



@rtens_

Making BDD work
for you

Nikolas.M@rtens.org

First ...

First ...
show your



Who are you guys?



Who are you guys?

Developers?



Who are you guys?

Developers?

Designers?



Who are you guys?

Developers?

Designers?

Managers?



Who are you guys?

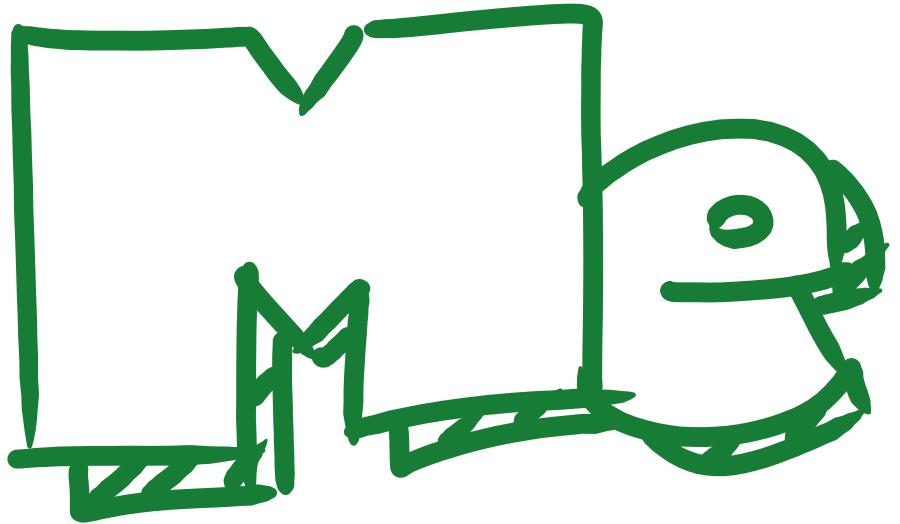
Developers?

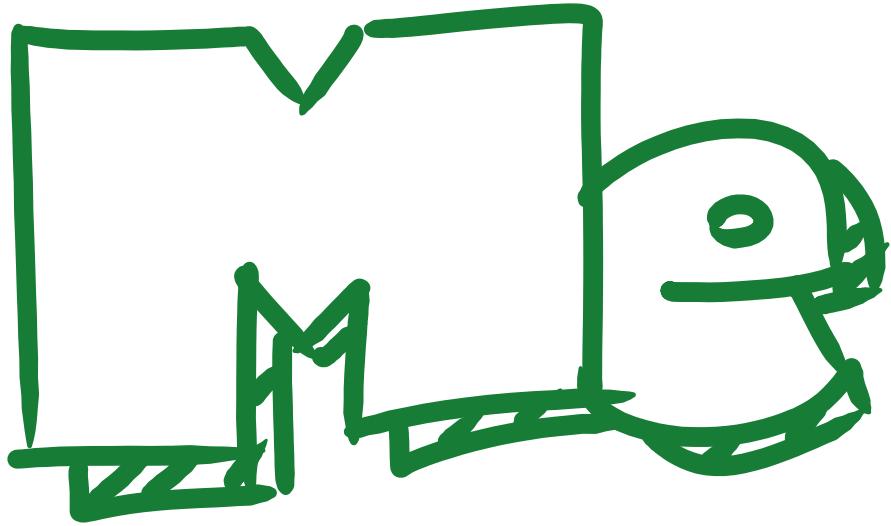
Designers?

Managers?

Real humans?







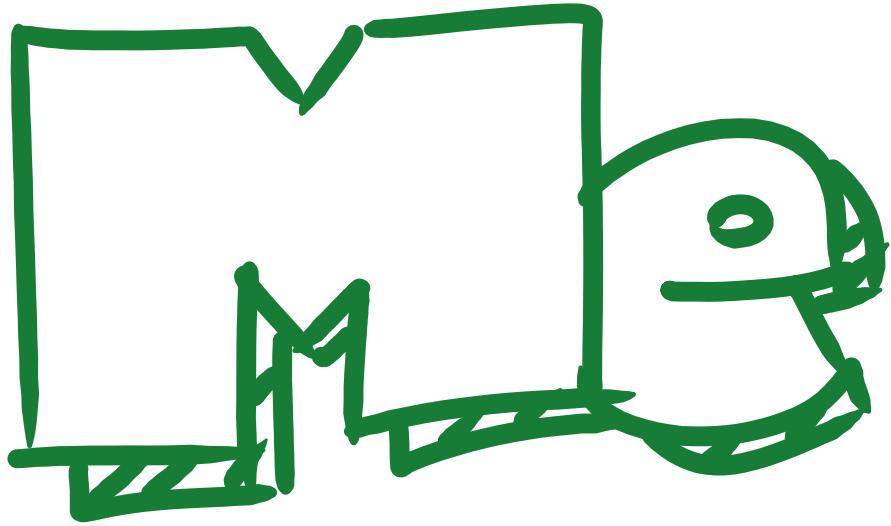
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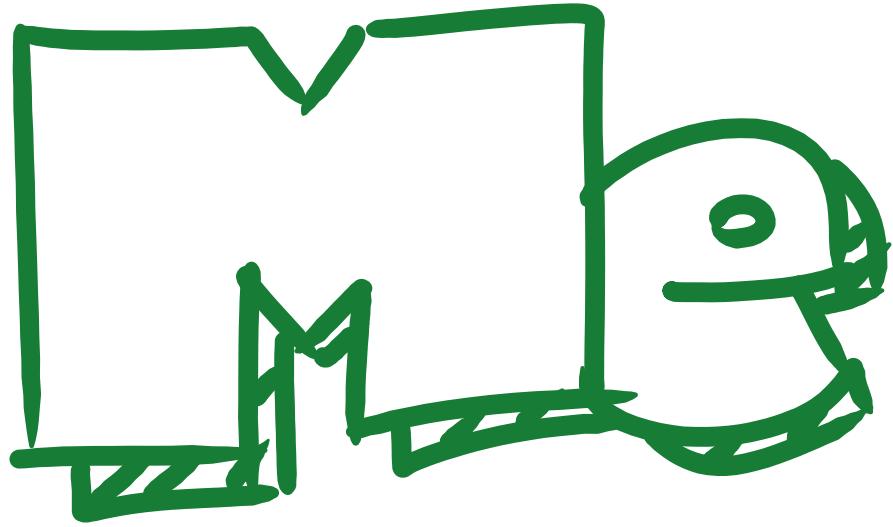


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QBasic

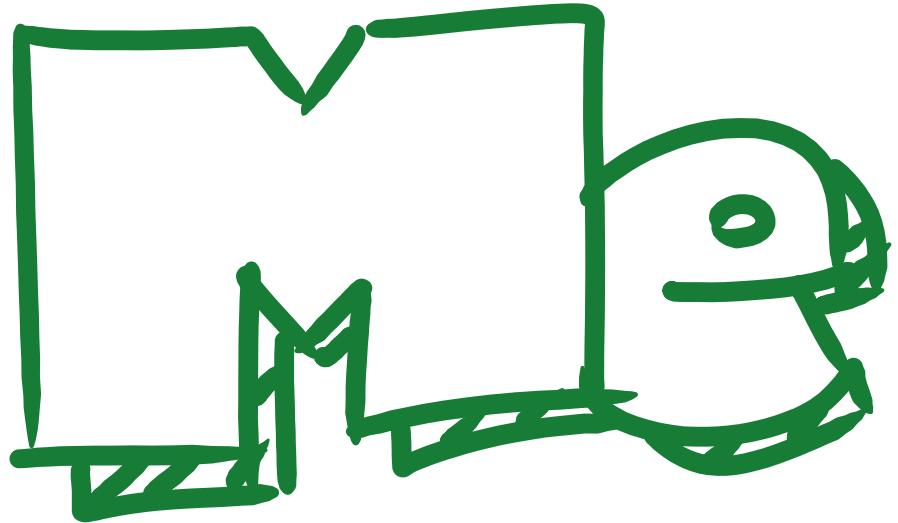
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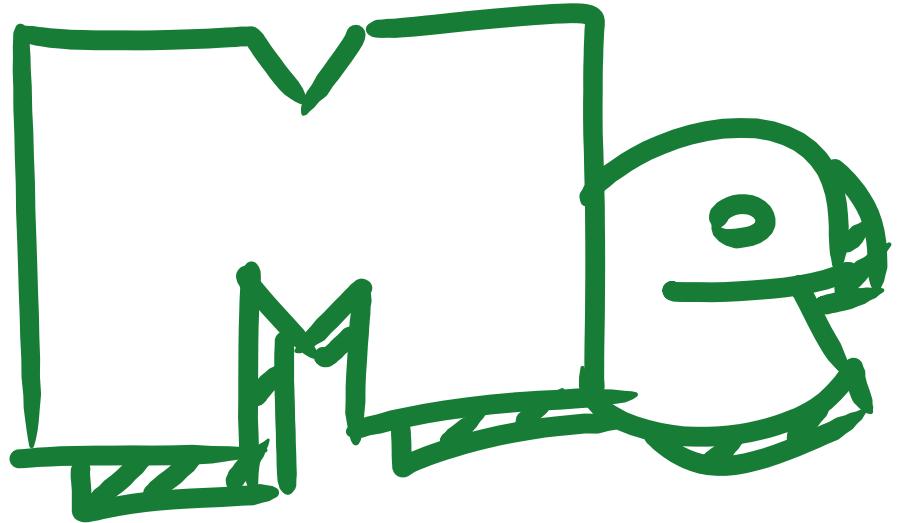
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Perl Web
QBasic Java
13



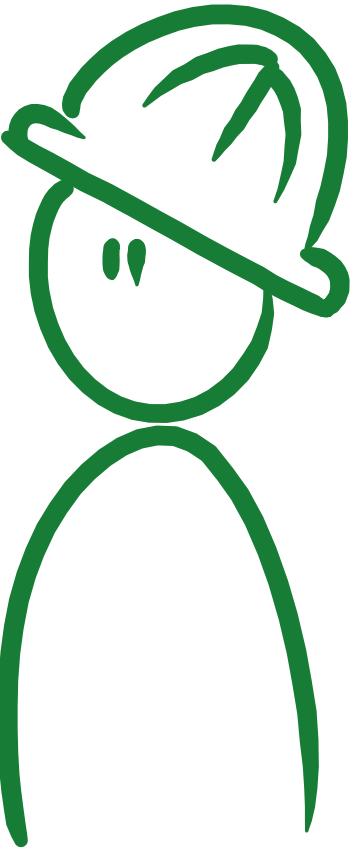
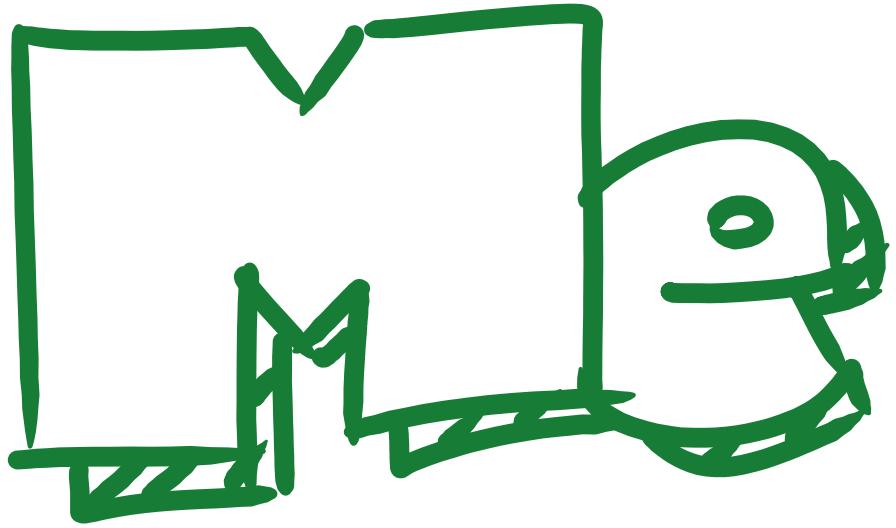
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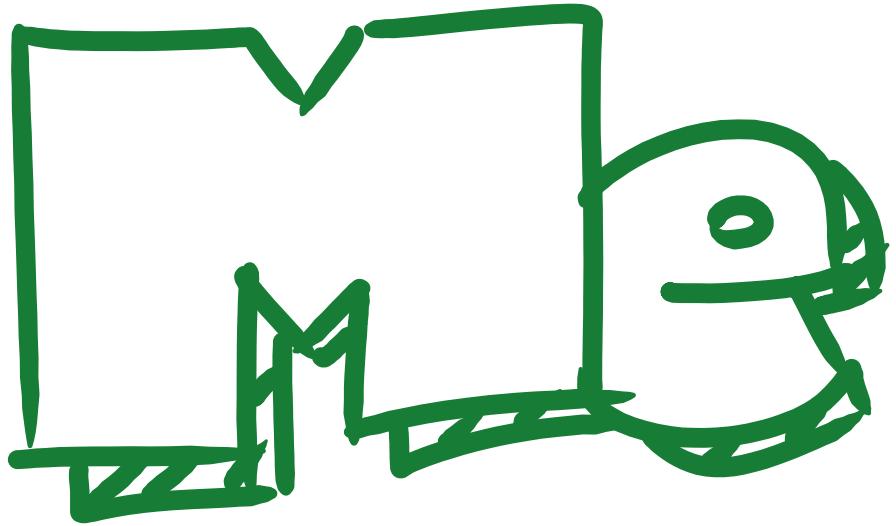
Perl
QBasic Java Web TUM Research Gate
13



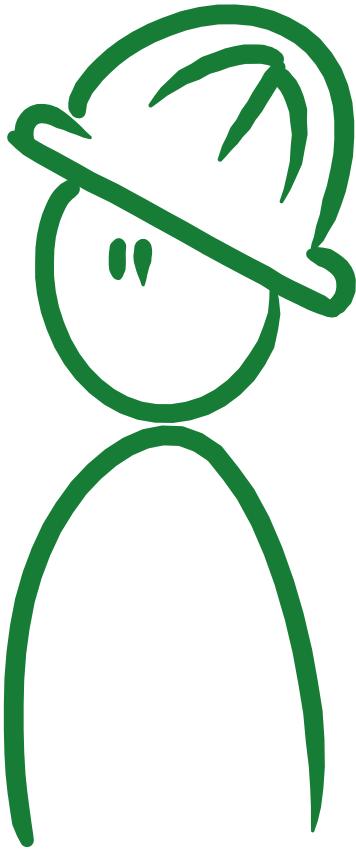
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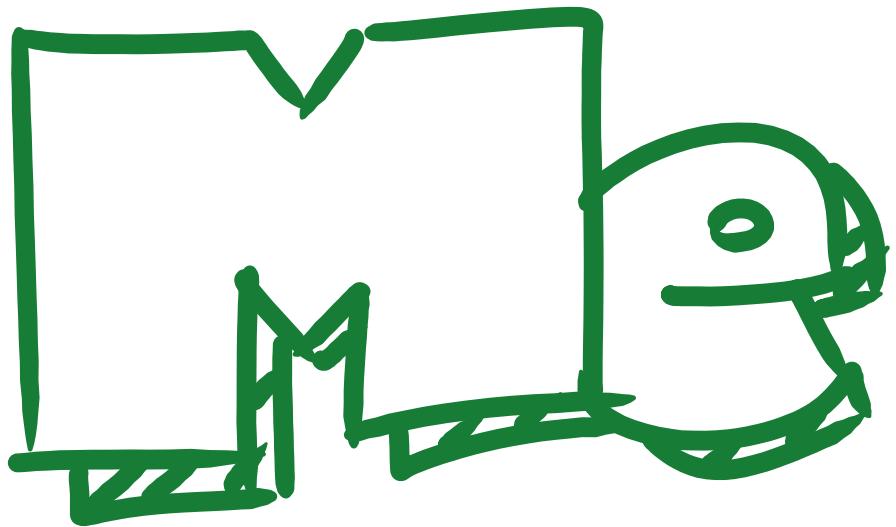
Perl
QBasic Java Web TUM ResearchGate
13 Consultant





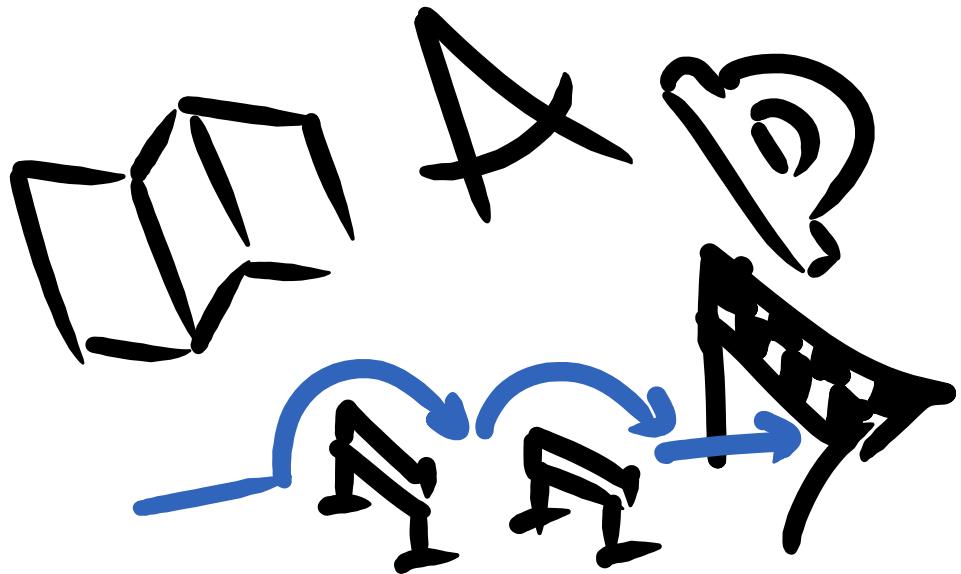
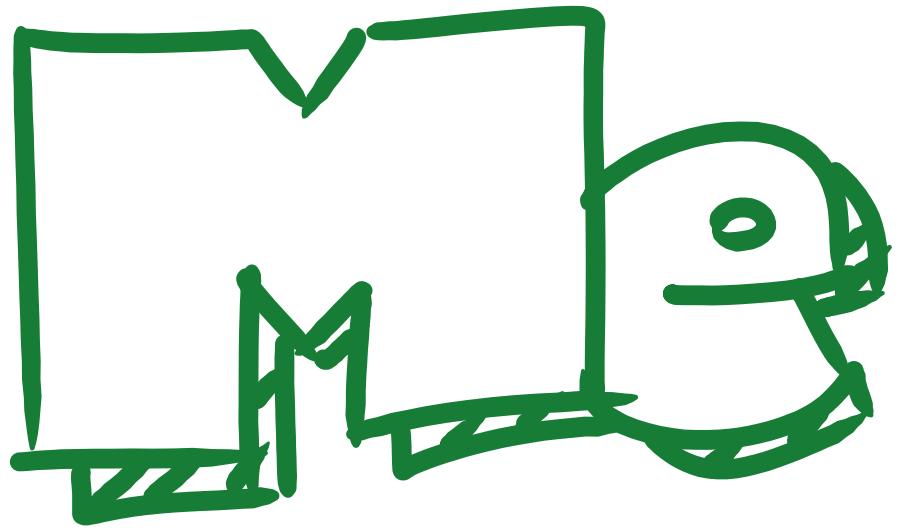
Z A P

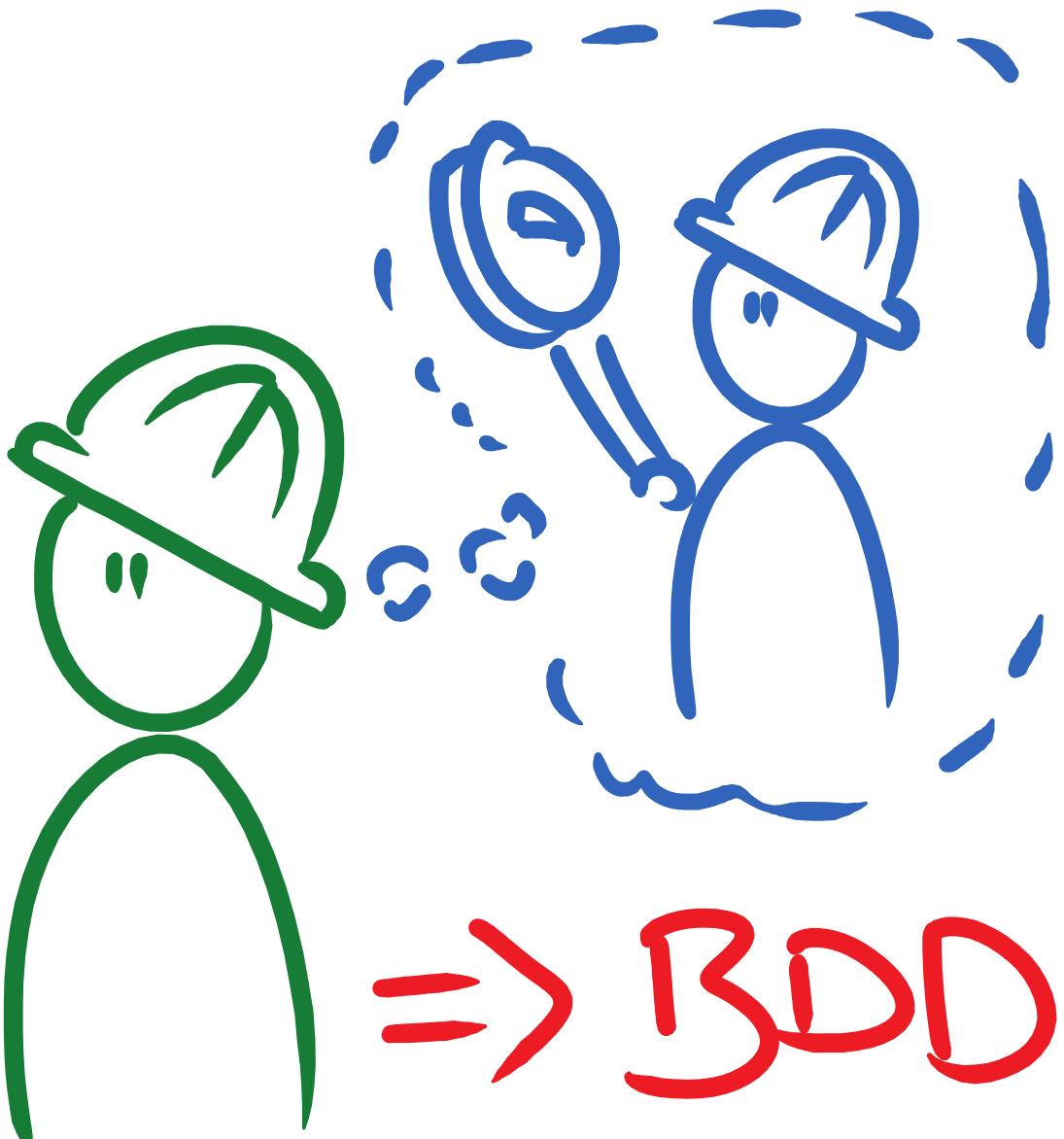
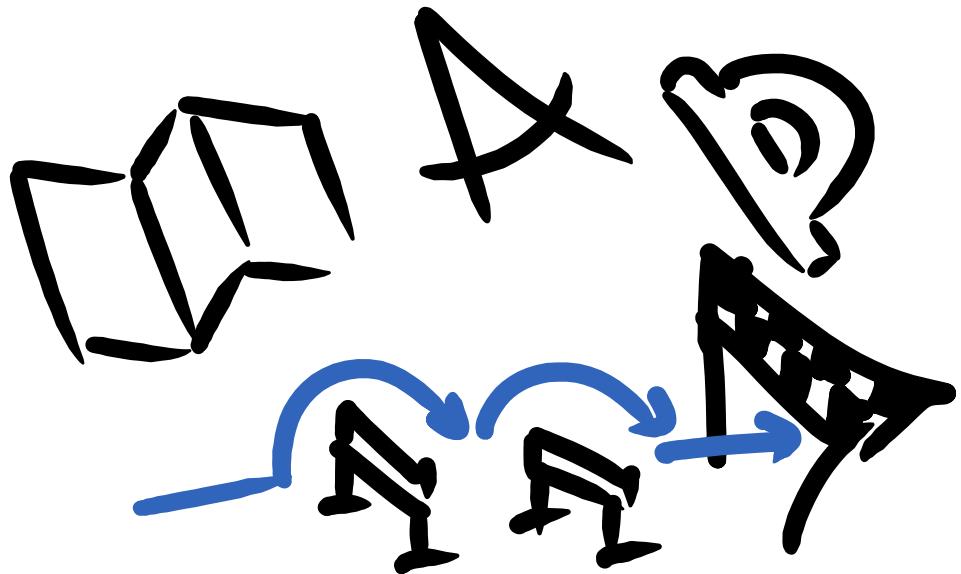
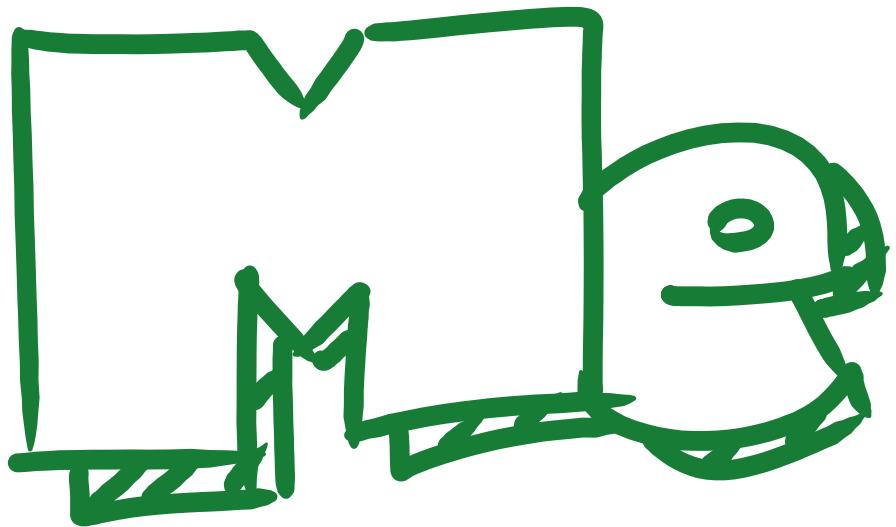
A black drawing of three letters: Z, A, and P.

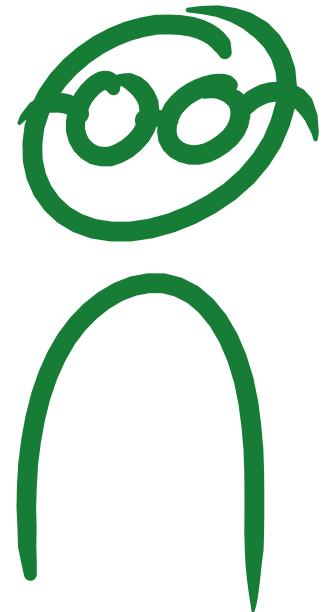


A
B
C

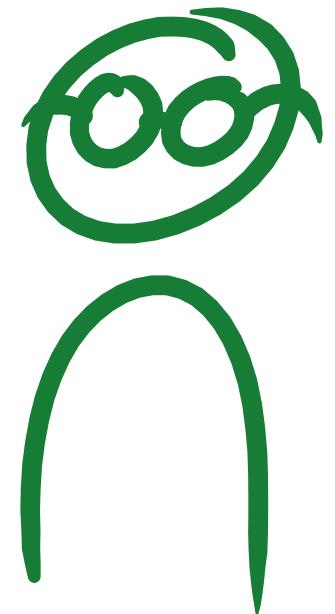


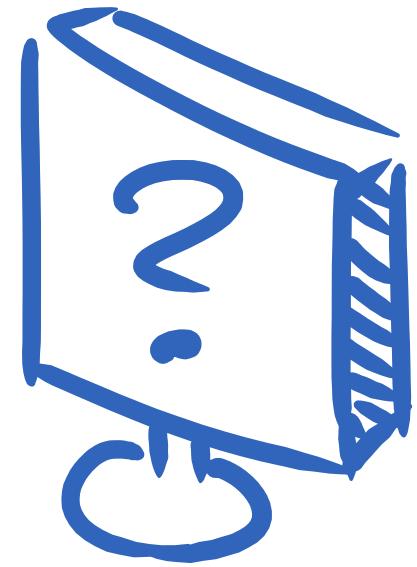
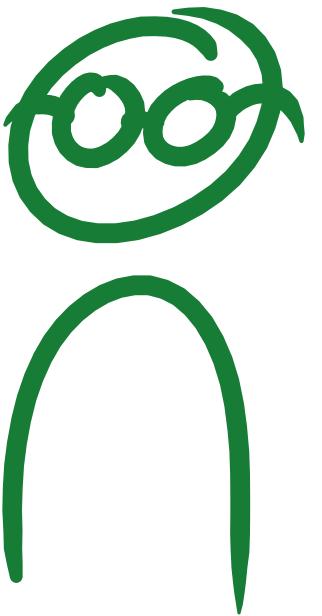


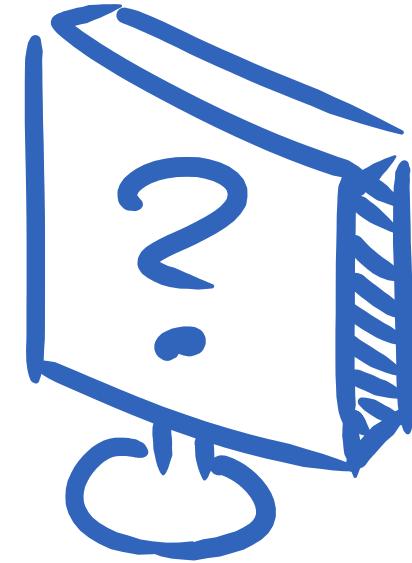
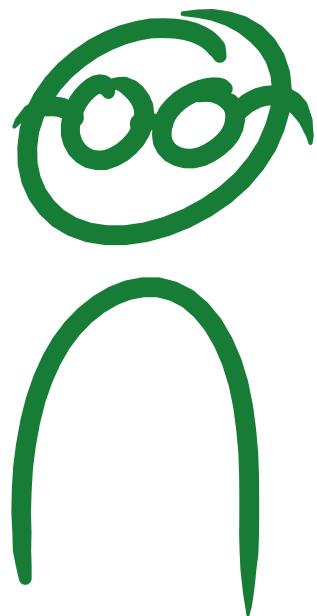
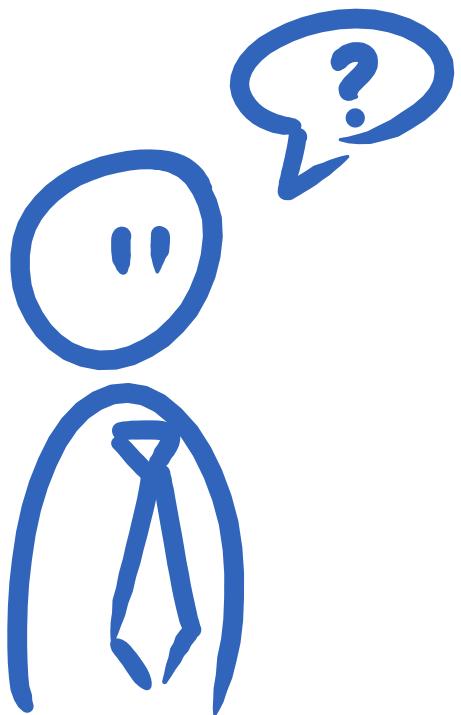


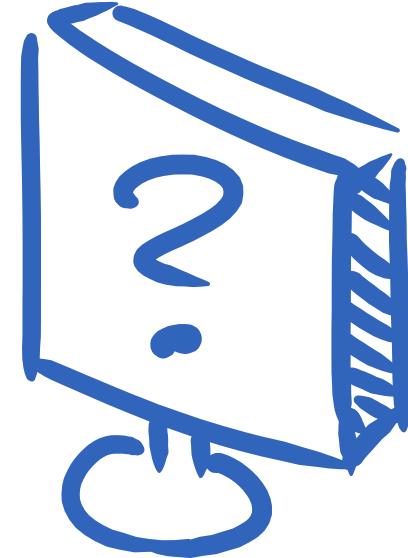
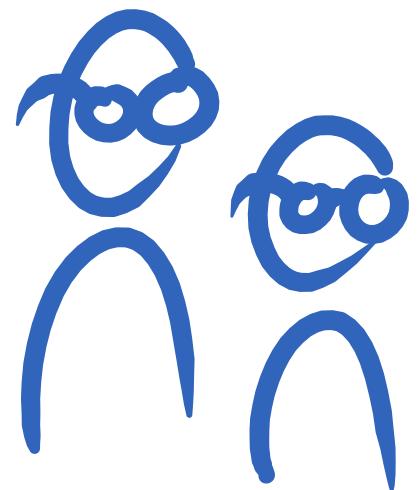
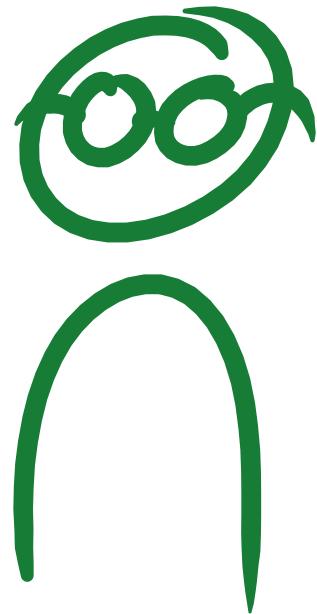
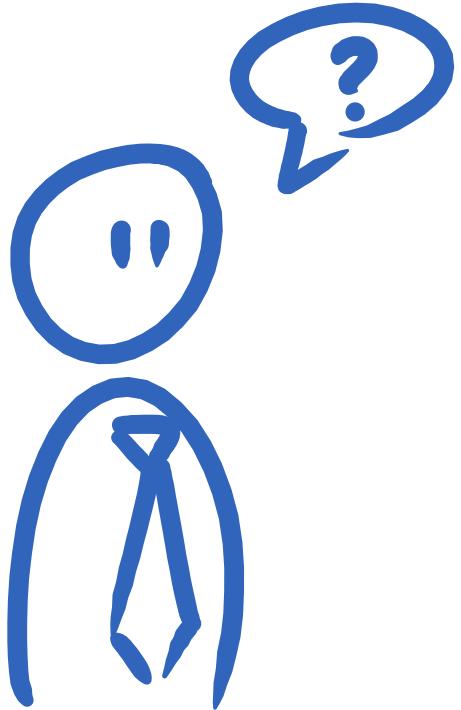


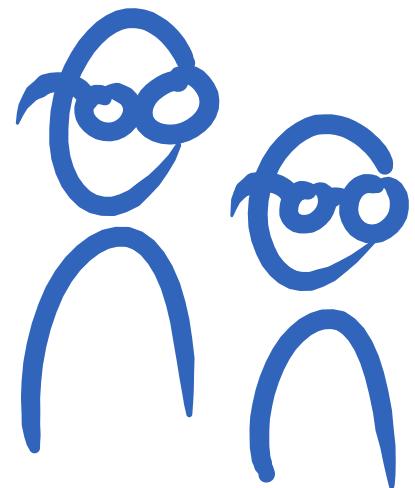
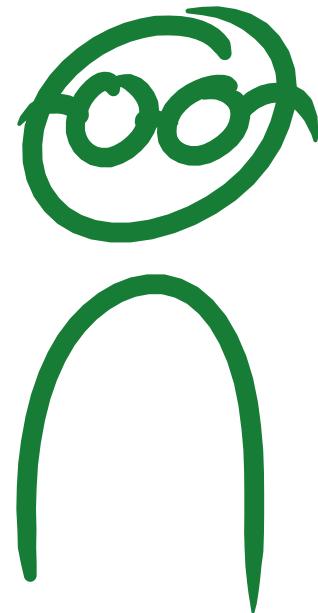
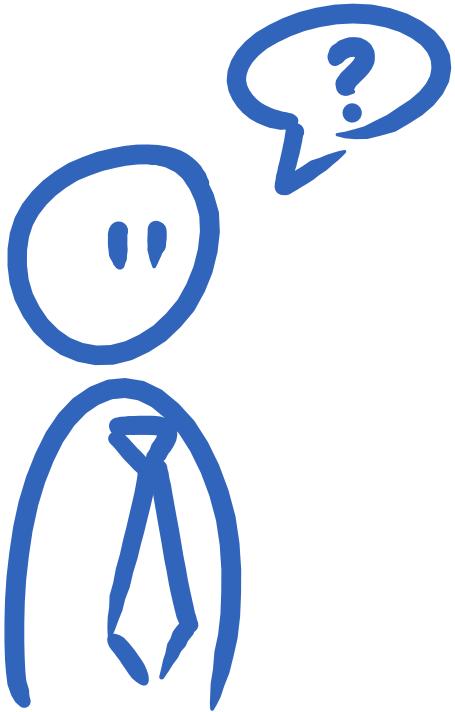
Why?



