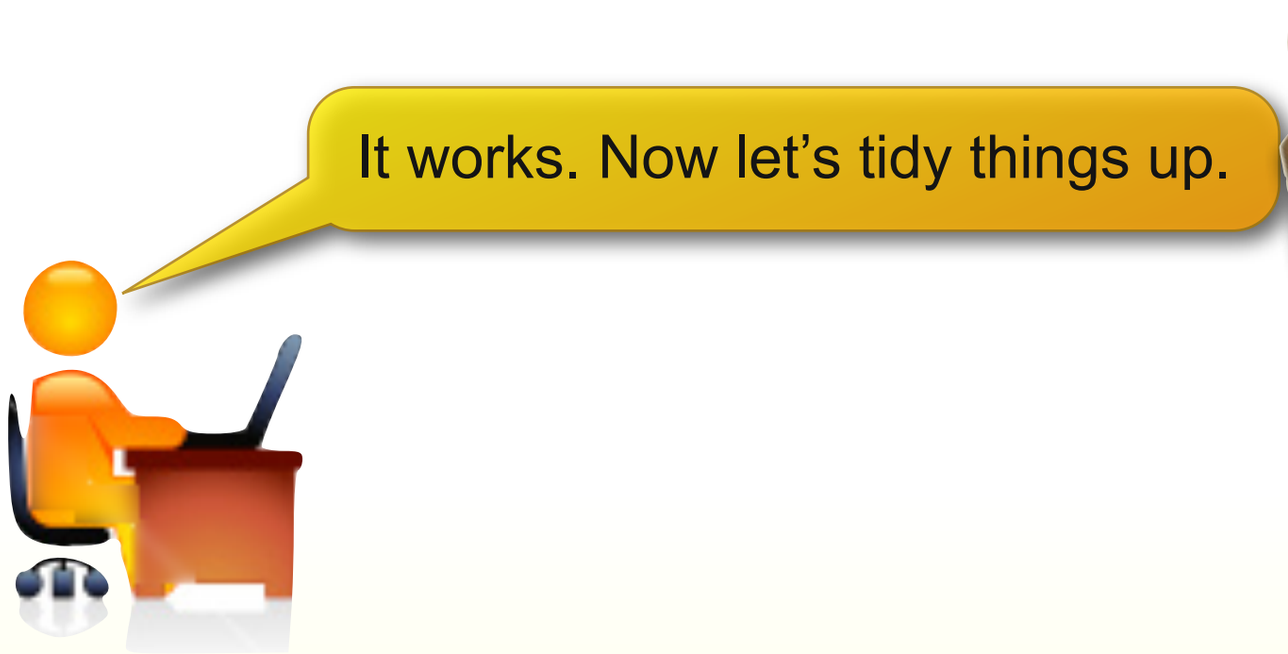
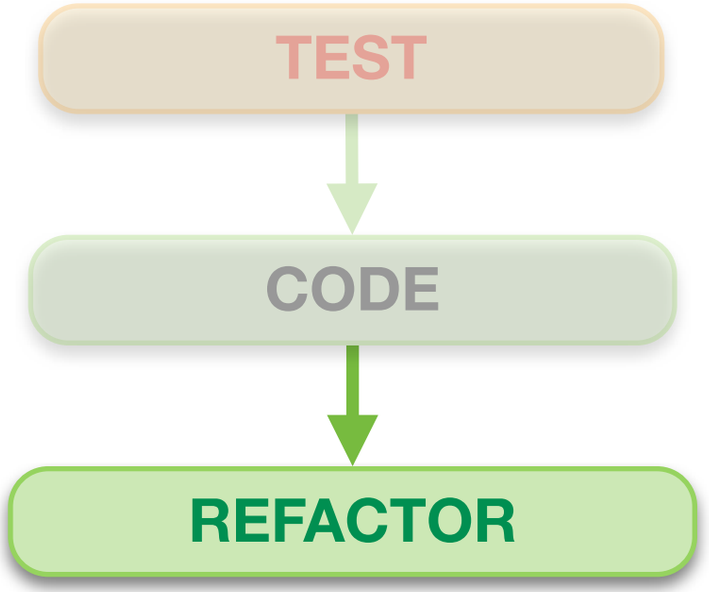
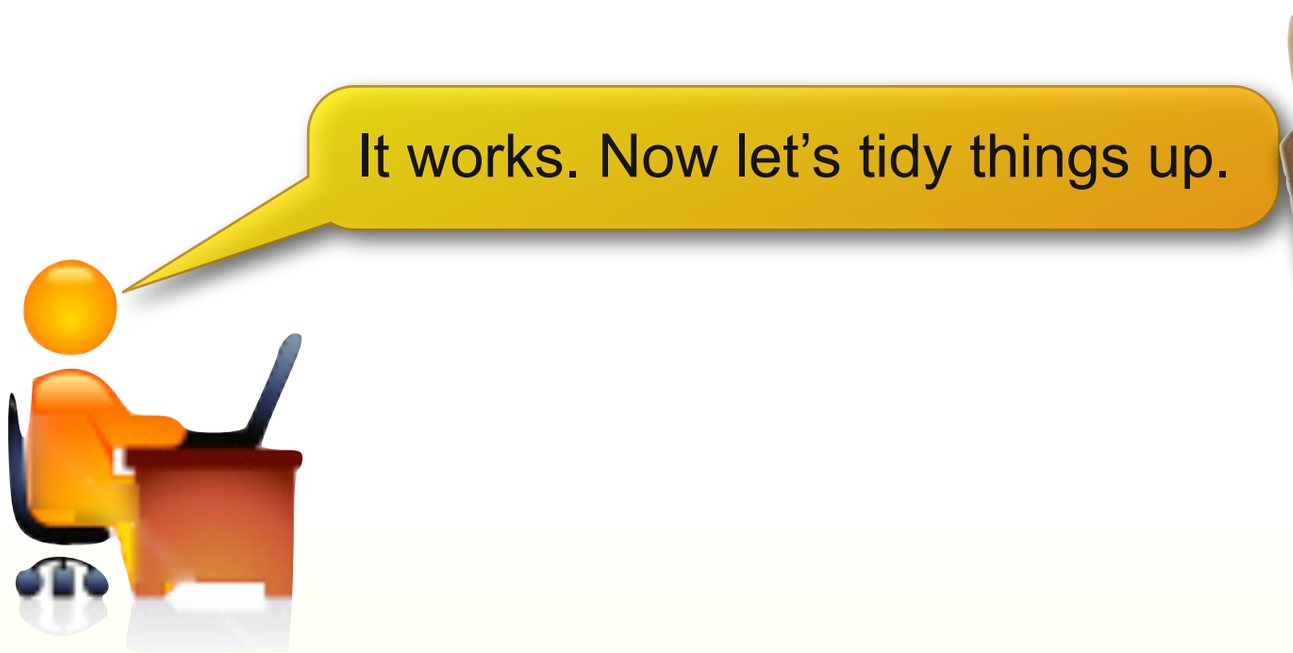




TDD Basics

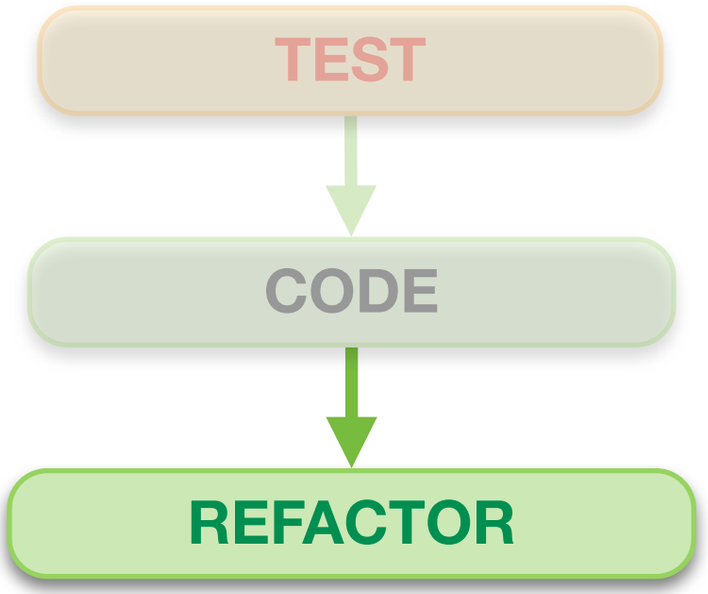
- **Step 3) Tidy up**

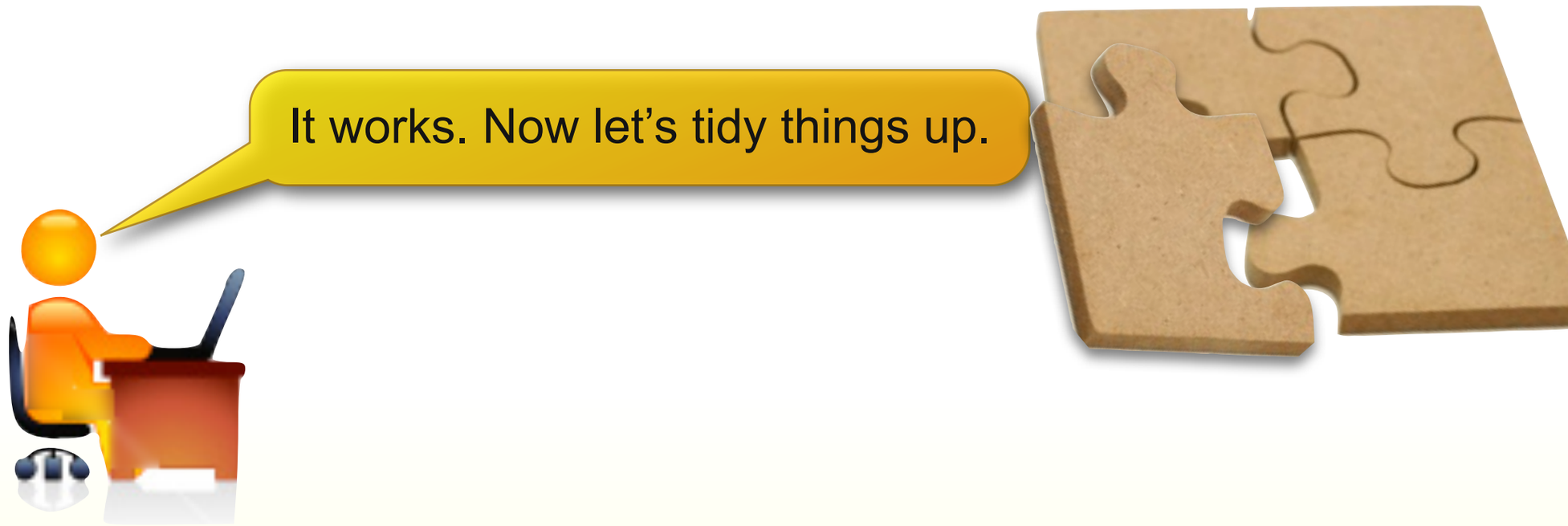




TDD Basics

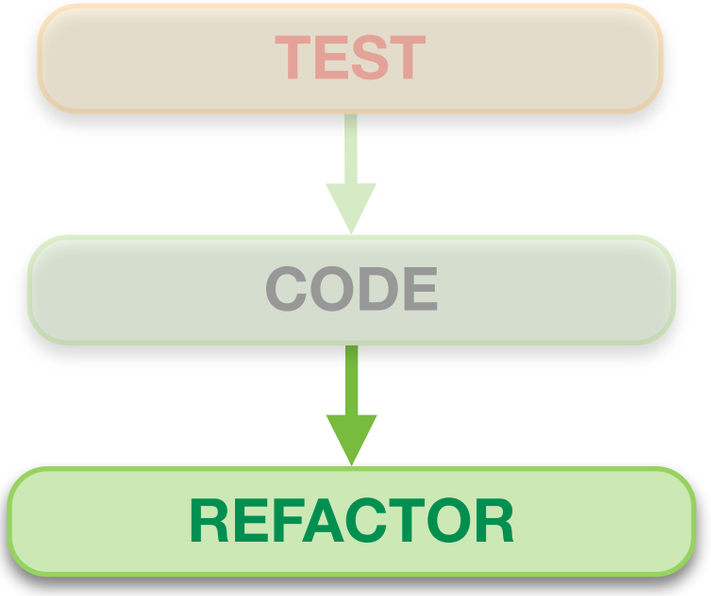
- **Step 3) Tidy up**
  - Evolutionary (emerging) design