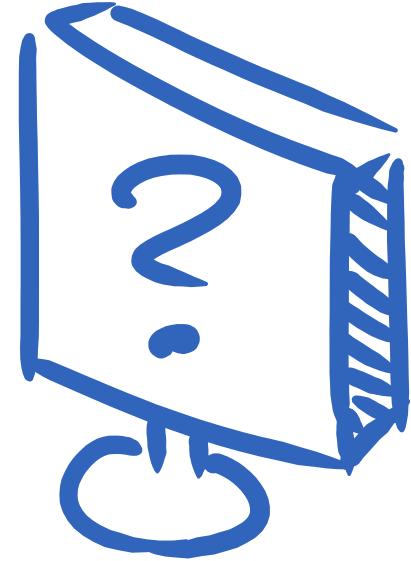






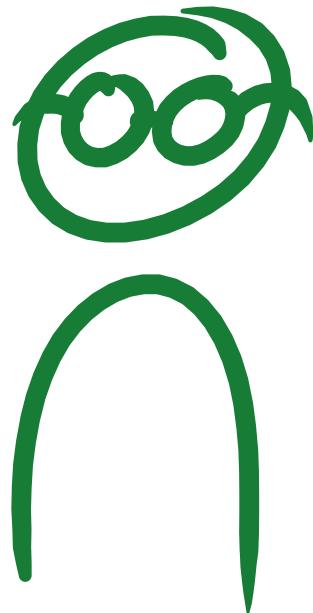


do the
thing
right

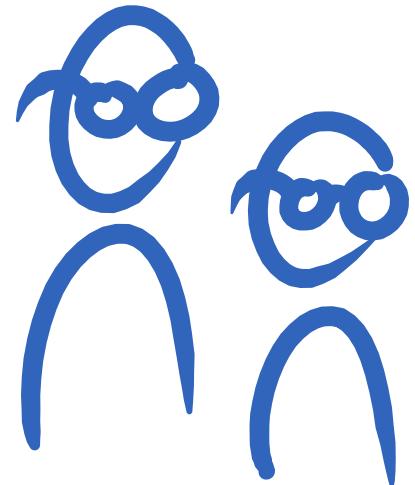
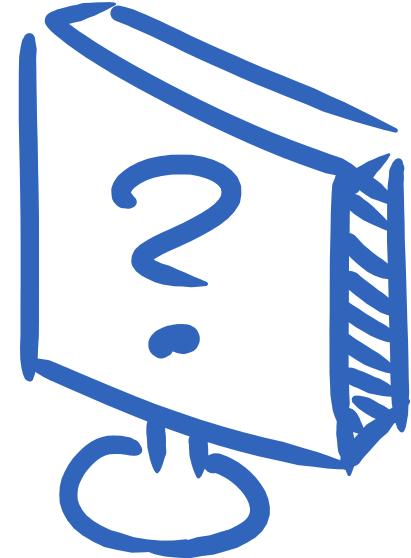




do the
right thing

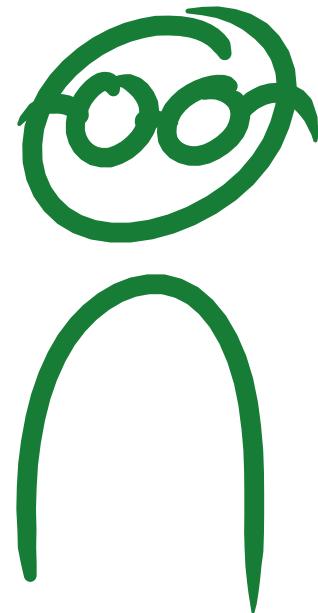


do the
thing
right

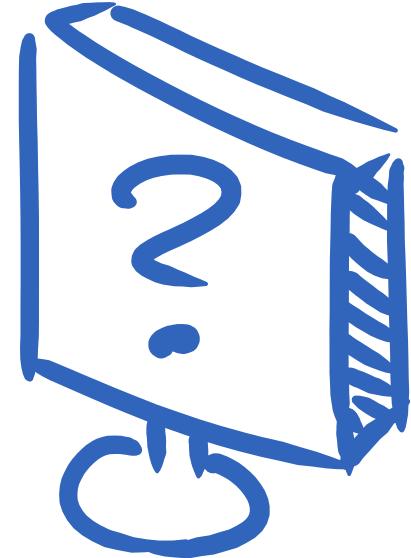




do the
right thing



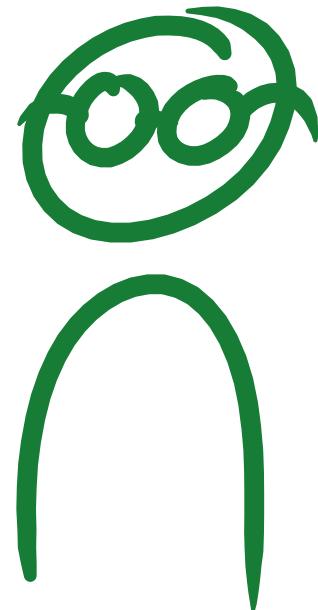
do the
thing
right



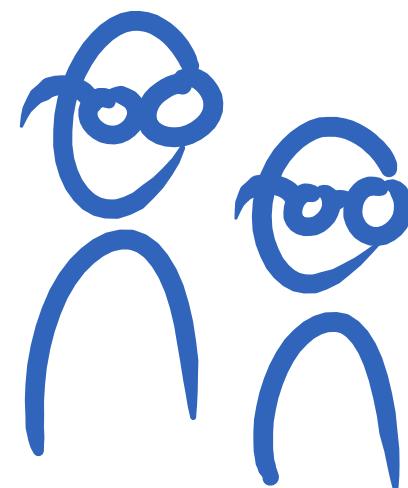
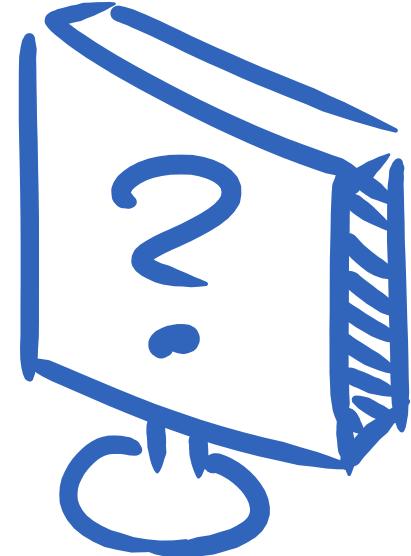
do it
together



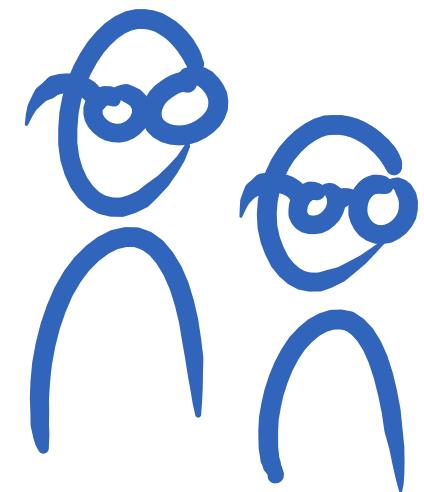
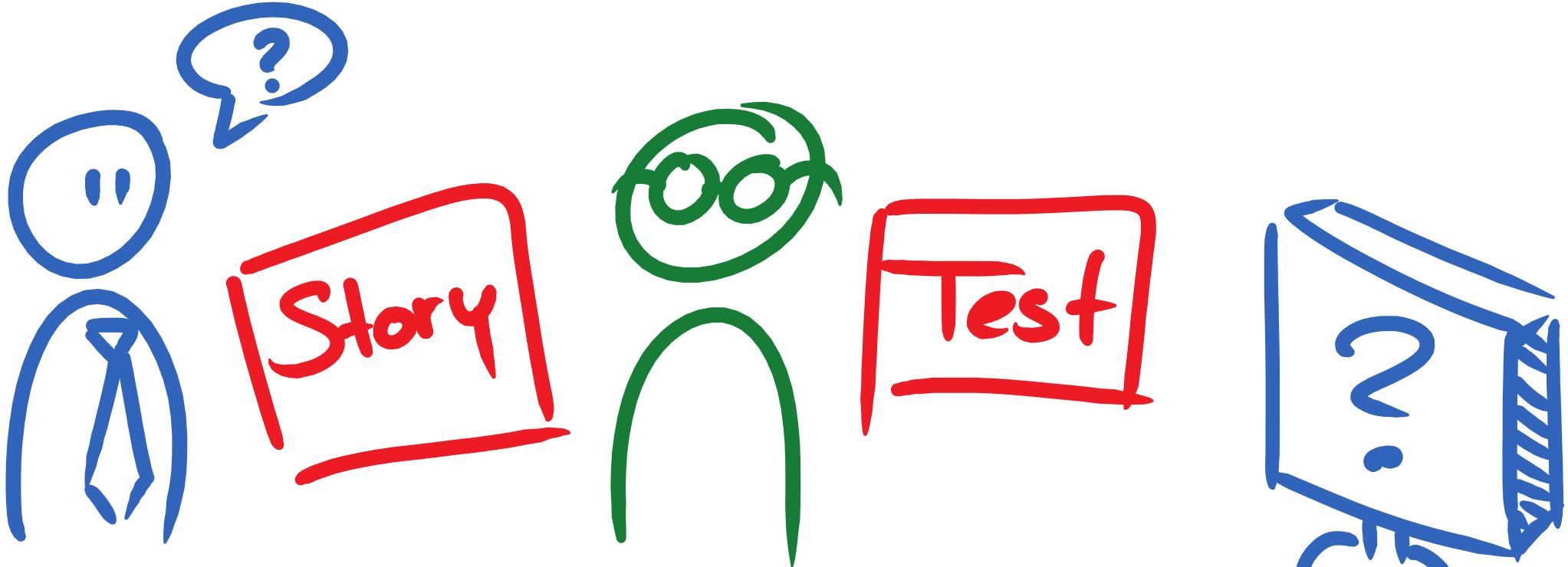
Story



do the
thing
right

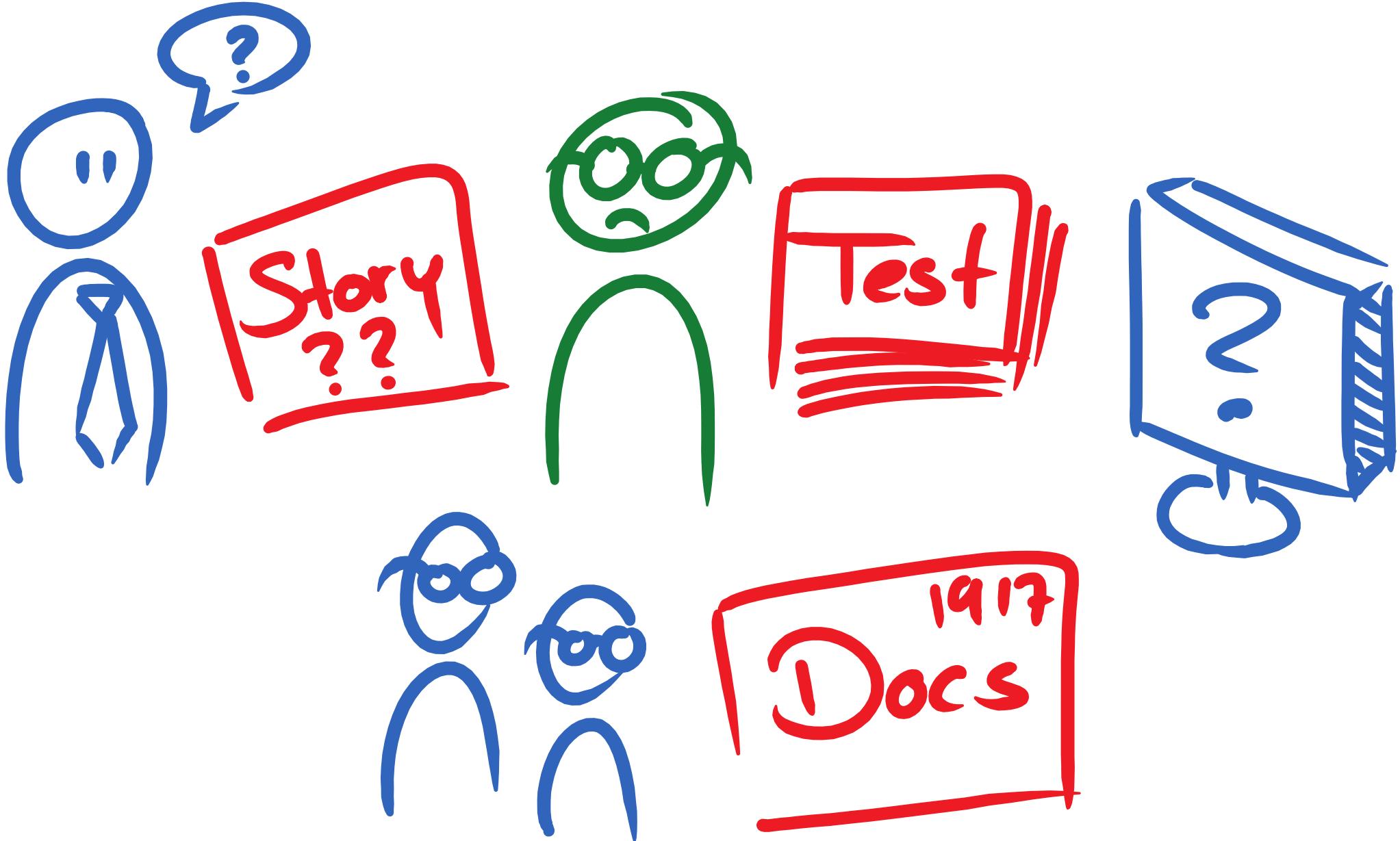


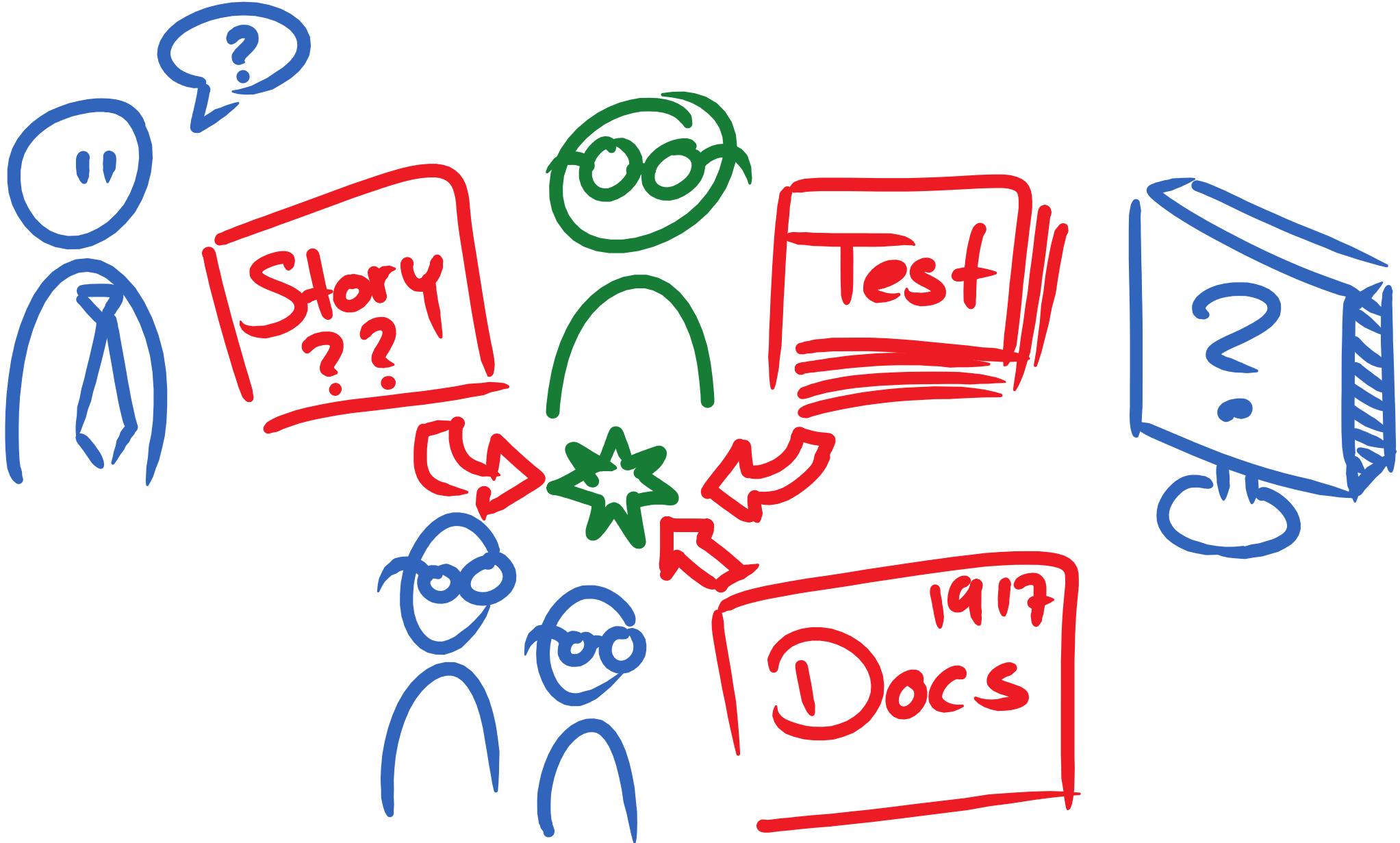
do it
together

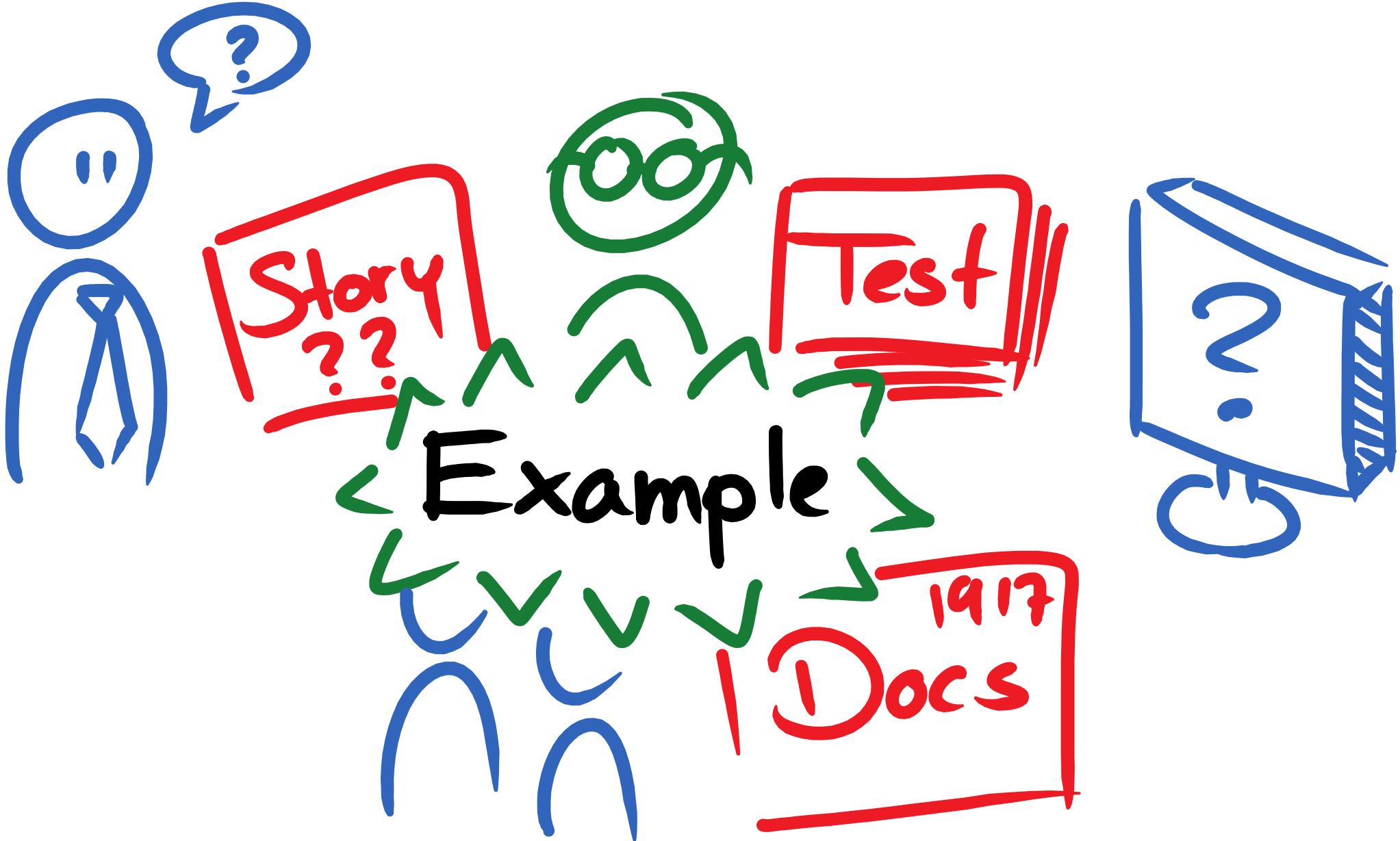


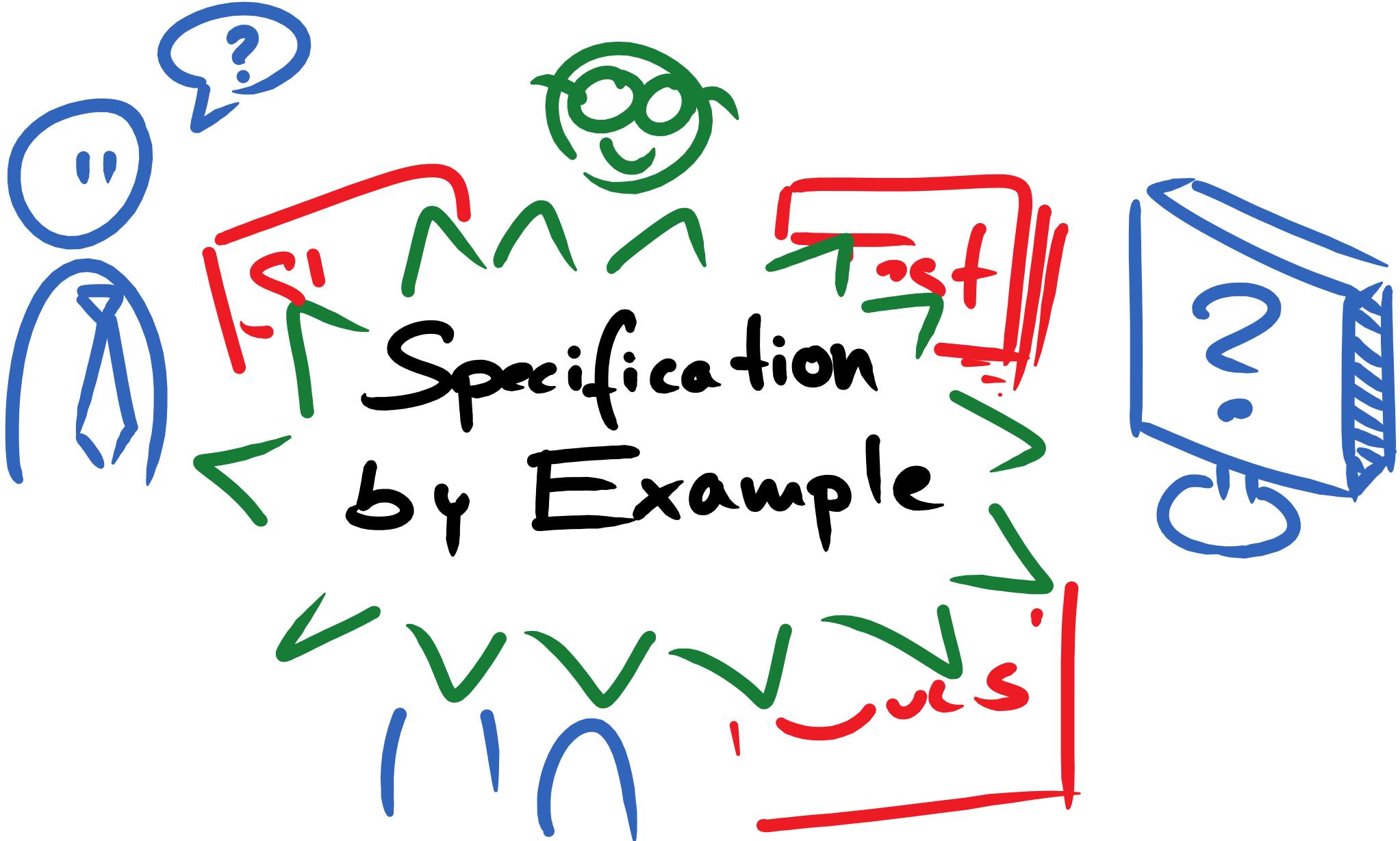
do it
together











SъE?

Who has heard
of SbE?



Who has heard
of SbE?

Example-Driven?



Who has heard
of SbE?

Agile acceptance testing?

Example-Driven?



Who has heard
of SbE?

Agile acceptance testing?

Acceptance Test-Driven?

Example-Driven?



Who has heard
of SbE?

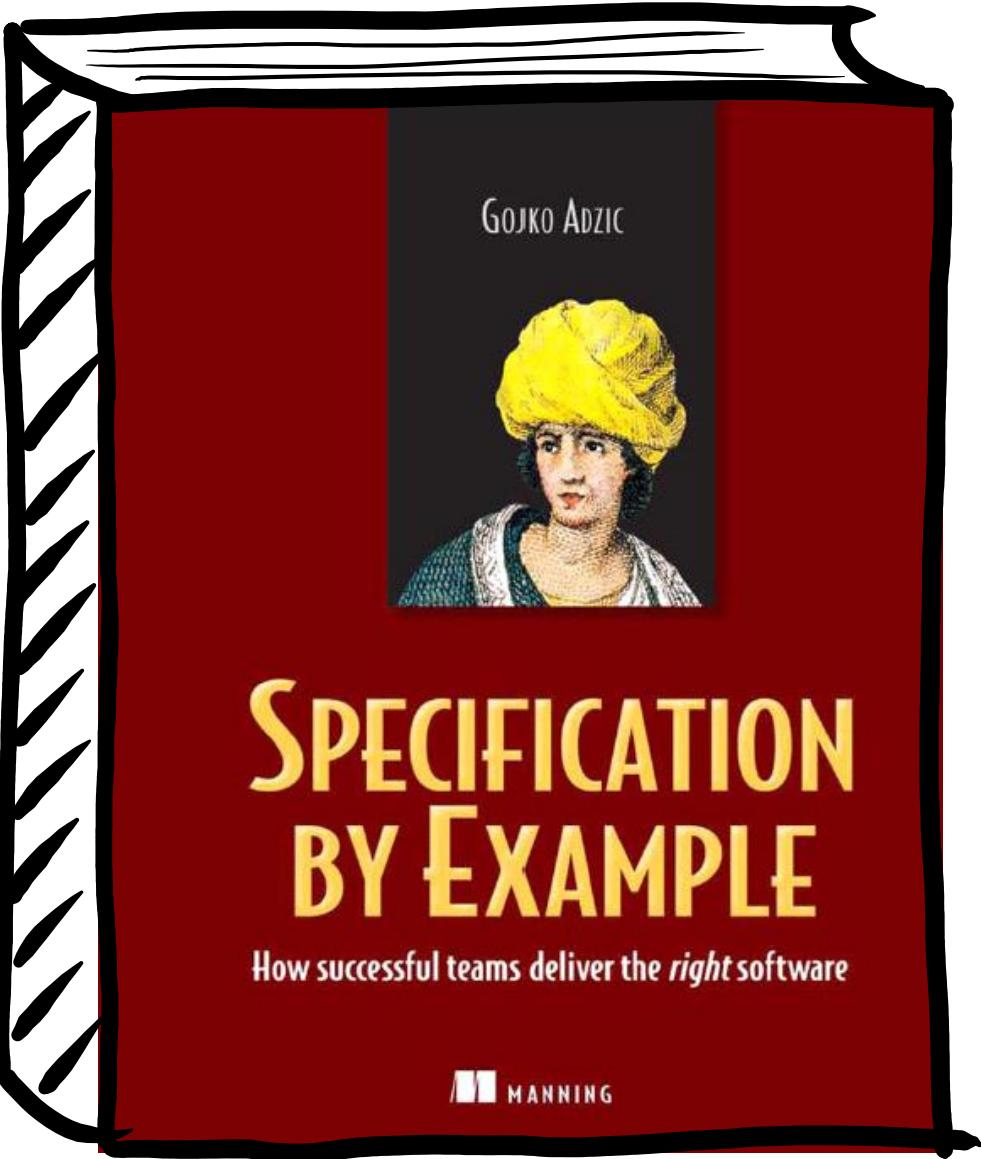
Agile acceptance testing?

Acceptance Test-Driven?

Example-Driven?

Behavior-Driven Development





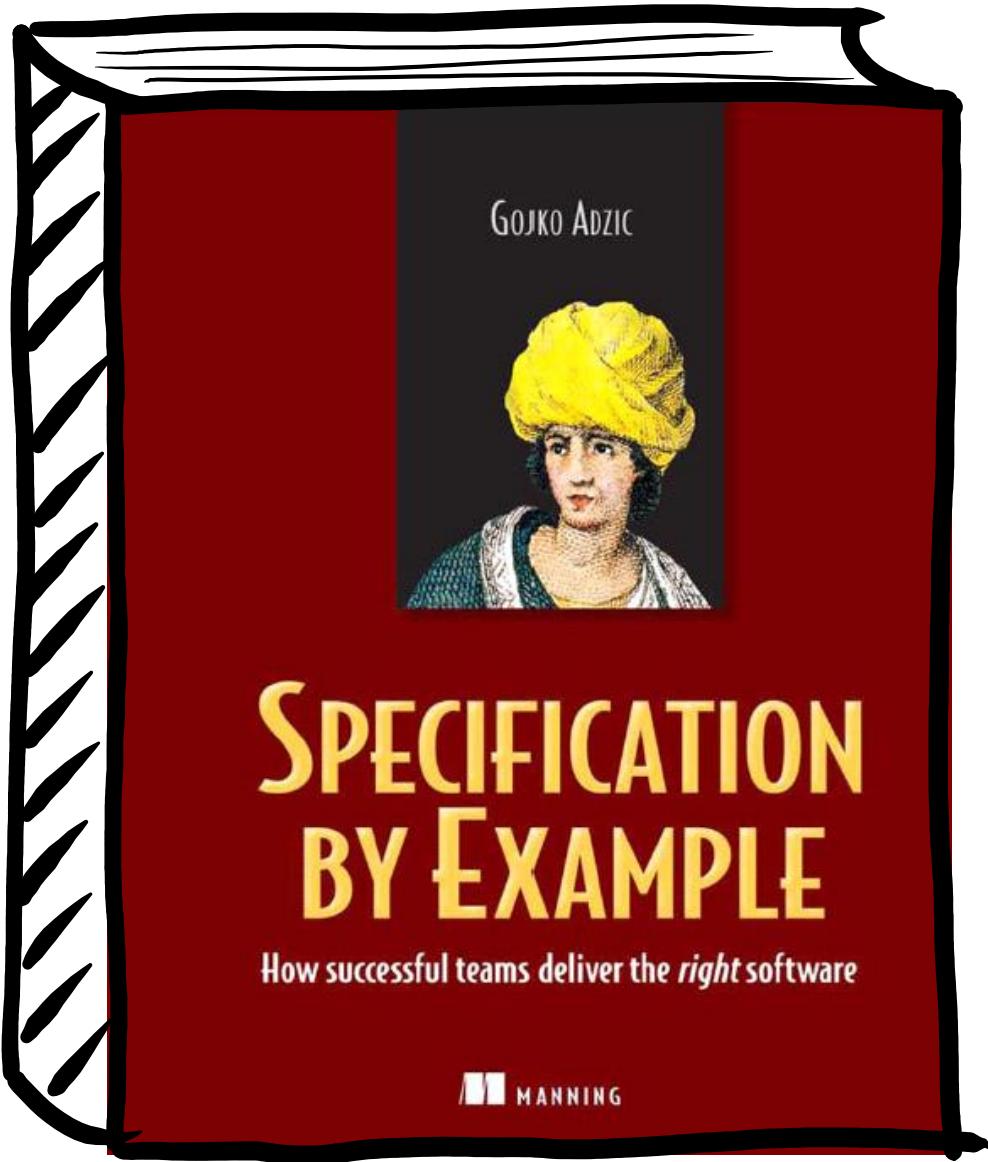
Gojko Adzic



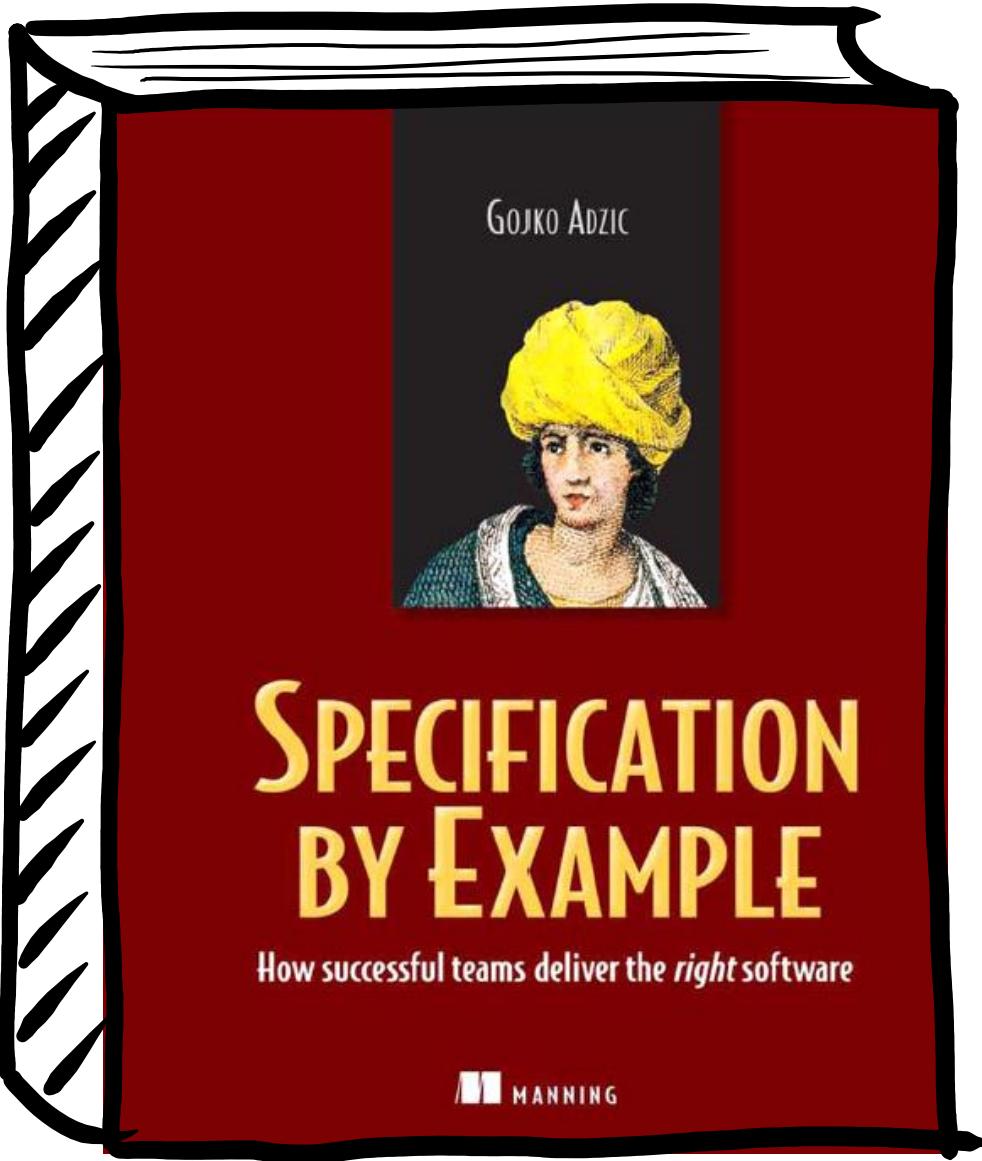
SPECIFICATION BY EXAMPLE

How successful teams deliver the *right* software

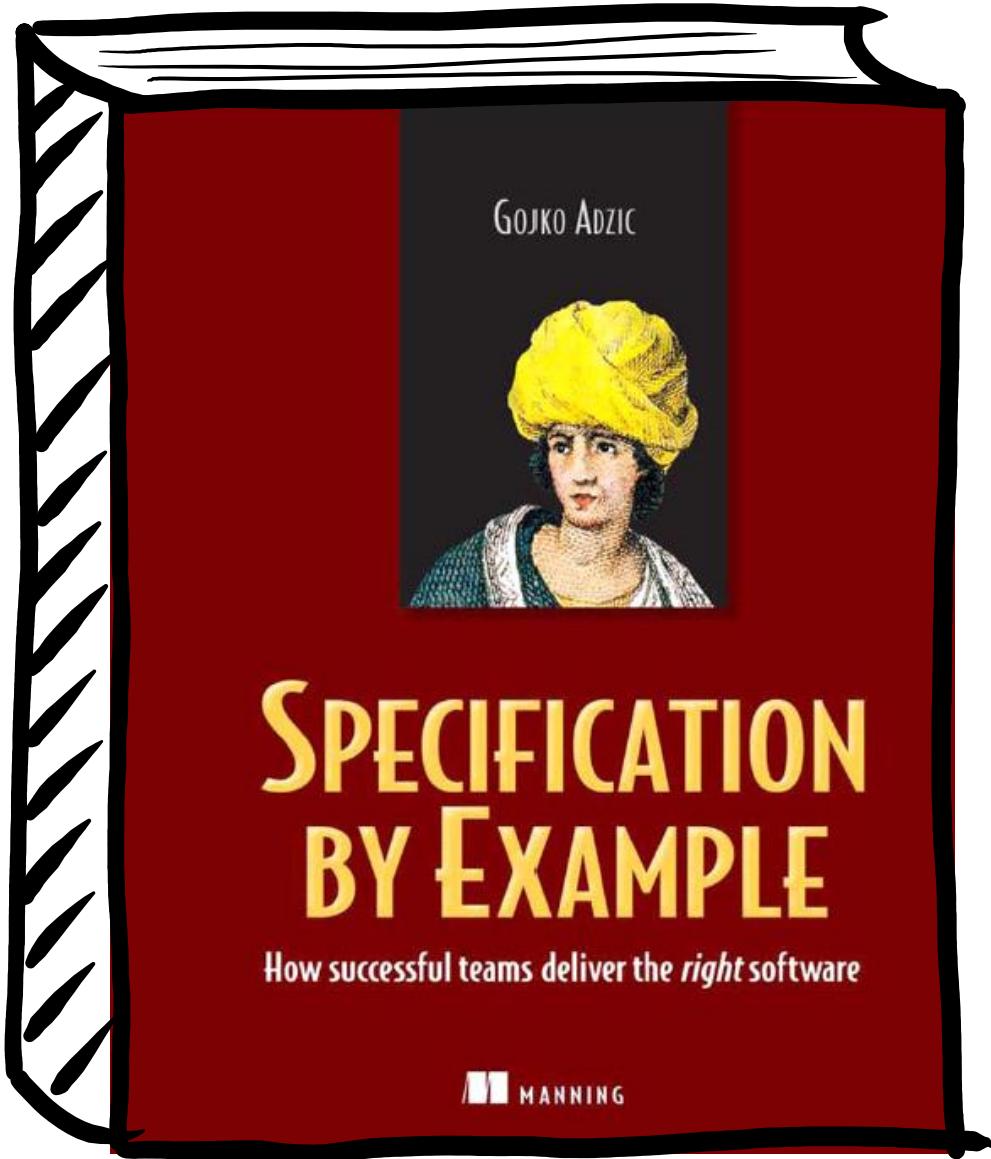
MANNING



Validating frequently



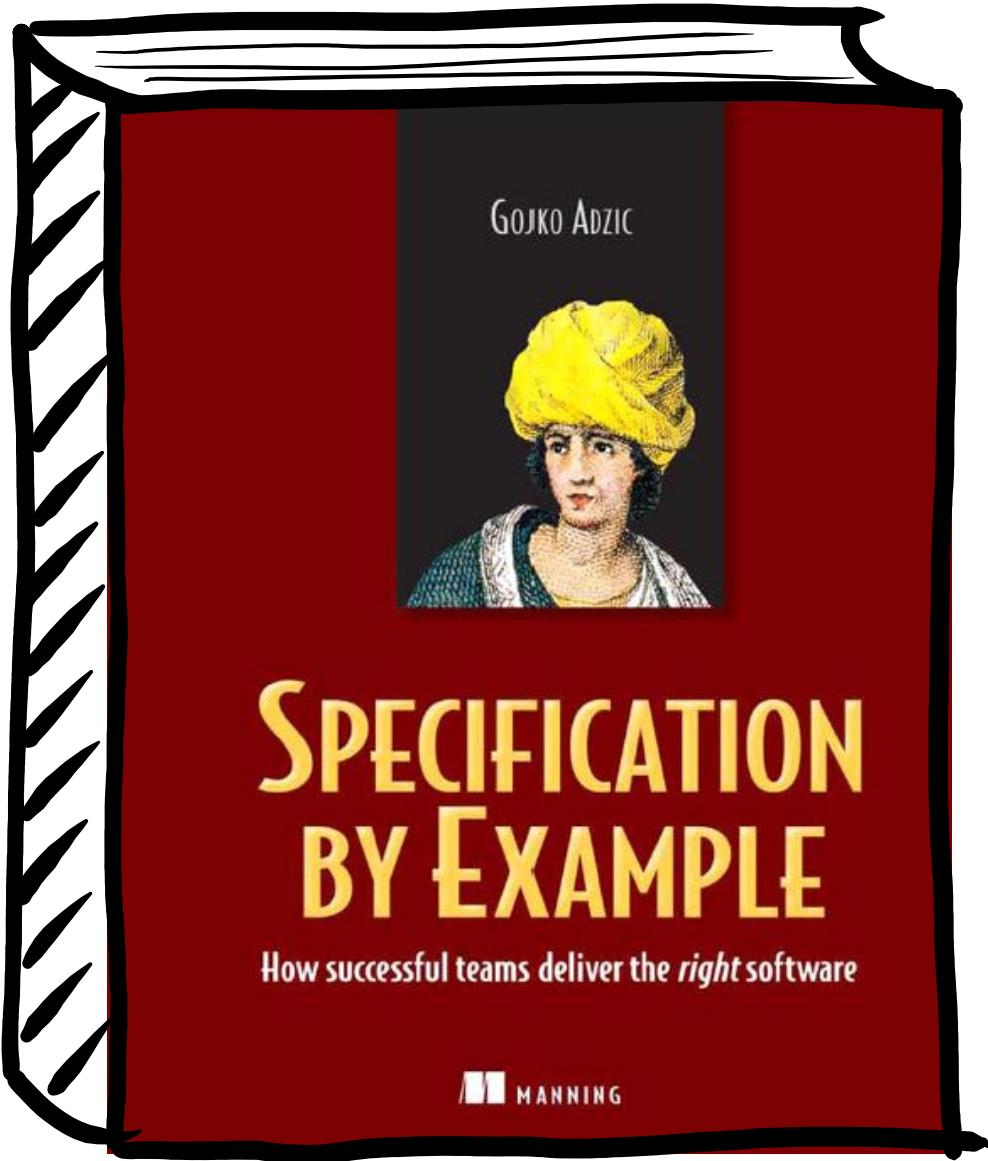
Refining the
specification
Validating frequently



Illustrating using
examples

Refining the
specification

Validating frequently



Illustrating using
examples

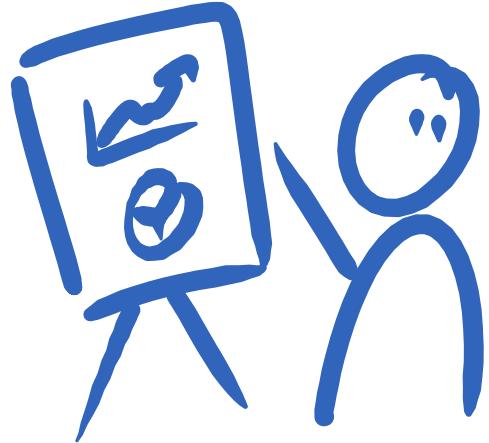
Refining the
specification

Validating frequently

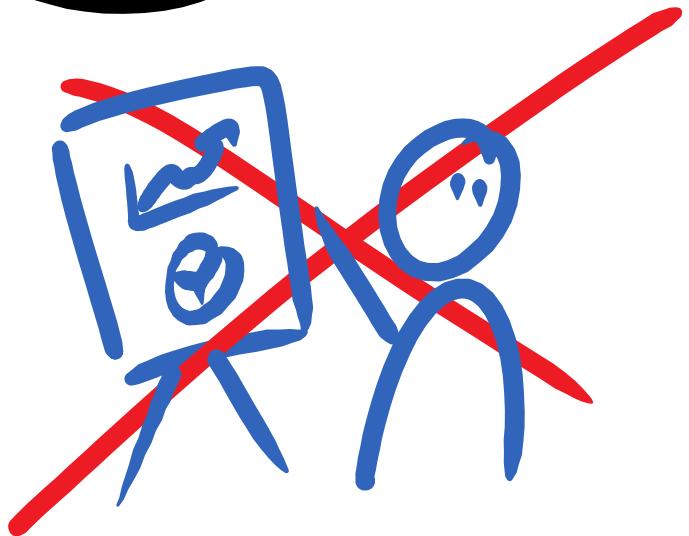
Automating validation
without changing
the specification

But what is it ?