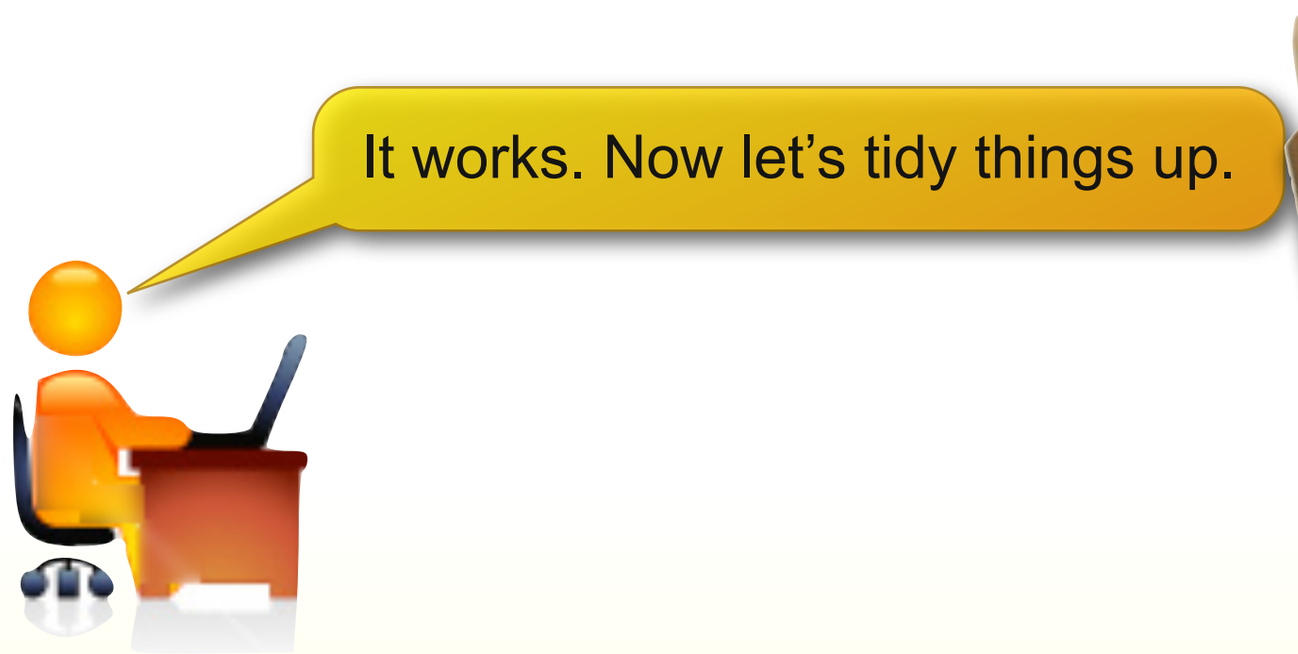




TDD Basics

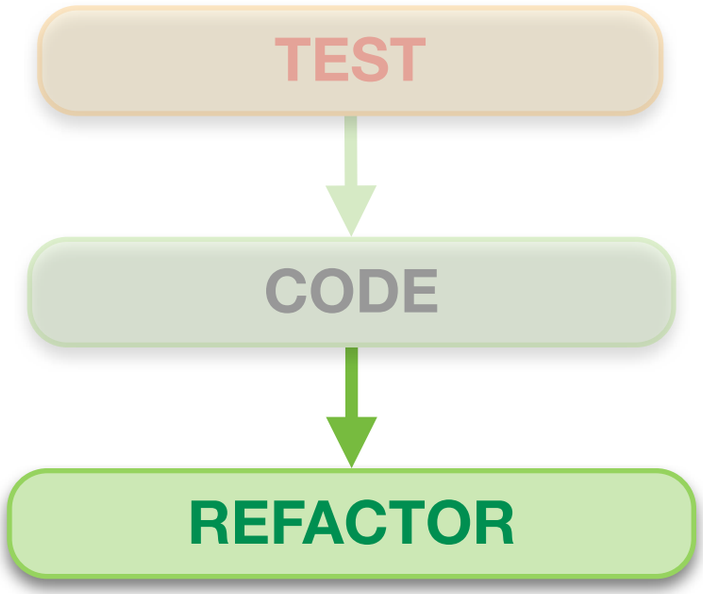
- **Step 3) Tidy up**
  - Evolutionary (emerging) design
    - Keep the code clean!

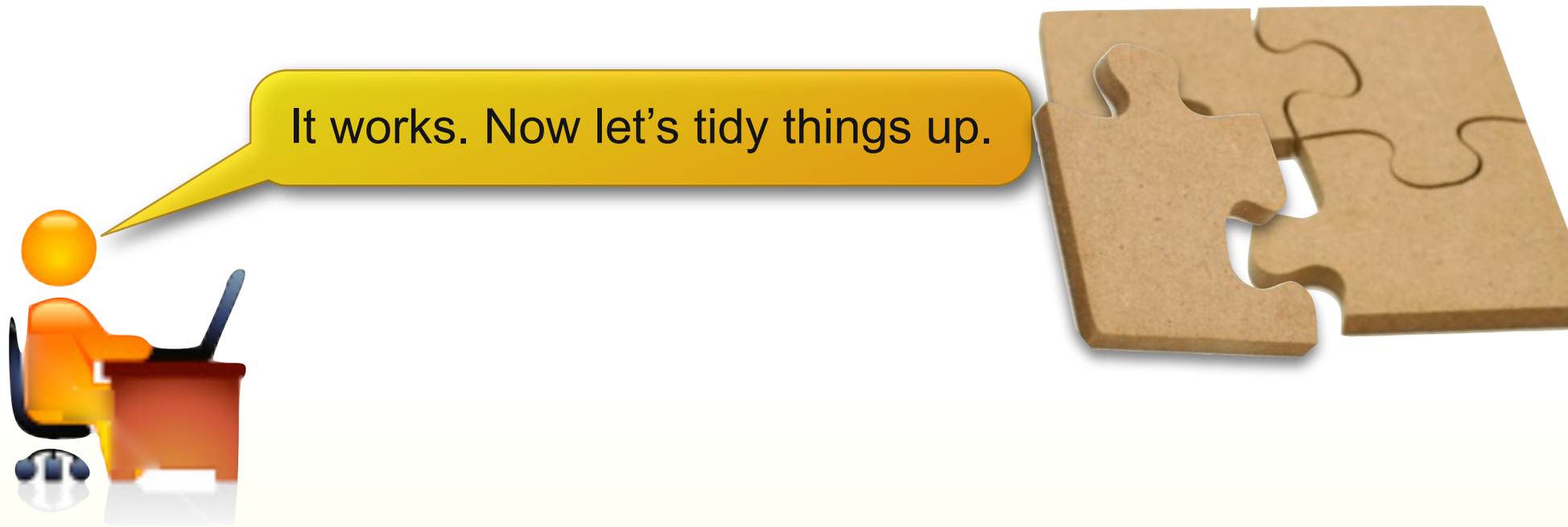




TDD Basics

- **Step 3) Tidy up**
  - Evolutionary (emerging) design
    - Keep the code clean!
    - Remove duplication and fix design problems





TDD Basics

- **Step 3) Tidy up**
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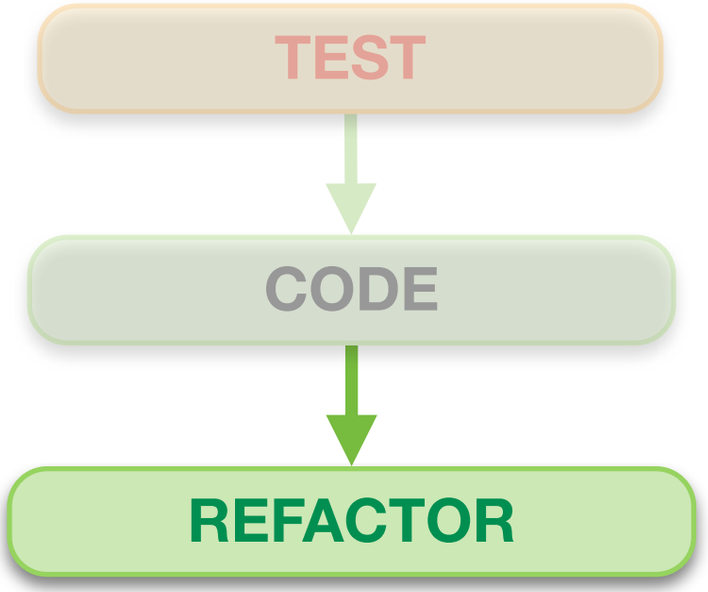
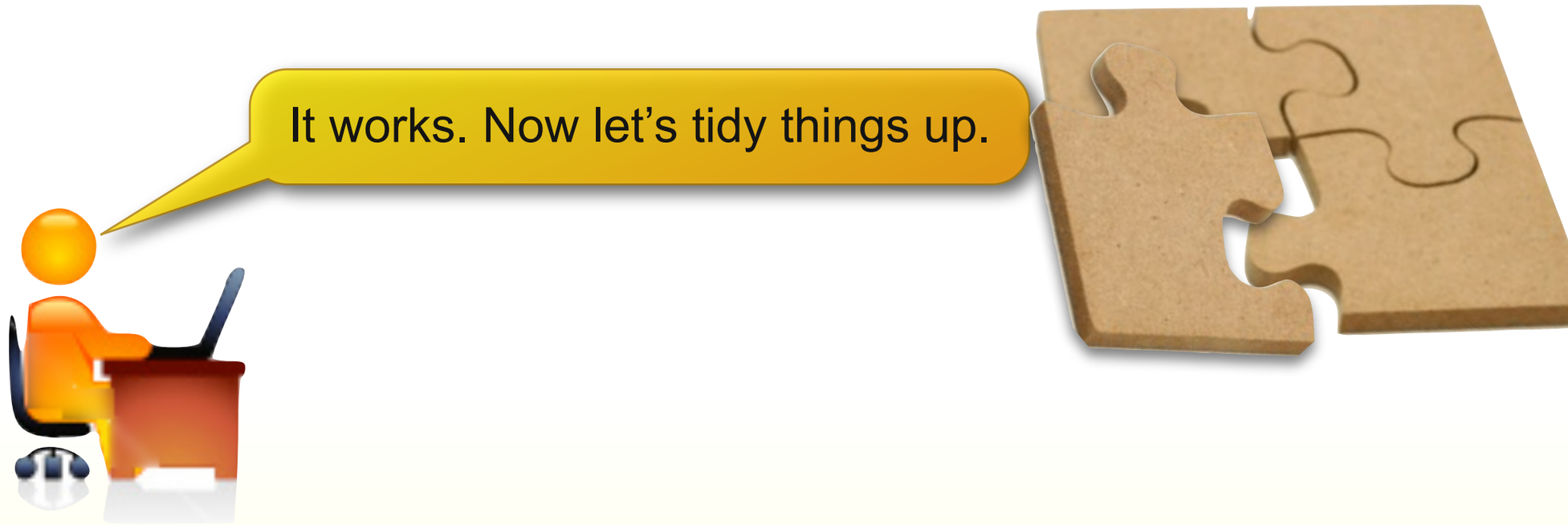
    - Keep the code clean!
    - Remove duplication and fix design problems
    - Restructure existing code - no new features!