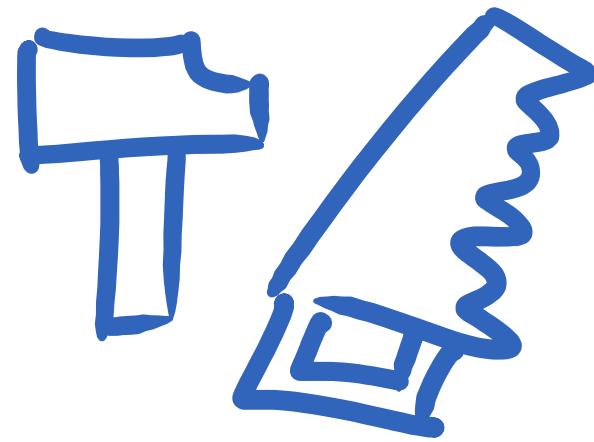
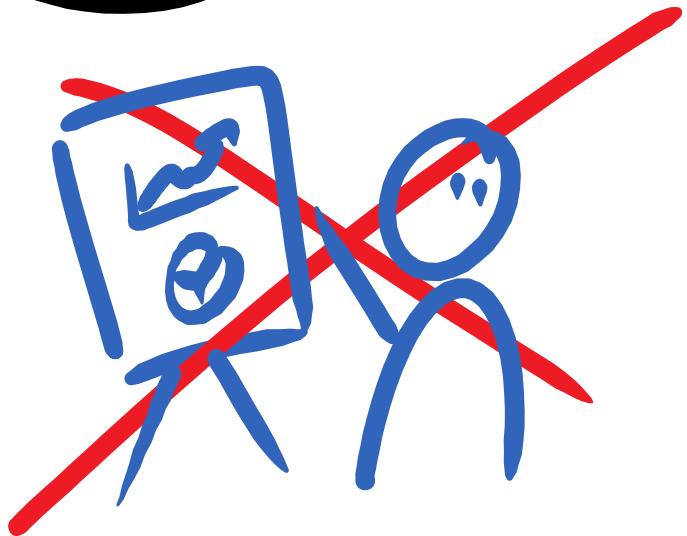
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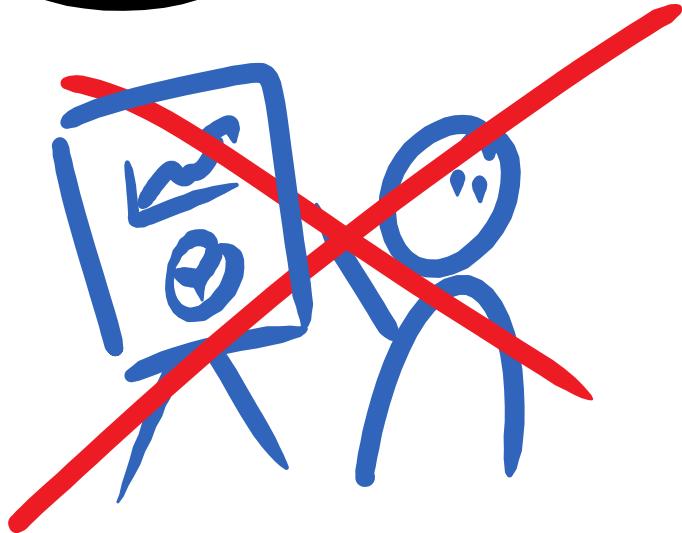
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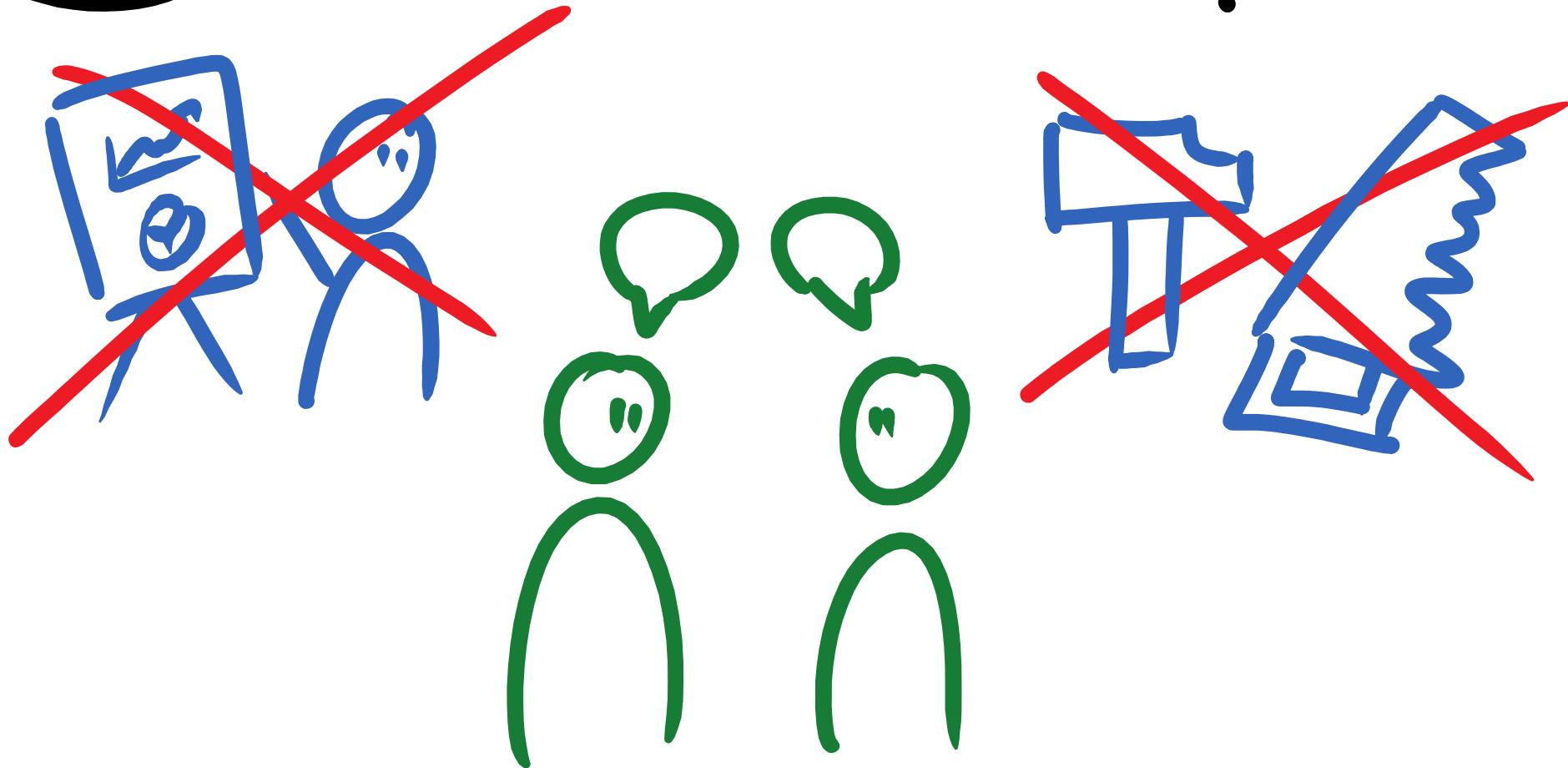
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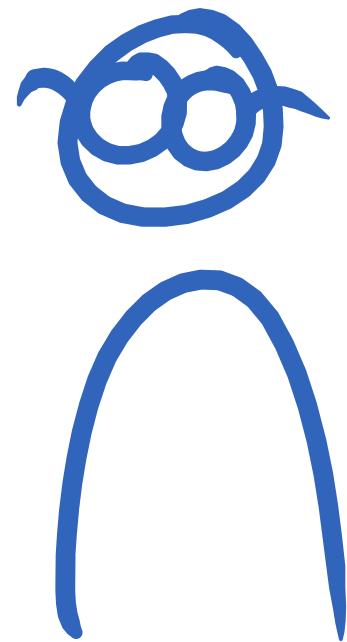
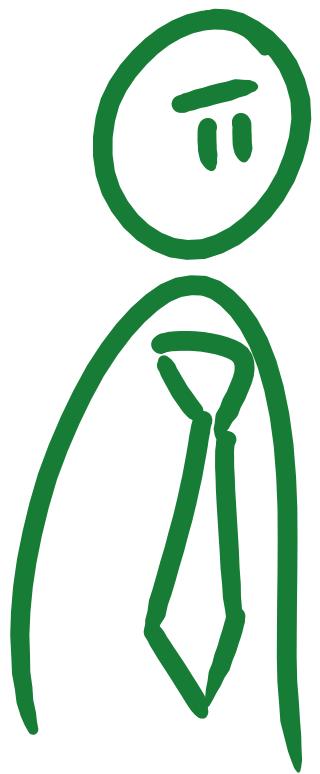


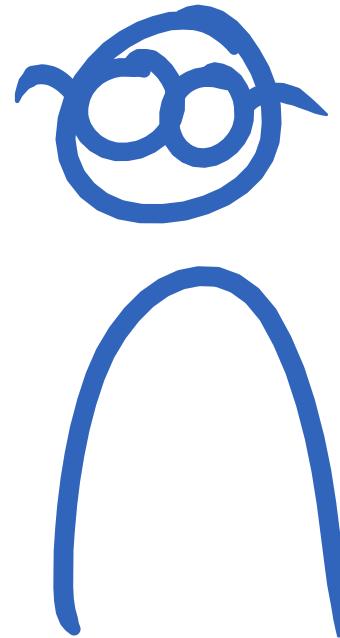
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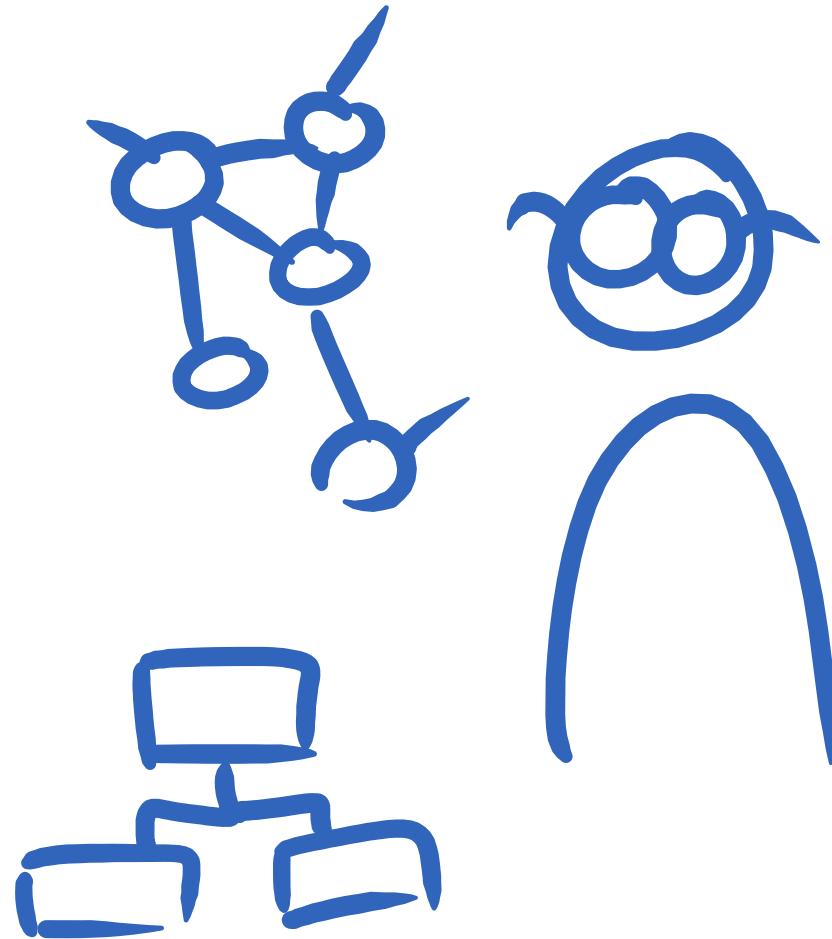


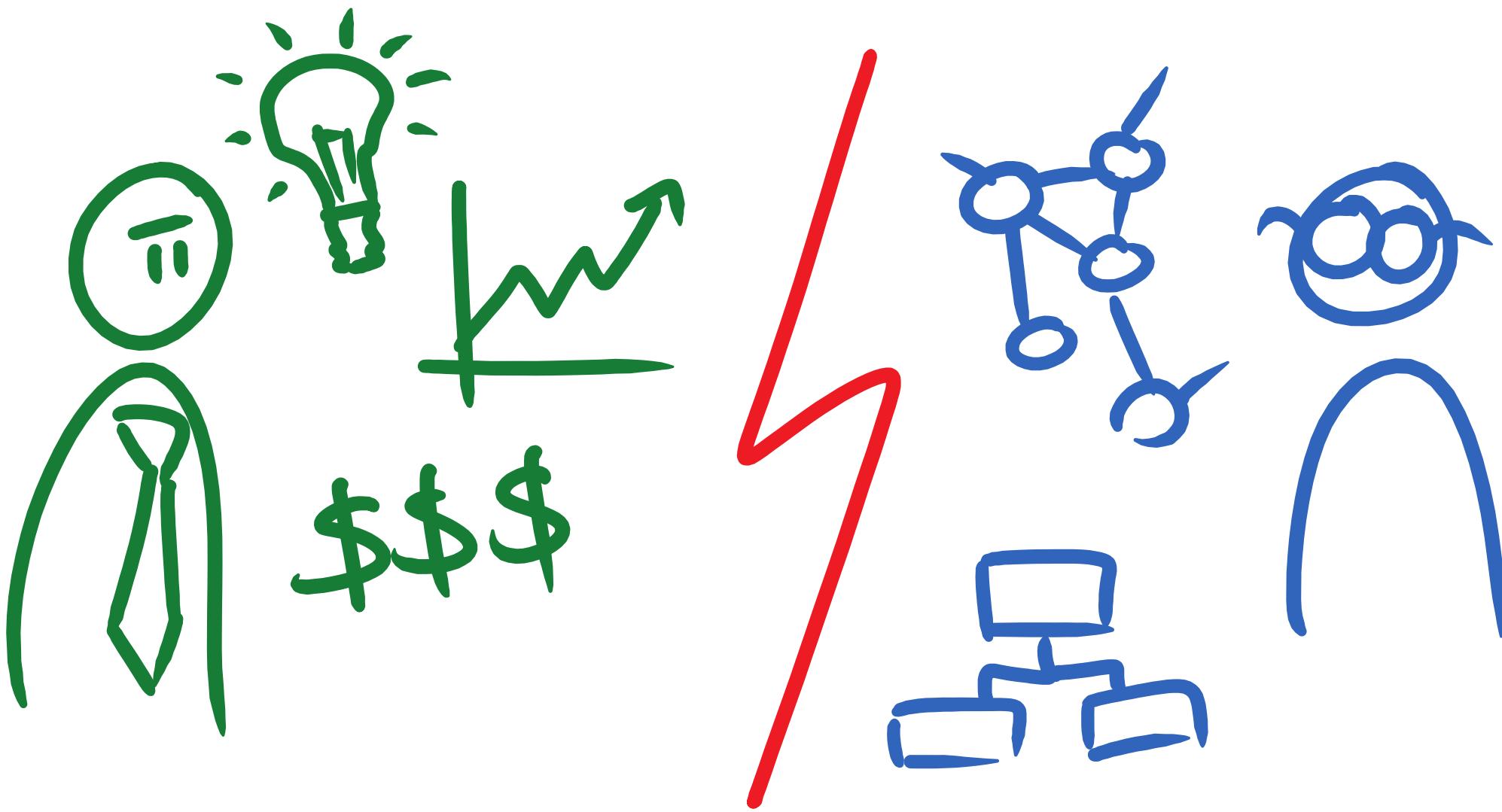
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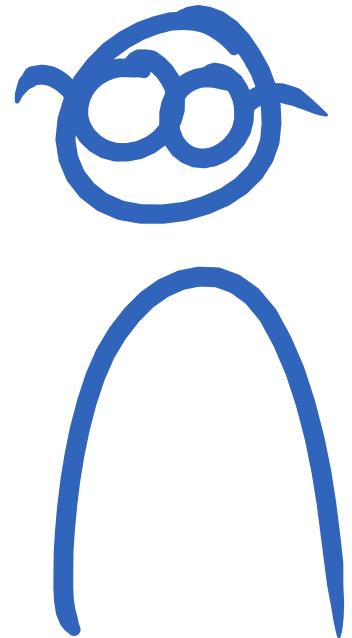
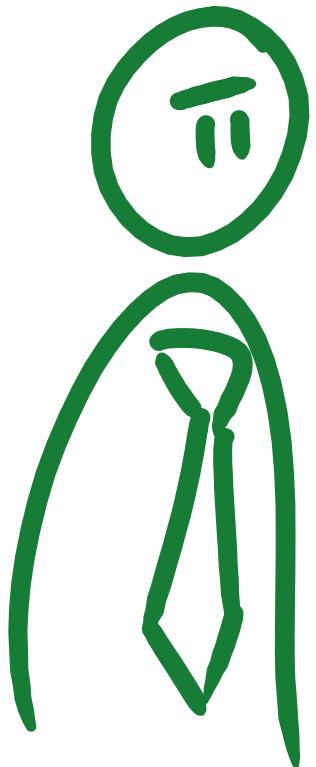




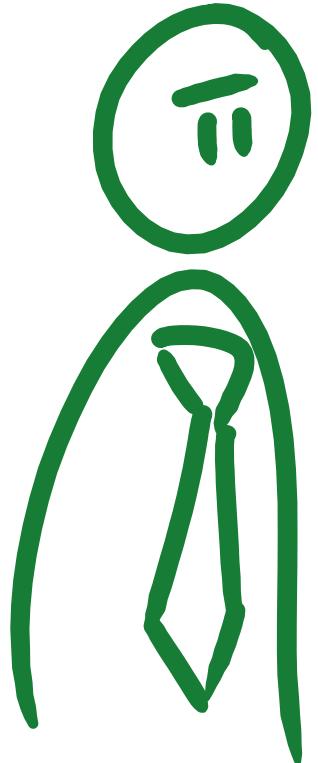




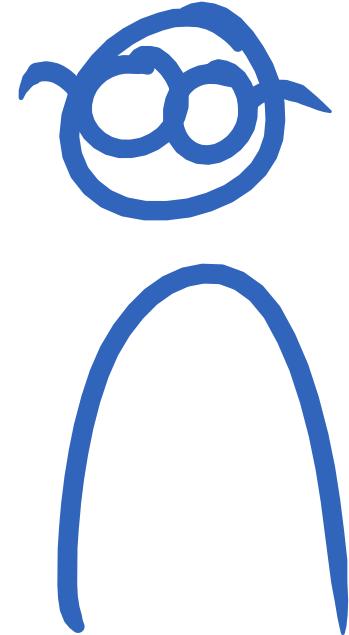




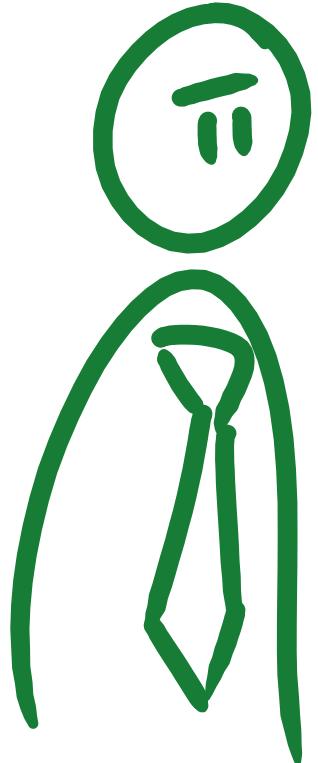
Implementation



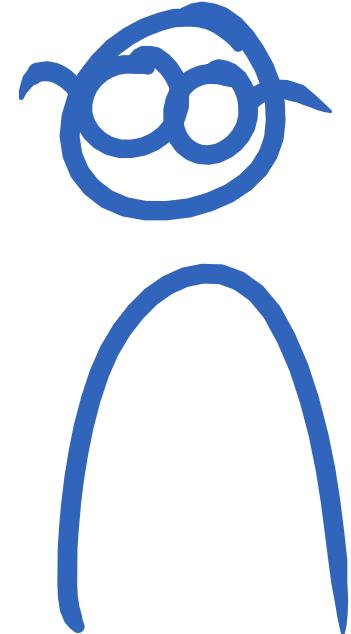
Vision
Capability
Feature Set

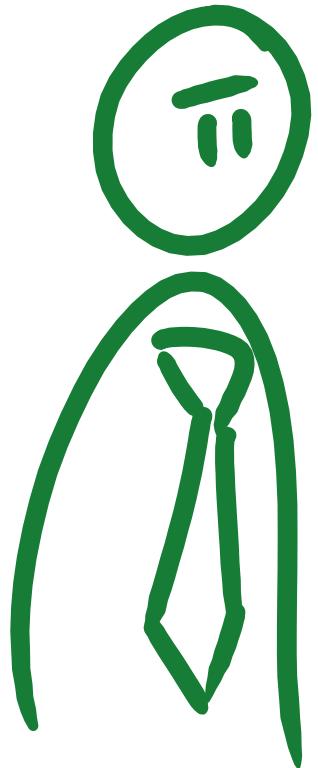


Implementation



Vision
Capability
Feature Set
Feature
Story
Scenario
Implementation

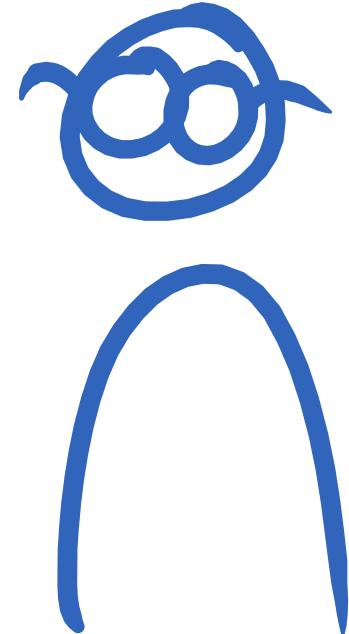


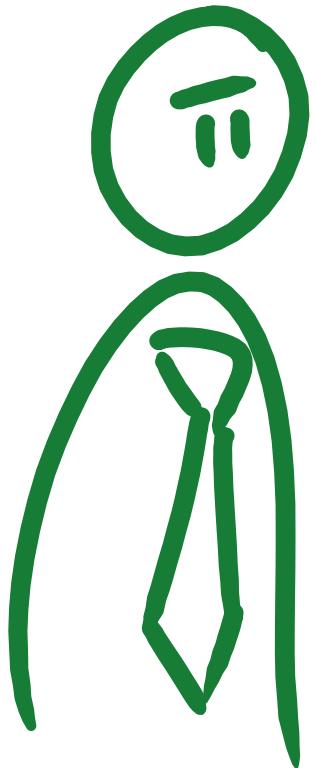


Vision
Capability
Feature Set

Feature
Story
Scenario

Implementation

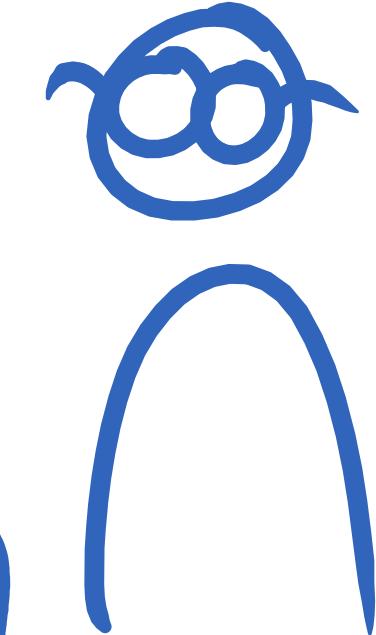


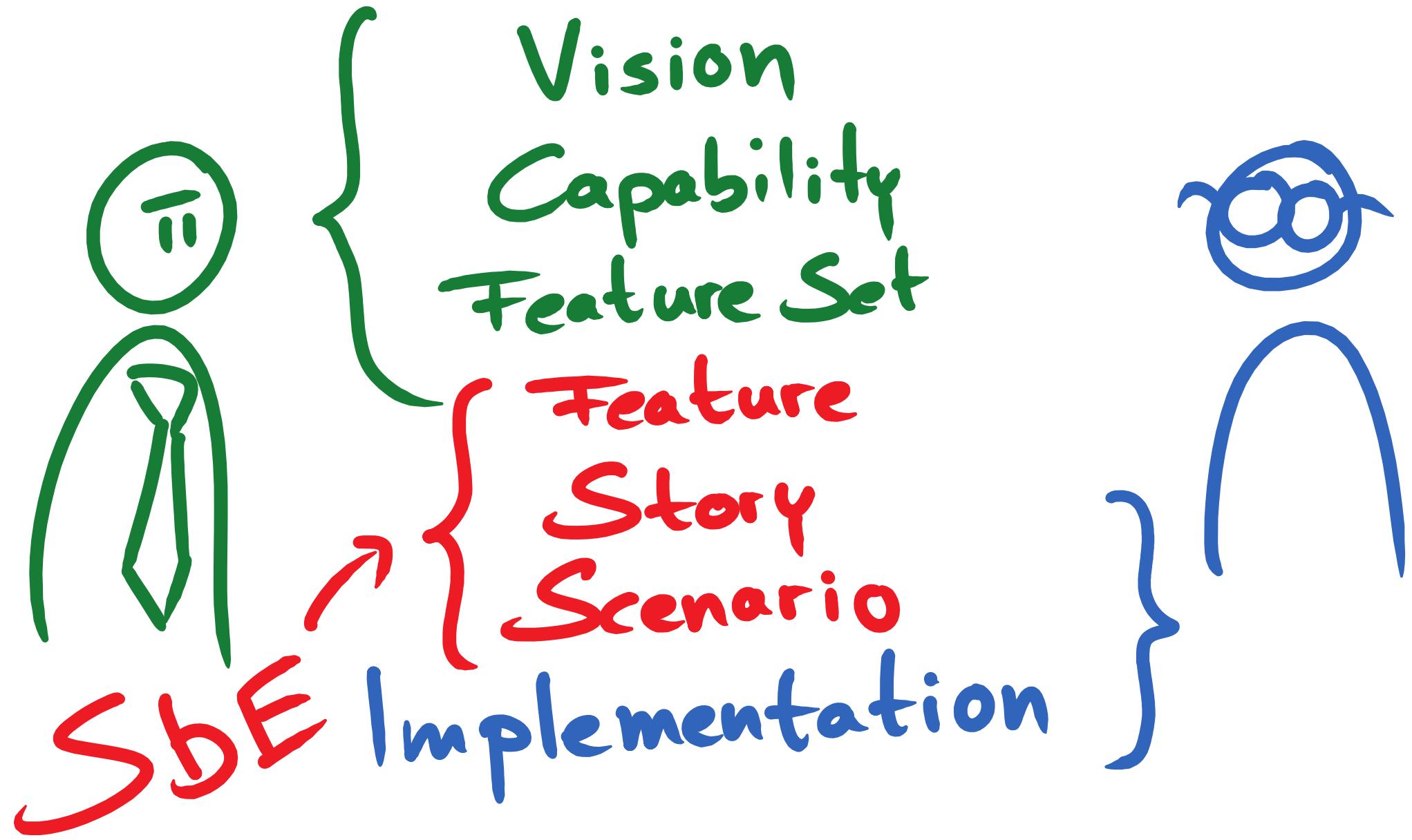


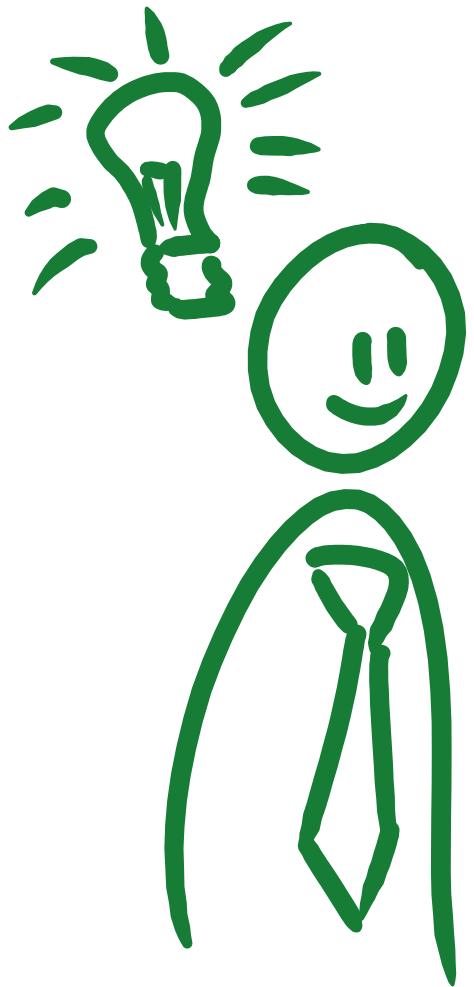
Vision
Capability
Feature Set

Feature
Story
Scenario

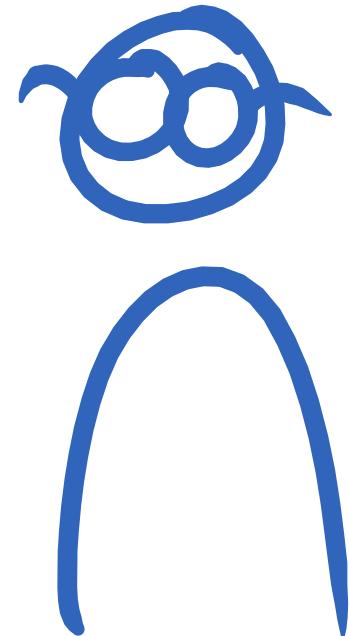
Implementation

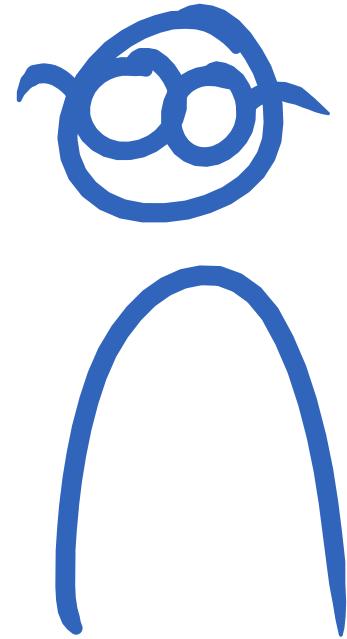
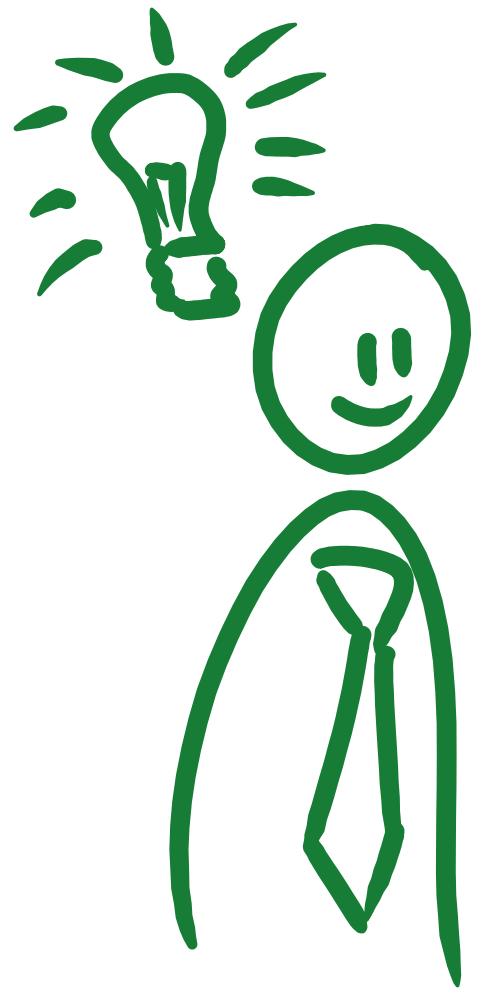


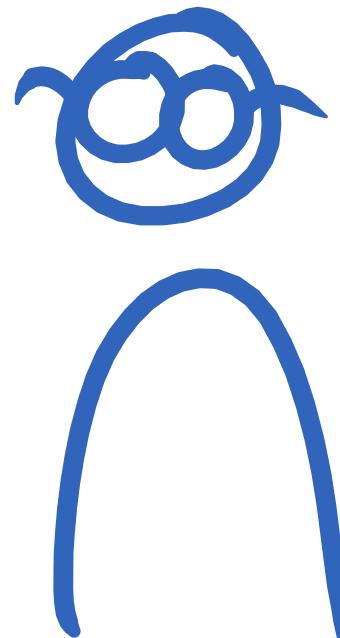
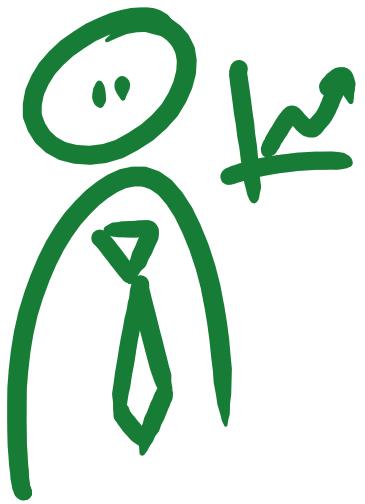
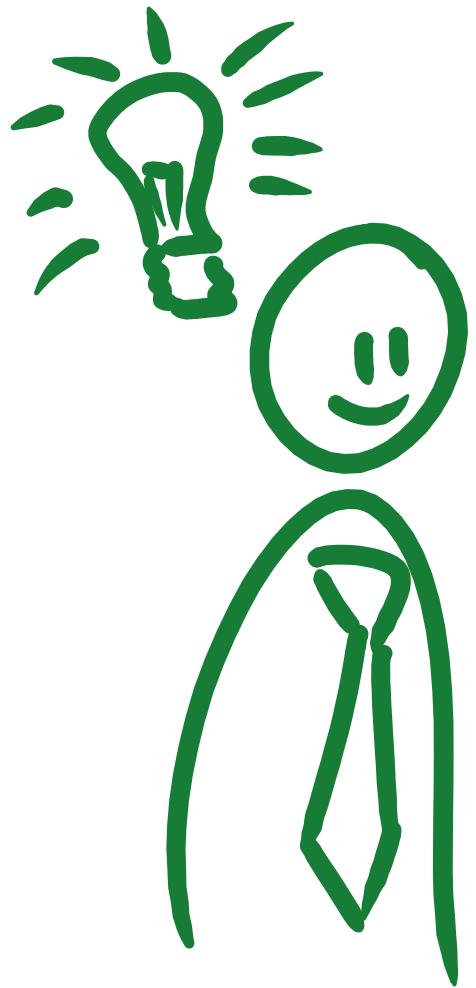


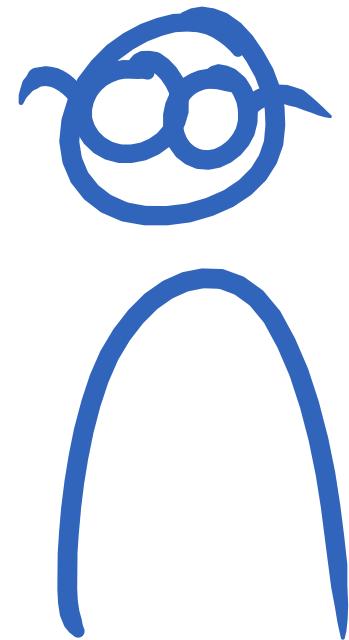
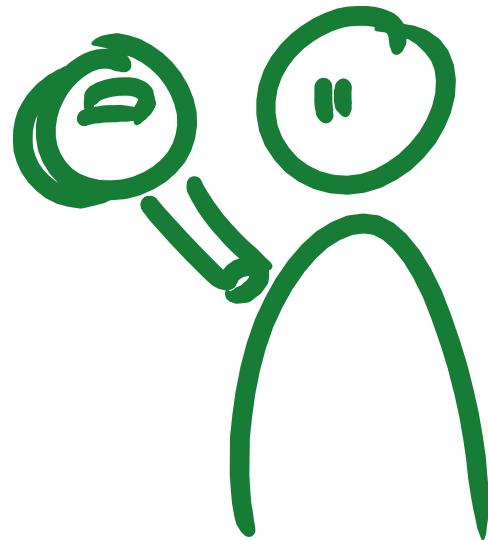
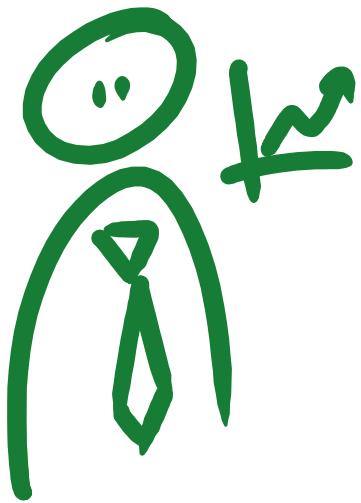
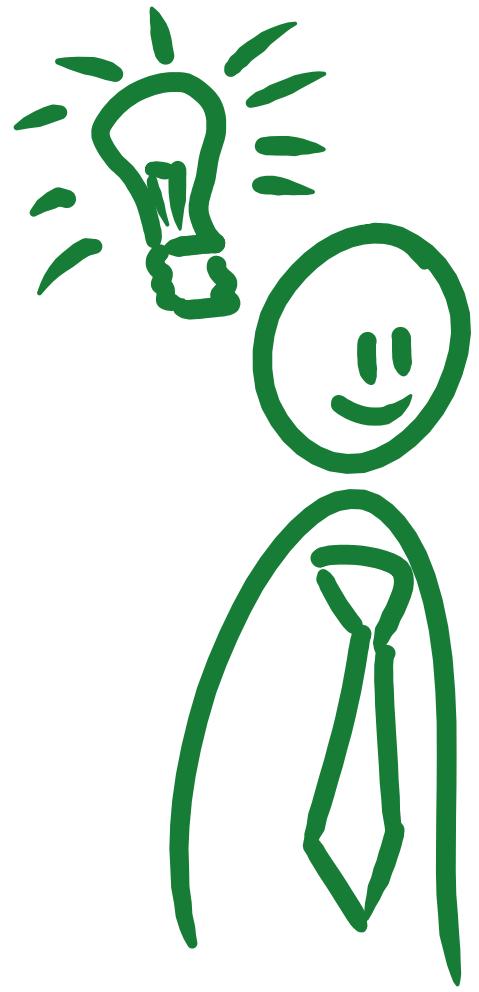


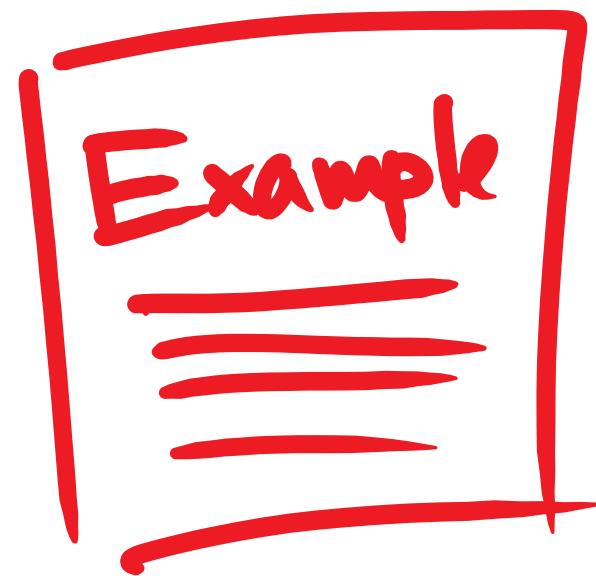
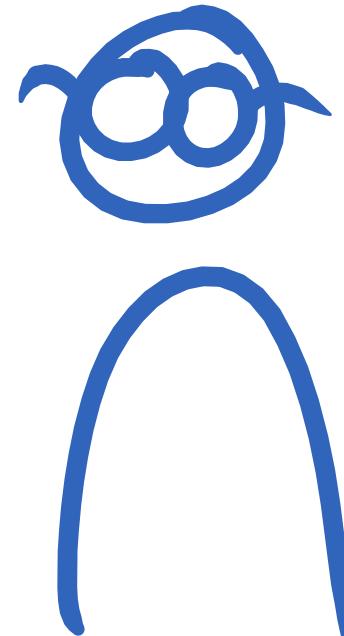
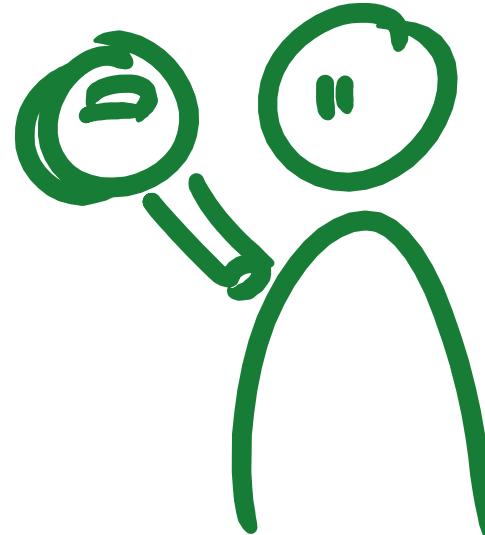
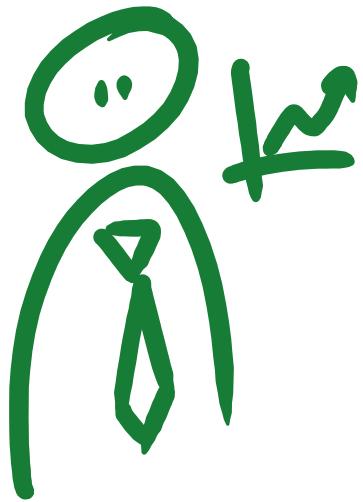
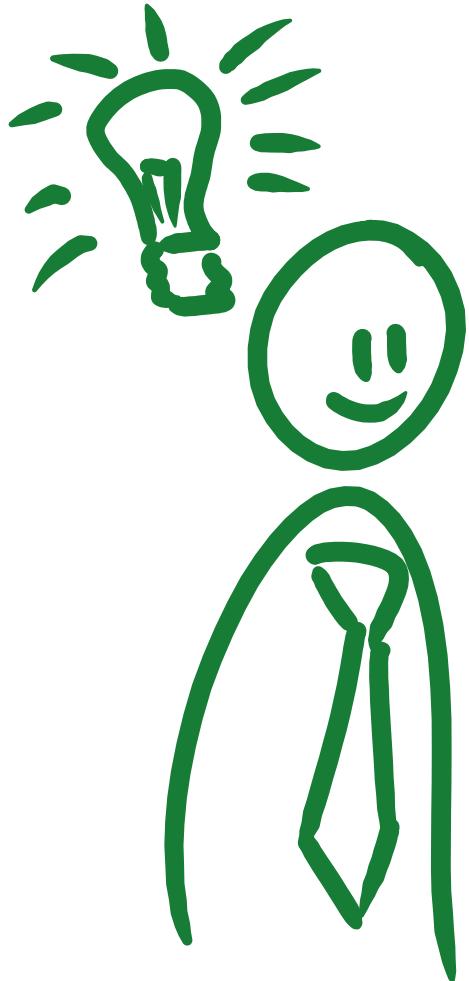
How?