TDD Basics

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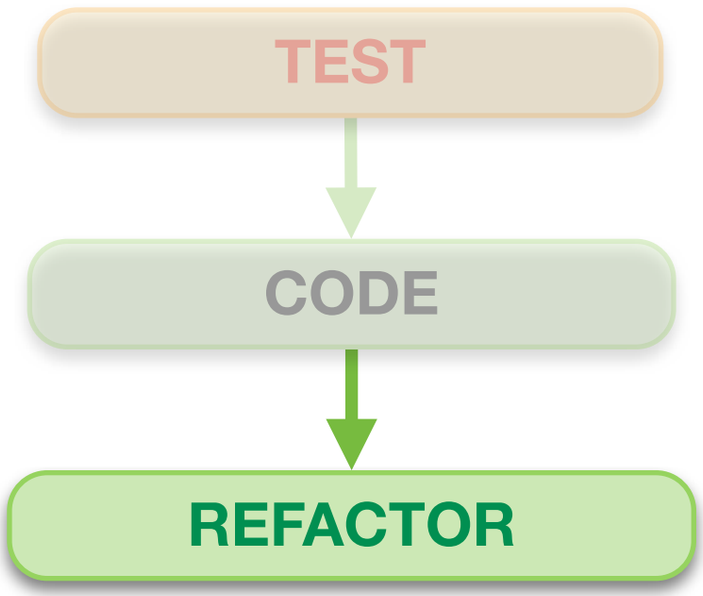
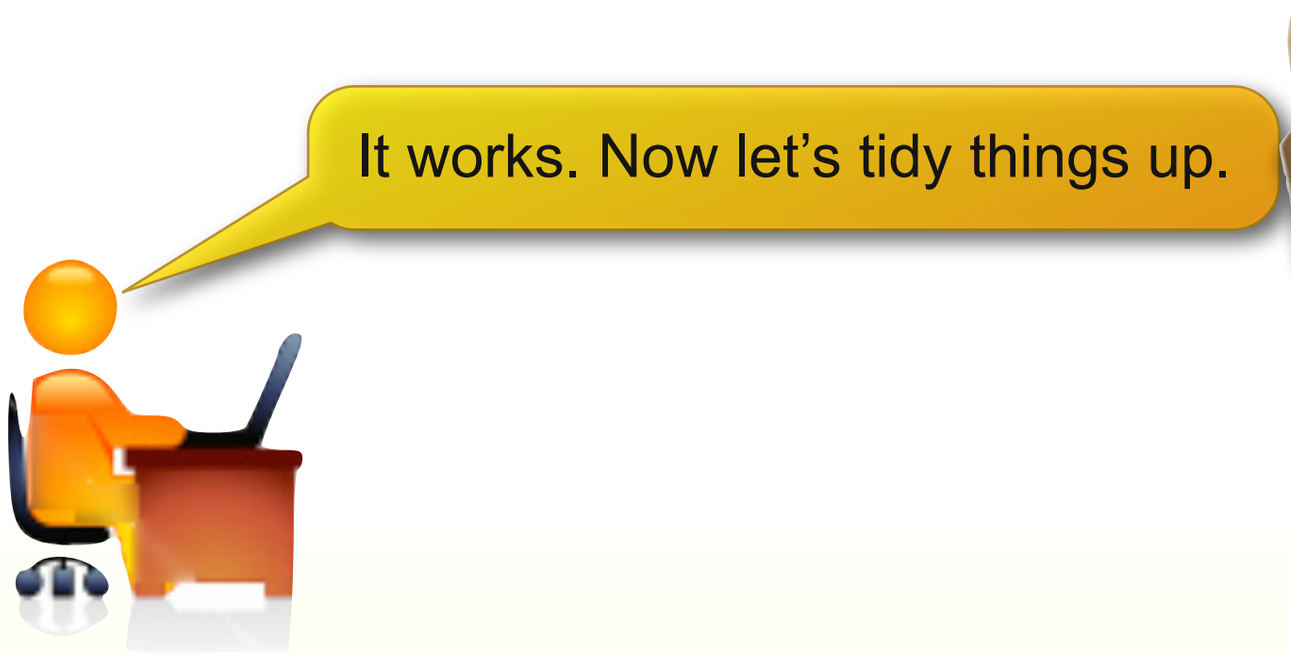
  - Evolutionary (emerging) design
    - Keep the code clean!
    - Remove duplication and fix design problems
    - Restructure existing code - no new features!
    - Make sure the tests still pass!





TDD in Action - the Game Of Life

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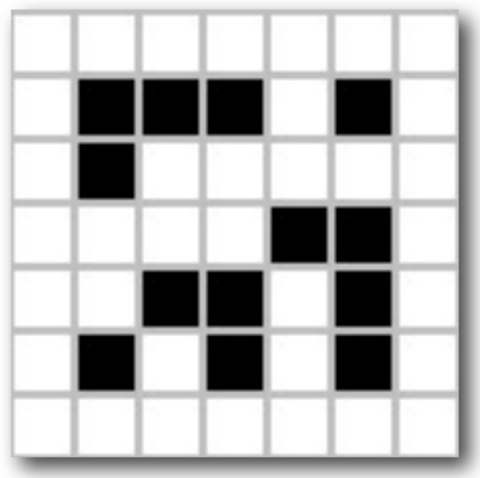
TDD in Action - the Game Of Life

The Game of Life

- Live cells with less than 2 live neighbours die
- Live cells with more than 3 live neighbours die
- Live cells with 2 or 3 live neighbours remain alive
- Dead cells with 3 neighbours become alive



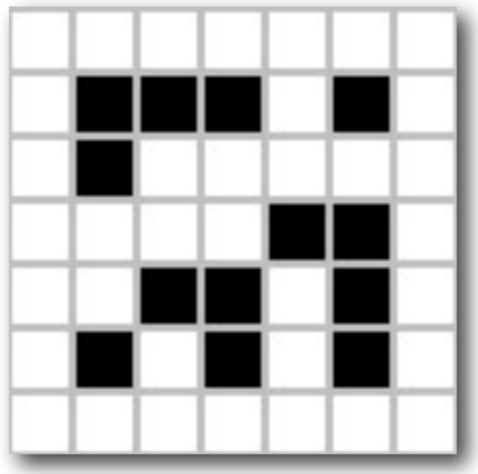
TDD in Action

The Game of Life

- Live cells with less than 2 live neighbours die
- [illegible]
- [illegible]
- [illegible]

User Story 1 - Less than 2 neighbours die

Given a cell with less than 2 live neighbours
When the next generation is created
Then this cell will die



TDD in Action

Now what?

The Game of Life

- Live cells with less than 2 live neighbours die
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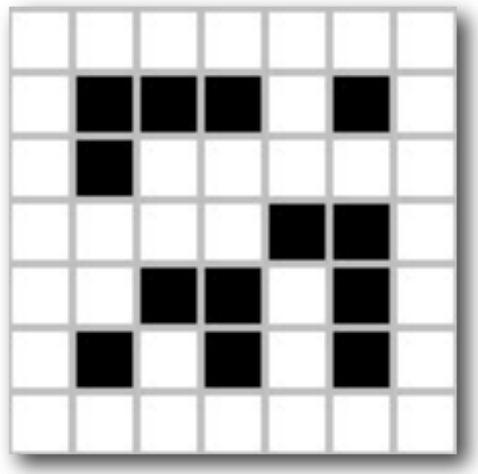

TDD in Action

Now what?

So what do we mean by this first requirement?

The Game of Life

- Live cells with less than 2 live neighbours die
- [illegible]
- [illegible]
- [illegible]

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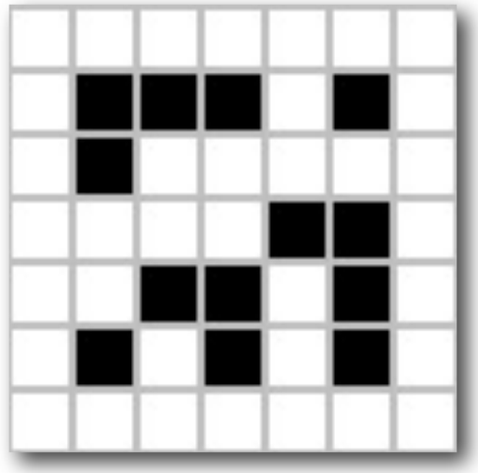

TDD in Action

The Game of Life

- Live cells with less than 2 live neighbours die
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- [illegible]
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User Story 1 - Less than 2 neighbours die

Given a cell with less than 2 live neighbours
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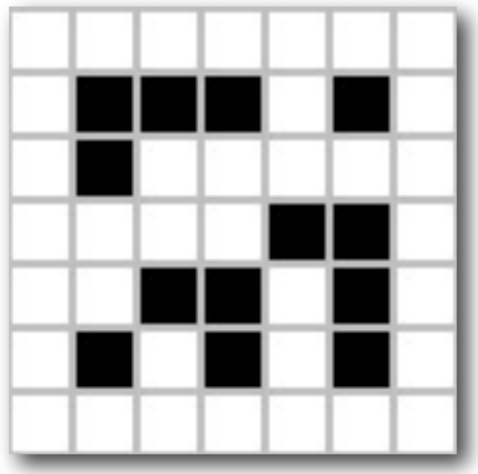

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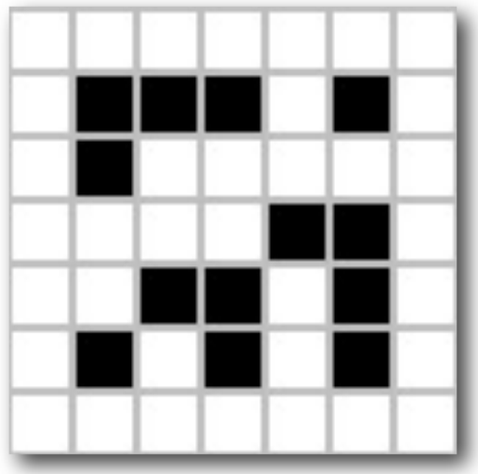