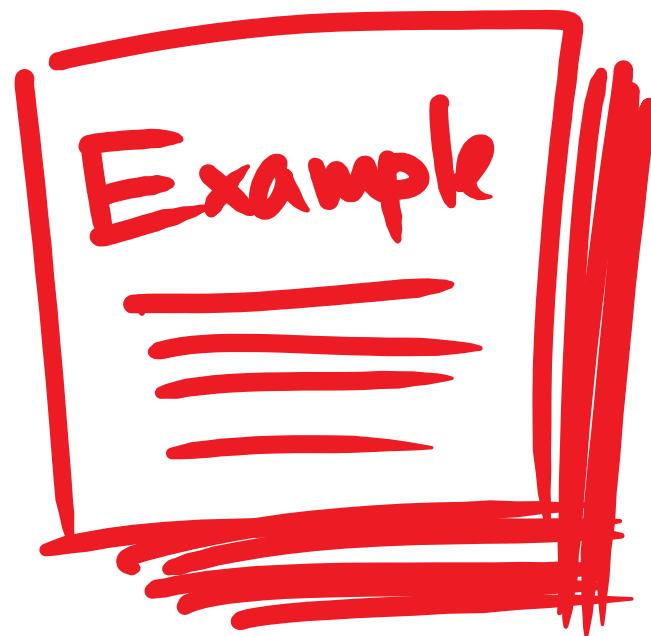
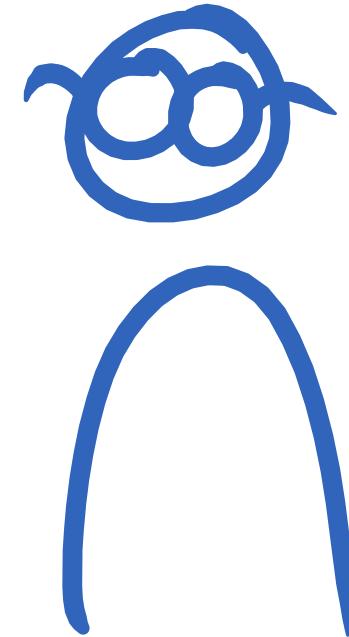
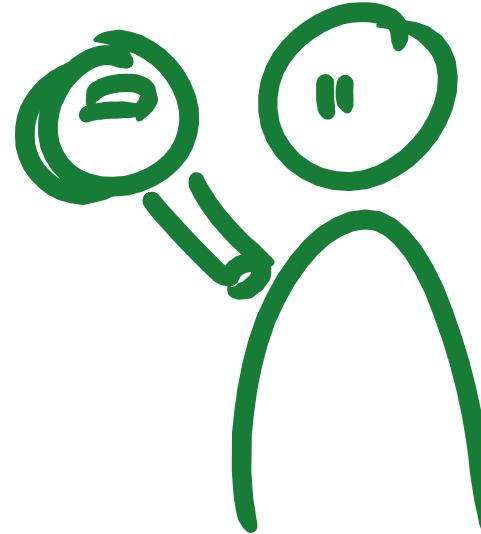
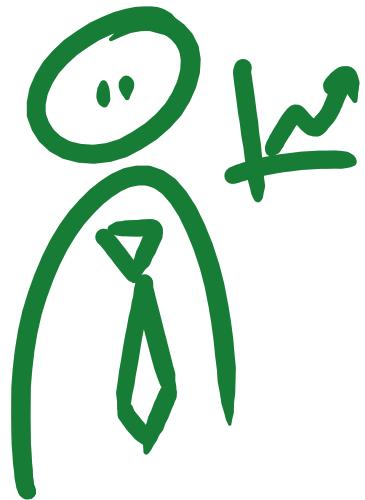
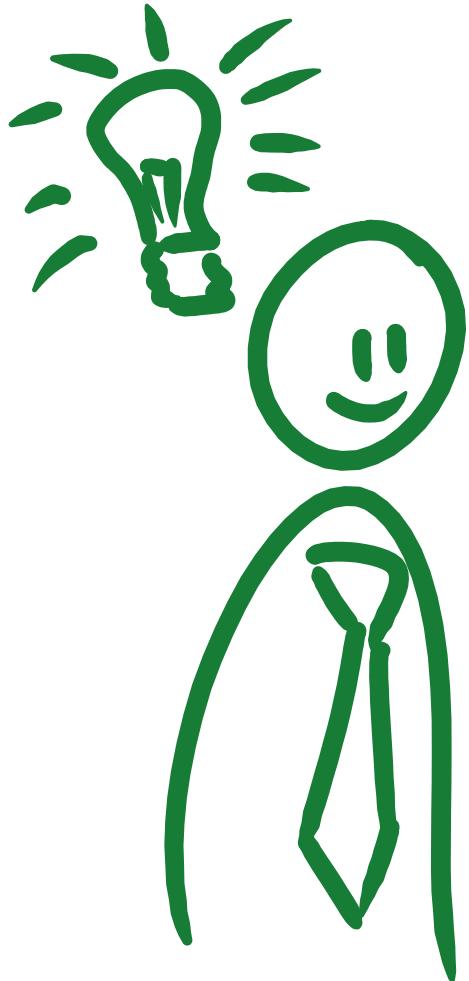


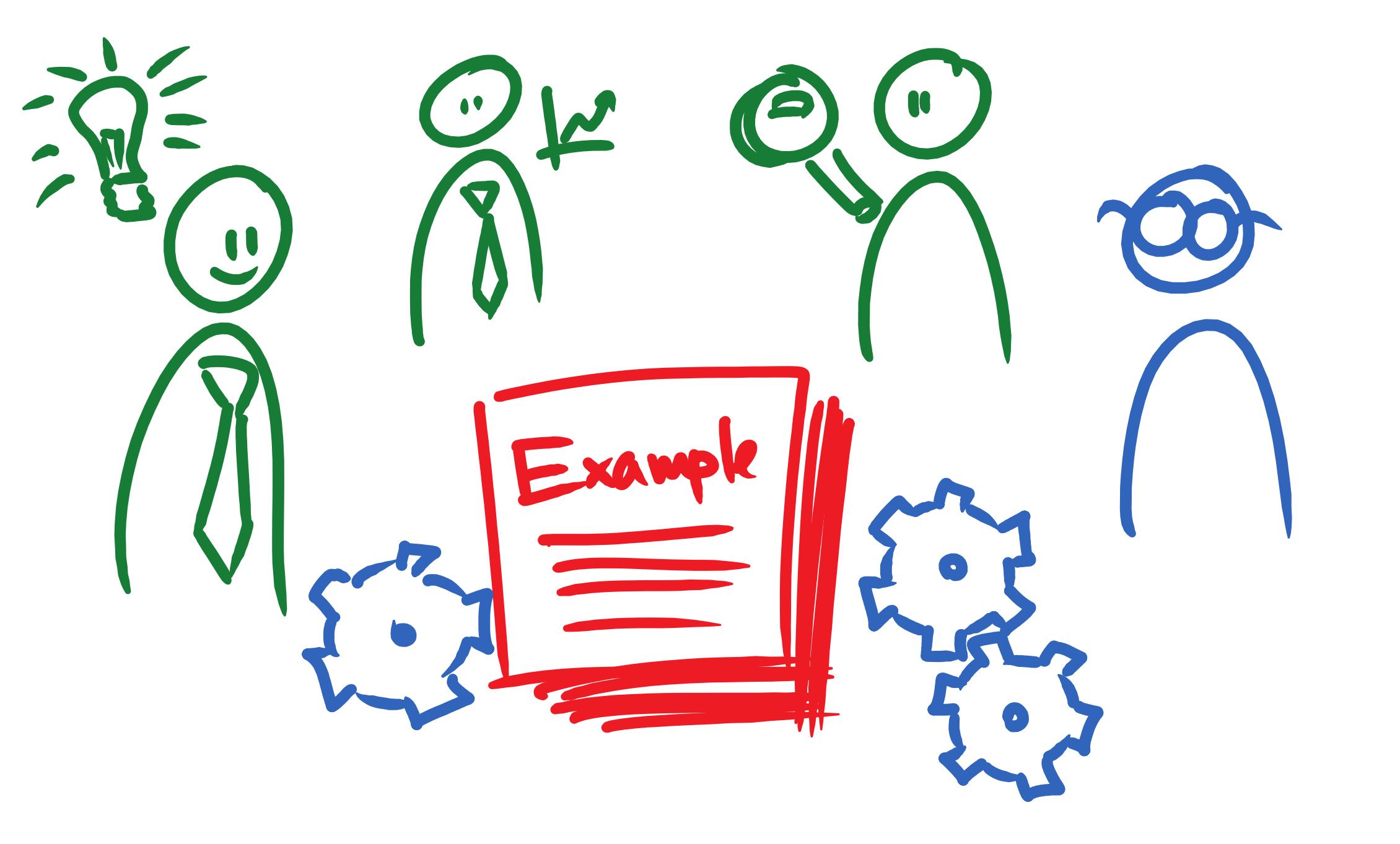




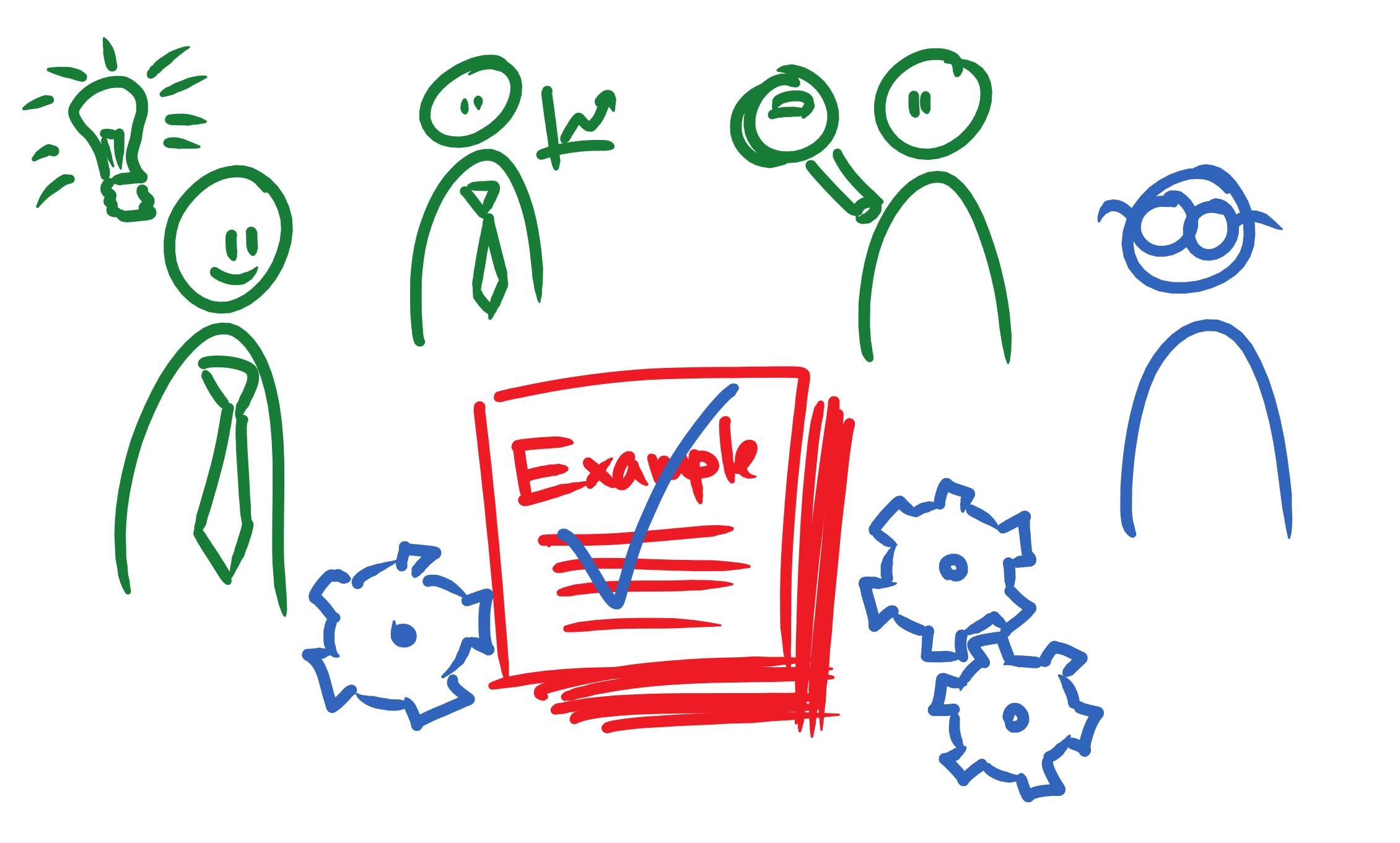


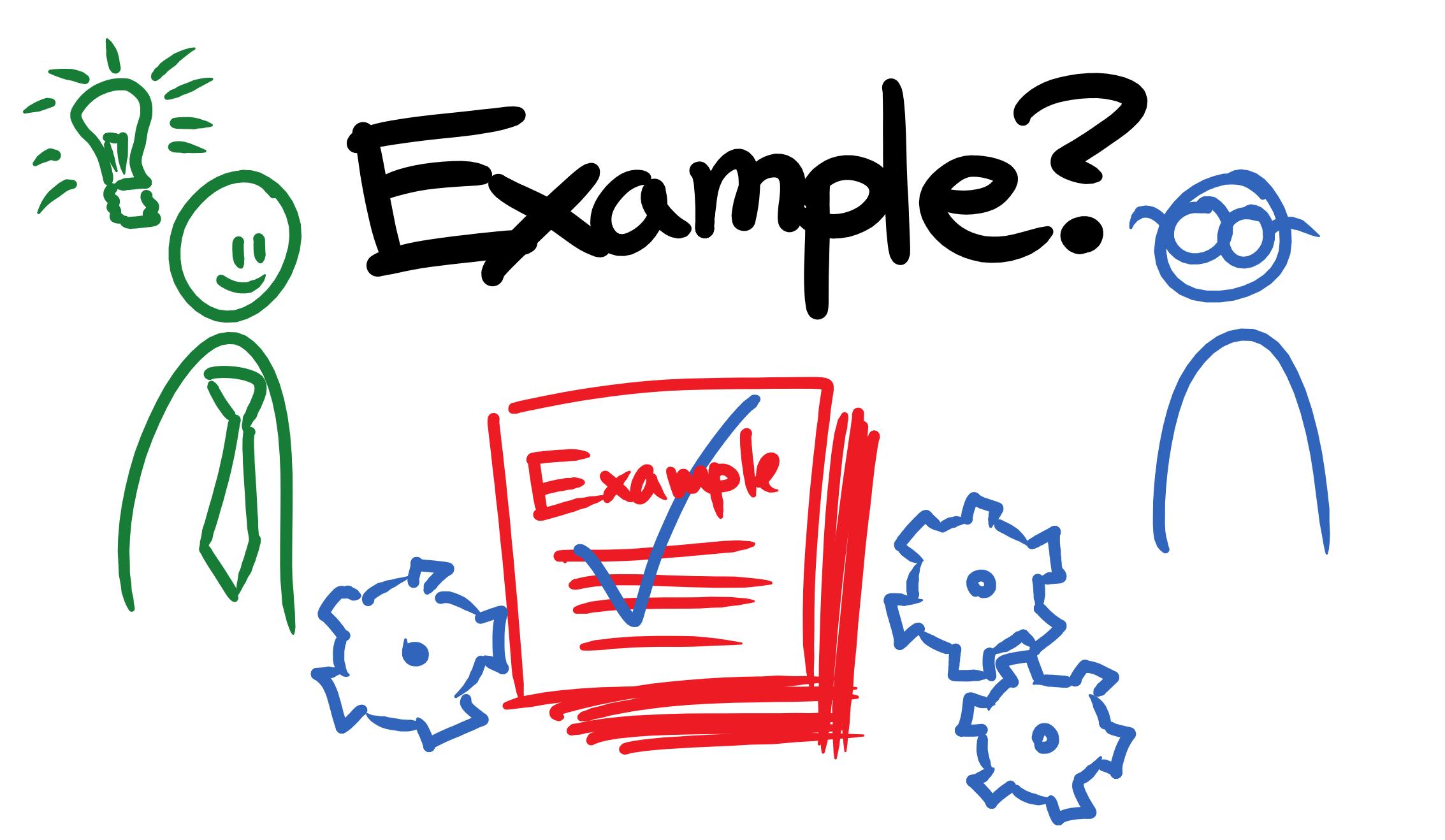


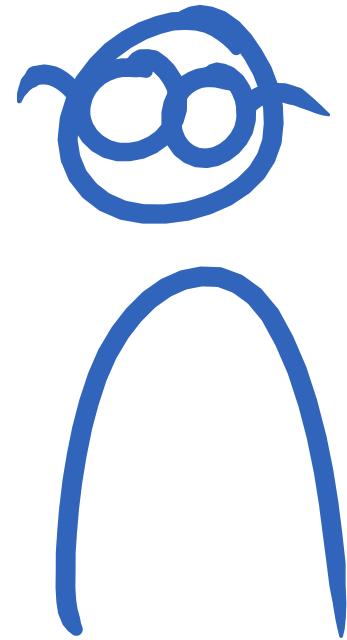
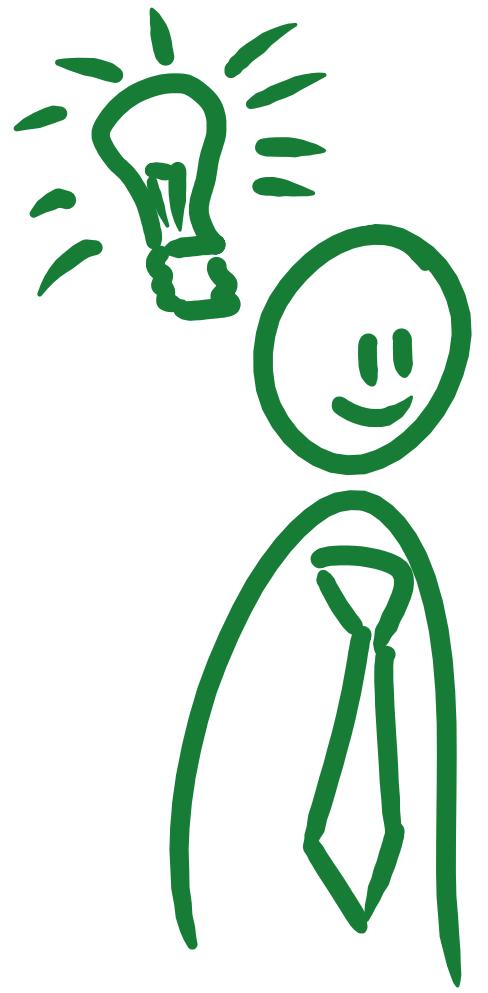


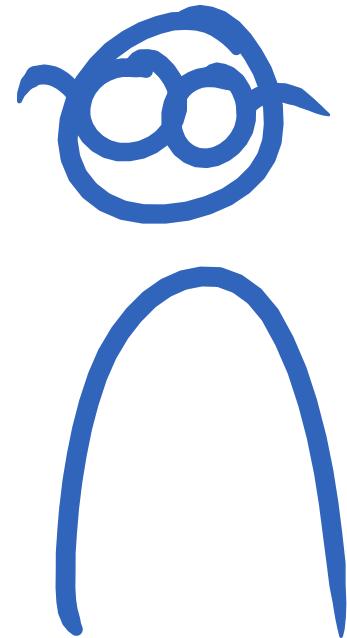
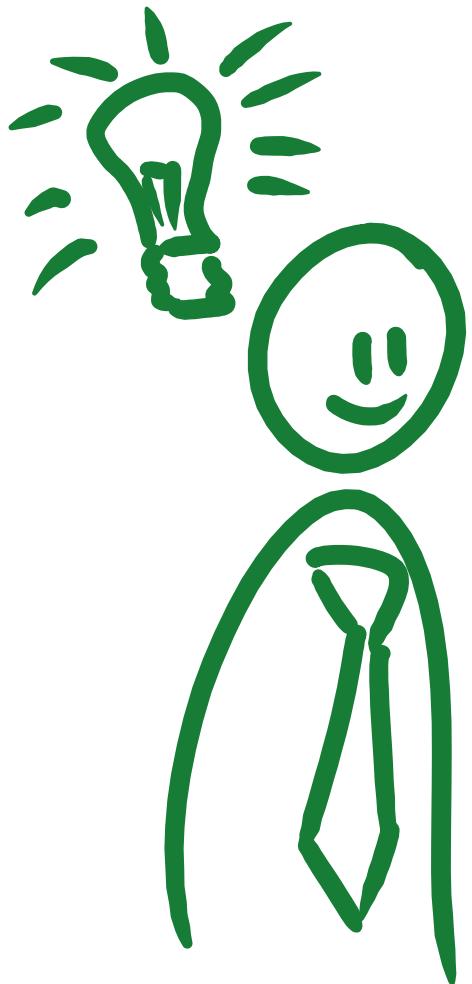


Example





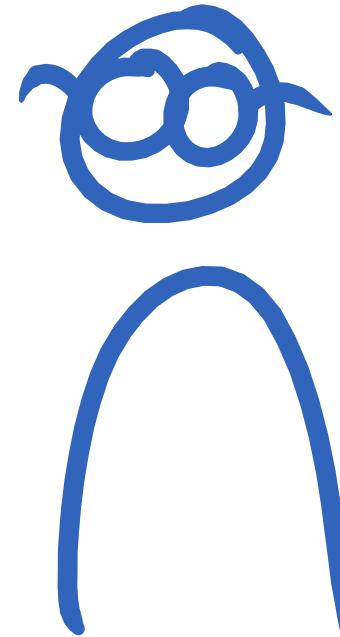




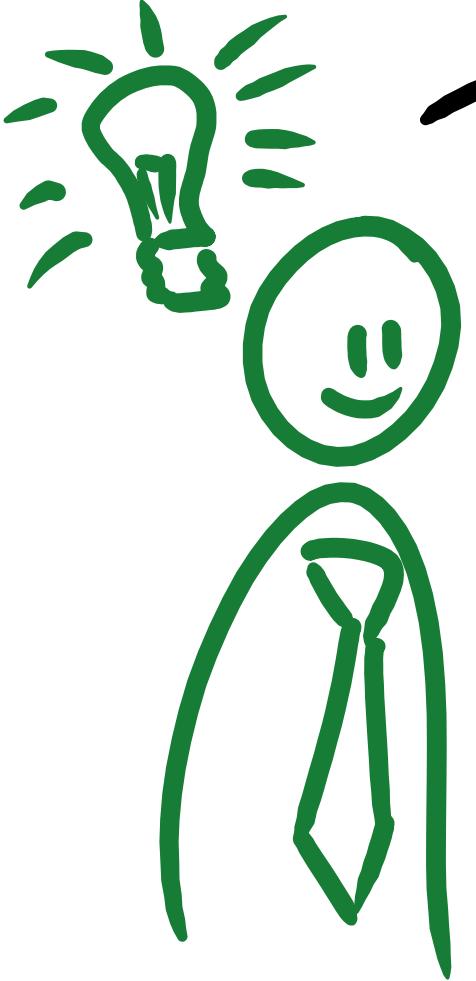
Amanoz.com



Free delivery!

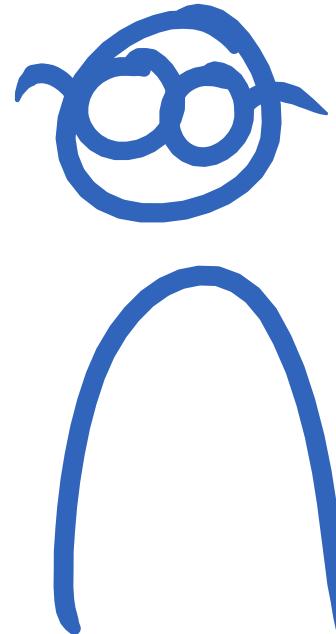


Amanoz.com

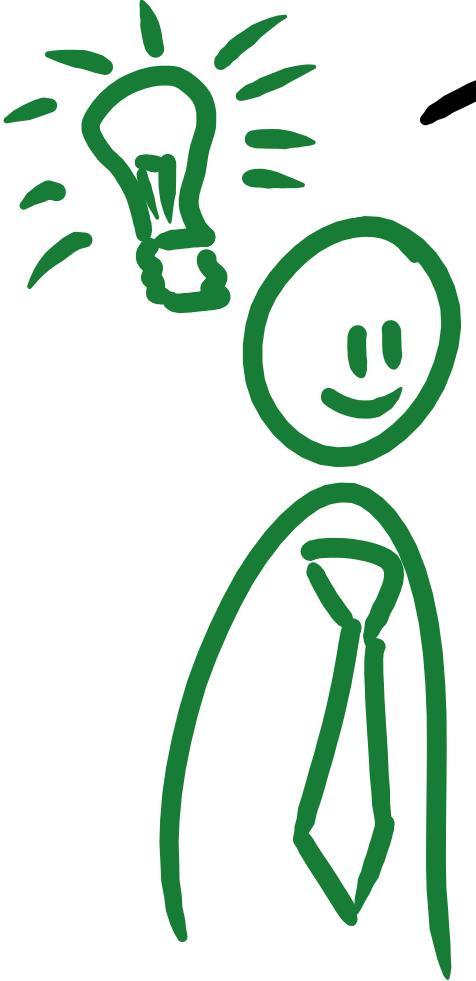


Free delivery!

Only for VIP



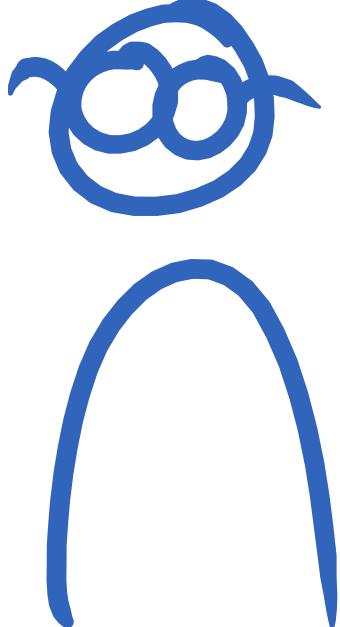
Amanoz.com



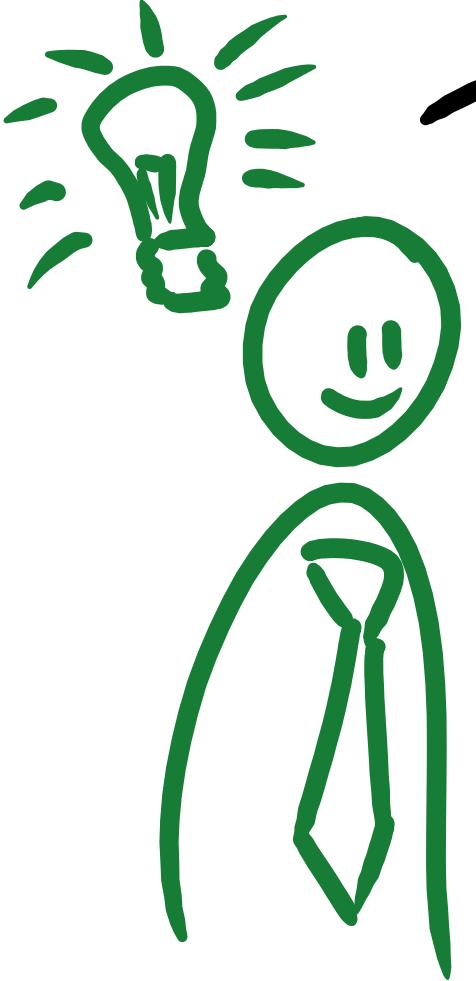
Free delivery!

Only for VIP

ordering 5 articles



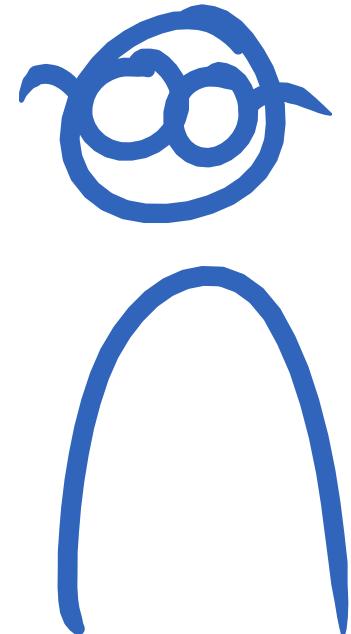
Amanoz.com



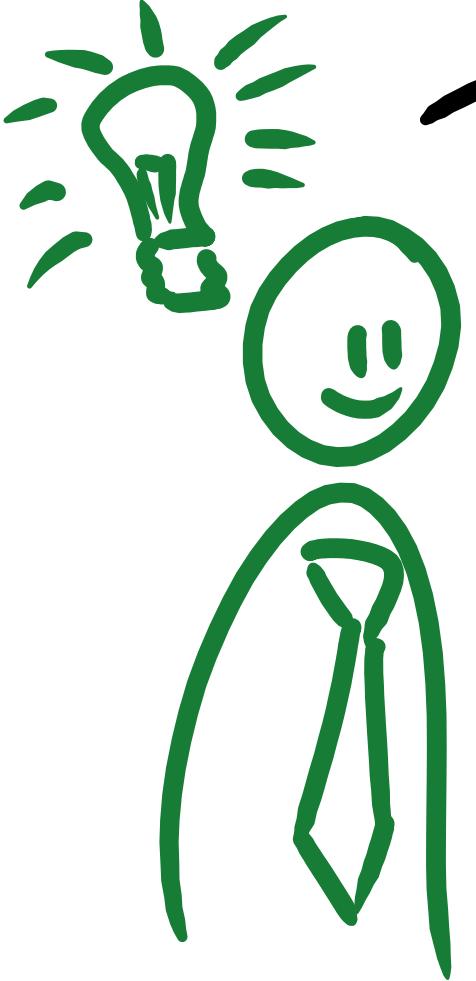
Free delivery!

Only for VIP

ordering 5 articles
only books



Amanoz.com

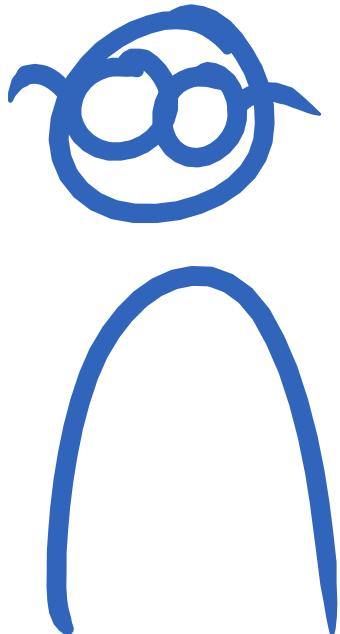


Free delivery!

Only for VIP

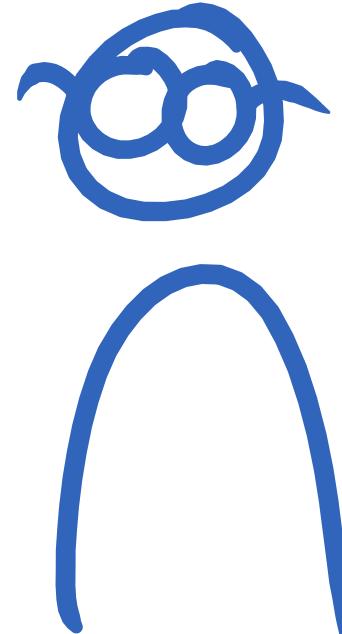
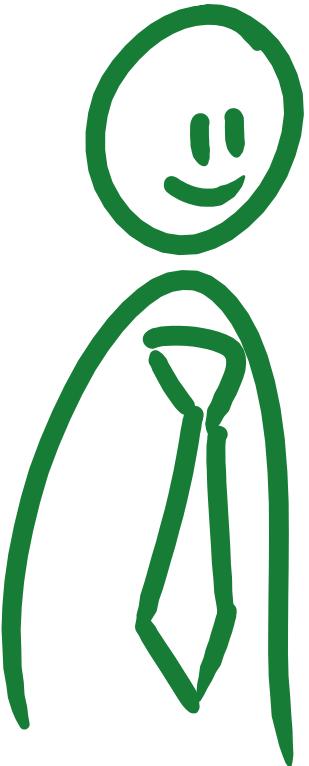


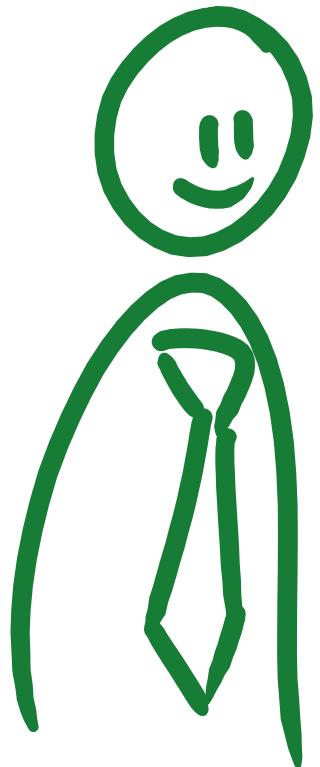
ordering 5 articles
only books



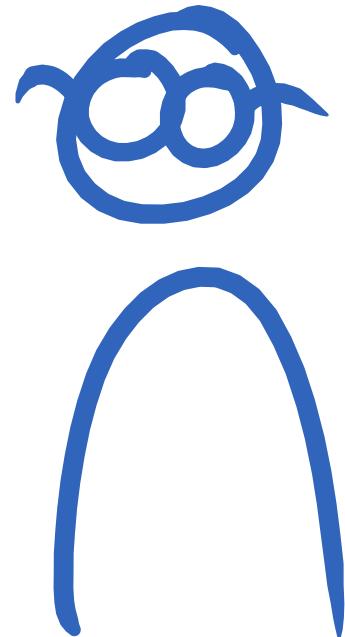
Amanoz.com

We need
Examples



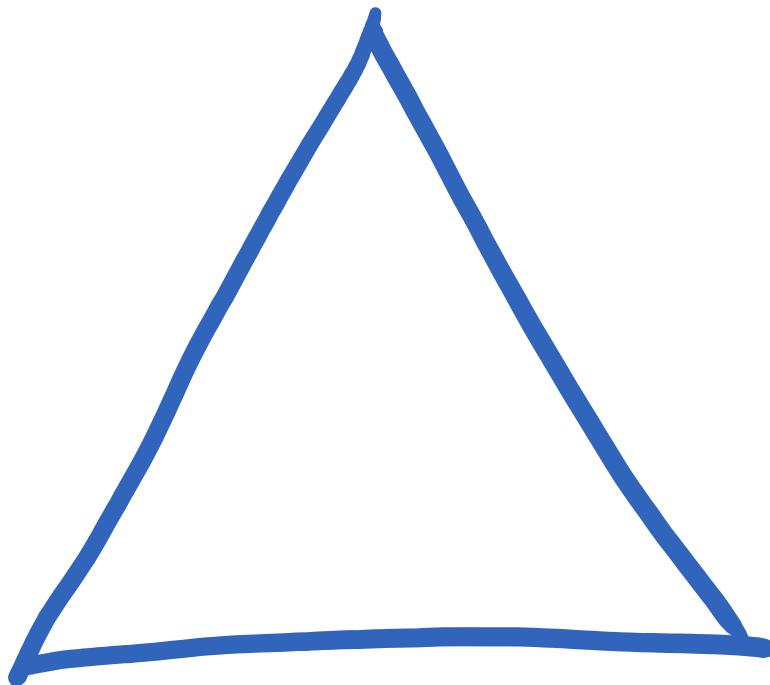
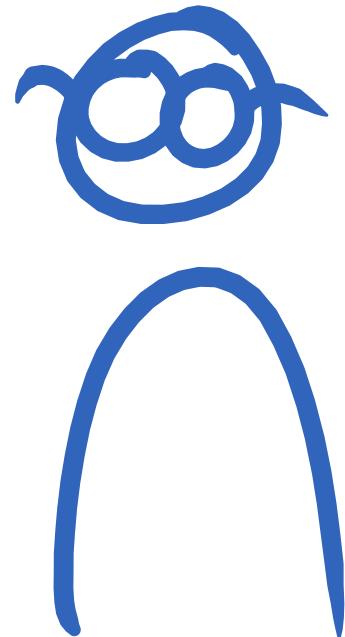


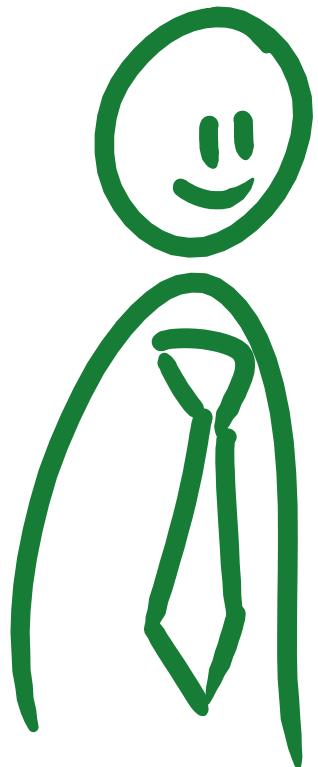
Examples



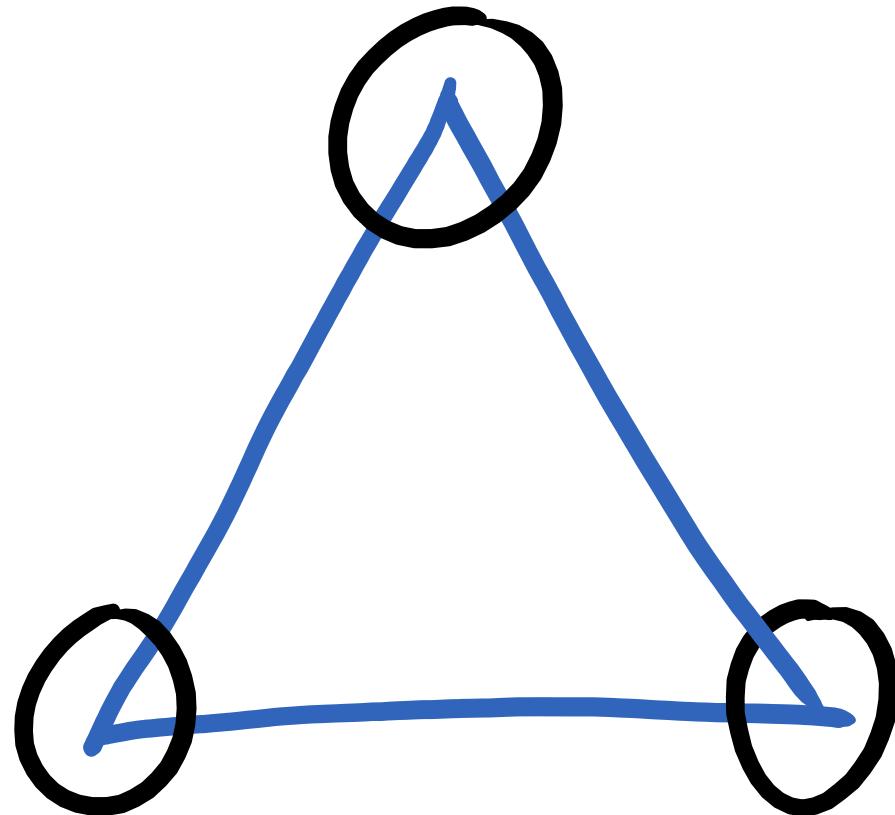
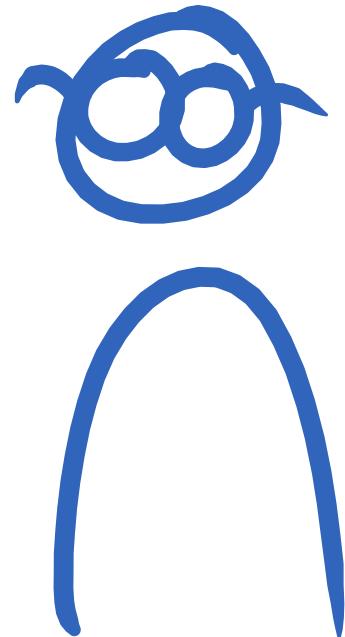


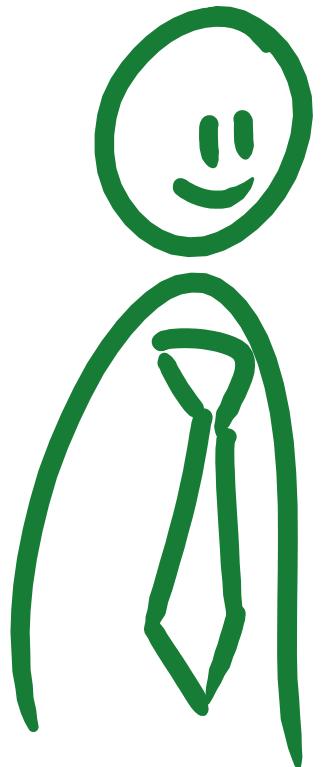
Examples



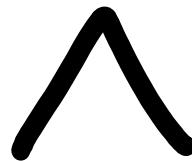
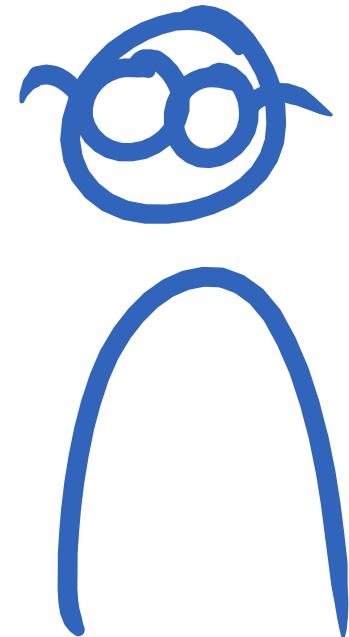