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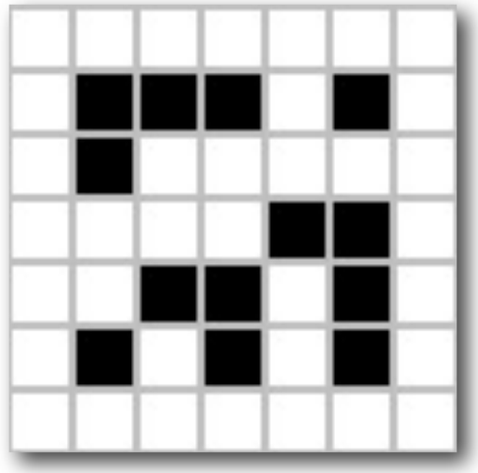

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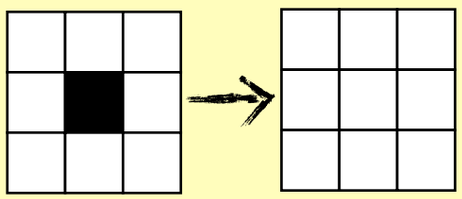
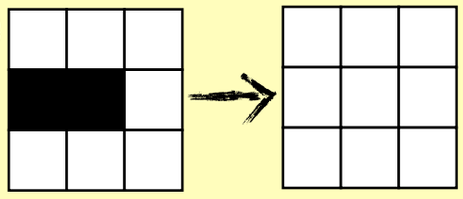
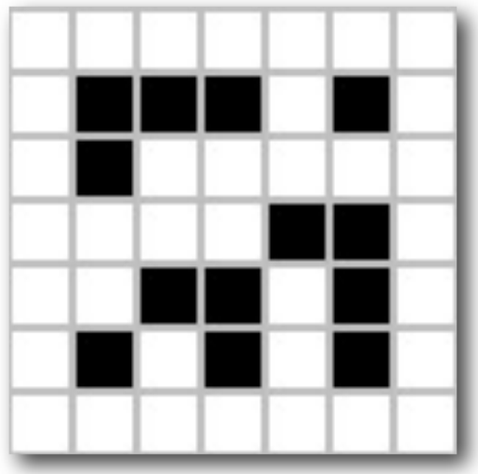
User Story 1 - Acceptance criteria

Sample grid transitions:

1) 

2) 



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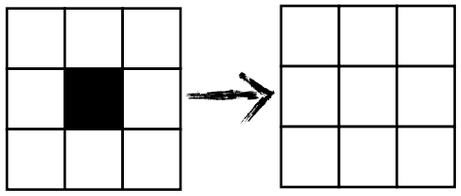

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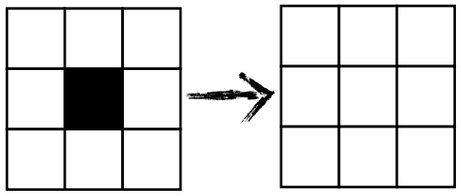

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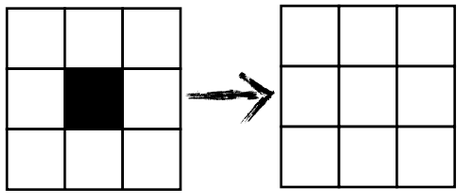

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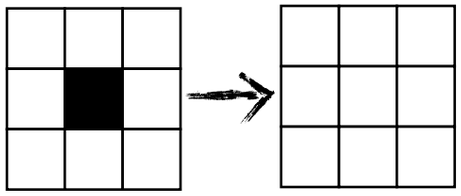

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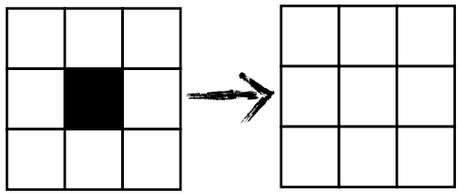

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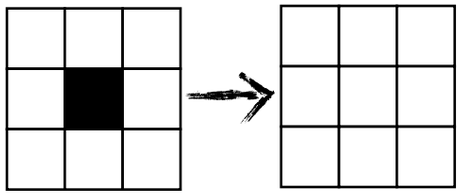

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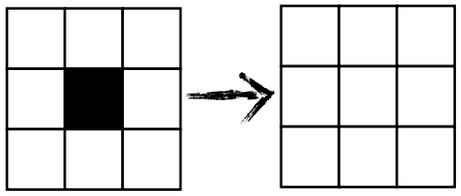

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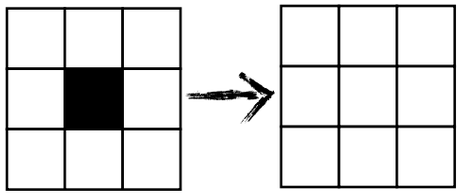

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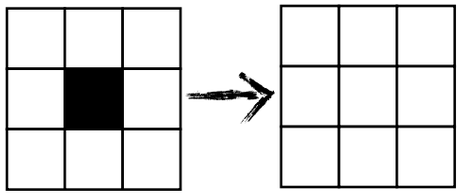

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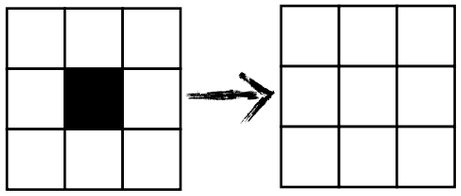

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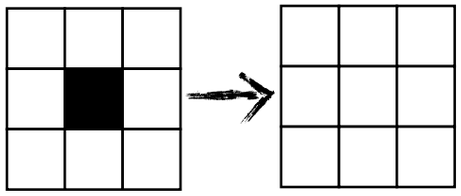

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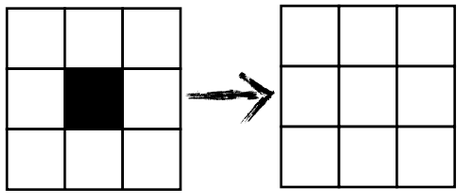

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It's a working example of how to use the class

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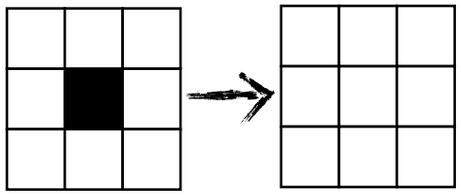

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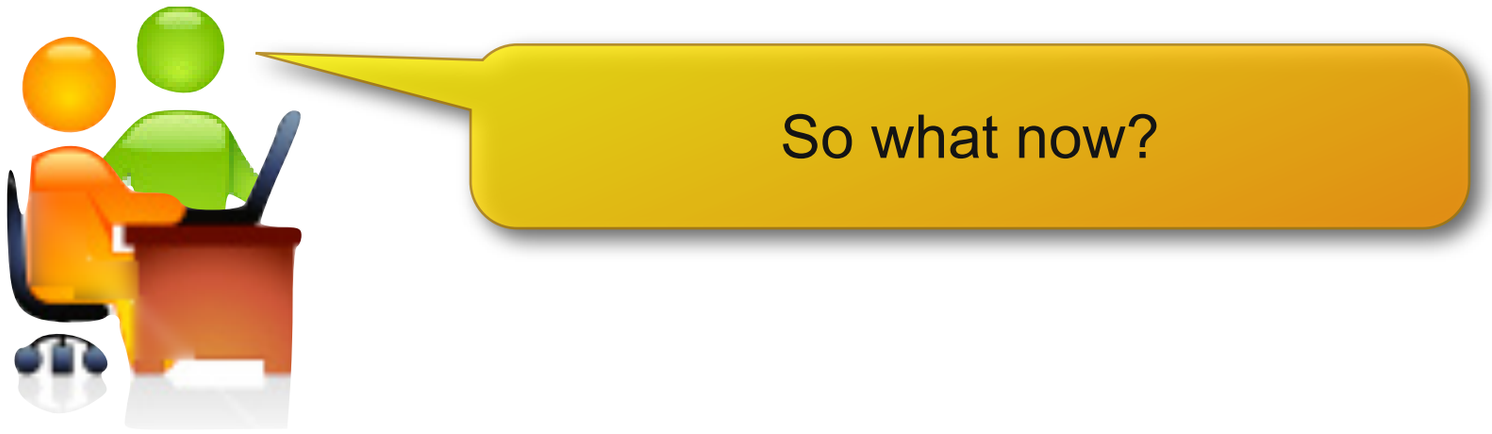

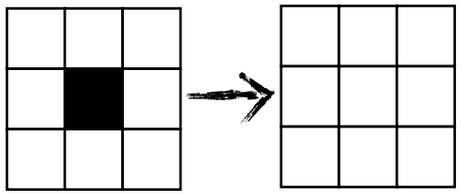

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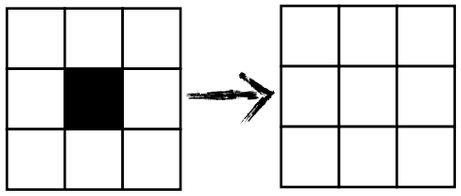

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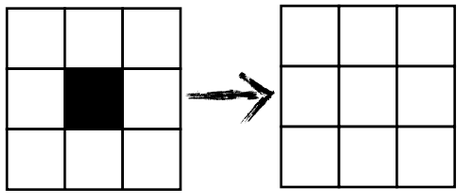

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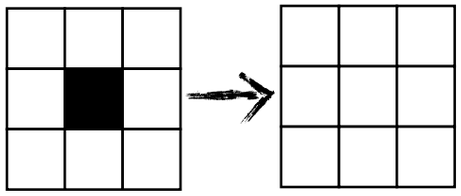

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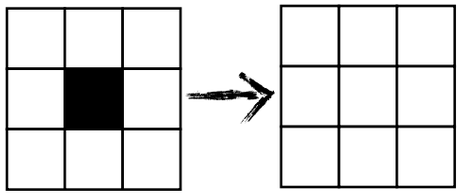

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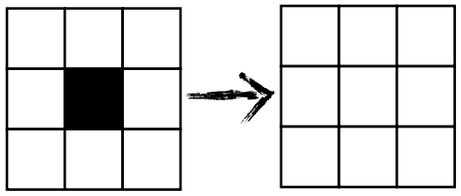

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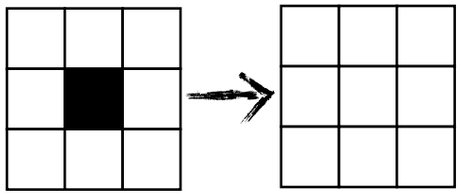

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    @Test
    public void aUniverseSeededWithAnEmpyGridContentWillContainAnEmptyGrid() {

        String seededGrid = "...\n" +
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        Universe theUniverse = new Universe(seededWith(seededGrid));
        String currentGrid = theUniverse.getGrid();
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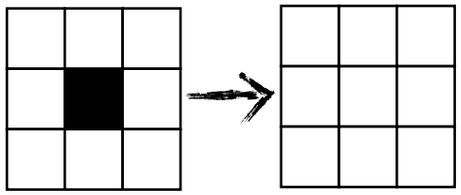

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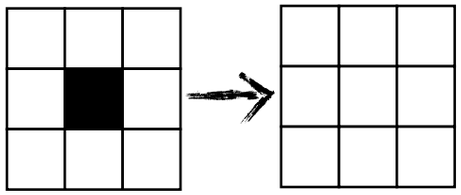
TDD in Action

So now can we code?