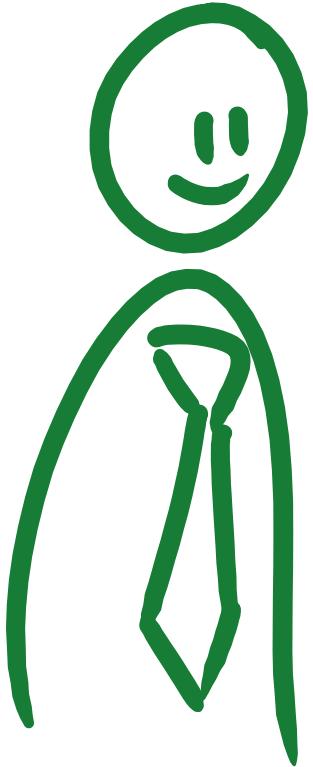
Examples



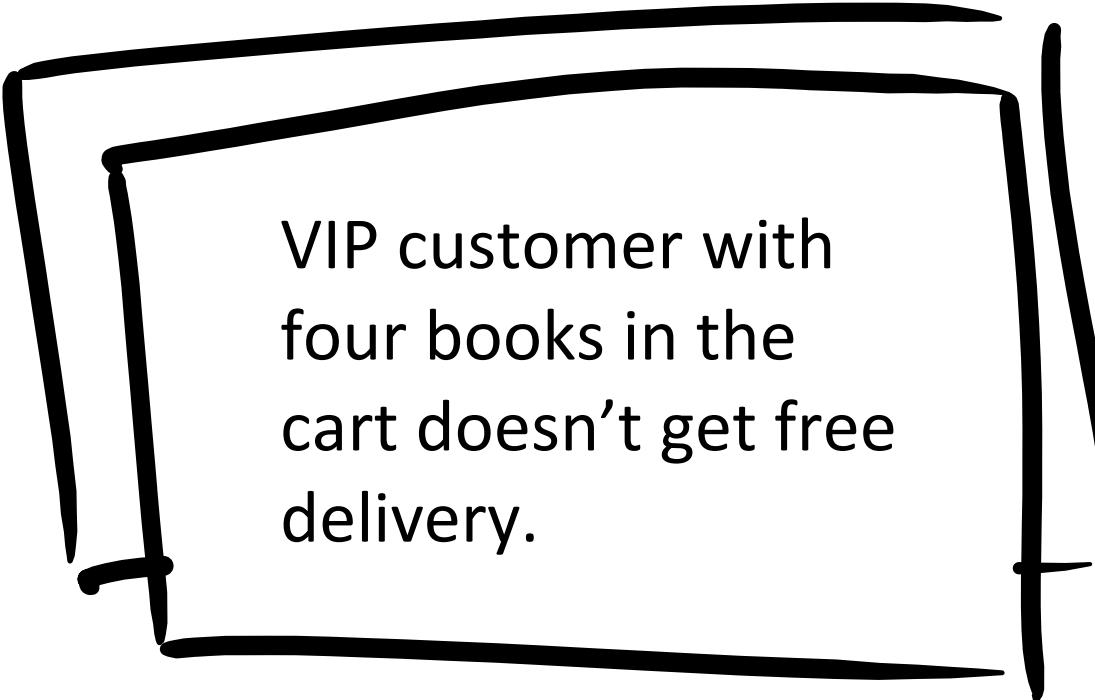
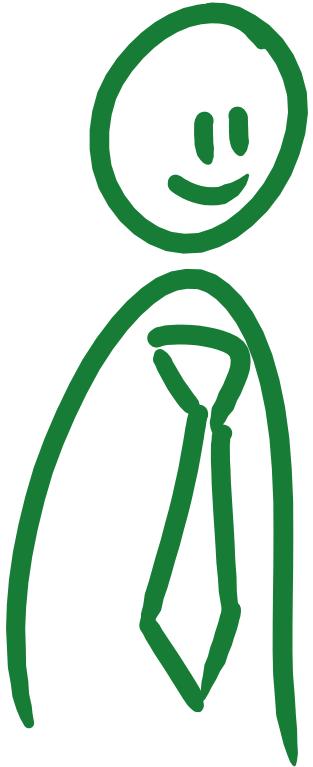


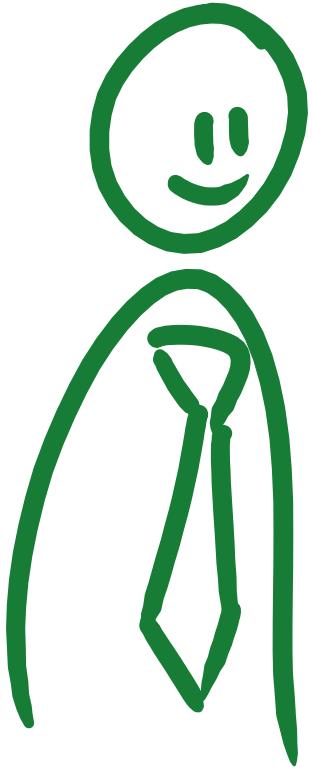
Examples



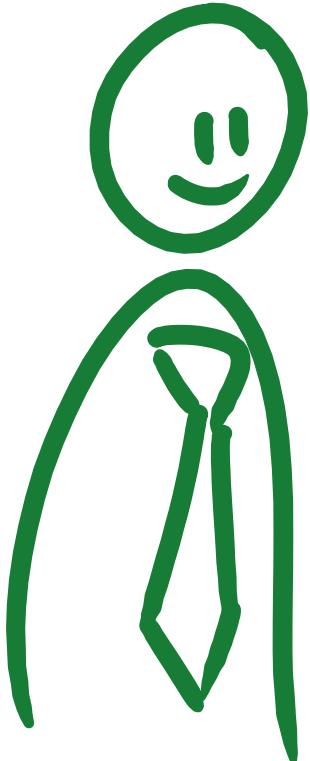


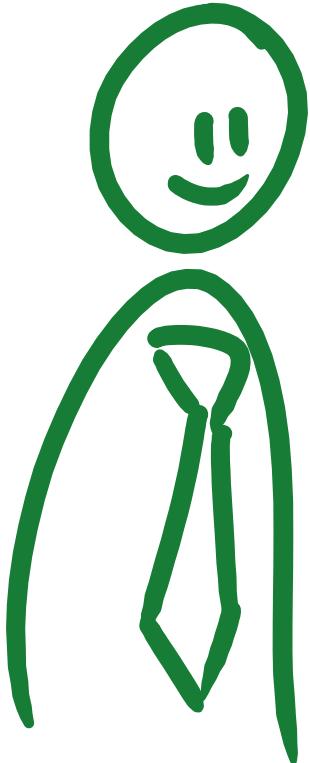
VIP customer with five
books in the cart gets
free delivery.

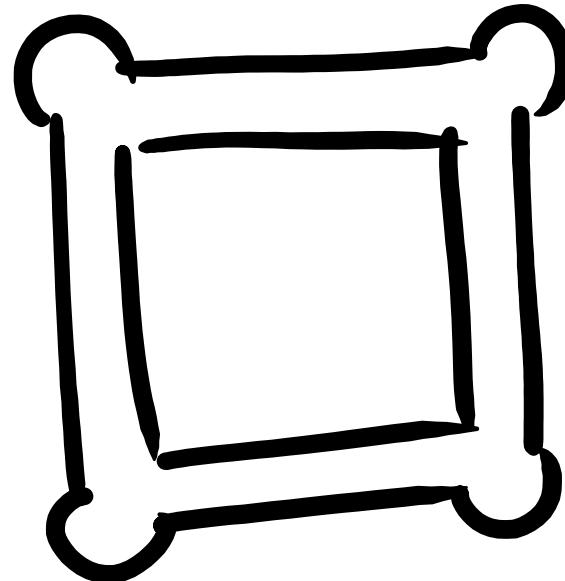
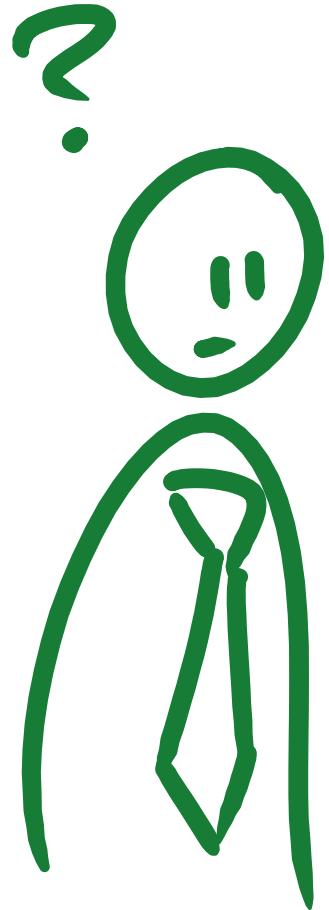


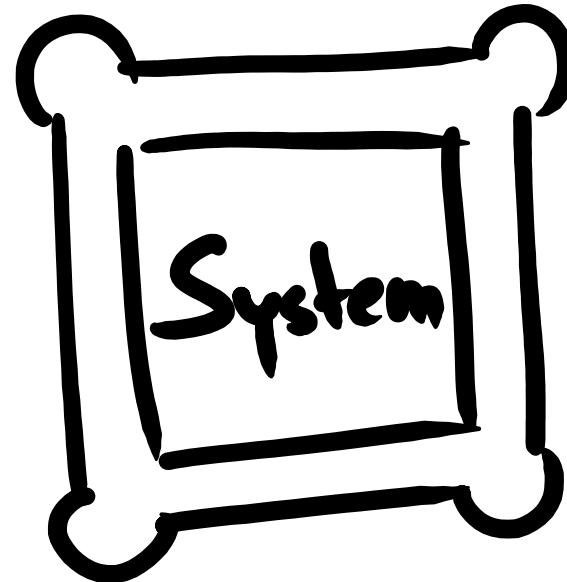
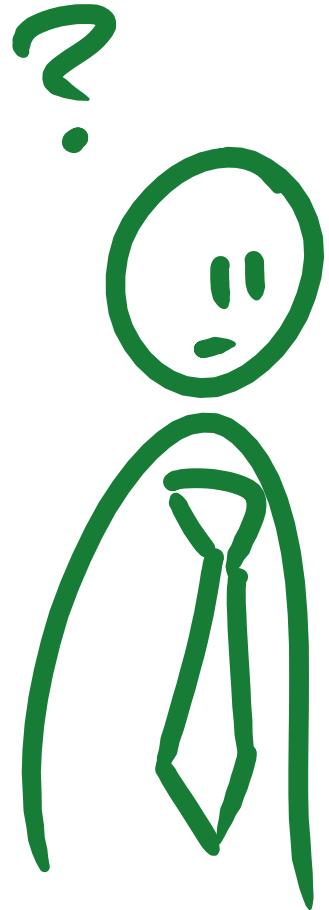


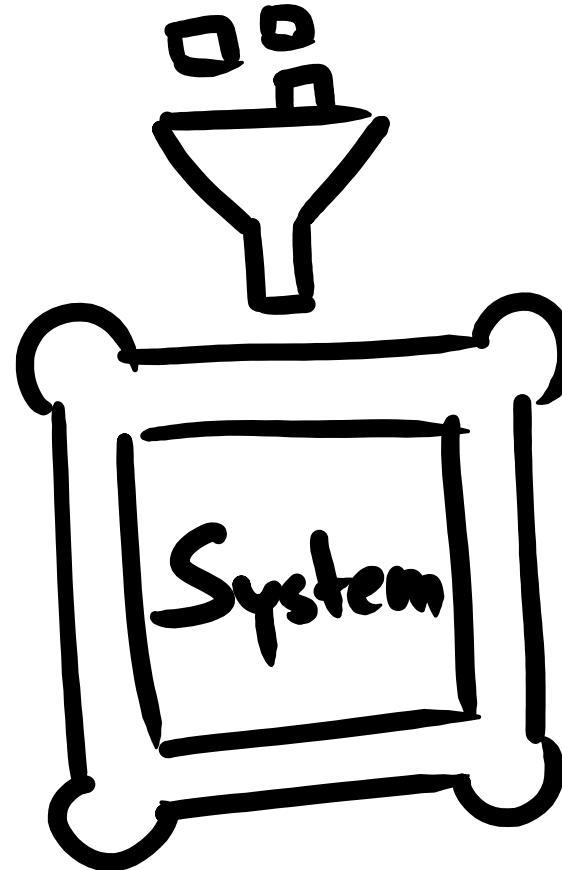
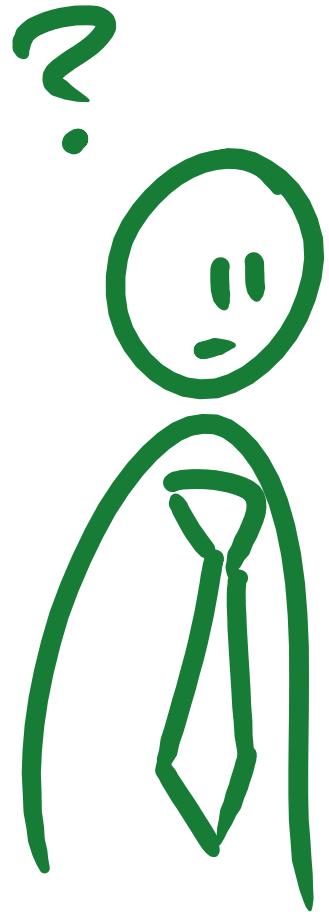
Regular customer
with five books in
the cart doesn't get
free delivery.

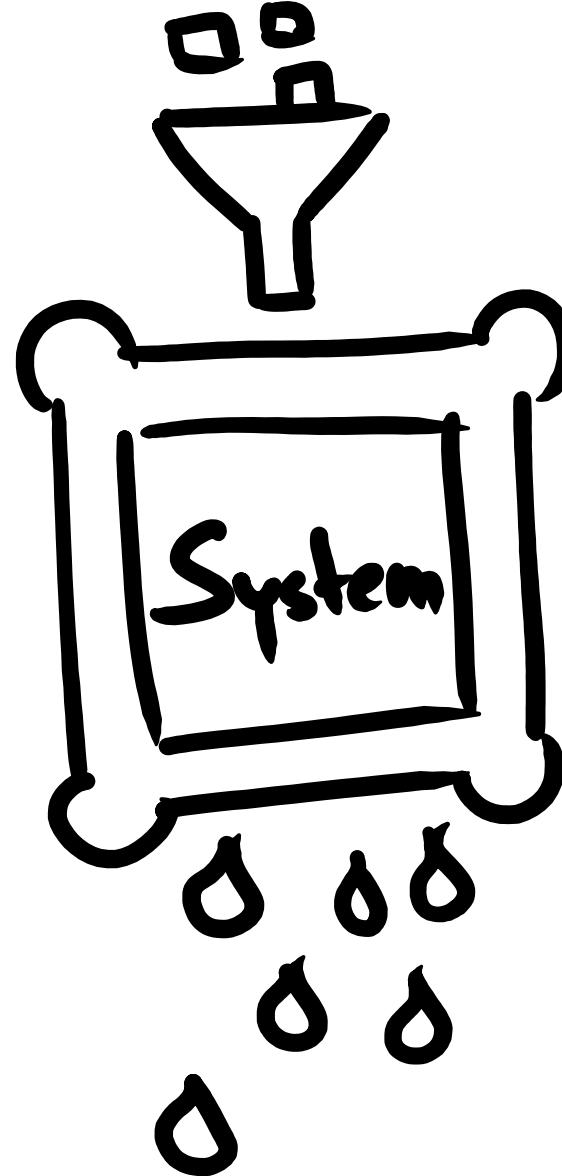
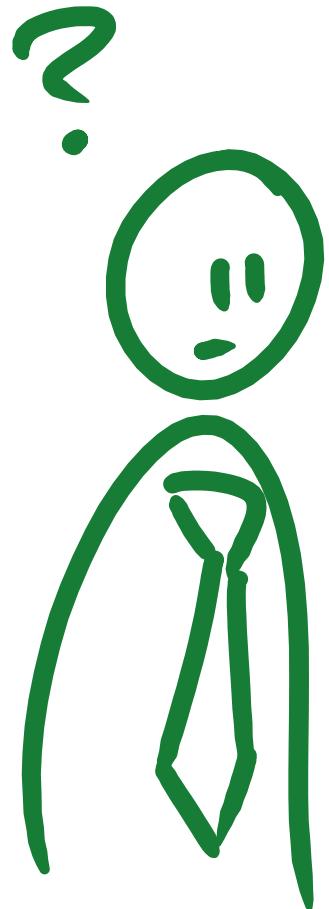


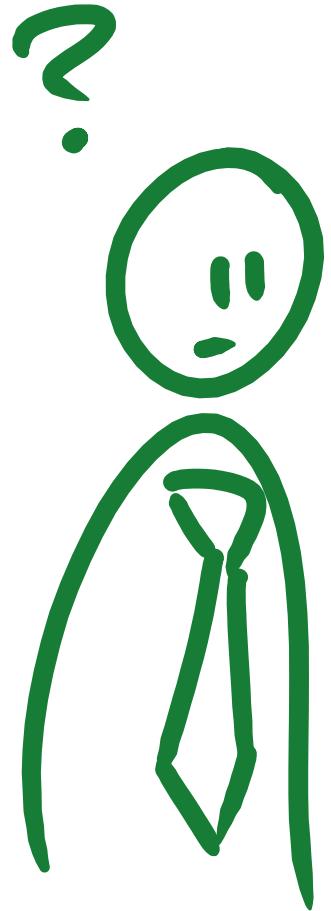




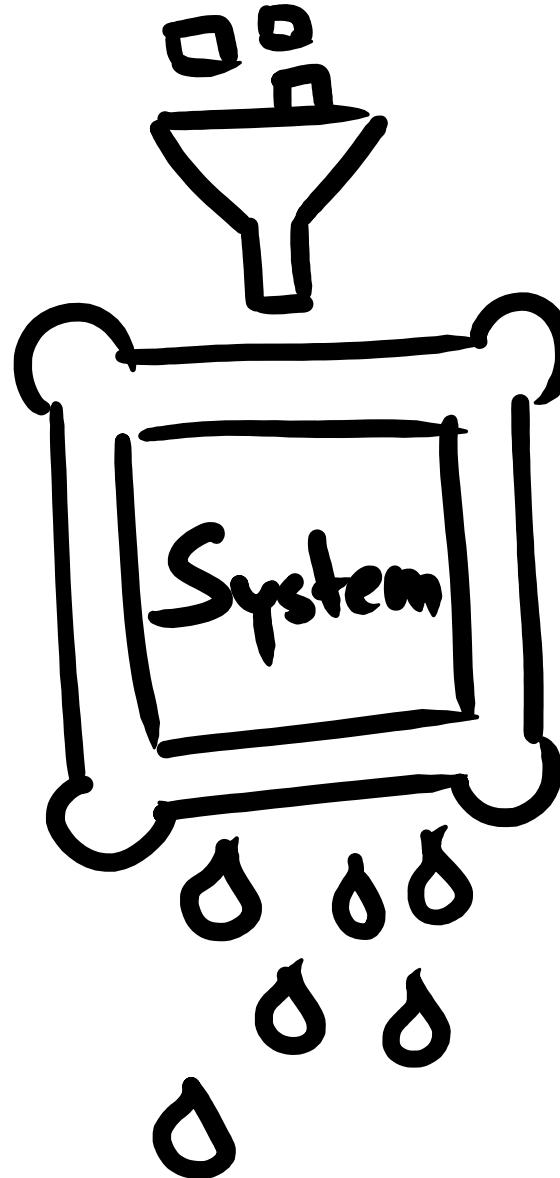


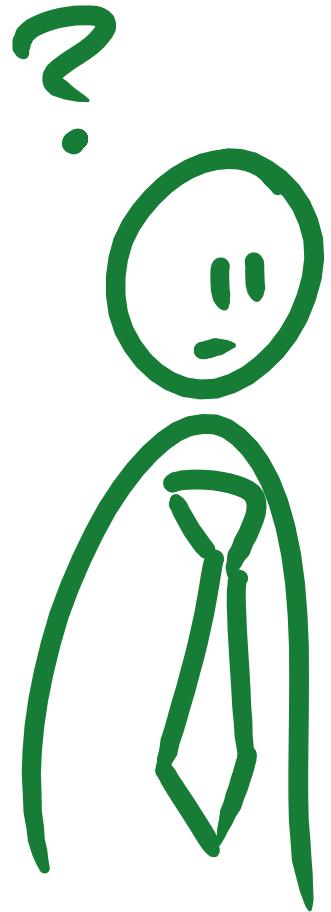




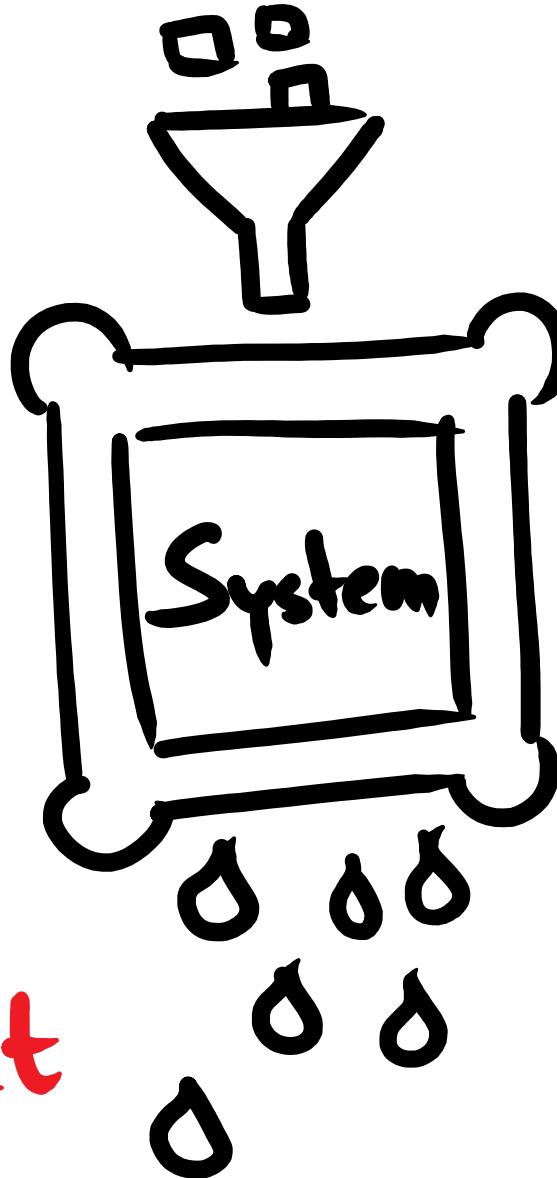


Input

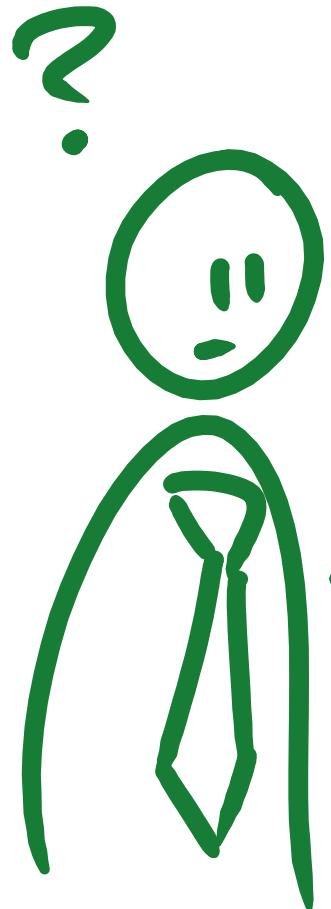




Input



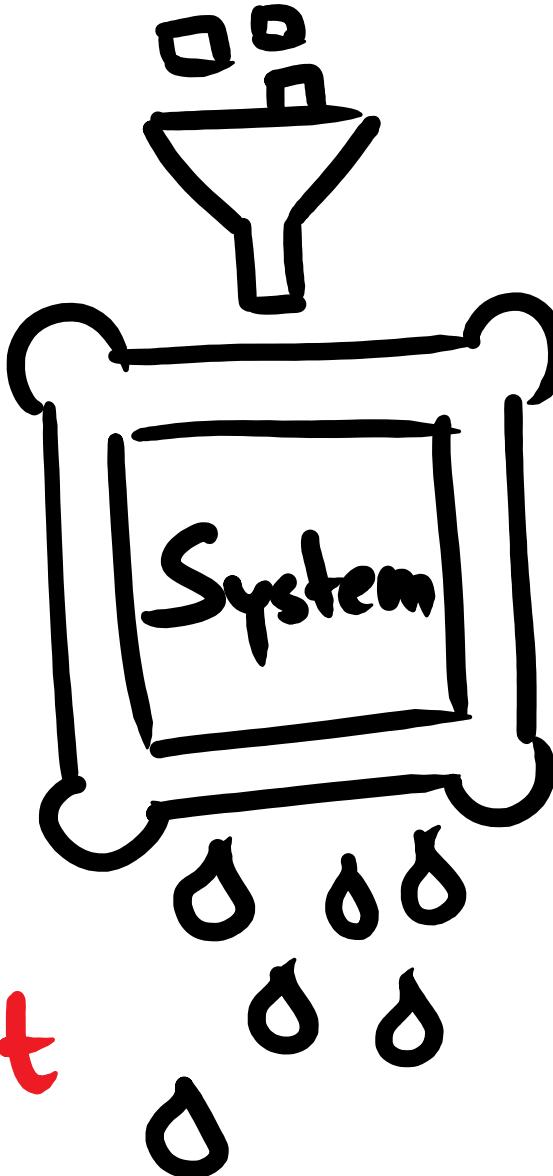
Output

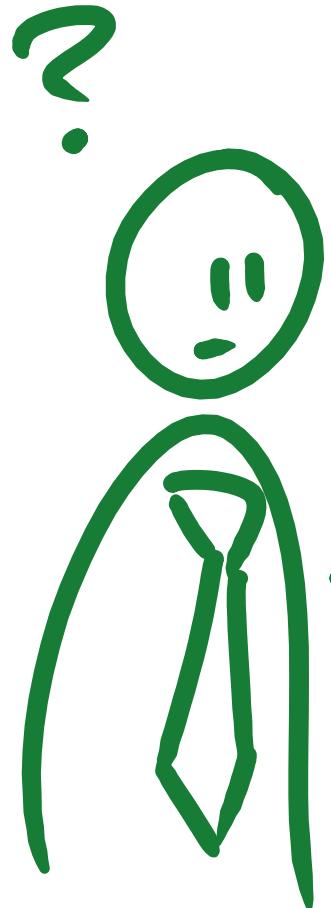


Input

Transformation

Output

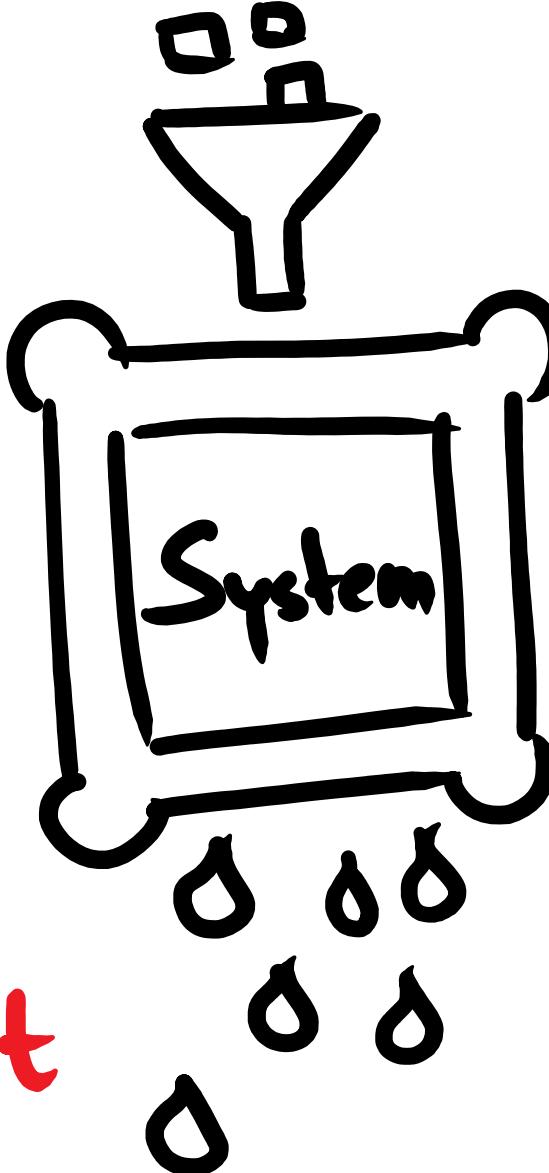




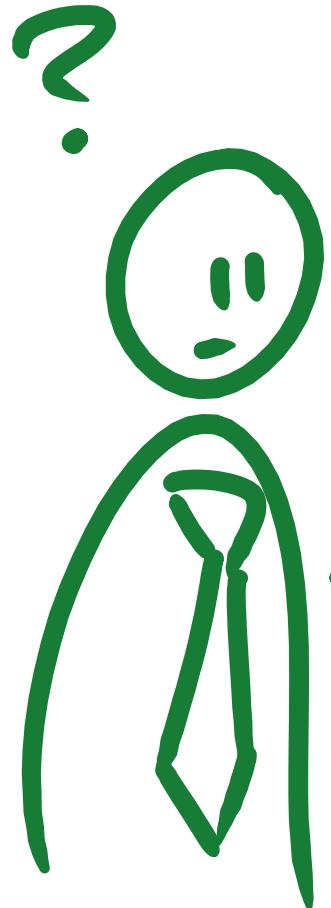
Input

Transformation

Output



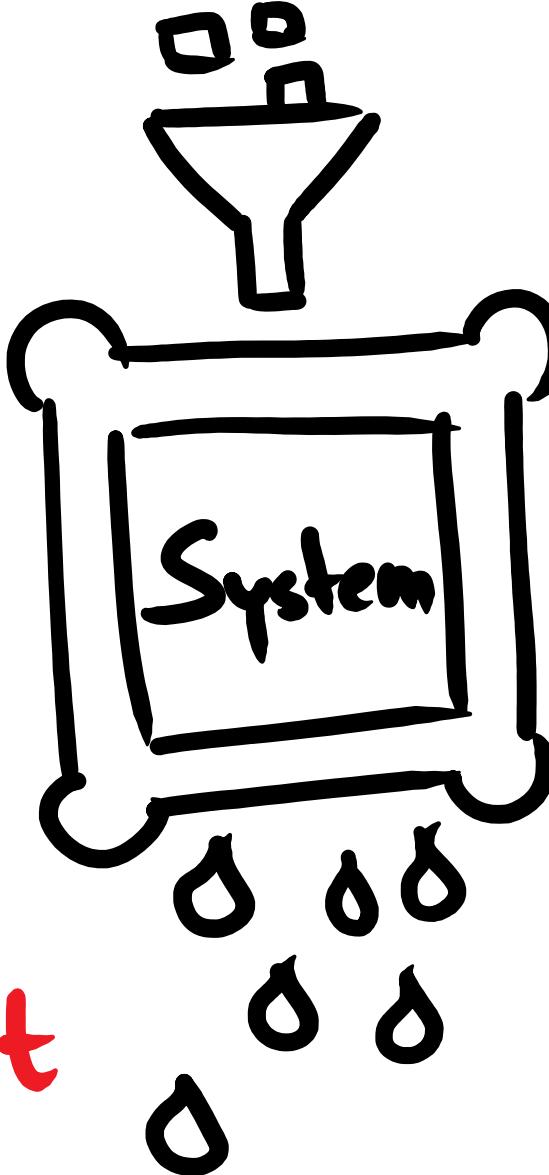
Pre
Condition



Input

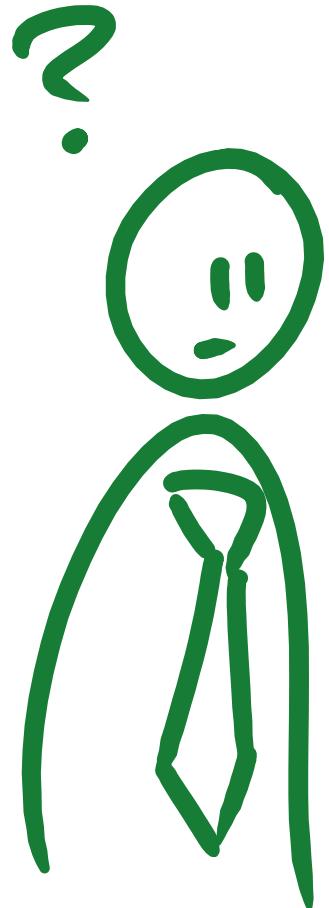
Transformation

Output



Pre
Condition

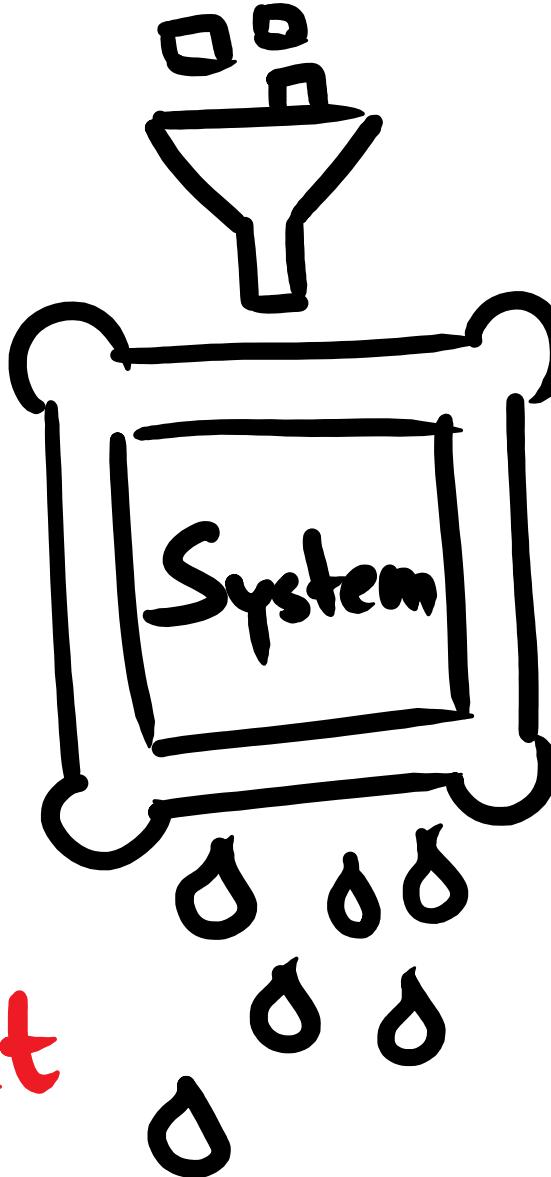
Post
Condition



Input

Transformation

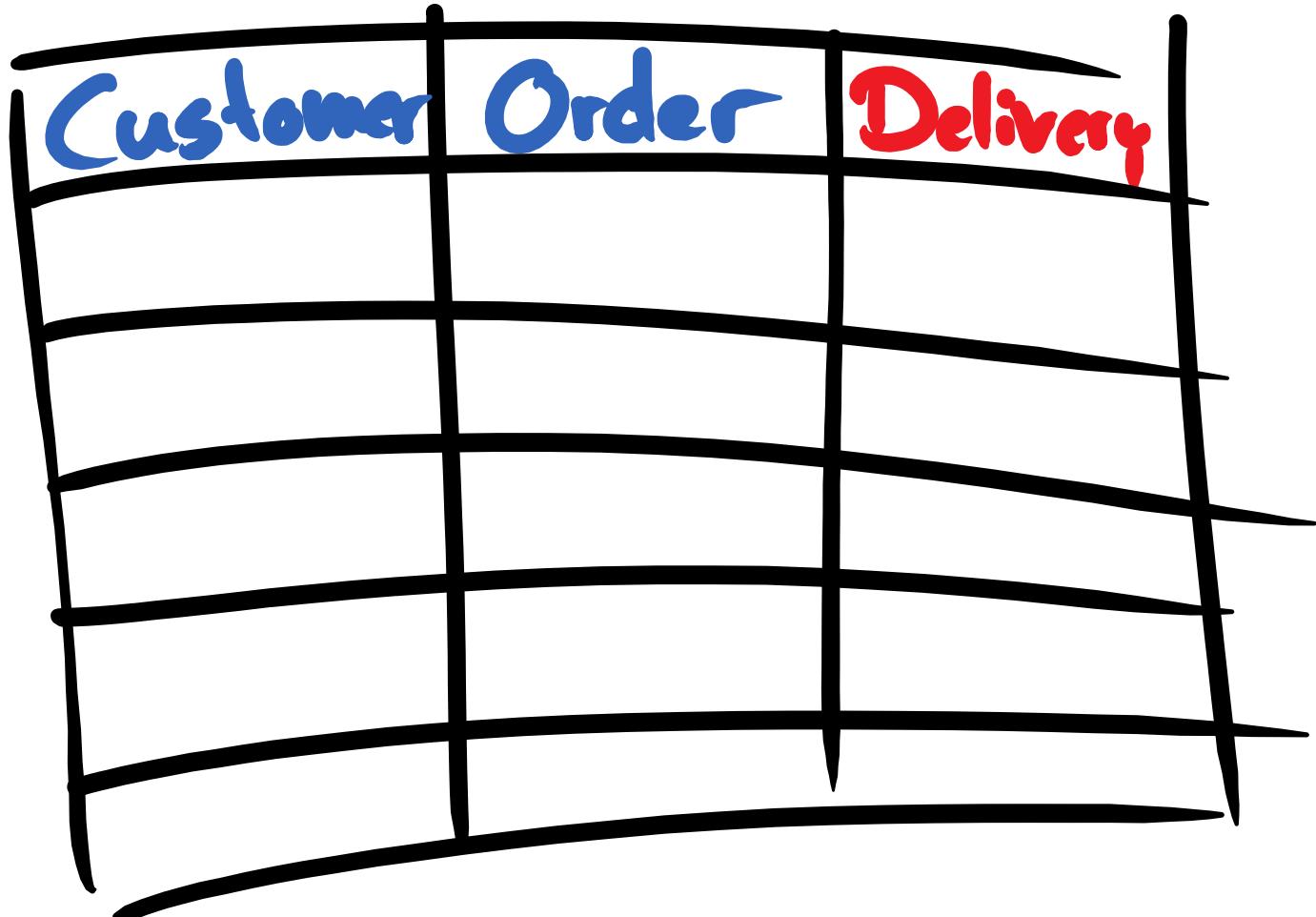
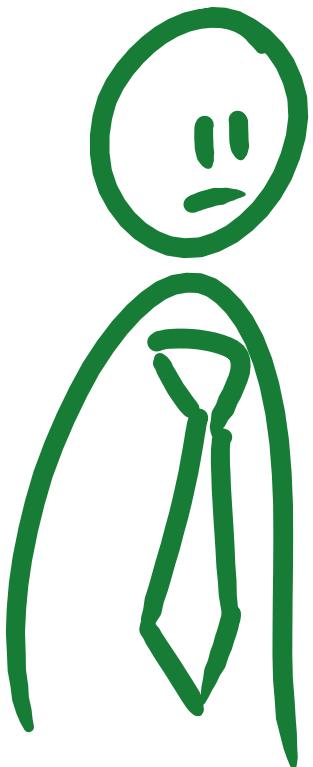
Output

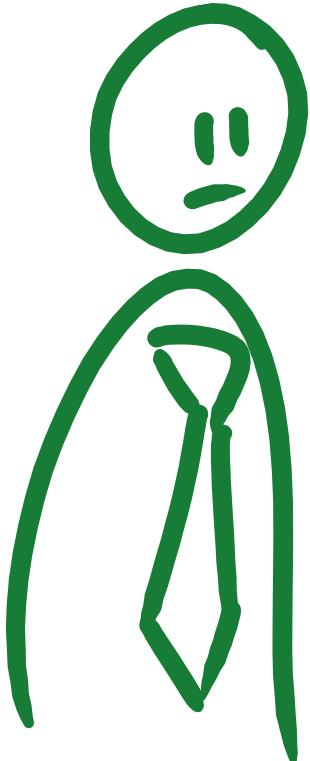


Pre
Condition

Action

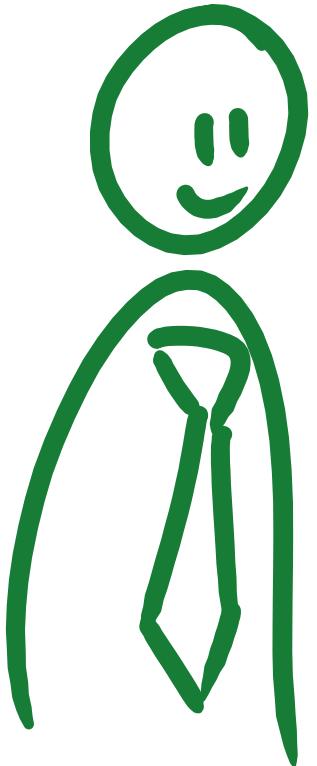
Post
Condition



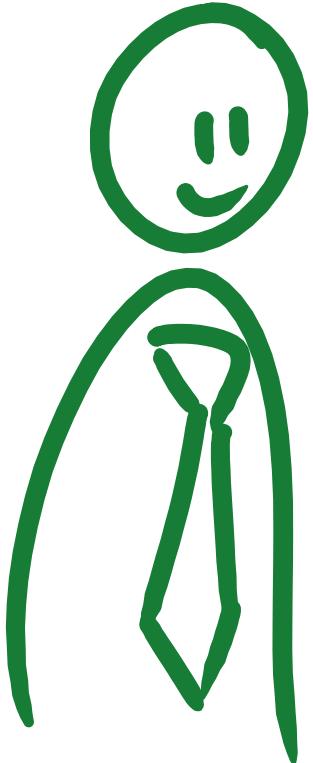


Customer	Order	Delivery
VIP	5 books	free
VIP	4 books	not
Reg	10 books	not
VIP	5 TV	not
VIP	5 books, 1 TV	not

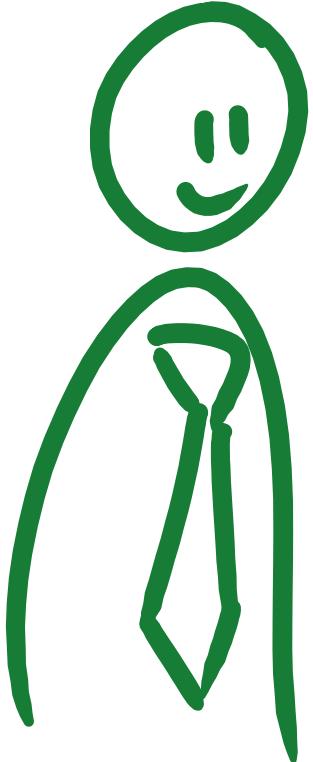
Sentences



Sentences in ubiquitous language

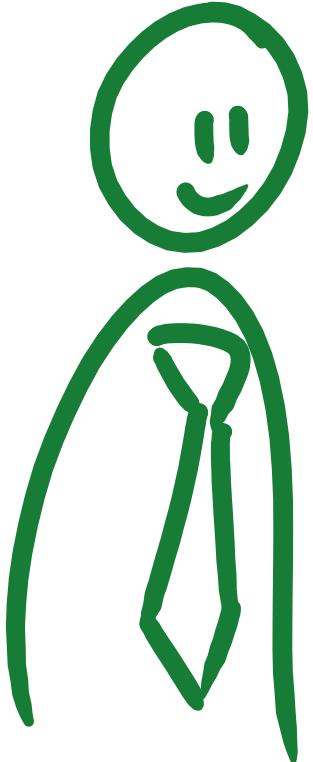


Sentences in ubiquitous language



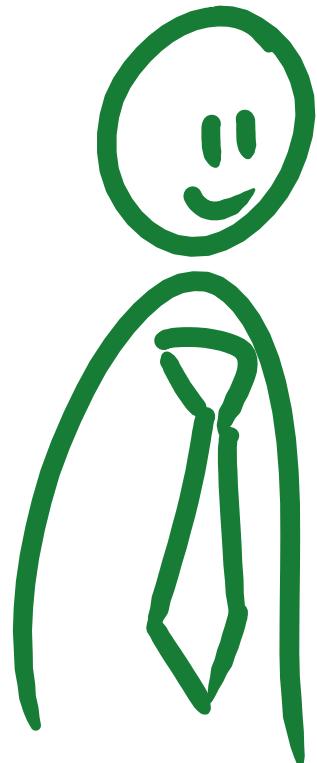
Pre → "Given..."

Sentences in ubiquitous language



Pre → "Given..."

Action → "When..."



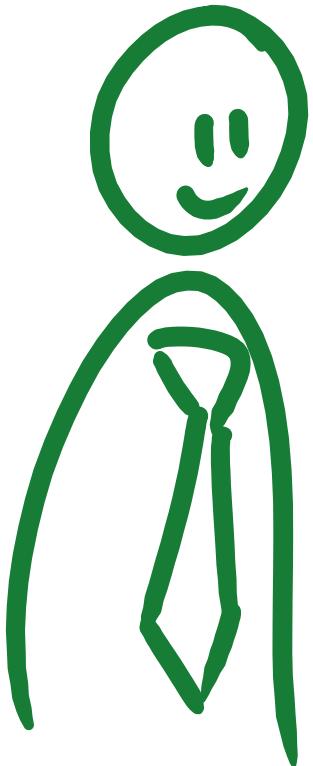
Sentences in ubiquitous language

Pre → "Given..."

Action → "When..."

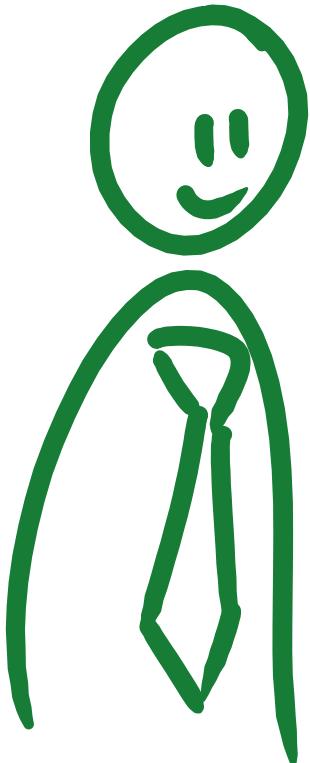
Post → "Then ... should..."

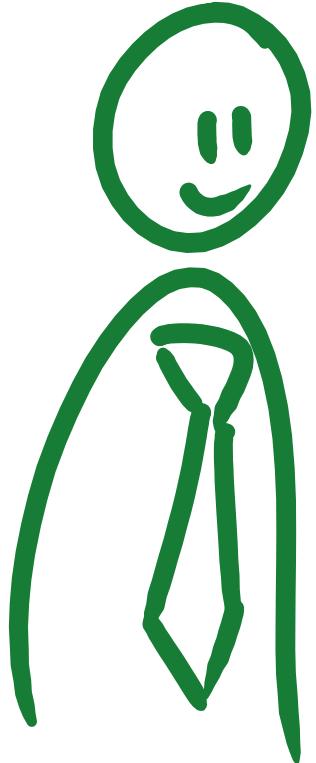
Given I am a VIP customer



Given I am a VIP customer

Given I have 5 books in my basket

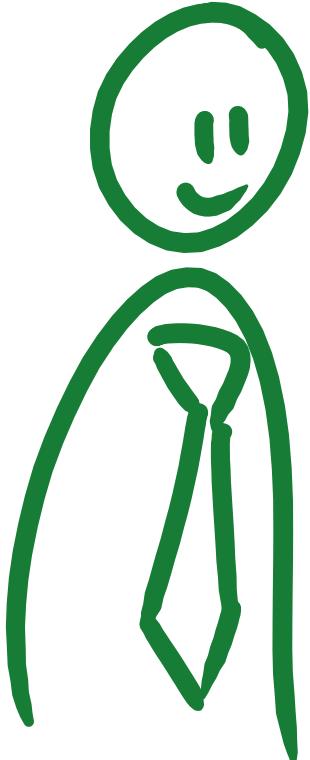




Given I am a VIP customer

Given I have 5 books in my basket

When I check the delivery options

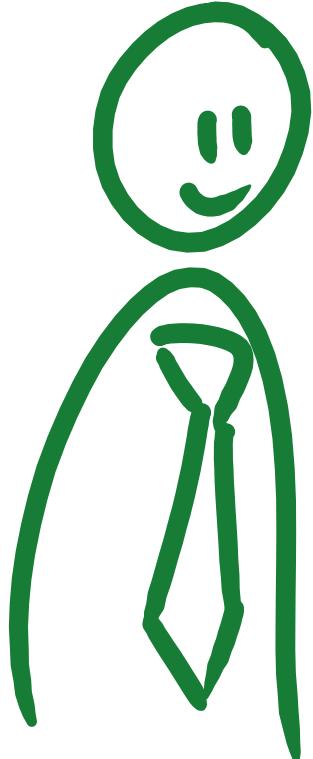


Given I am a VIP customer

Given I have 5 books in my basket

When I check the delivery options

Then delivery should be free



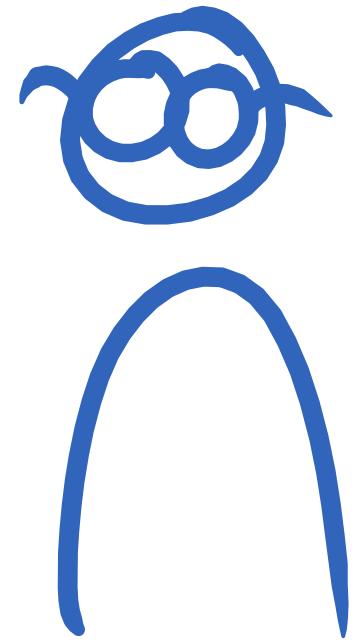
Given I am a VIP customer

Given I have 5 books in my basket

When I check the delivery options

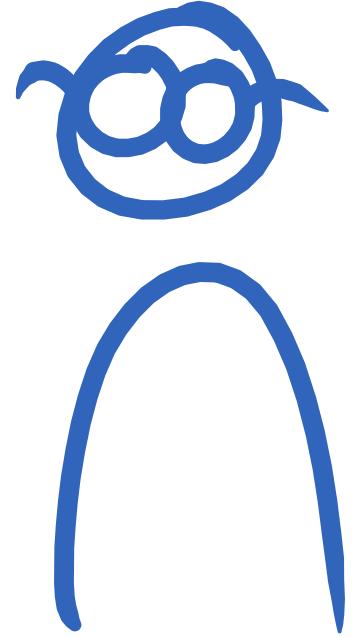
Then delivery should be free

Domain language ↗



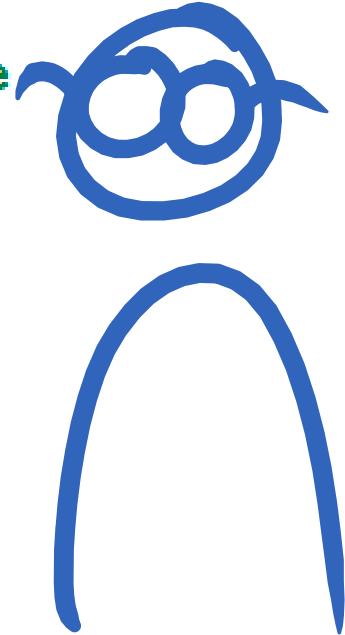
Code,
please

```
class FreeDeliveryToVipCustomers extends TestCase
```



Code,
please

```
class FreeDeliveryToVipCustomers extends TestCase {  
  
    function story() {  
        return "In order to create incentives to become  
        a VIP customer, I want to provide free  
        delivery for VIPs";  
    }  
  
}
```



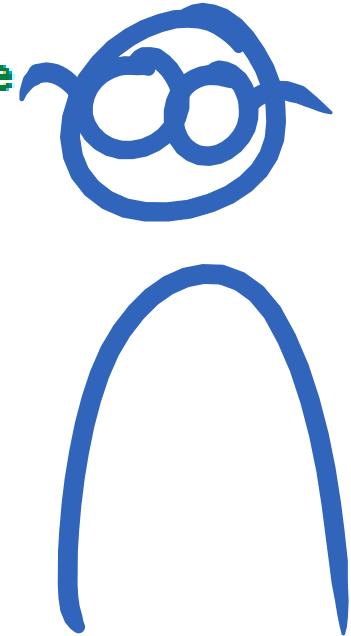
Code,
please

```
class FreeDeliveryToVipCustomers extends TestCase {
```

```
    function story() {
```

```
        return "In order to create incentives to become  
a VIP customer, I want to provide free  
delivery for VIPs";
```

```
}
```



Code,
please

```
class FreeDeliveryToVipCustomers extends TestCase {
```

```
    function story() {
```

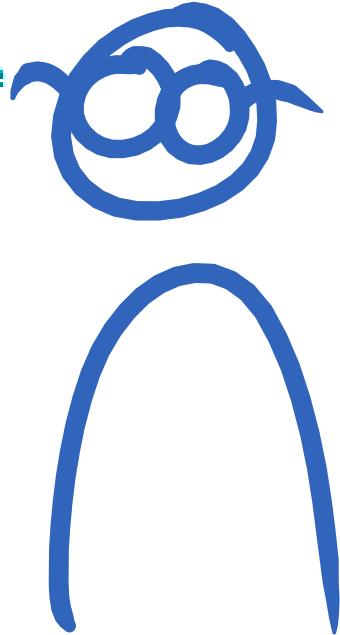
```
        return "In order to create incentives to become  
        a VIP customer, I want to provide free  
        delivery for VIPs";
```

```
}
```

```
    function scenarioVipWithFiveBooks() {
```

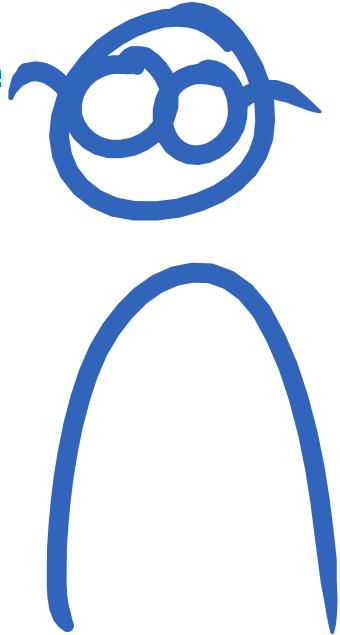
```
}
```

```
}
```



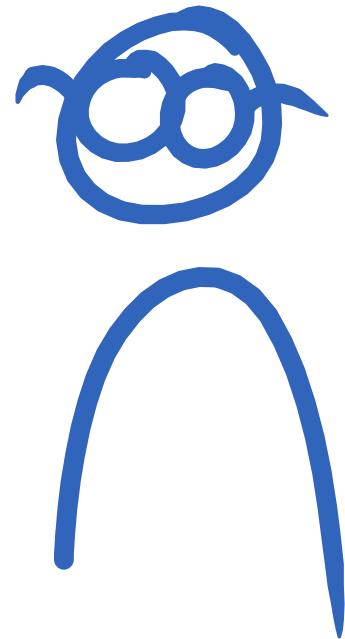
*Code,
please*

```
class FreeDeliveryToVipCustomers extends TestCase {  
  
    function story() {  
        return "In order to create incentives to become  
        a VIP customer, I want to provide free  
        delivery for VIPs";  
    }  
  
    function scenarioVipWithFiveBooks() {  
        $this->givenIAmAVipCustomer();  
        $this->givenIHave_BooksInMyBasket(5);  
  
        $this->whenICheckMyDeliveryOptions();  
  
        $this->thenTheDeliveryShouldBeFree();  
    }  
}
```

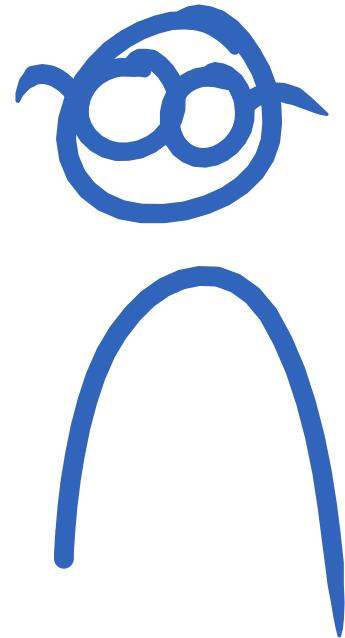


Code,
please

```
function givenIAmAVipCustomer() {  
}  
  
function givenIHave_BooksInMyBasket($number) {  
}  
  
}  
  
function whenICheckMyDeliveryOptions() {  
}  
  
}  
  
function thenTheDeliveryShouldBeFree() {  
}
```



```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}  
  
function givenIHave_BooksInMyBasket($number) {  
}  
  
}  
  
function whenICheckMyDeliveryOptions() {  
}  
  
}  
  
function thenTheDeliveryShouldBeFree() {  
}
```

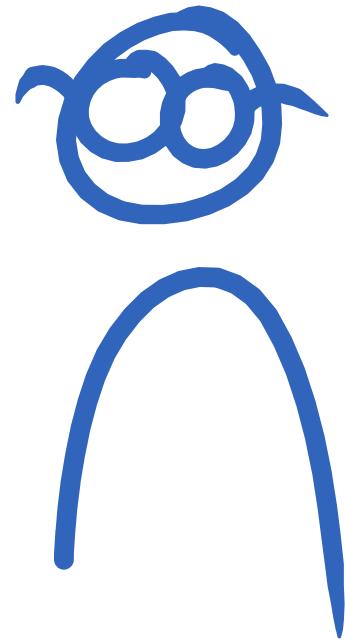


```
function givenIAmAVipCustomer() {
    $this->customer = new Customer();
    $this->customer->setVip(true);
}

function givenIHave_BooksInMyBasket($number) {
    $this->basket = new Basket();
    for ($i=0; $i<$number; $i++) {
        $this->basket->getItems()->put(new Book());
    }
}

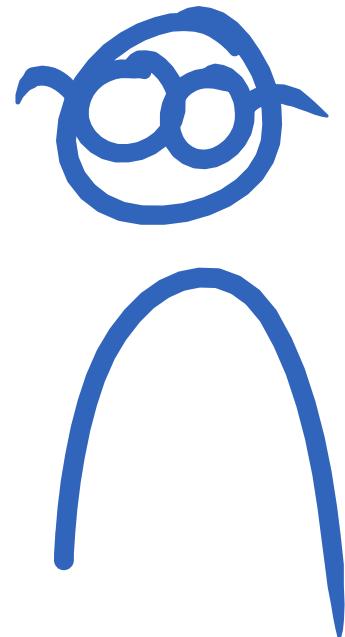
function whenICheckMyDeliveryOptions() {
}

function thenTheDeliveryShouldBeFree() {
```



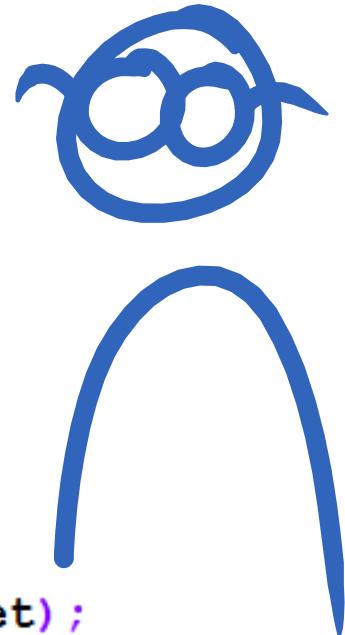
```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}  
  
function givenIHave_BooksInMyBasket($number) {  
    $this->basket = new Basket();  
    for ($i=0; $i<$number; $i++) {  
        $this->basket->getItems()->put(new Book());  
    }  
}  
  
function whenICheckMyDeliveryOptions() {  
}  
  
function thenTheDeliveryShouldBeFree() {  
}
```

Fake it



```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}  
  
function givenIHave_BooksInMyBasket($number) {  
    $this->basket = new Basket();  
    for ($i=0; $i<$number; $i++) {  
        $this->basket->getItems()->put(new Book());  
    }  
}  
  
function whenICheckMyDeliveryOptions() {  
    $delivery = new DeliveryManager($this->customer, $this->basket);  
    $this->isFree = $delivery->isDeliveryFree();  
}  
  
function thenTheDeliveryShouldBeFree() {  
}
```

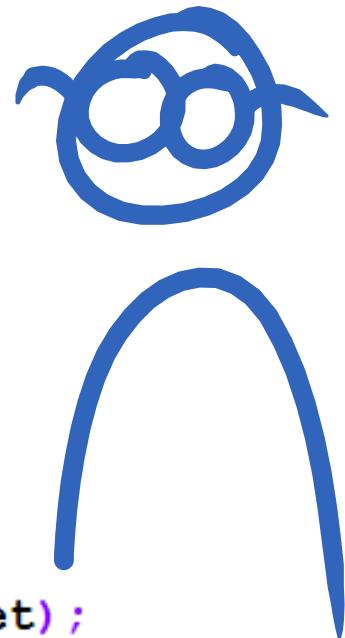
Fake it



```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}  
  
function givenIHave_BooksInMyBasket($number) {  
    $this->basket = new Basket();  
    for ($i=0; $i<$number; $i++) {  
        $this->basket->getItems()->put(new Book());  
    }  
}  
  
function whenICheckMyDeliveryOptions() {  
    $delivery = new DeliveryManager($this->customer, $this->basket);  
    $this->isFree = $delivery->isDeliveryFree();  
}  
  
function thenTheDeliveryShouldBeFree() {  
}
```

Fake it

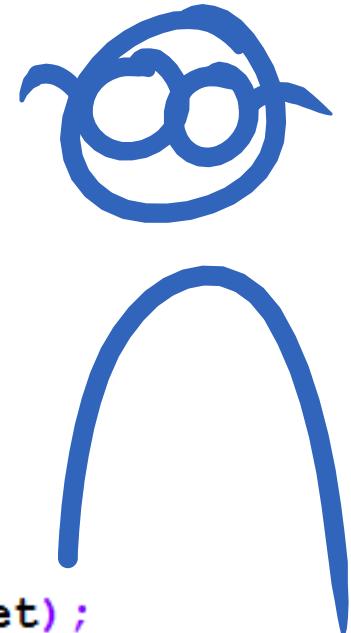
Do it



```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}  
  
function givenIHave_BooksInMyBasket($number) {  
    $this->basket = new Basket();  
    for ($i=0; $i<$number; $i++) {  
        $this->basket->getItems()->put(new Book());  
    }  
}  
  
function whenICheckMyDeliveryOptions() {  
    $delivery = new DeliveryManager($this->customer, $this->basket);  
    $this->isFree = $delivery->isDeliveryFree();  
}  
  
function thenTheDeliveryShouldBeFree() {  
    $this->assertTrue($this->isFree);  
}
```

Fake it

Do it



```
function givenIAmAVipCustomer() {  
    $this->customer = new Customer();  
    $this->customer->setVip(true);  
}
```

Fake it

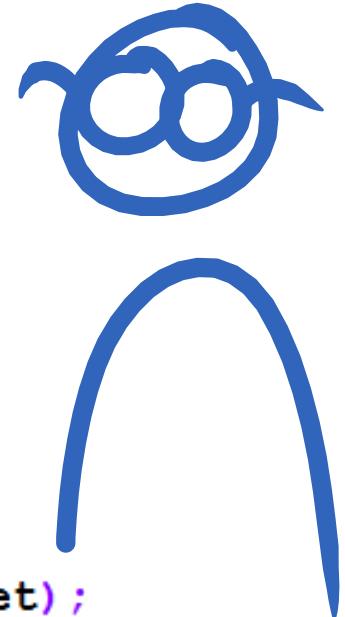
```
function givenIHave_BooksInMyBasket($number) {  
    $this->basket = new Basket();  
    for ($i=0; $i<$number; $i++) {  
        $this->basket->getItems()->put(new Book());  
    }  
}
```

Do it

```
function whenICheckMyDeliveryOptions() {  
    $delivery = new DeliveryManager($this->customer, $this->basket);  
    $this->isFree = $delivery->isDeliveryFree();  
}
```

```
function thenTheDeliveryShouldBeFree() {  
    $this->assertTrue($this->isFree);  
}
```

Check it



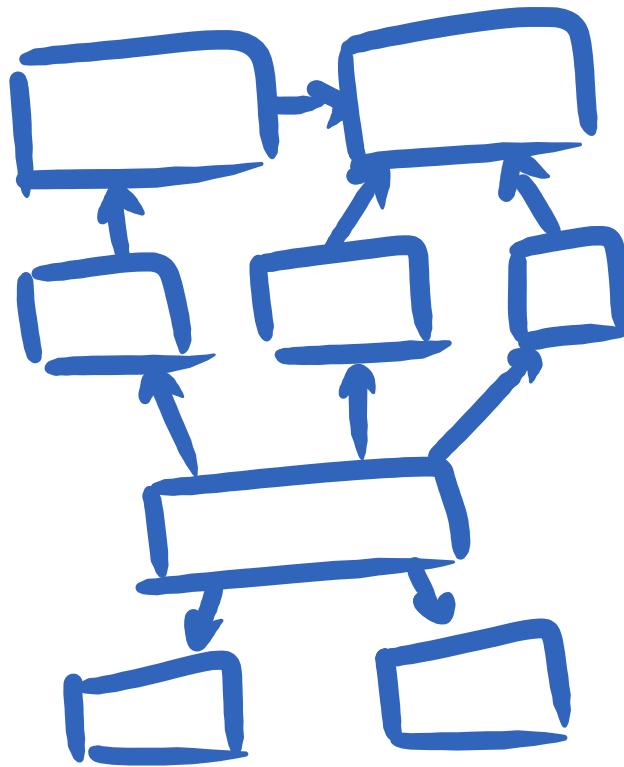


That's All
Folks

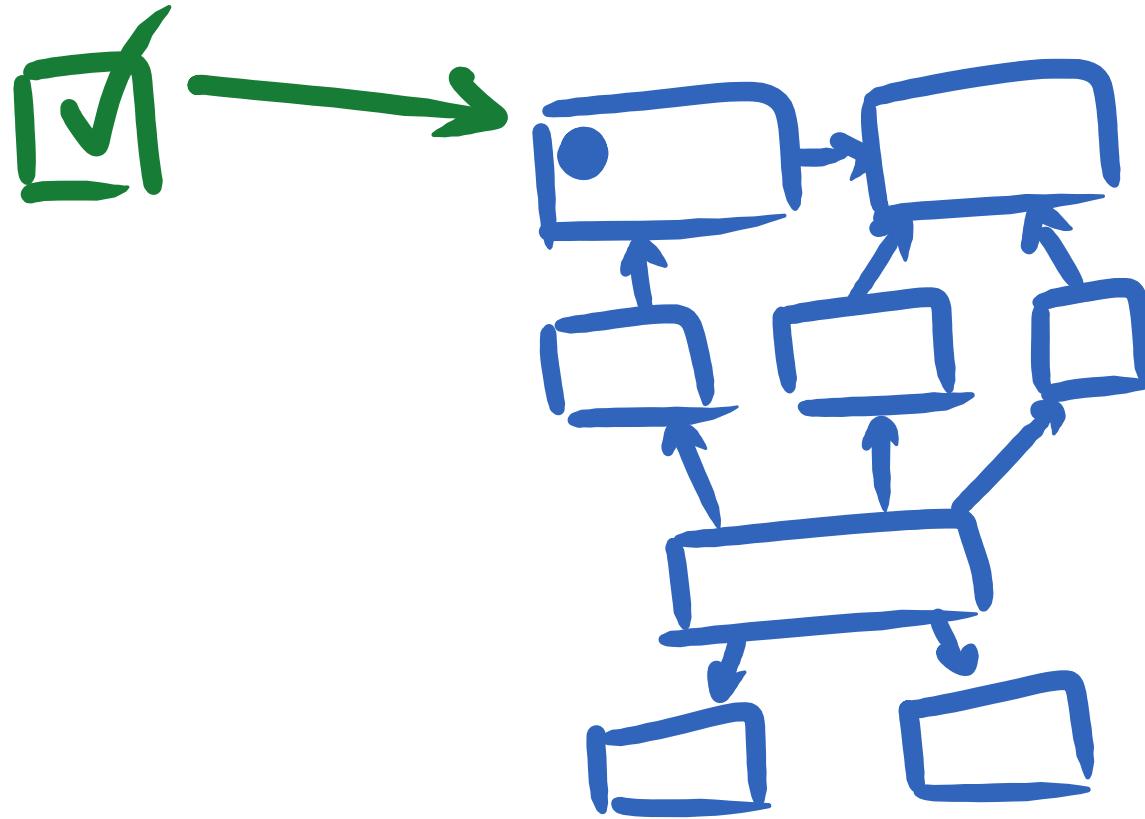
Reality

Scope of the test

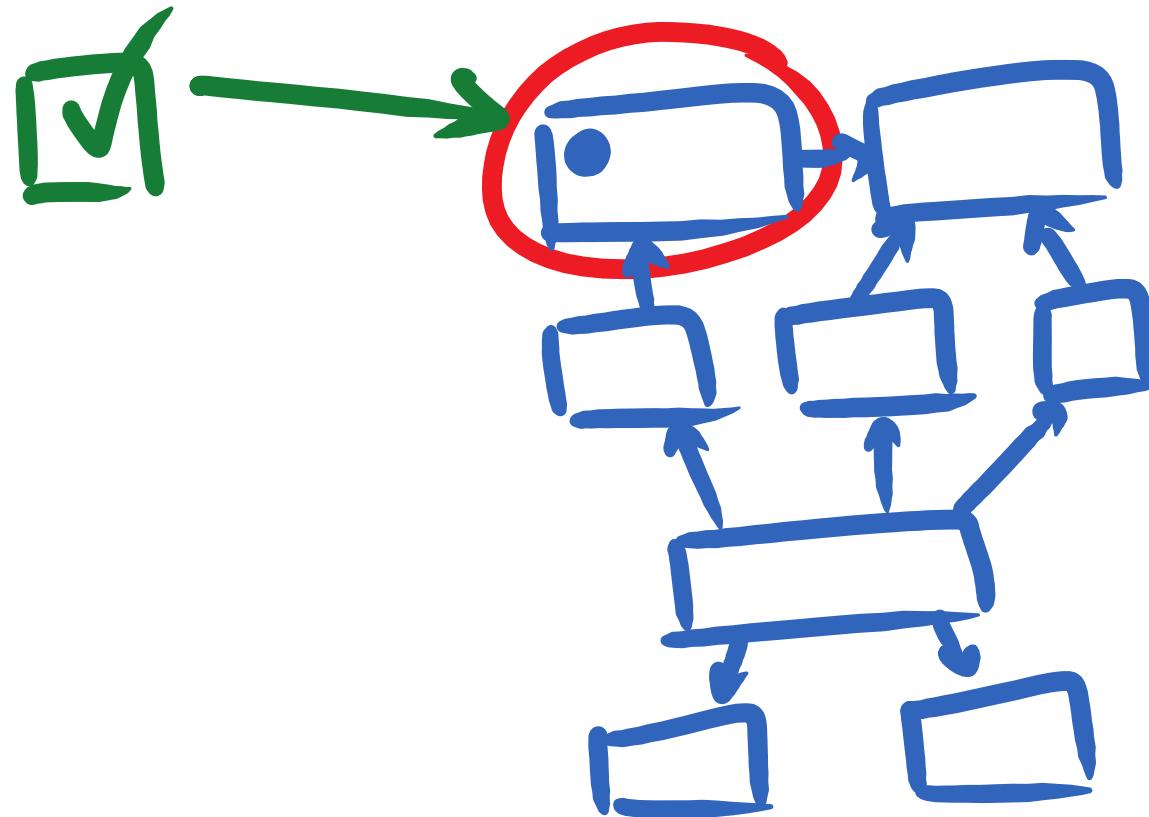
Scope



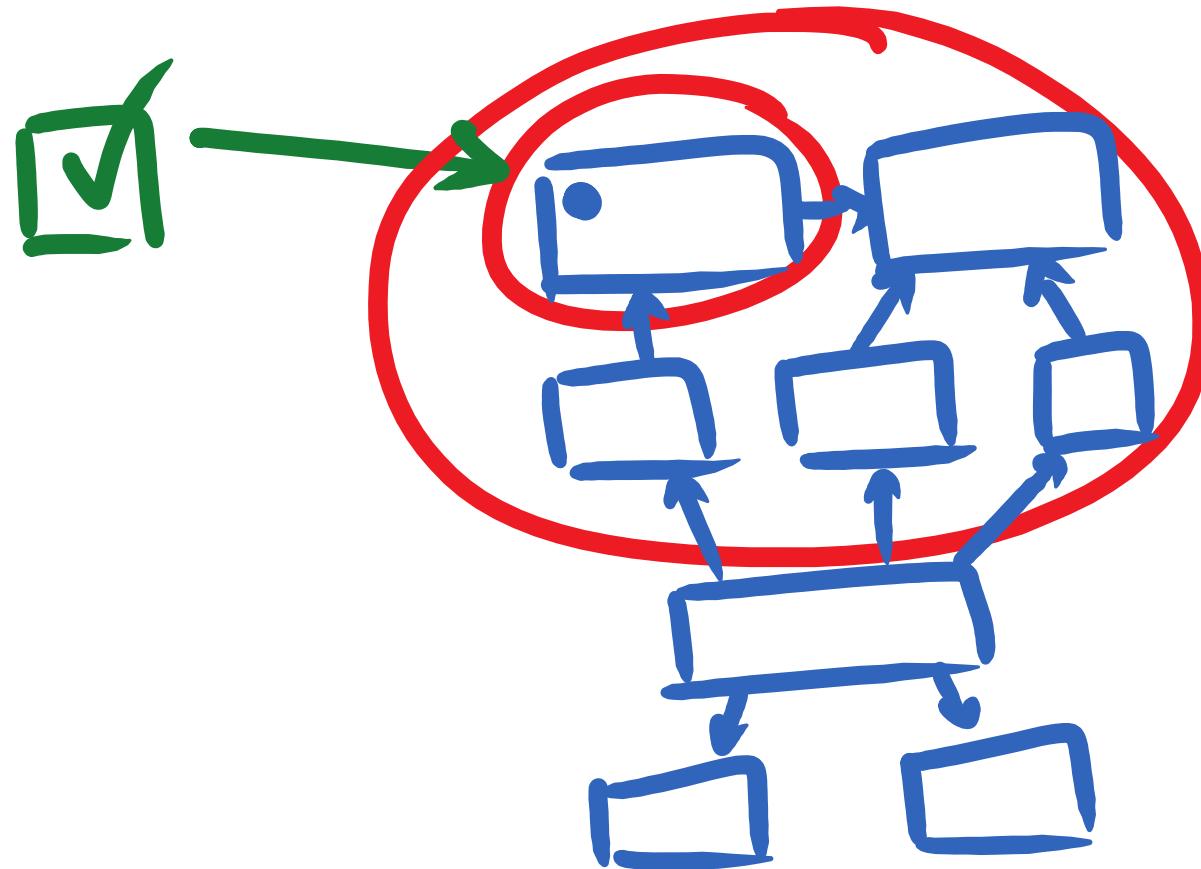
Scope



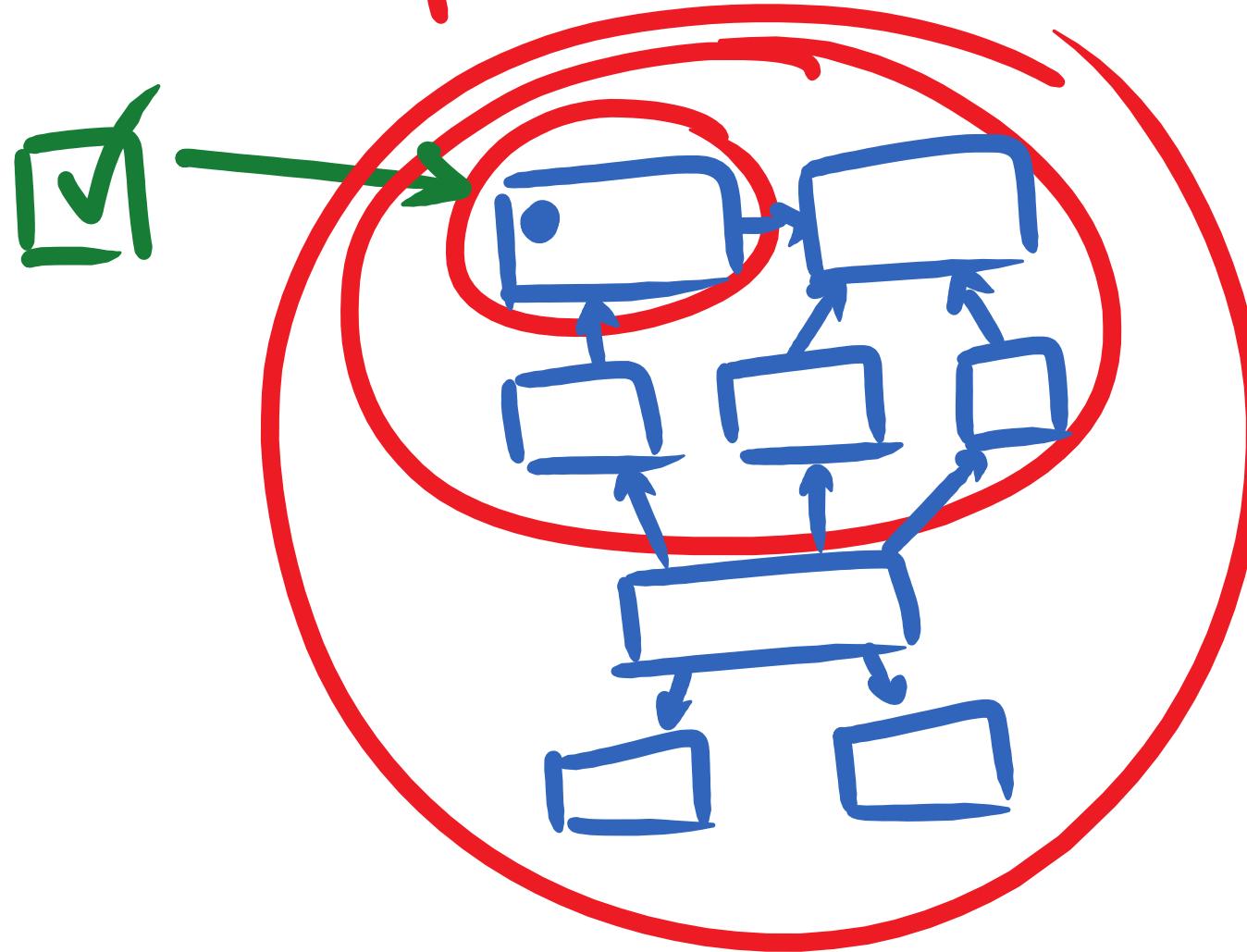
Scope



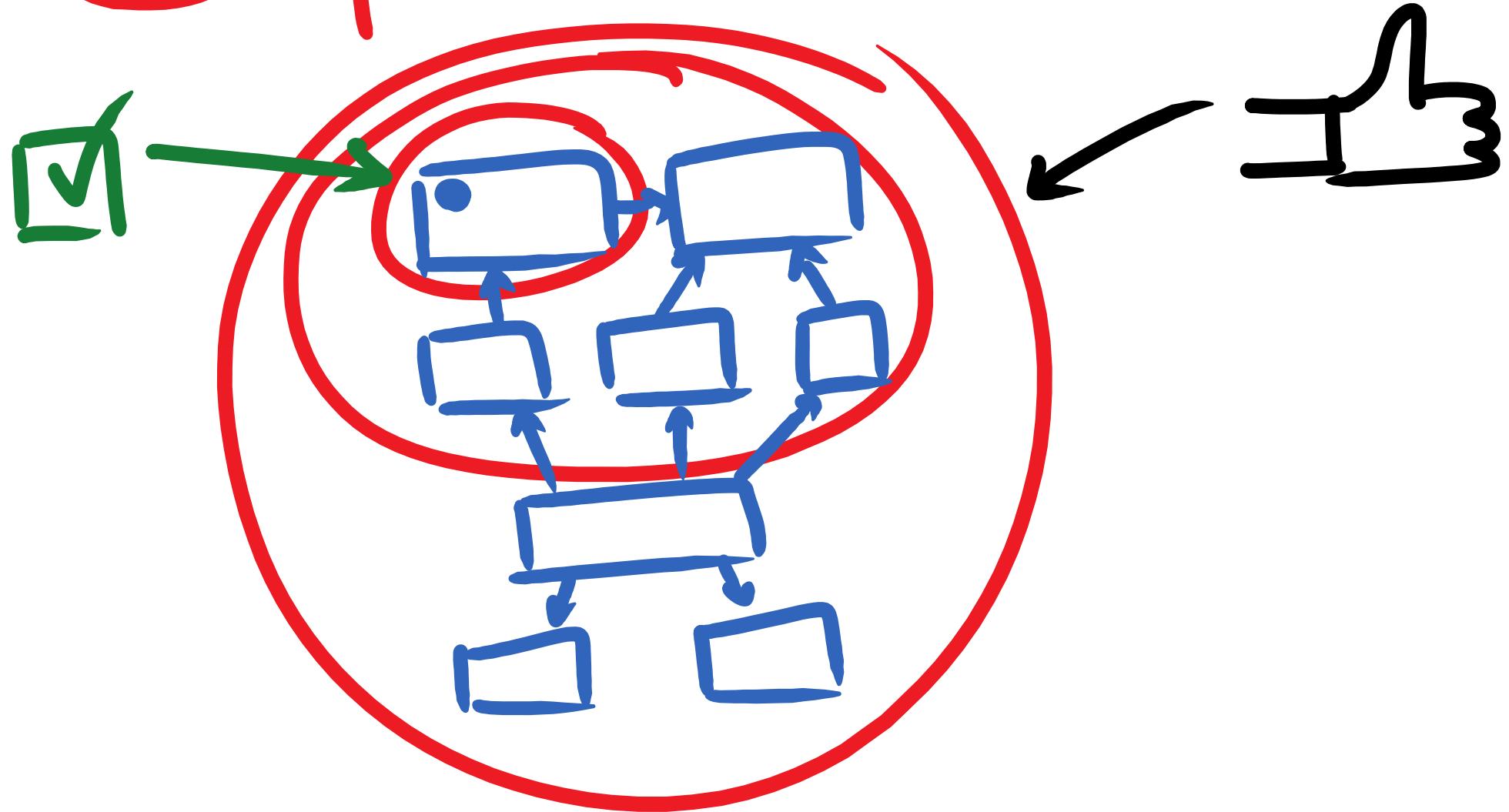
Scope



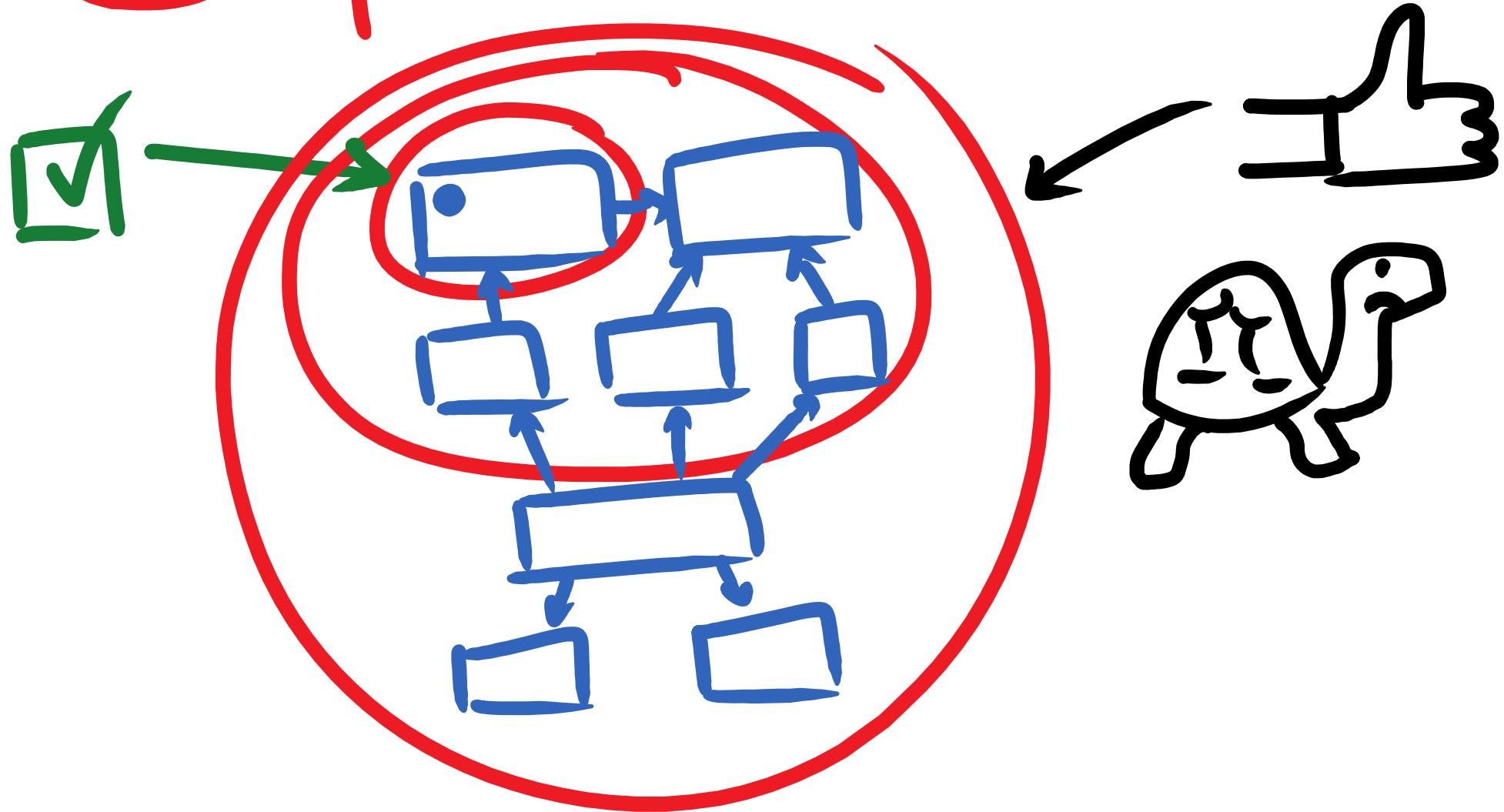
Scope



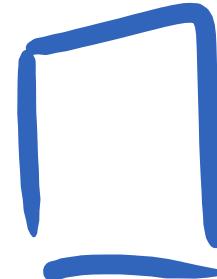
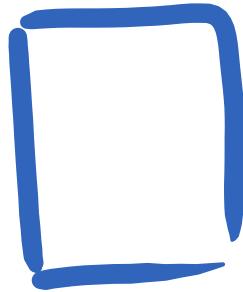
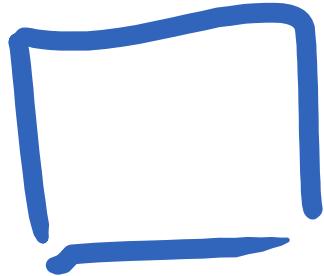
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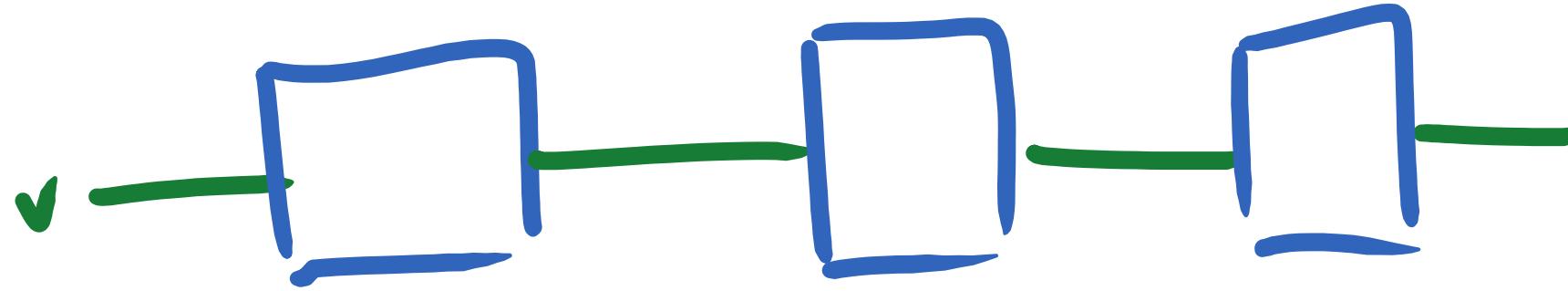
Scope