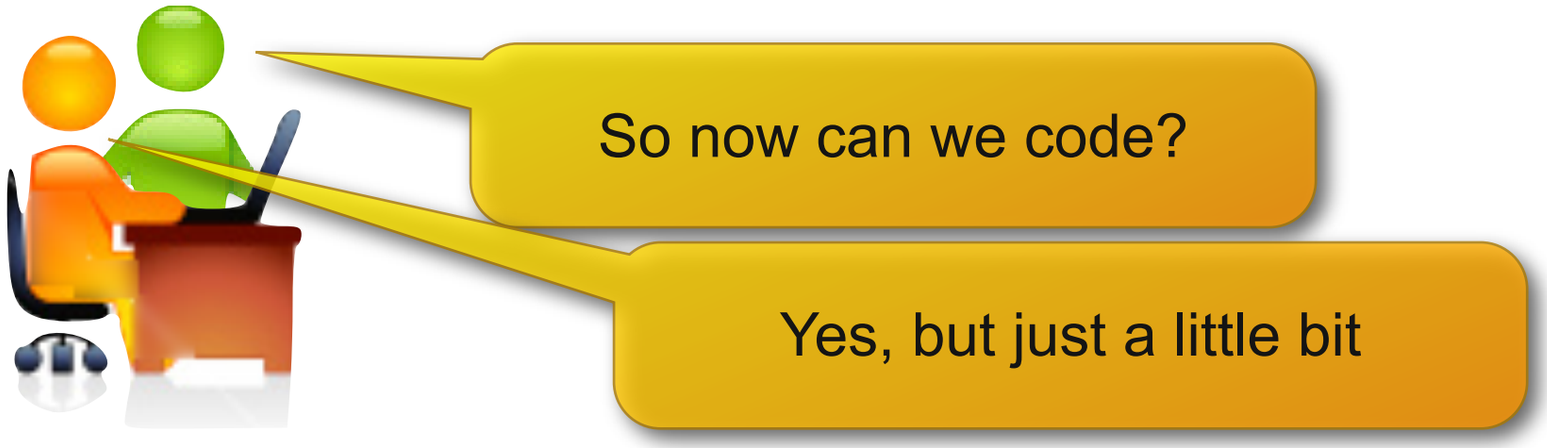
```
public class UniverseTest {

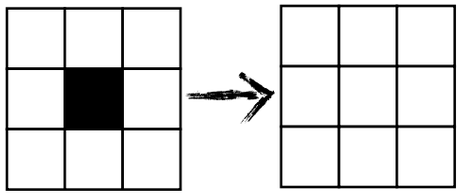
    @Test
    public void aUniverseSeededWithAnEmpyGridContentWillContainAnEmptyGrid() {

        String seededGrid = "...\n" +
                            "...\n" +
                            "...";

        Universe theUniverse = new Universe(seededWith(seededGrid));
        String currentGrid = theUniverse.getGrid();
        assertThat(currentGrid, is(seededGrid));
    }
}
```

TDD in Action





```
public class UniverseTest {

    @Test
    public void aUniverseSeededWithAnEmpyGridContentWillContainAnEmptyGrid() {

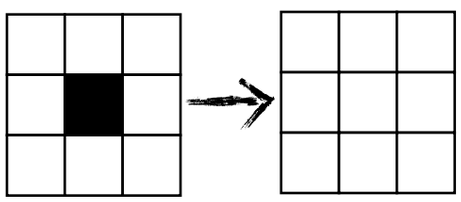
        String seededGrid = "...\n" +
                            "...\n" +
                            "...";

        Universe theUniverse = new Universe(seededWith(seededGrid));
        String currentGrid = theUniverse.getGrid();
        assertThat(currentGrid, is(seededGrid));
    }
}
```

TDD in Action

So now can we code?

Yes, but just a little bit



```
public class UniverseTest {

    @Test
    public void aUniver

        String seededGr



        Universe theUni
        String currentG
        assertThat(curr
    }
}
```

```
public class Universe {

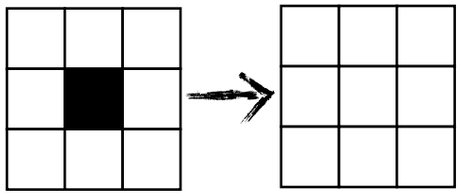
    public Universe(String initialGridContents) {}

    public static String seededWith(String gridContents) {
        return null;
    }

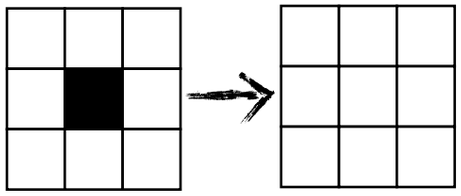
    public void createNextGeneration() {}

    public String getGrid() {
        return "...\n" +
               "...\n" +
               "...";
    }
}
```

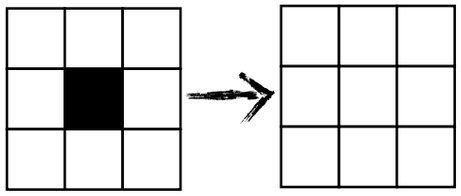
TDD in Action



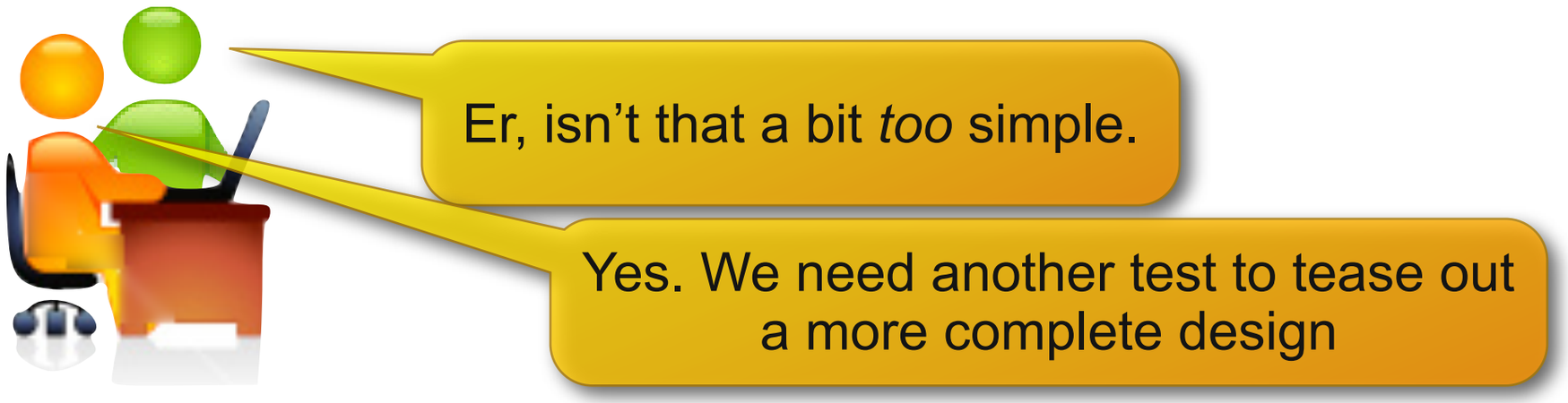
TDD in Action

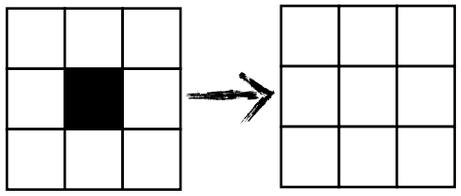


TDD in Action



TDD in Action





```
public class UniverseTest {

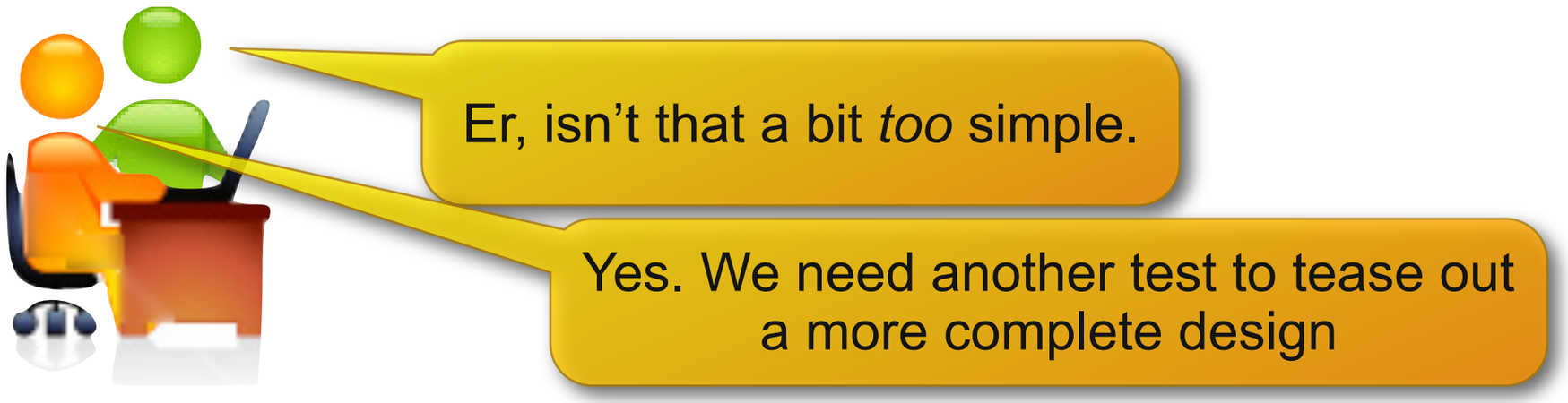
    @Test
    public void aUniverseSeededWithAnEmpyGridContentWillContainAnEmptyGrid() {...}

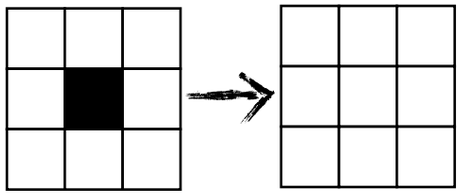
    @Test
    public void aUniverseSeededWithANonEmpyGridContentWillContainThatGrid() {

        String seededGrid = "...\n" +
                            ".*.\n" +
                            "...";

        Universe theUniverse = new Universe(seededWith(seededGrid));
        String currentGrid = theUniverse.getGrid();
        assertThat(currentGrid, is(seededGrid));
    }
}
```

TDD in Action





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public class UniverseTest {

    @Test
    public void aUniverseSeededWithAnEmpyGridContentWillContainAnEmptyGrid() {...}

    @Test
    public void aUniverseSeededWithANonEmpyGridContentWillContainThatGrid() {

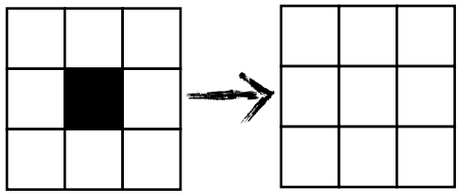
        String seededGrid = "...\n" +
                            ".*.\n" +
                            "...";