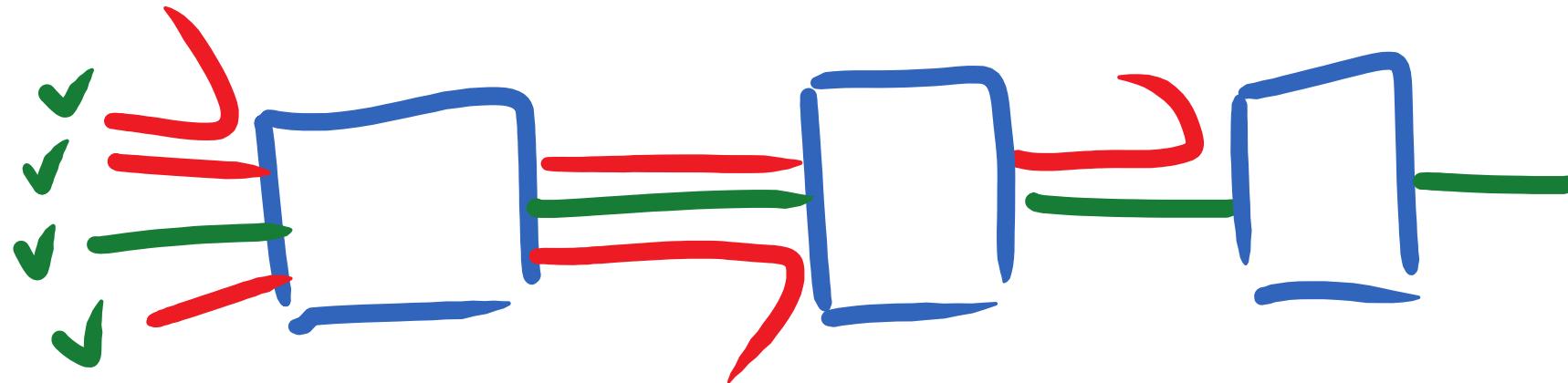
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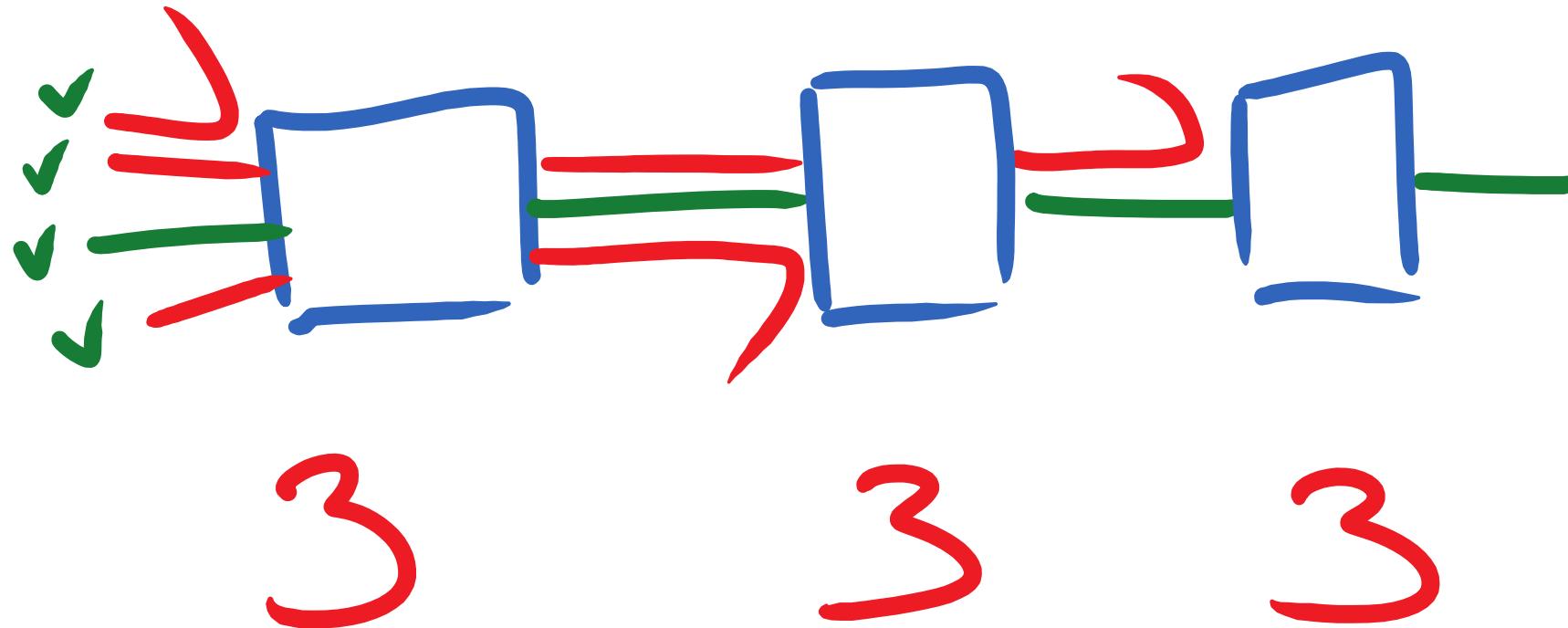
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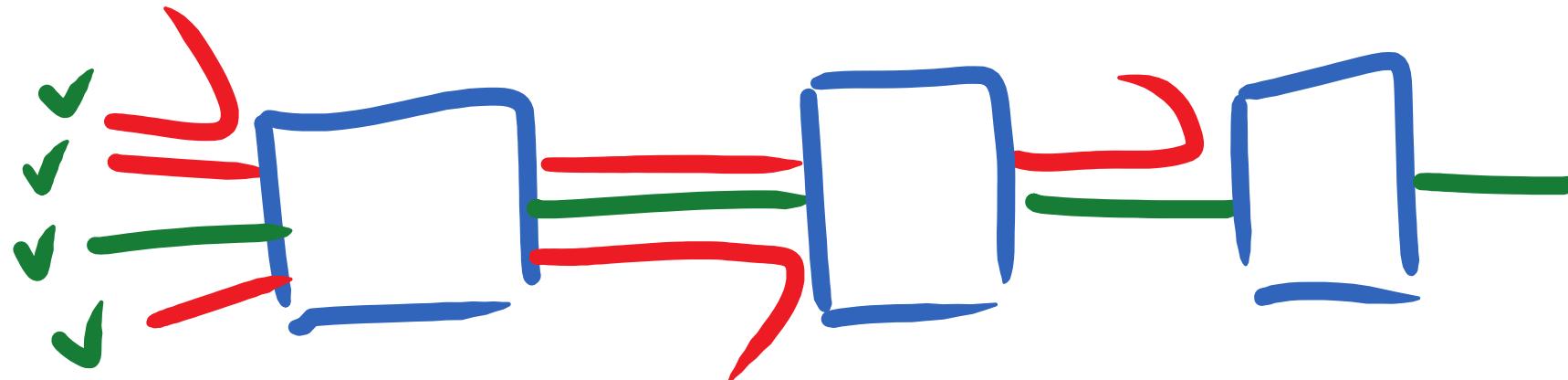
Scope



Scope

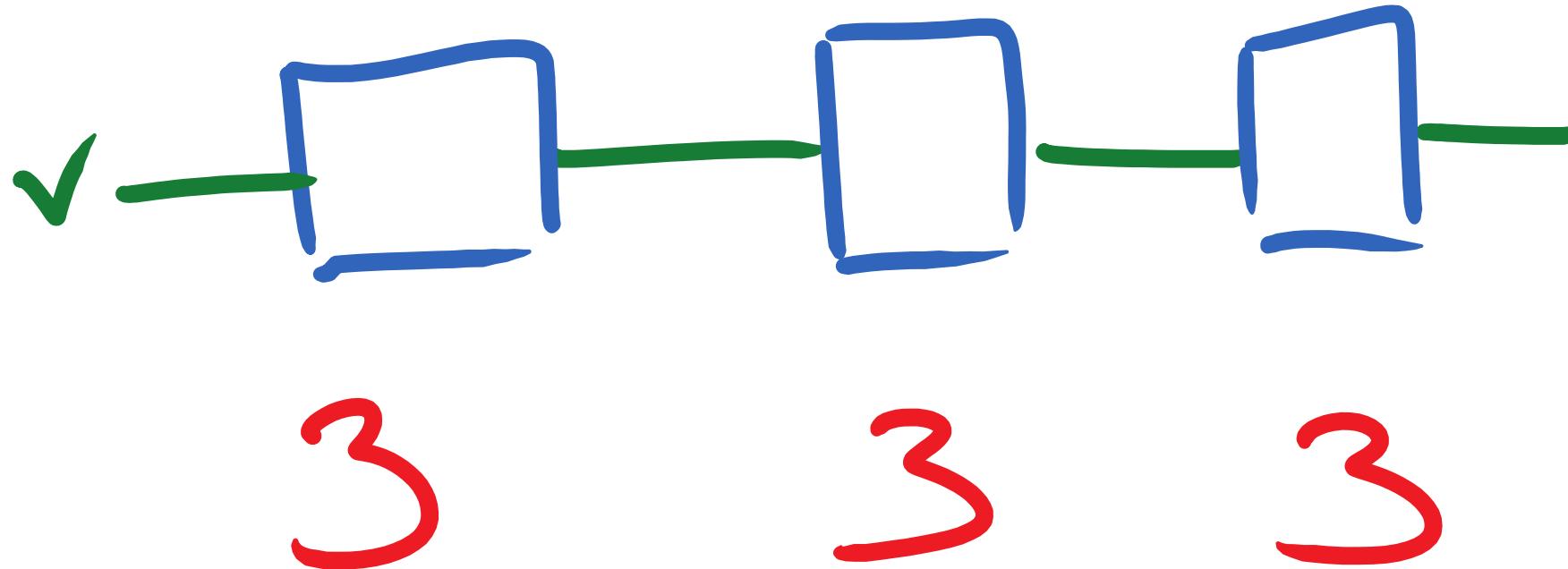


Scope

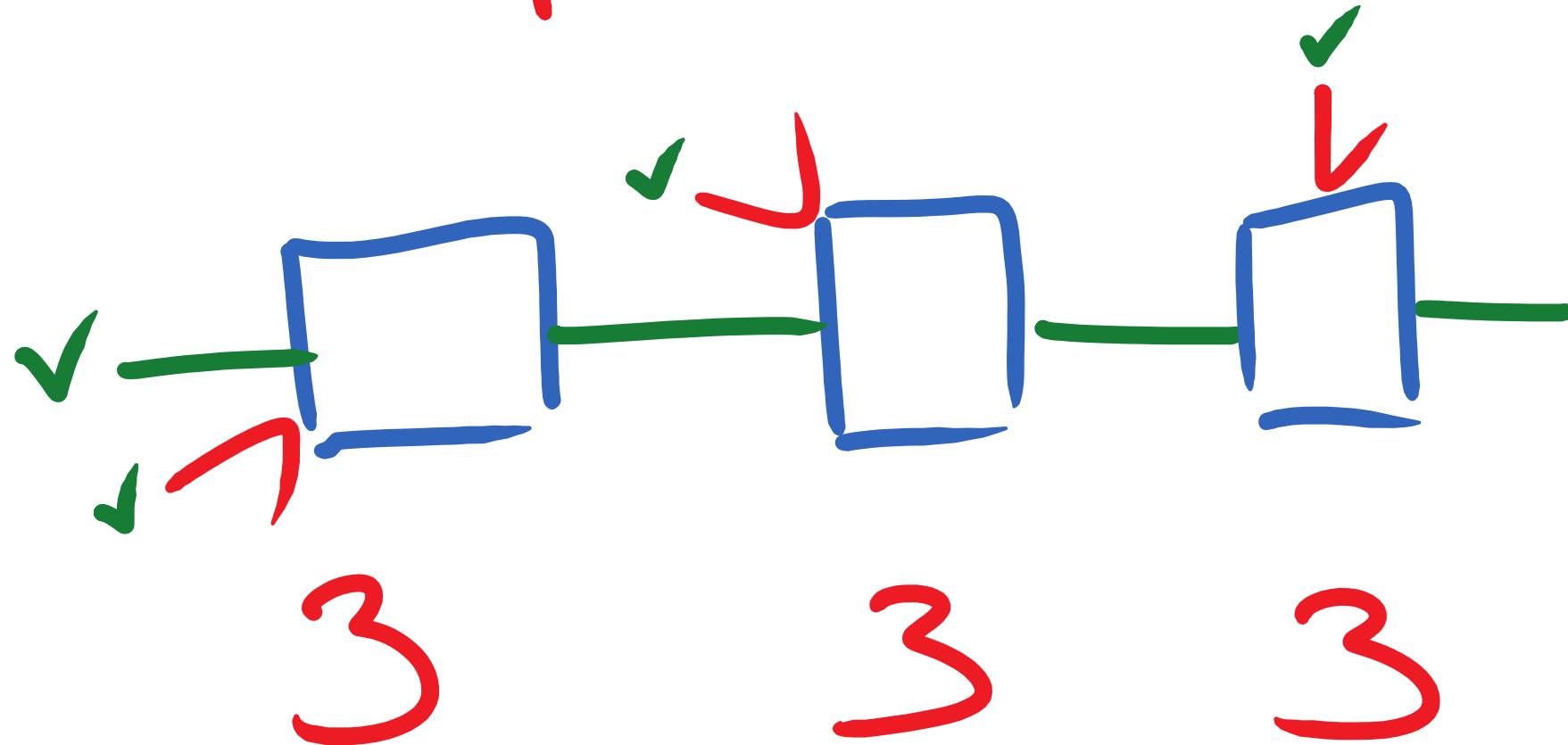


$$3 \times 3 \times 3 = 27$$

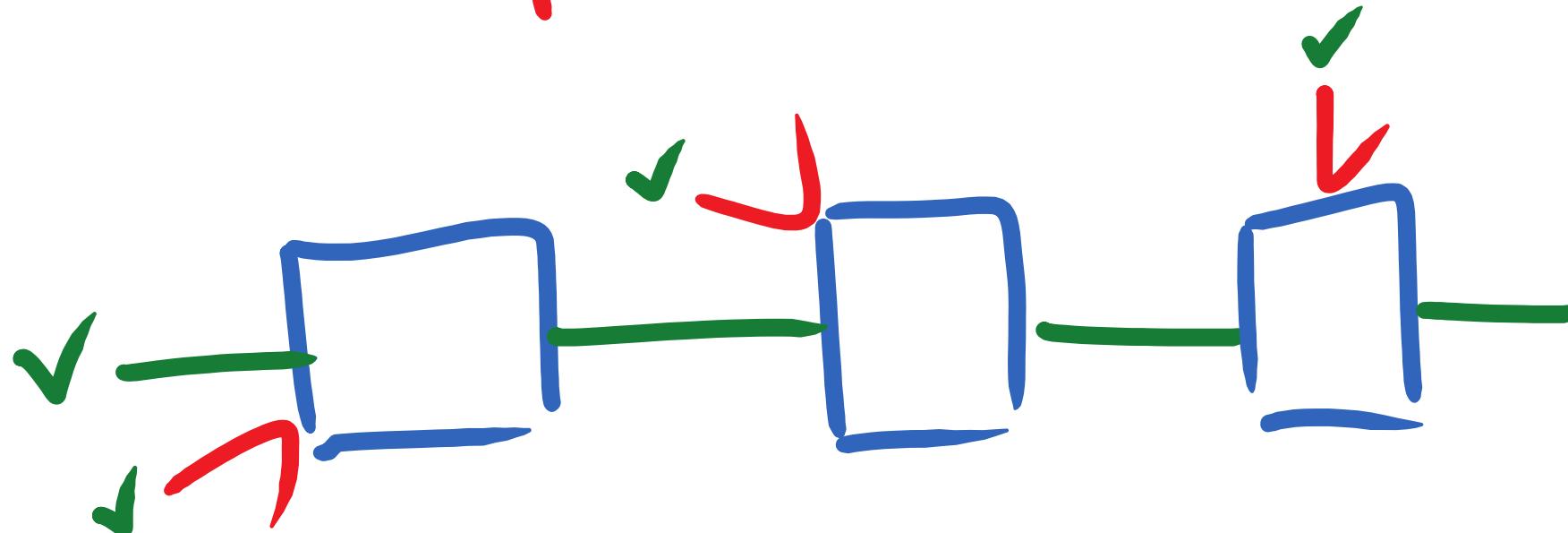
Scope



Scope

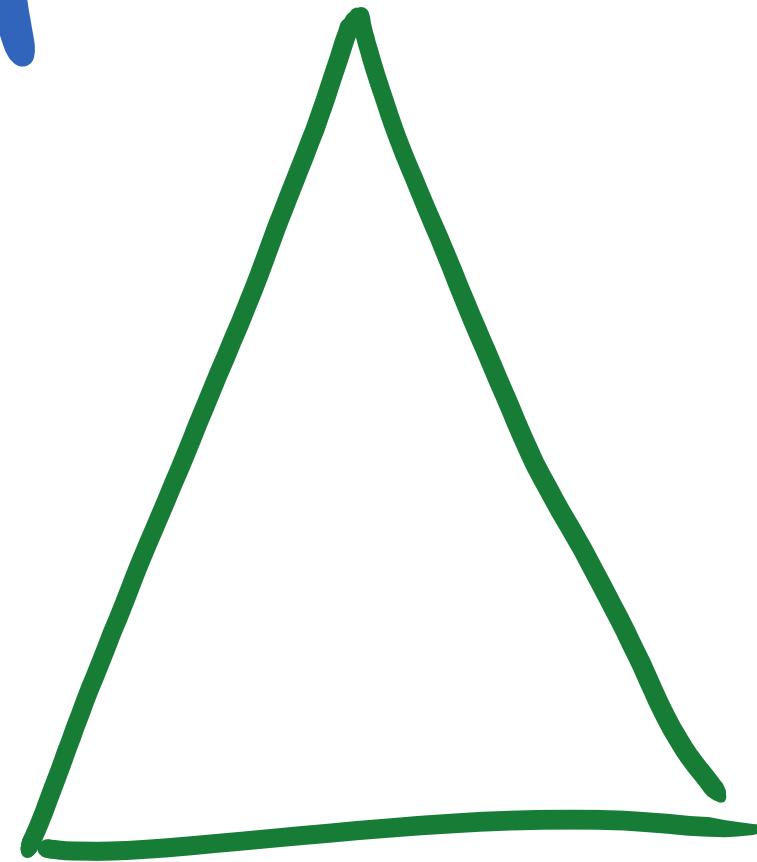


Scope



$$3 + 3 + 3 = \underline{\underline{9}}$$

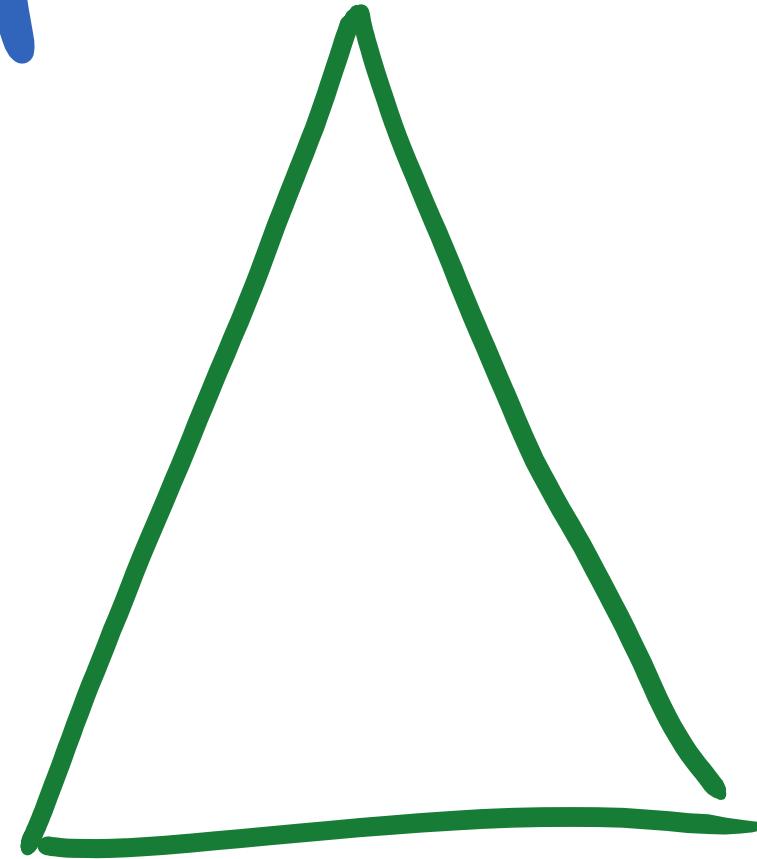
Pyramid



Scope



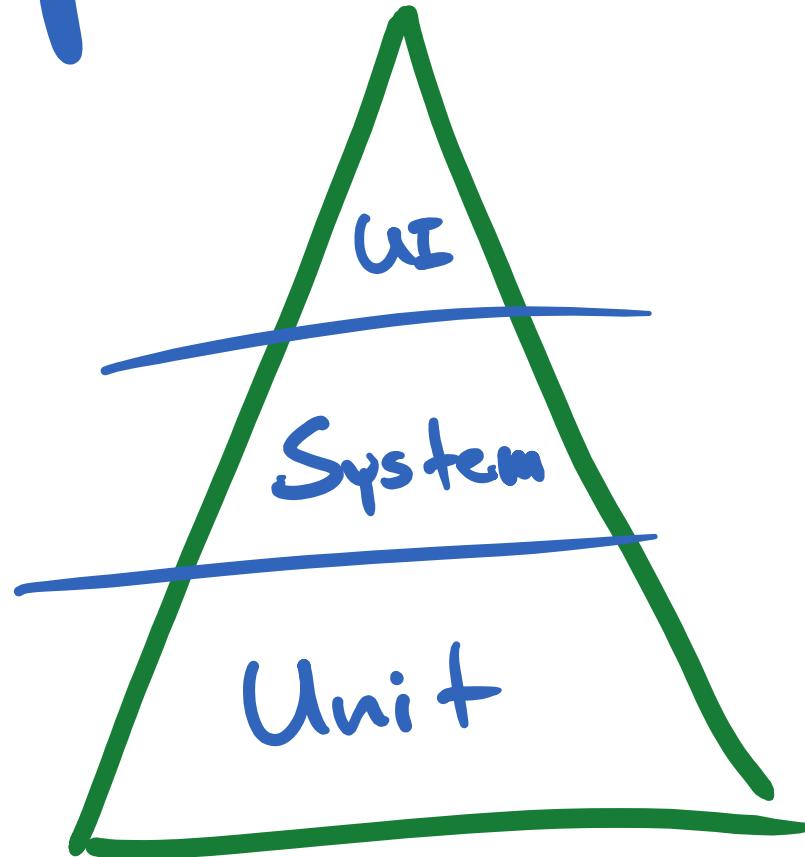
Pyramid



Scope



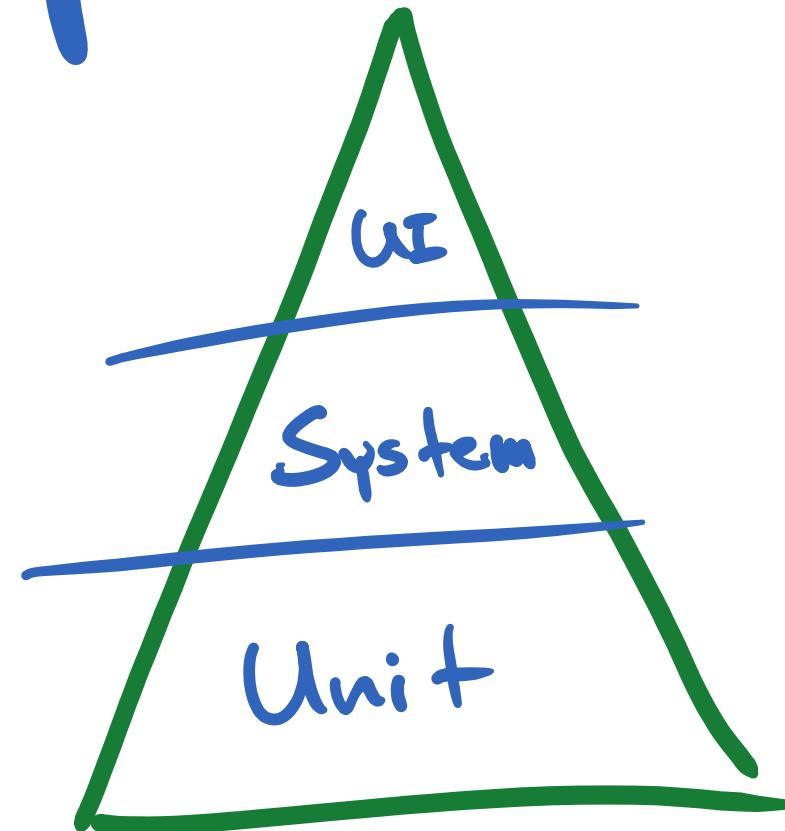
Pyramid



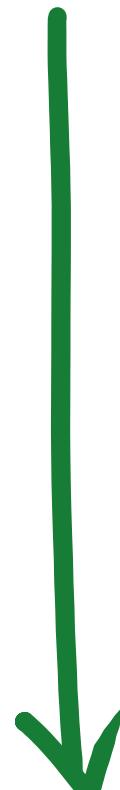
Scope

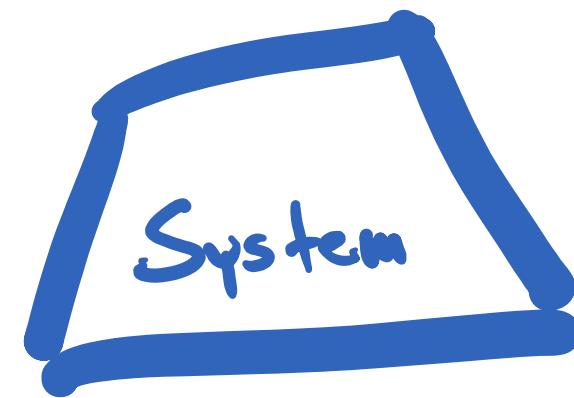


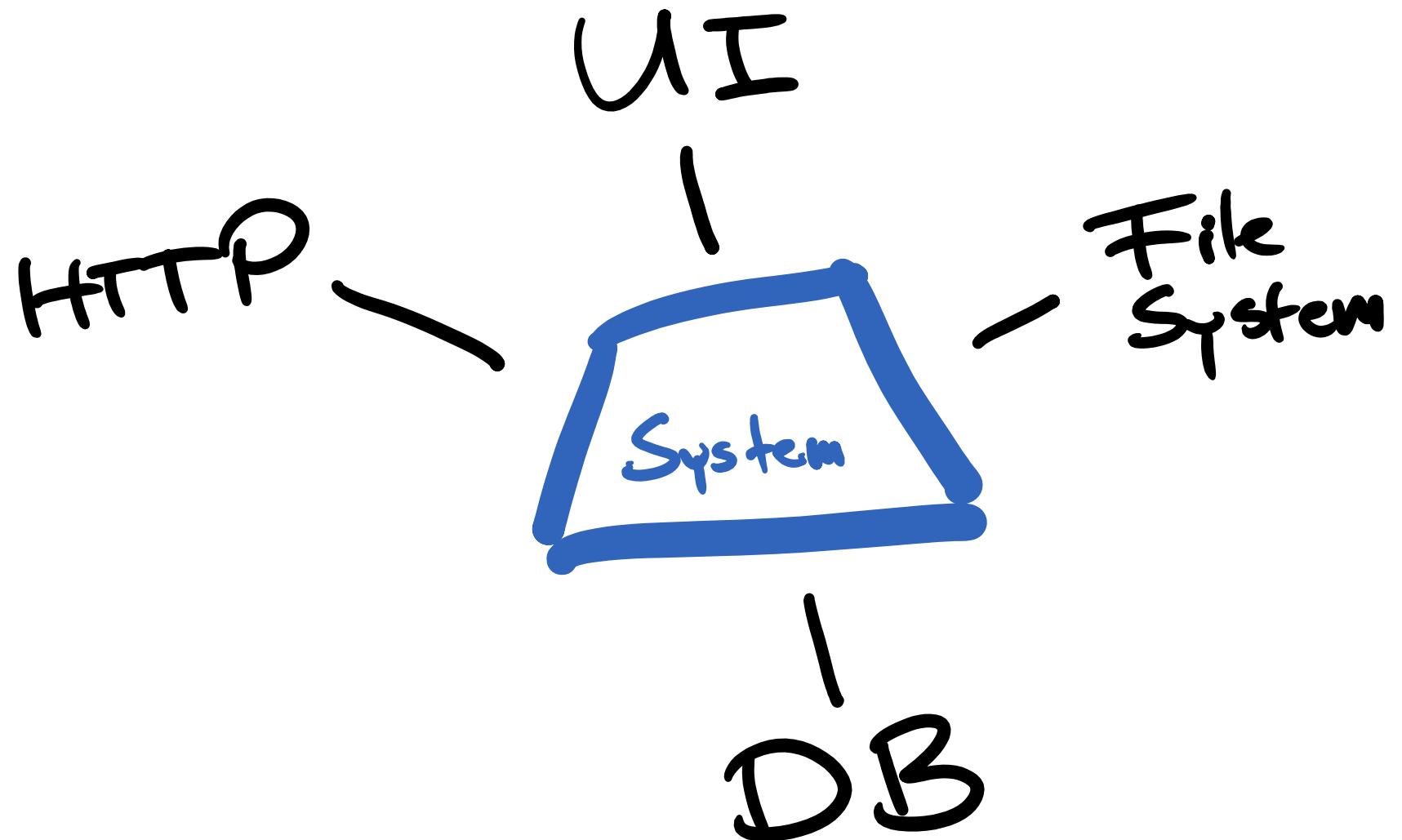
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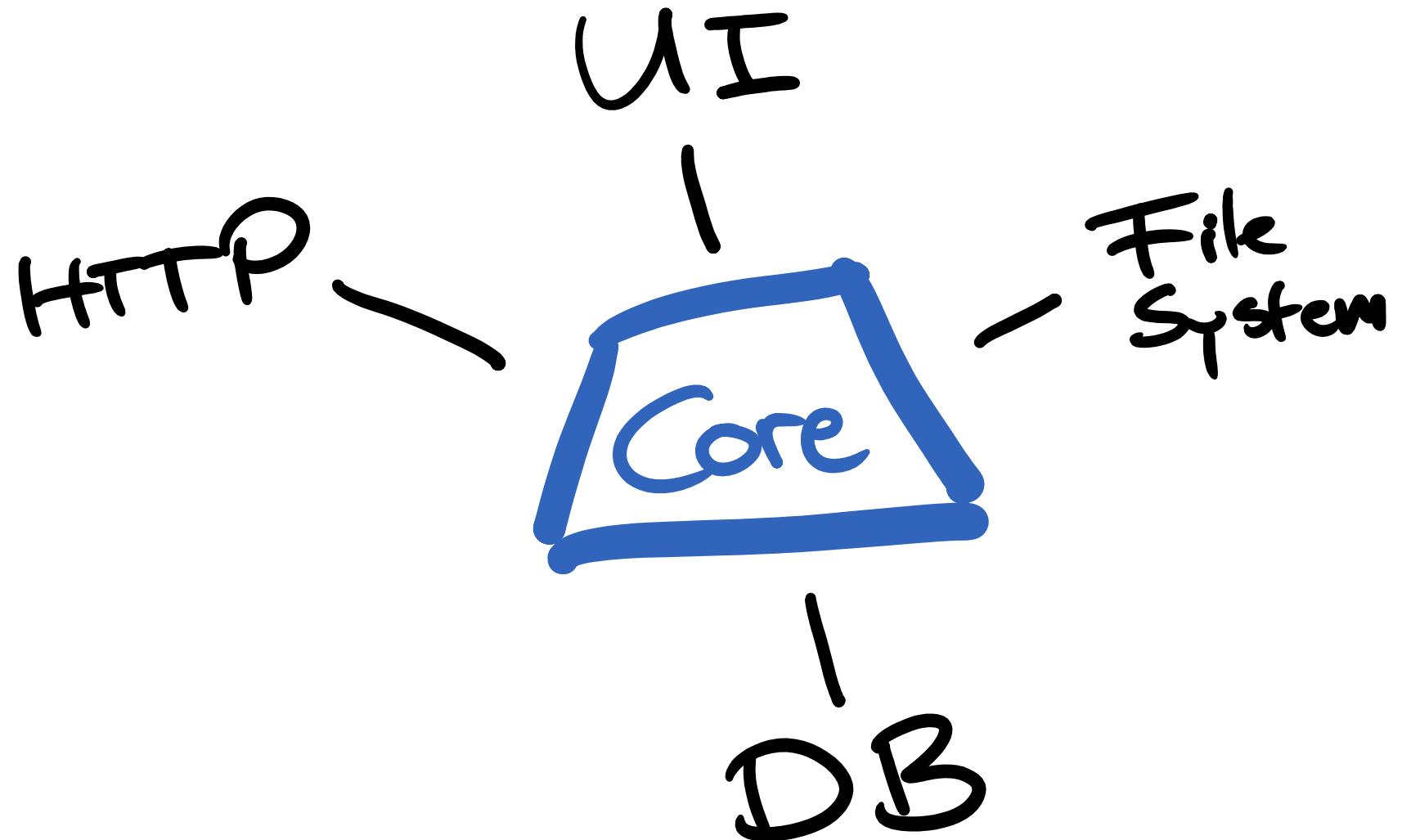