        Universe theUniverse = new Universe(seededWith(seededGrid));
        String currentGrid = theUniverse.getGrid();
        assertThat(currentGrid, is(seededGrid));
    }
}
```

TDD in Action

Er, isn't that a bit *too* simple.

Yes. We need another test to tease out a more complete design



```
public class UniverseTest {

    @Test
    public void aUniverseSee

    @Test
    public void aUniverseSee

        String seededGrid =



        Universe theUniverse
        String currentGrid =
        assertThat(currentGr
    }
}
```

```
public class Universe {

    private String currentContent;

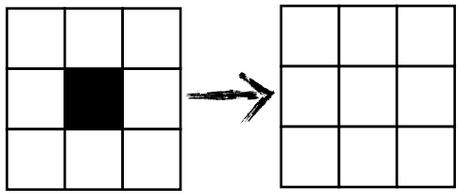
    public Universe(String initialGridContents) {
        currentContent = initialGridContents;
    }

    public static String seededWith(String gridContents) {
        return gridContents;
    }

    public void createNextGeneration() {
    }

    public String getGrid() {
        return currentContent;
    }
}
```

TDD in Action



```
public class Universe {

    private String currentContent;

    public Universe(String initialGridContents) {
        currentContent = initialGridContents;
    }

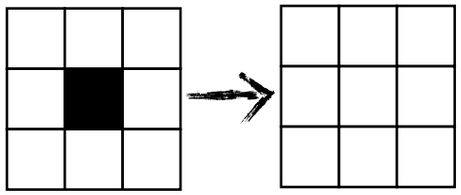
    public static String seededWith(String gridContents) {
         return gridContents;
    }

    public void createNextGeneration() {
    }

    public String getGrid() {
        return currentContent;
    }
}
```

TDD in Action

Well, now at least those two tests pass.



```
public class Universe {

    private String currentContent;

    public Universe(String initialGridContents) {
        currentContent = initialGridContents;
    }

    public static String seededWith(String gridContents) {
        return gridContents;
    }

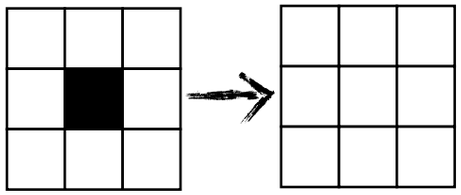
    public void createNextGeneration() {
    }

    public String getGrid() {
        return currentContent;
    }
}
```

TDD in Action

Well, now at least those two tests pass.

Now we need to implement the ‘createNextGeneration()’ method...



```
public class Universe {

    private String currentContent;

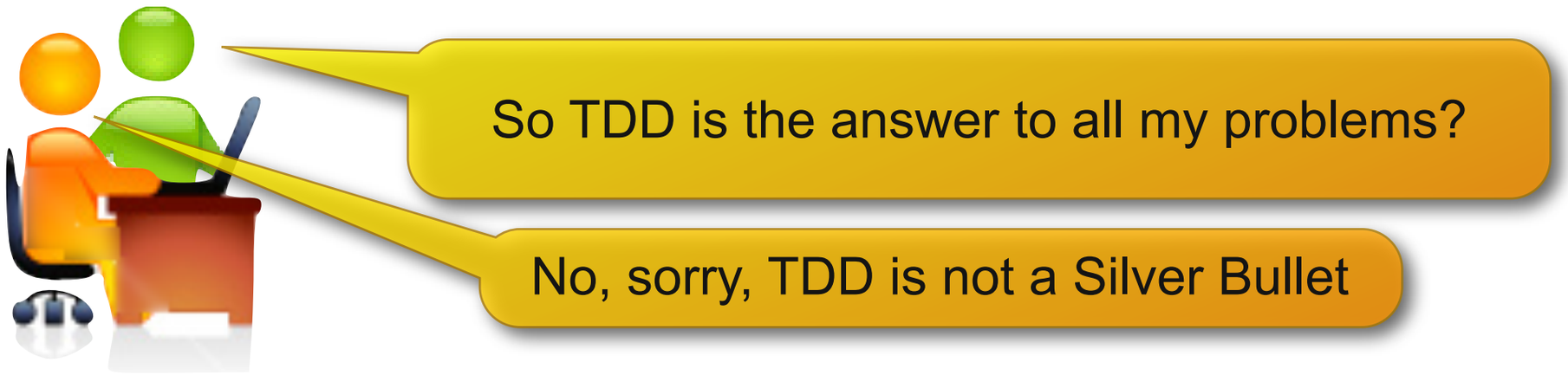
    public Universe(String initialGridContents) {
        currentContent = initialGridContents;
    }

    public static String seededWith(String gridContents) {
        return gridContents;
    }

    public void createNextGeneration() {
    }

    public String getGrid() {
        return currentContent;
    }
}
```

TDD for unbelievers



- You still have to use your brain
  - Also use other design activities (domain modeling, DDD,...)
- TDD is not applicable everywhere
  - Highly visual coding, ‘know it when you see it’ stuff,...
- TDD works best if you have a vision

TDD for unbelievers

But how can I write tests if I don't know what the code looks like?

How can you write code when you can't express what it should do?

"Write code for others as you would have them write code for you"

- Some agile dude

- TDD is about expressing the intent of your code
- It is a design practice
- Design your code "outside-in"

TDD for unbelievers

I don’t have time to write tests

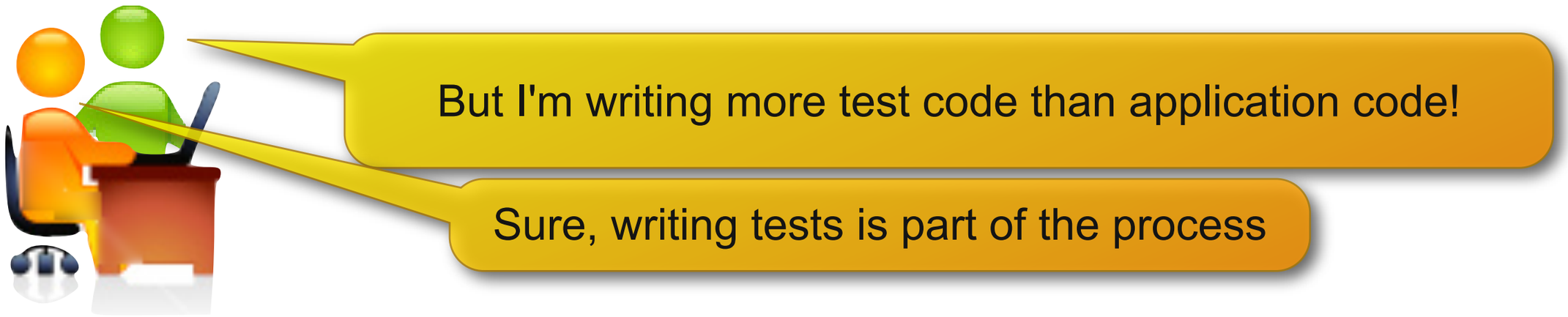
But you have time to fix the code afterwards, right?

“I can get it done much faster if it doesn’t have to work”

- Kent Beck (paraphrased)

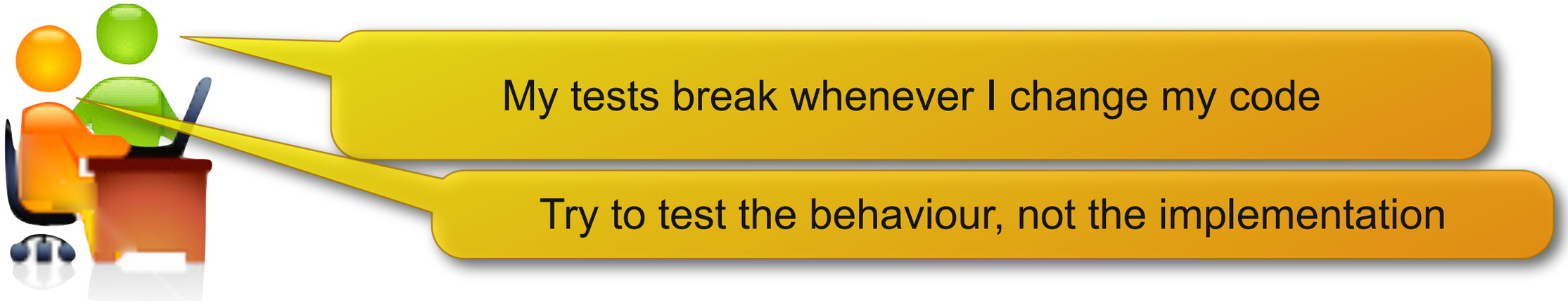
- New TDDers will take maybe 20-30% longer
- Experienced TDD developers don’t spend much (if any) more time coding
- But the code is of much higher quality

TDD for unbelievers



- You will write lots of tests...
- ...but your code will be more focused and more accurate

TDD for unbelievers



- Validate behaviour, don’t verify implementation

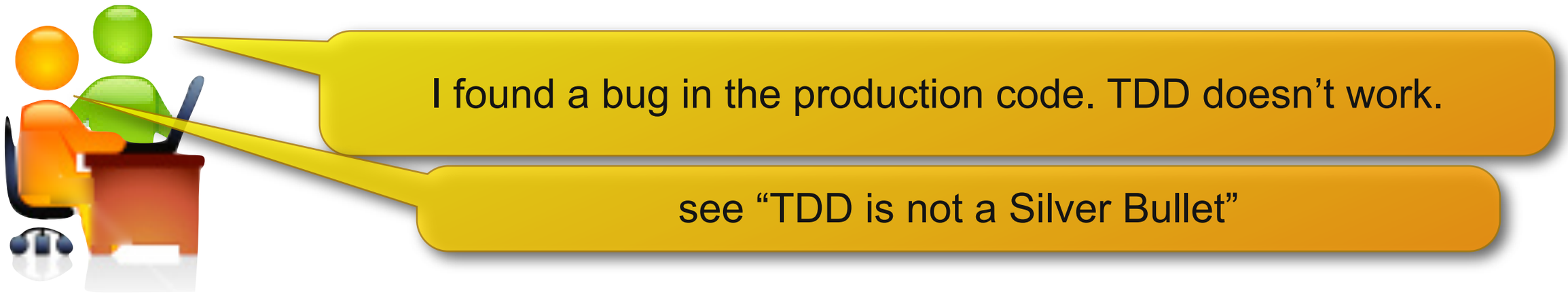
TDD for unbelievers

Our tests are too hard and take too much time to keep up to date

Treat your test code as production code

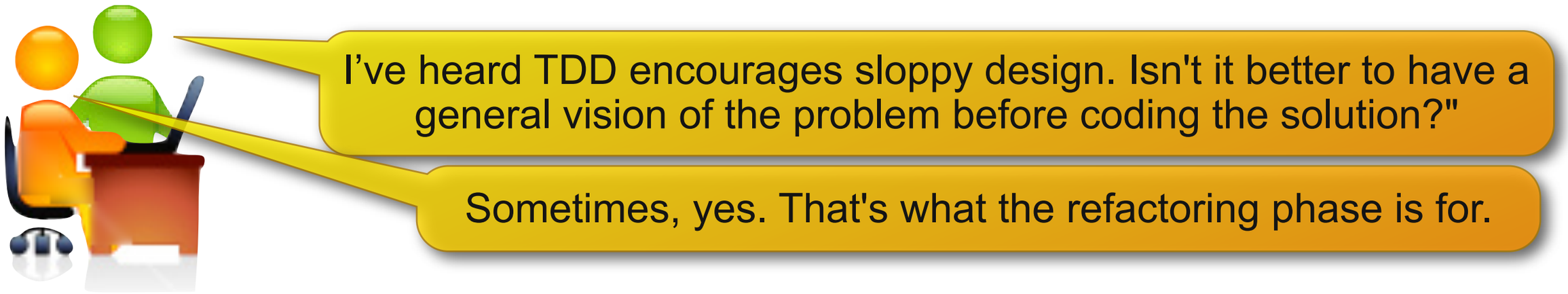
- Be wary of test maintenance overhead
- Test code is not second-class code
- Refactor to keep your test code maintanable
- Avoid technical dept

TDD for unbelievers



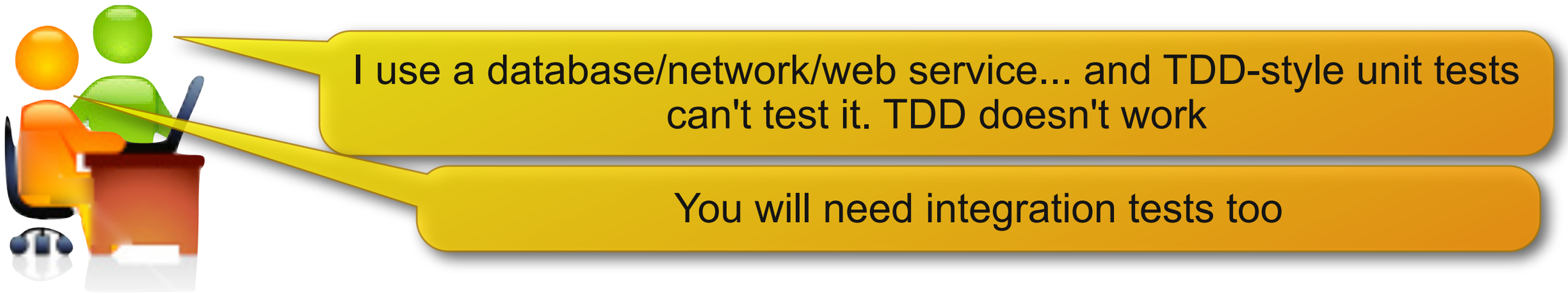
- You still need your testers!
- You can still make mistakes...
- ...but they are easier to isolate and to fix
- If you find a bug, just add another test to reproduce it, then fix it!

TDD for unbelievers



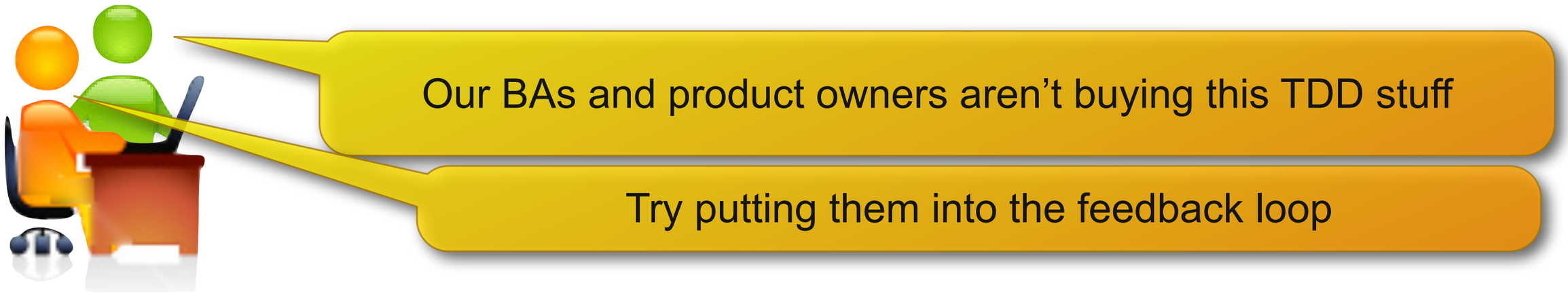
- TDD does not preclude initial high-level design
  - Brainstorm a high-level design approach
  - Define a common well-known domain language
  - Use an ‘Iteration 0’ and spikes
  - Don’t be afraid to refactor
- TDD works better when you have a vision

TDD for unbelievers



- Unit tests when you can, integrations tests when you must
- Integration tests for system boundaries
- Mock out these boundary classes for the rest of your tests

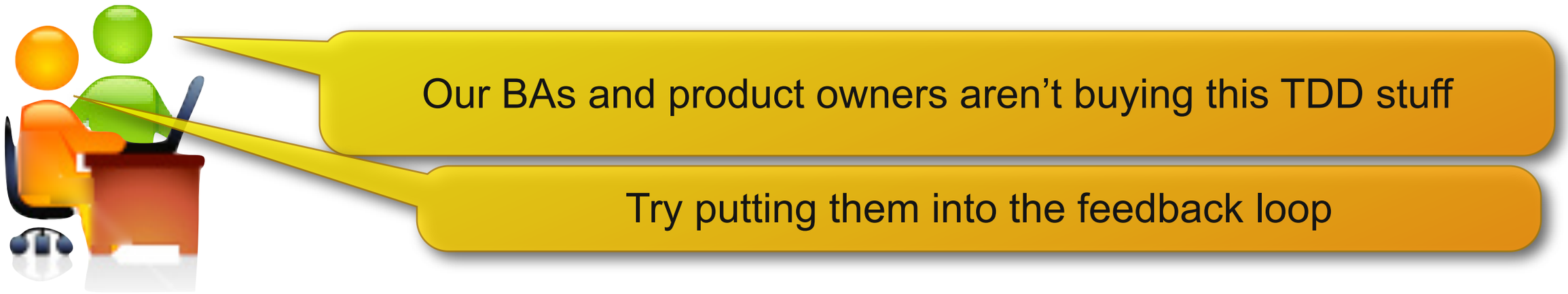
TDD for unbelievers



- Acceptance-Test Driven Development is about communication
- BDD help BAs and POs participate in writing executable requirements

```
scenario "A cell with less than 2 live neighbours should die", {
    given "Given a cell with no live neighbours",
    when "a new generation is generated",
    then "that cell will have died"
}
```

TDD for unbelievers

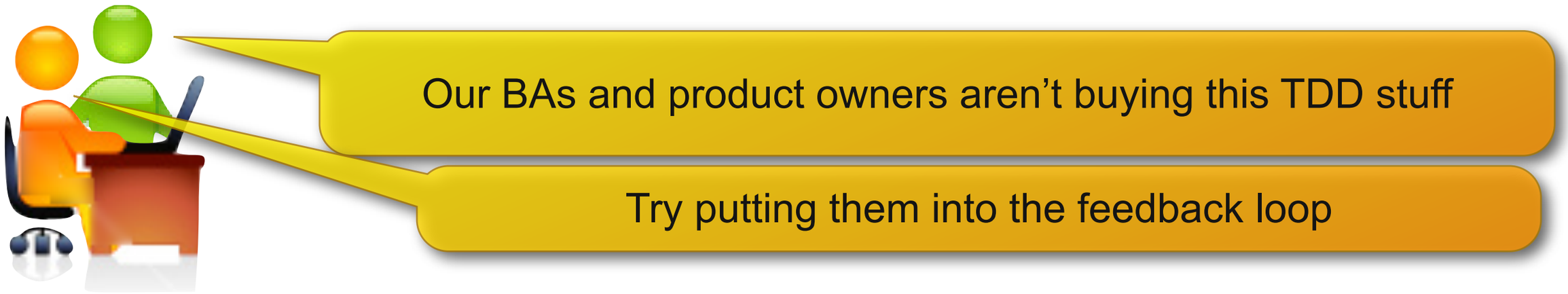


- Acceptance-Test Driven Development is about communication
- BDD help BAs and POs participate in writing executable requirements

```
scenario "A cell with less than 2 live neighbours should die", {
    given "Given a cell with no live neighbours", {
        initialGrid = ""...
                      .*.
                      ..."" 
        theUniverse = new Universe(seededWith(initialGrid));
    }
    when "a new generation is generated",  {
        theUniverse.createNextGeneration()
    }
    then "that cell will have died", {
        theUniverse.grid.shouldBe ""...
                                  ...
                                  ..."" 
    }
}
```

easyb -- bdd in java can't get any easier

TDD for unbelievers

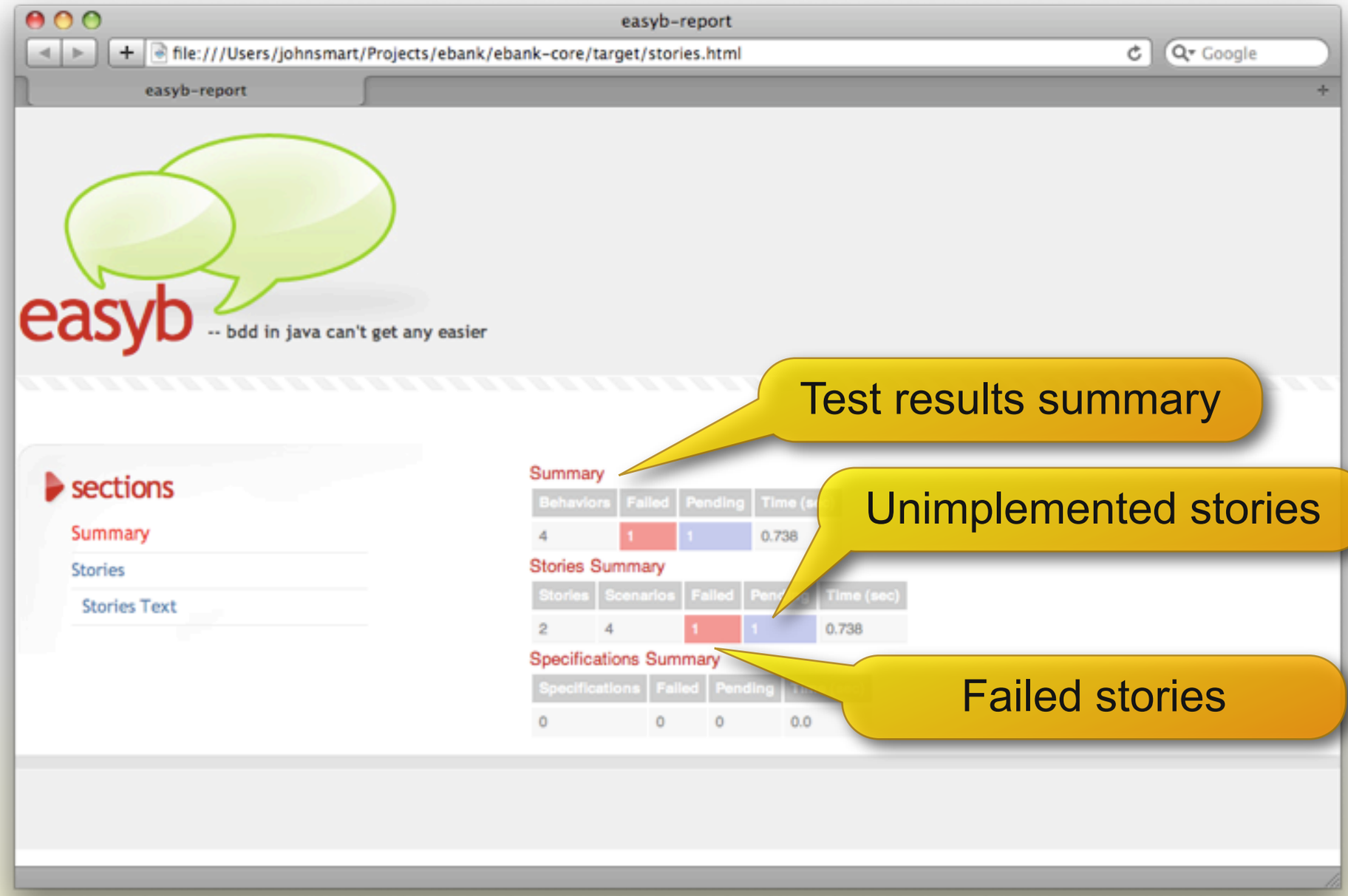


- Acceptance-Test Driven Development is about communication
- BDD help BAs and POs participate in writing executable requirements

```
Given a living cell with no live neighbours like this
...
.*.
...
When a new generation is generated
then the grid should look like this:
...
...
...
```

TDD for unbelievers

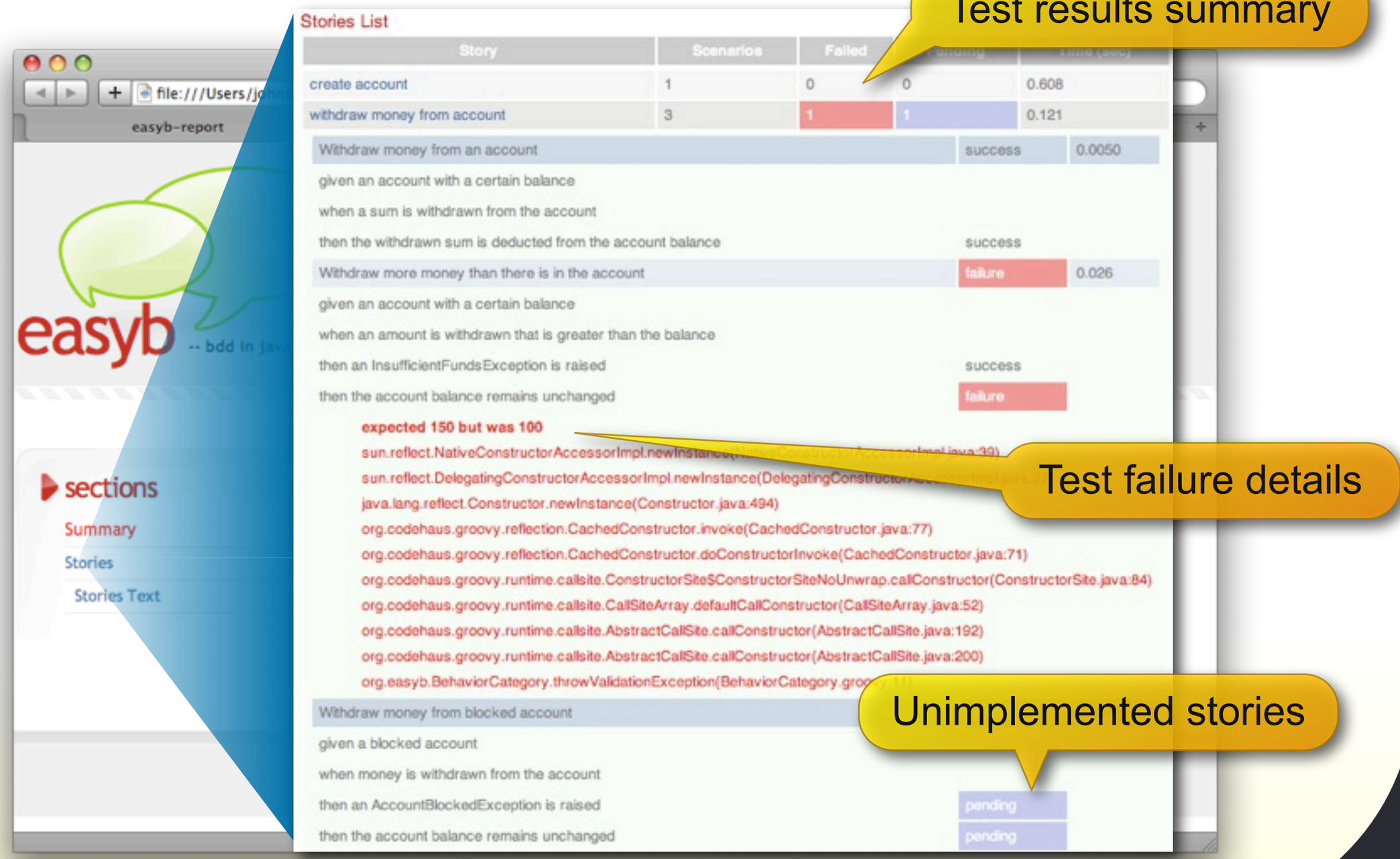
Many BDD tools also have great reporting features



TDD for unbelievers

Many BDD tools have great reporting features

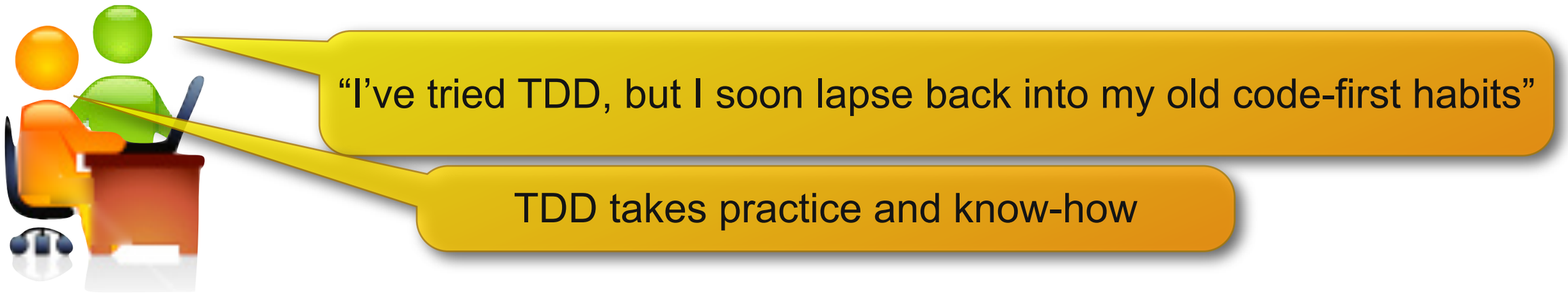
Test results summary



Test failure details

Unimplemented stories

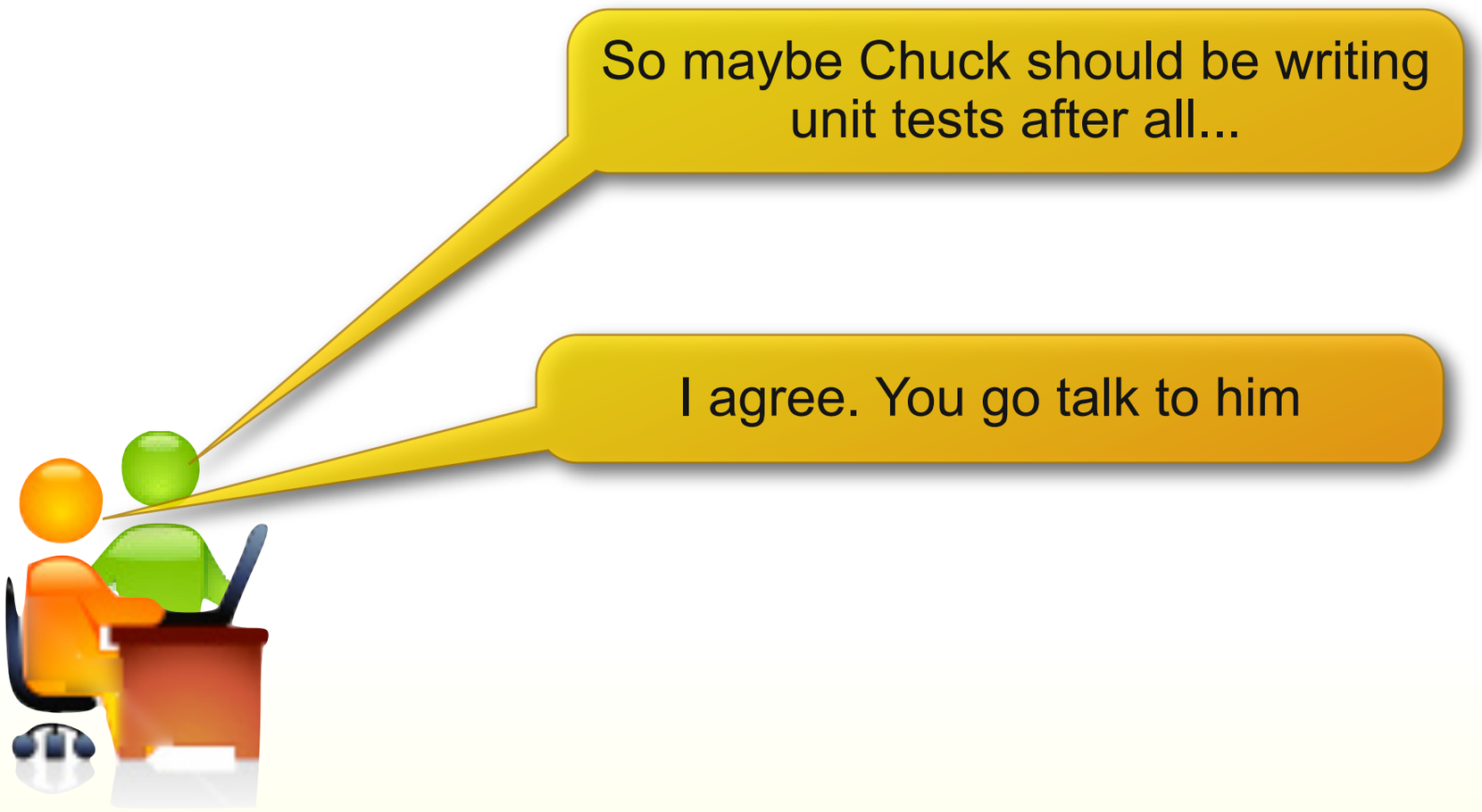
TDD for unbelievers



- Unit tests when you can, integrations tests when you must
- Learn about TDD - read books on TDD practices
- Do pair program with someone who knows TDD
- Participate in and organize coding dojos
- **<blatant plug>**Training/mentoring**</blatant plug>**

Conclusion

- Real Developers Don’t Need Unit Tests?



Thank You

John Ferguson Smart
Wakaleo Consulting Ltd.

http://www.wakaleo.com

Email: john.smart@wakaleo.com
Twitter: wakaleo