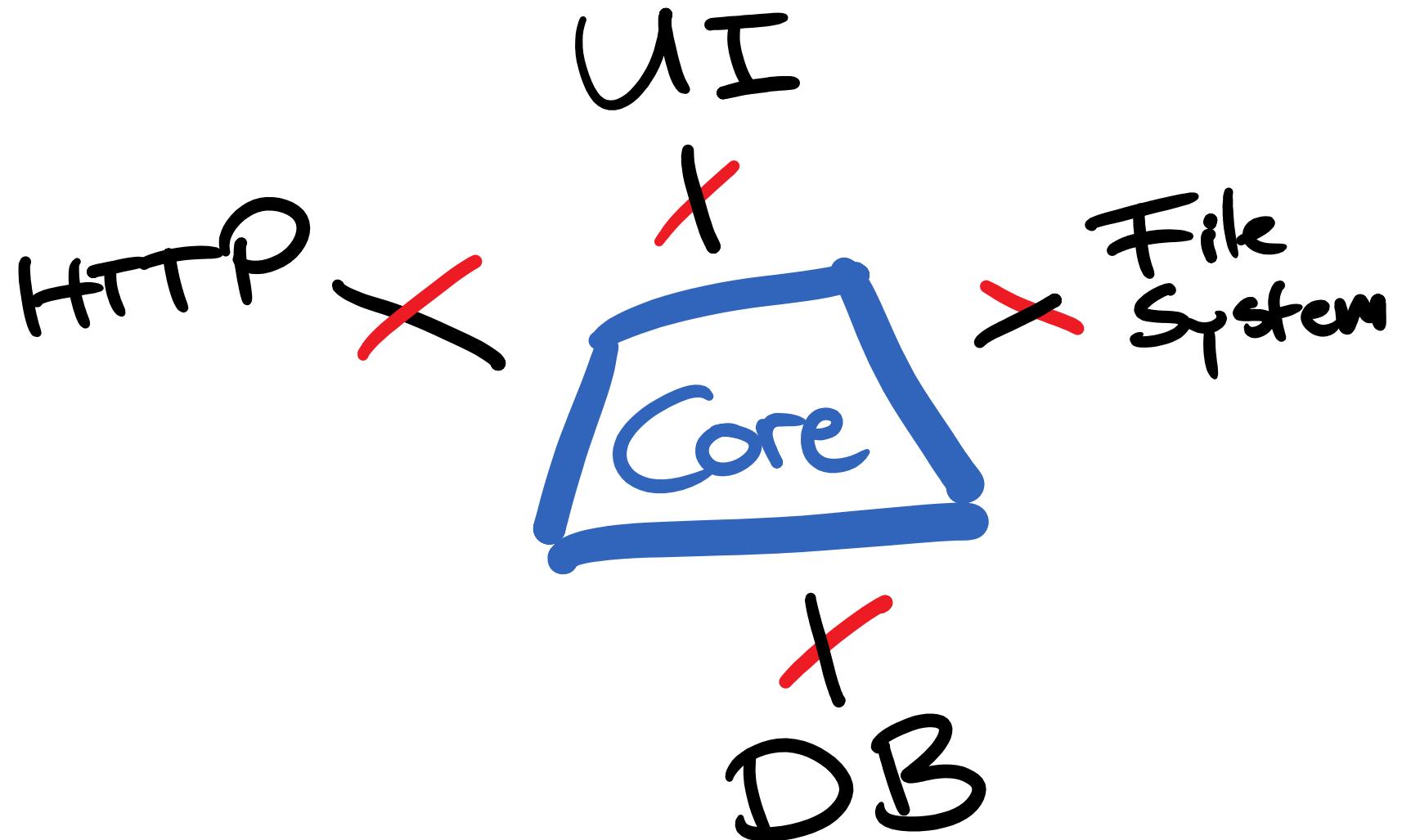
Optimization

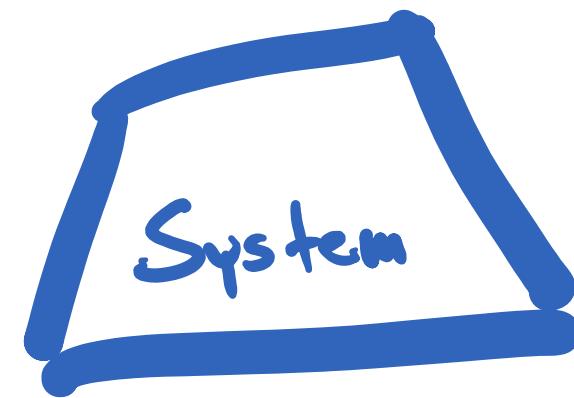


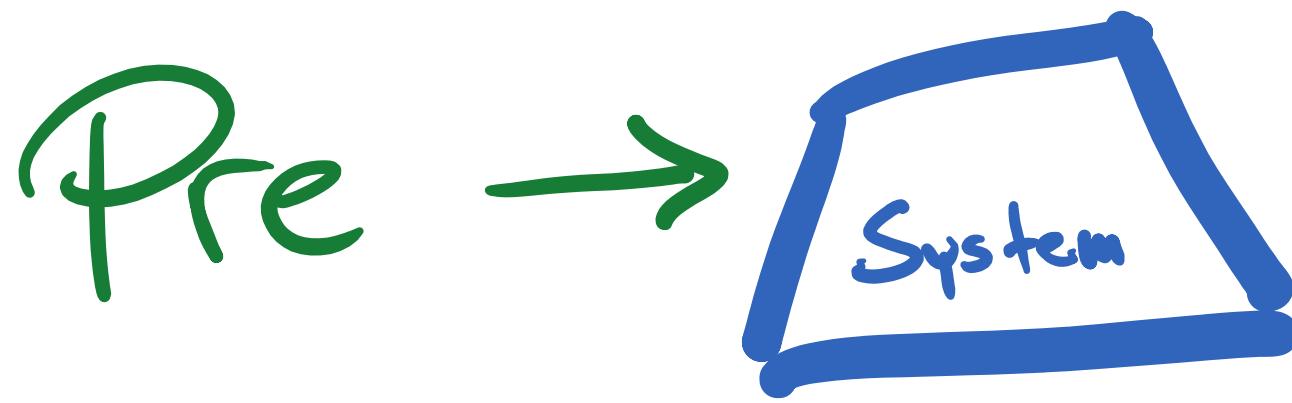


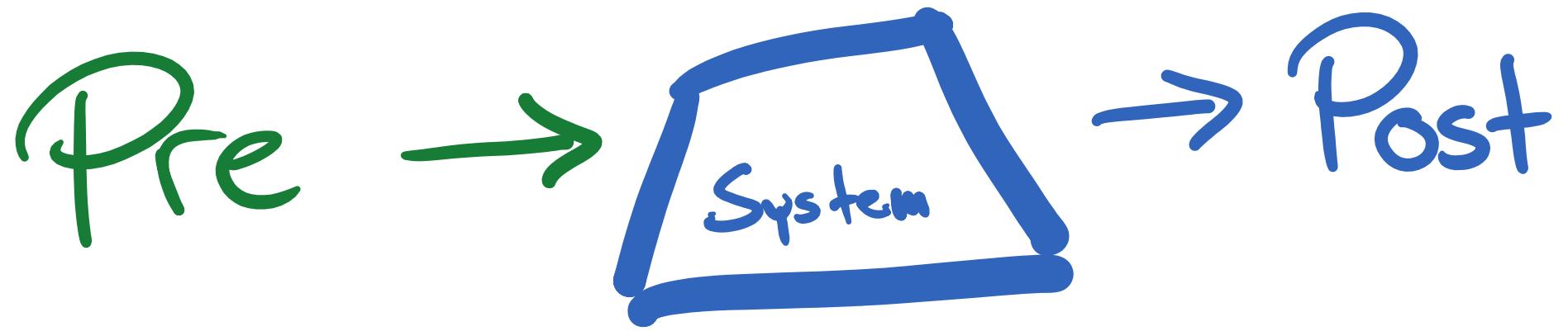




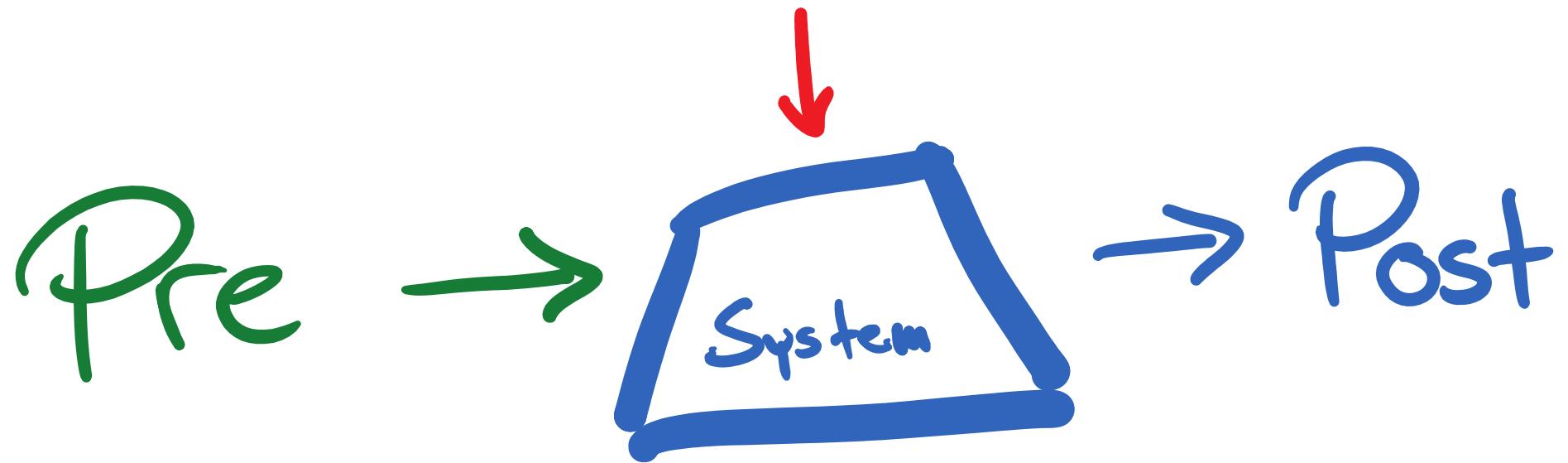








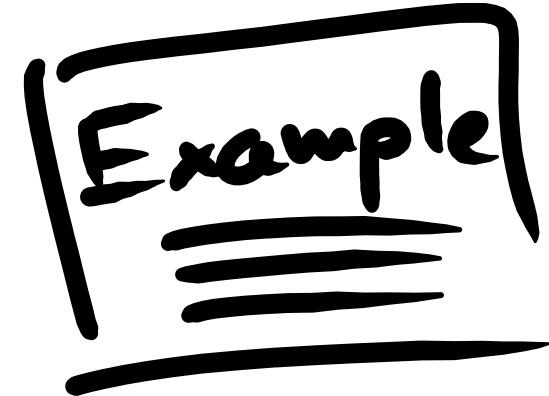
Action



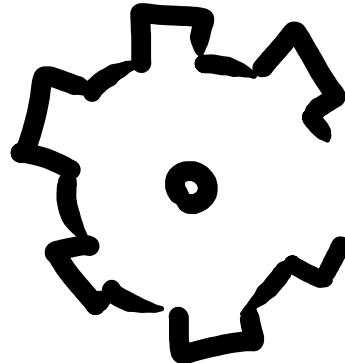
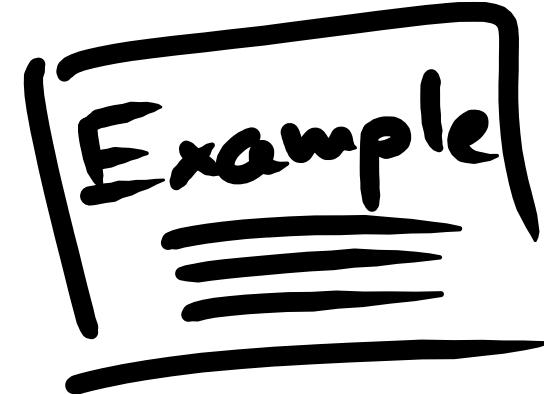
Maintanance



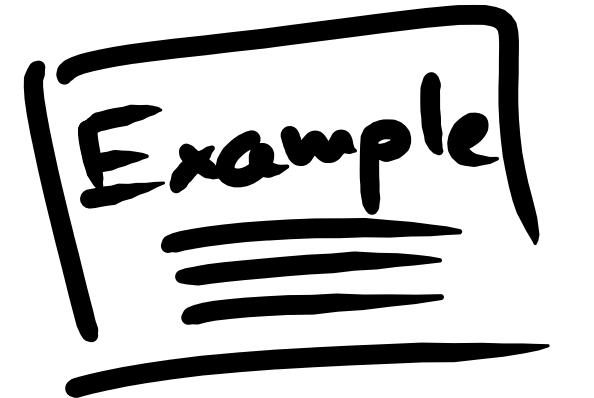
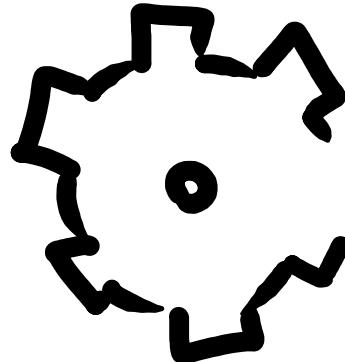
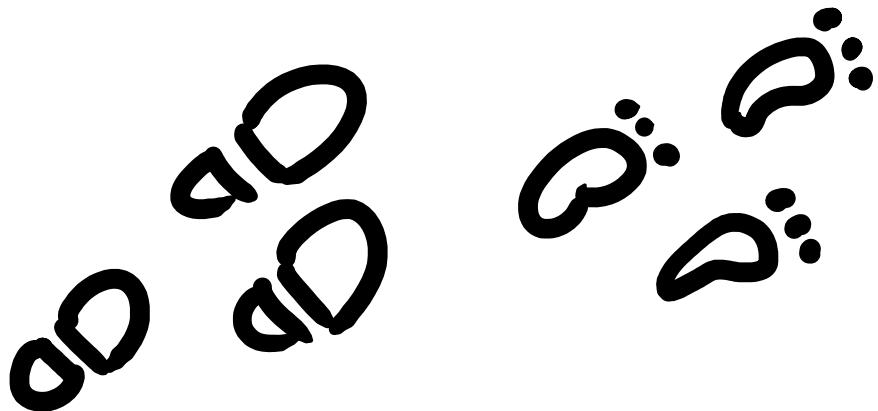
Maintanance



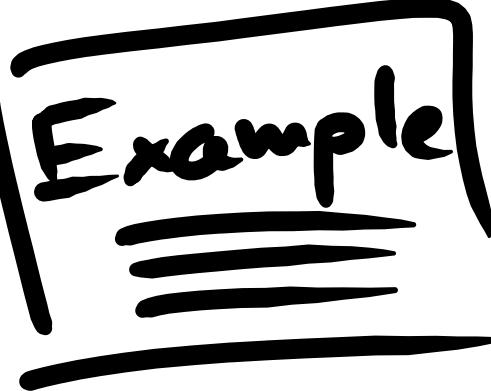
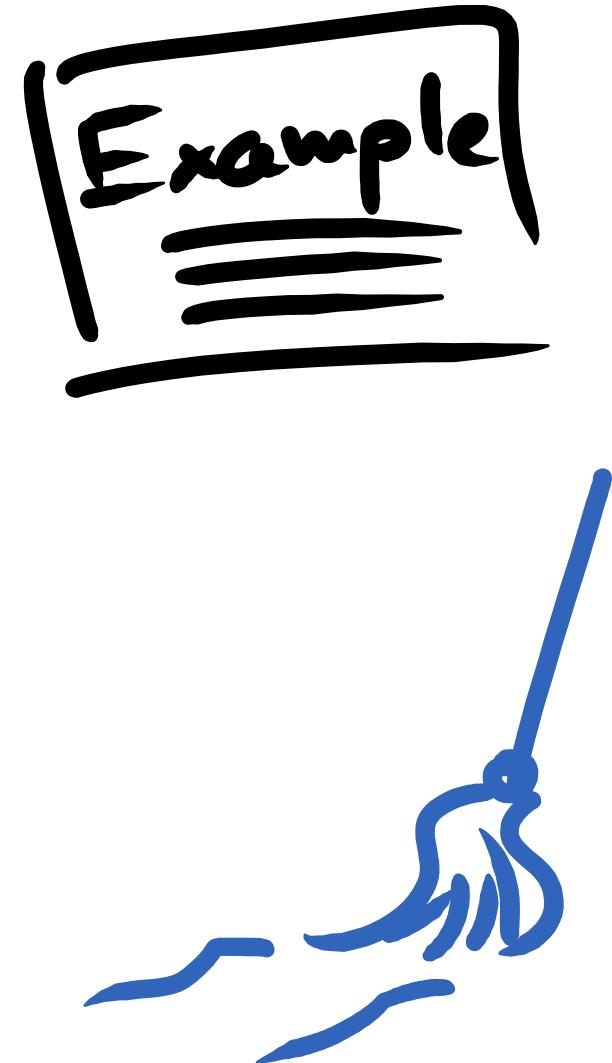
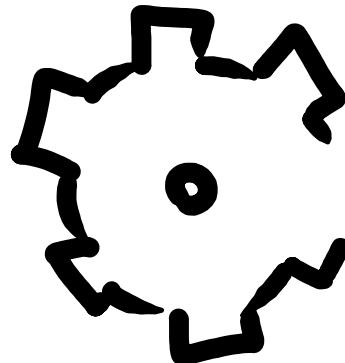
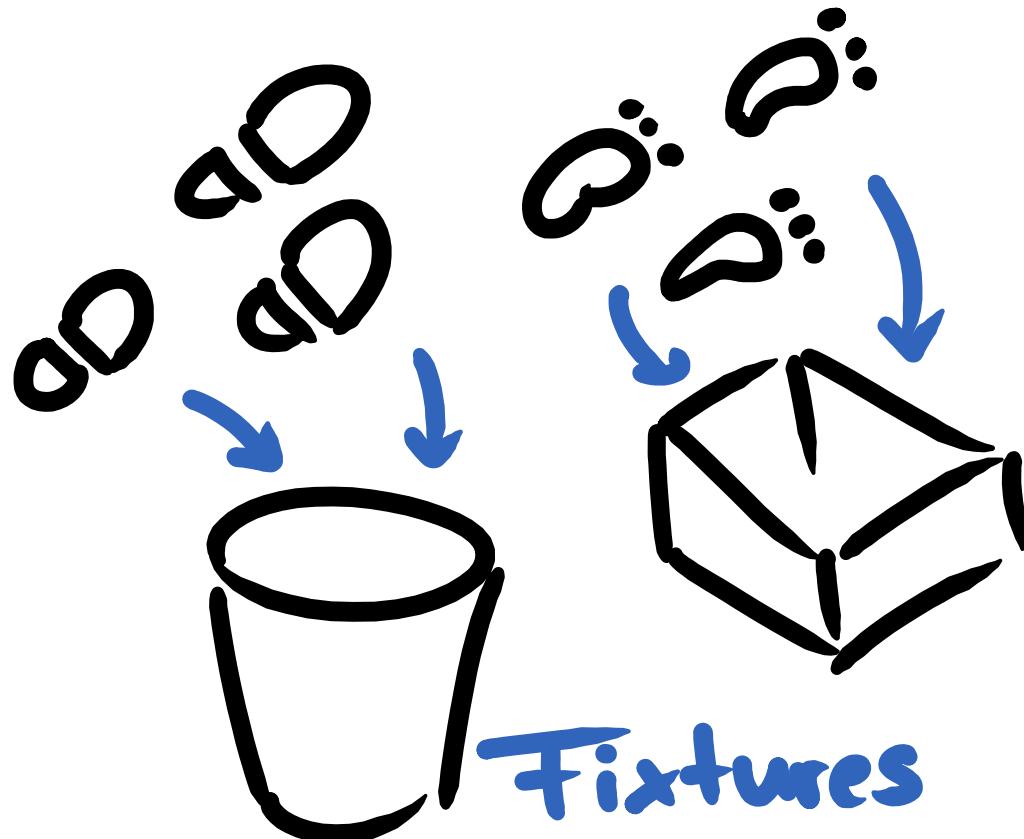
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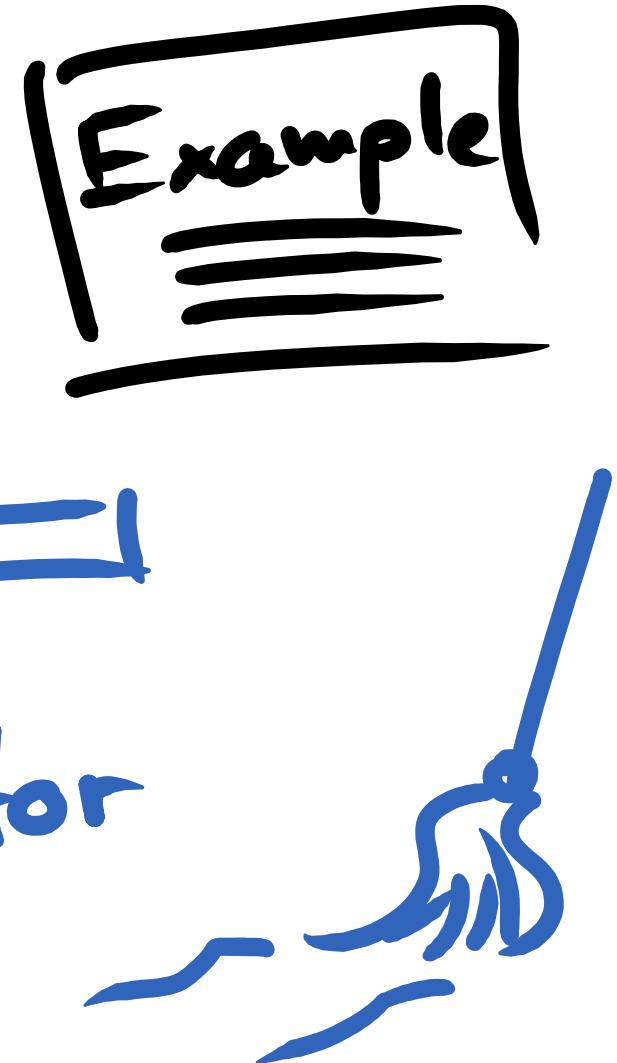
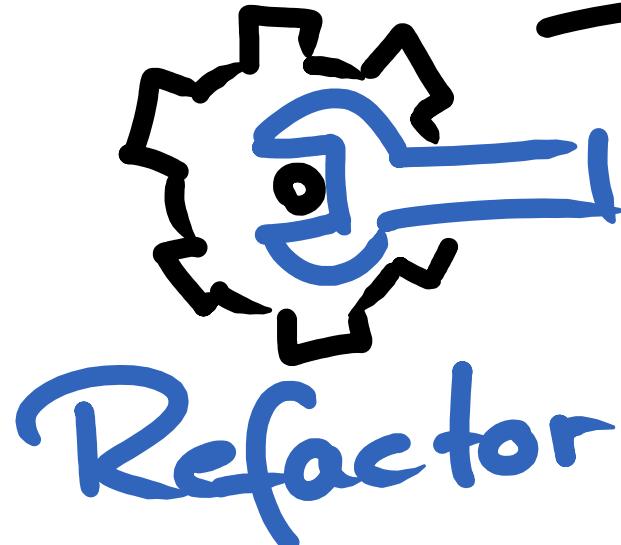
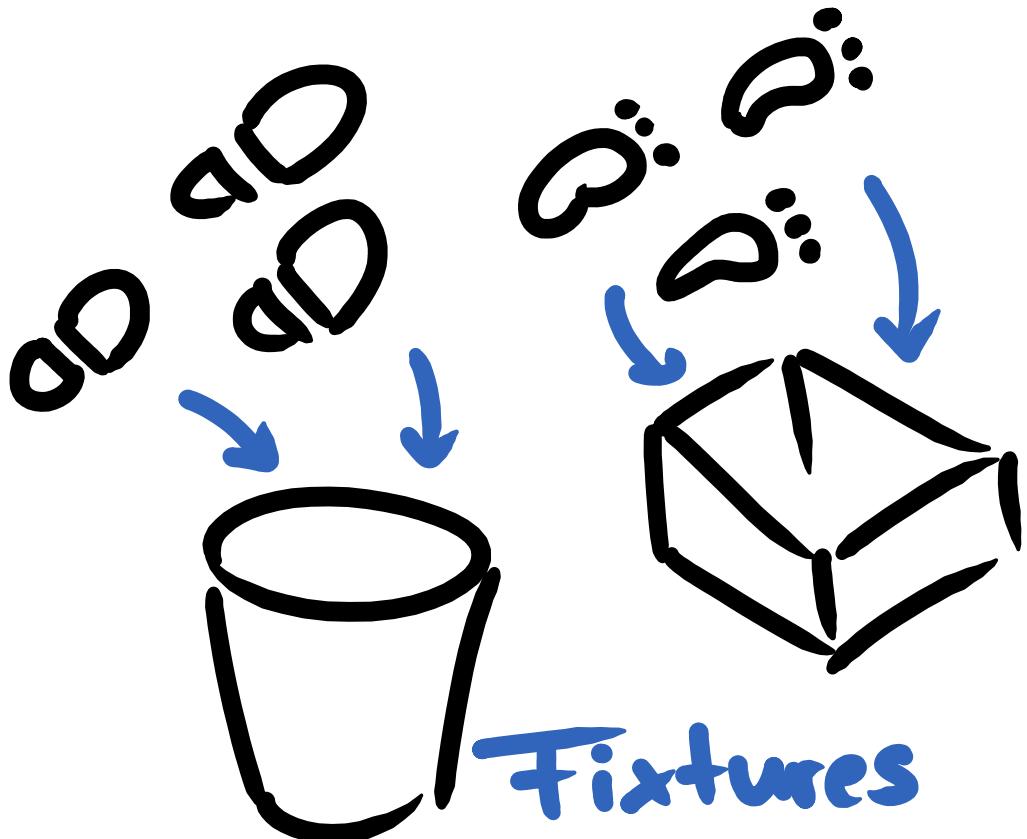
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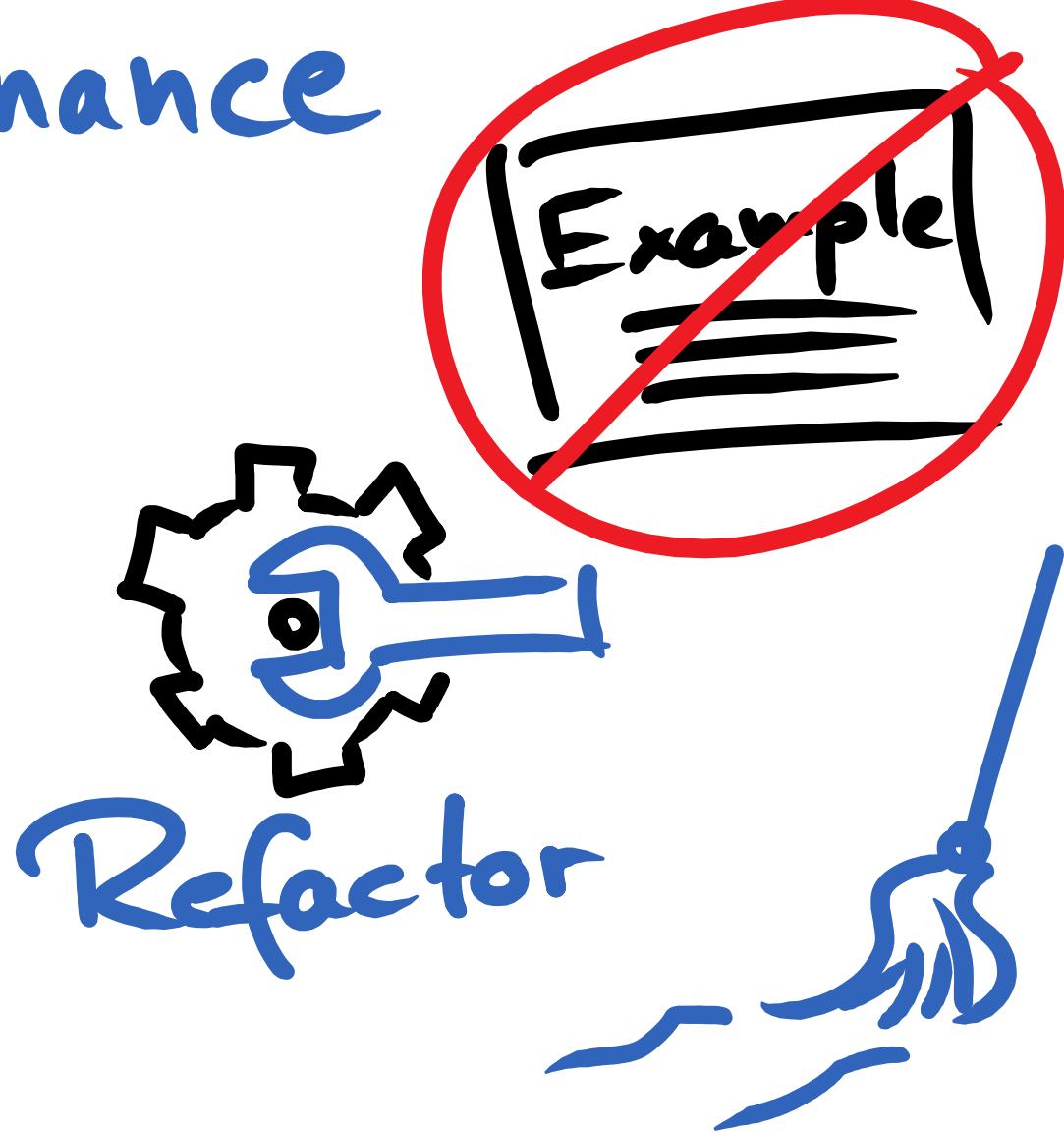
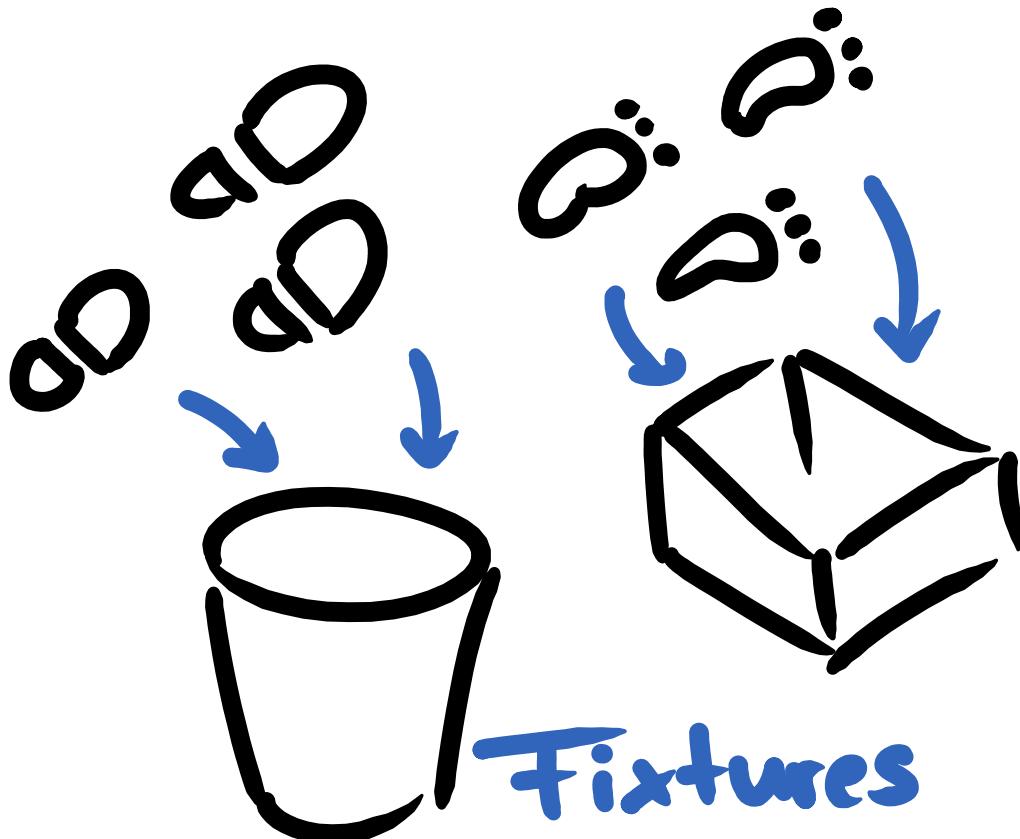
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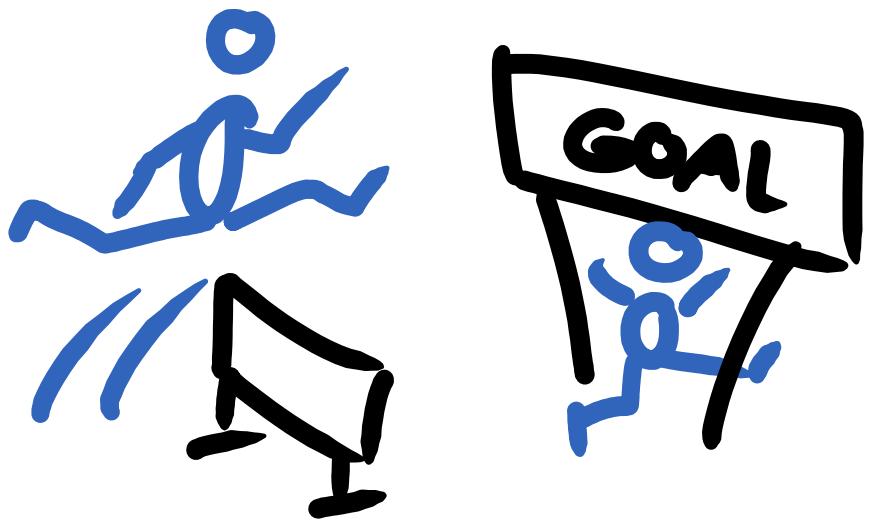


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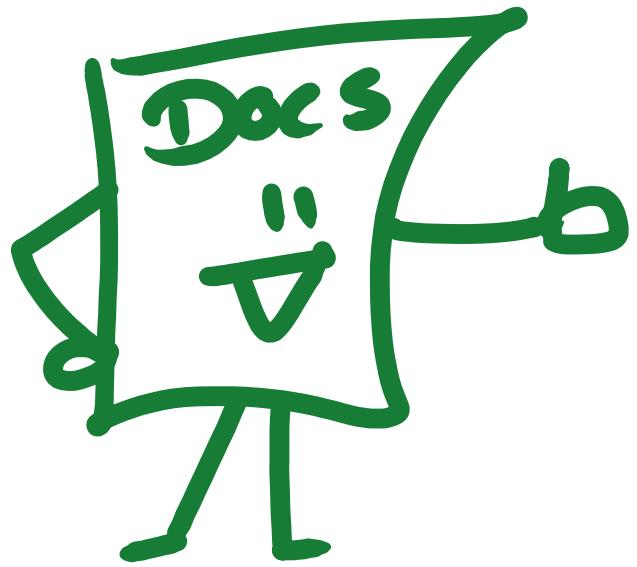
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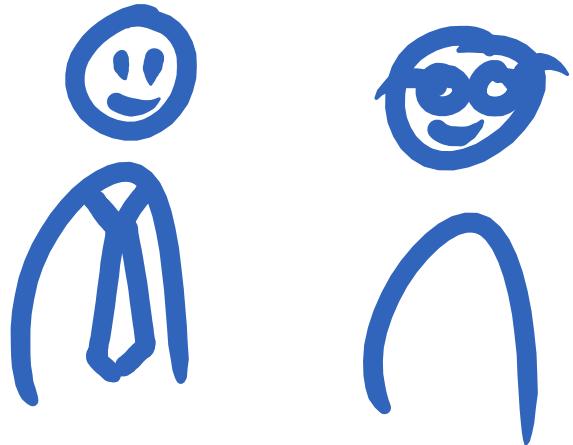
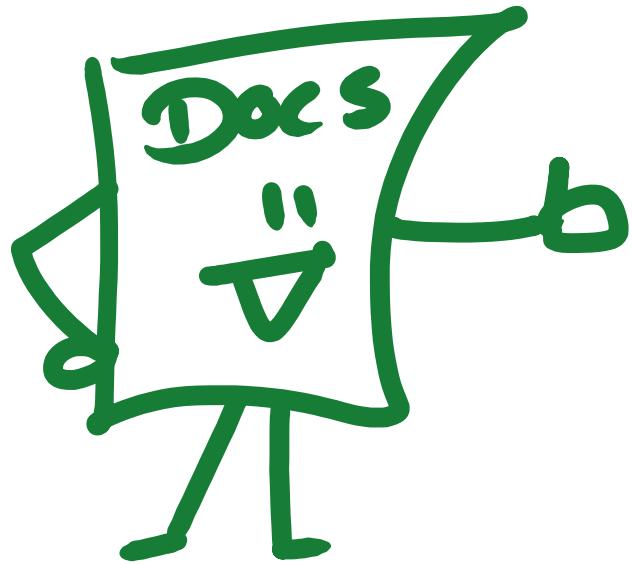




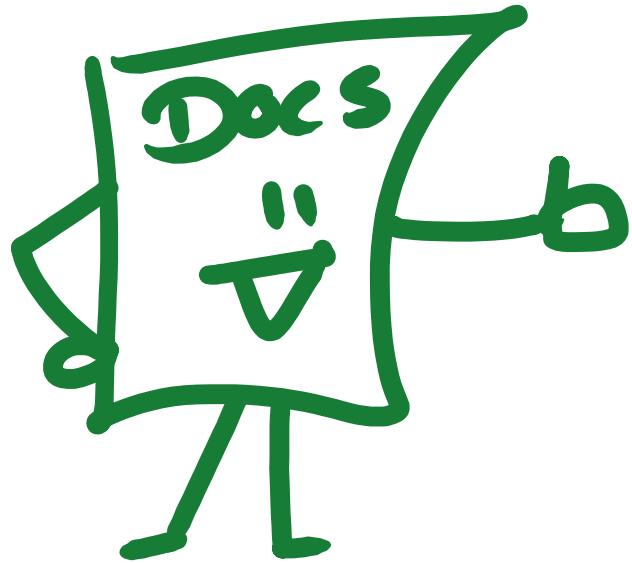




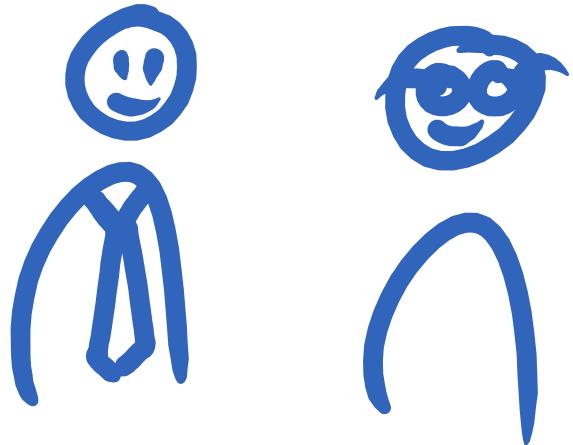




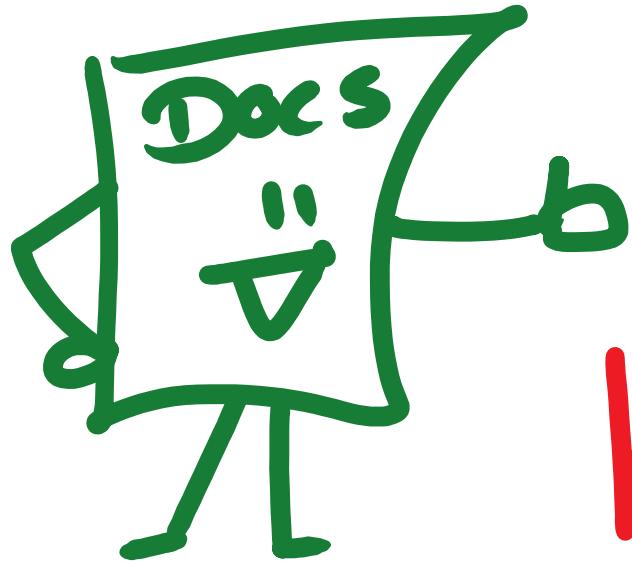
Single source of
truth accessible
for everyone



Does it work ?

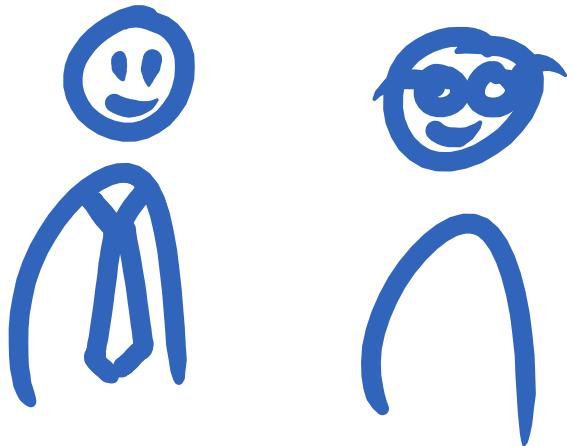


Single source of
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for everyone

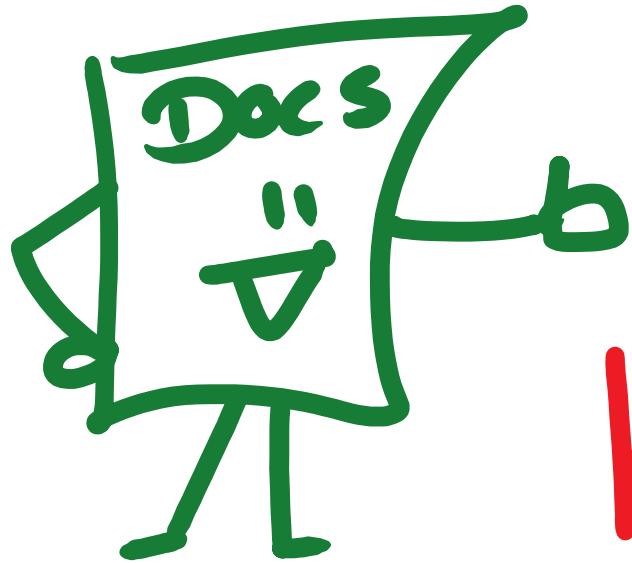


Does it work ?

How does it work ?

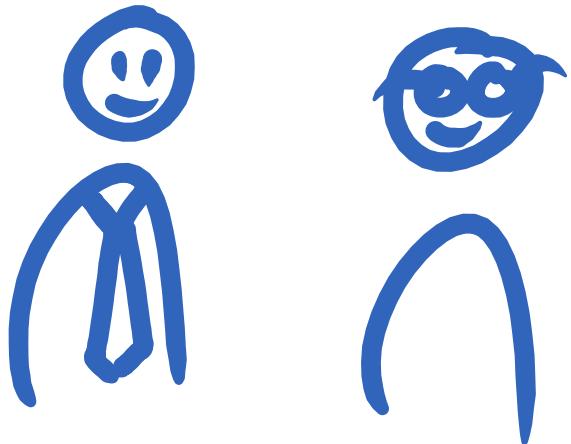


Single source of
truth accessible
for everyone



Does it work ?

How does it work ?



Single source of
truth accessible
for everyone

once again ...

Specification by Example

once again ...

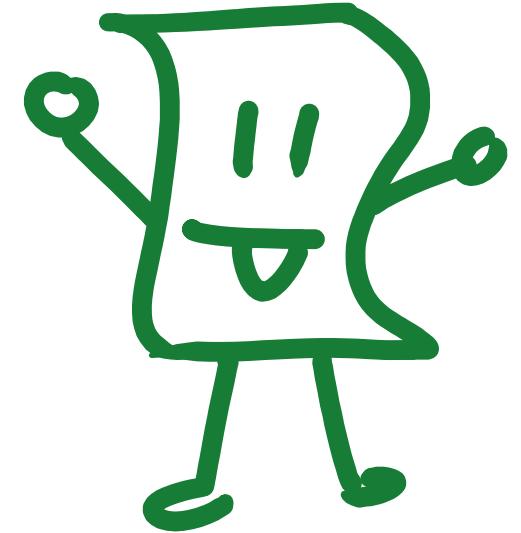
Specification by Example



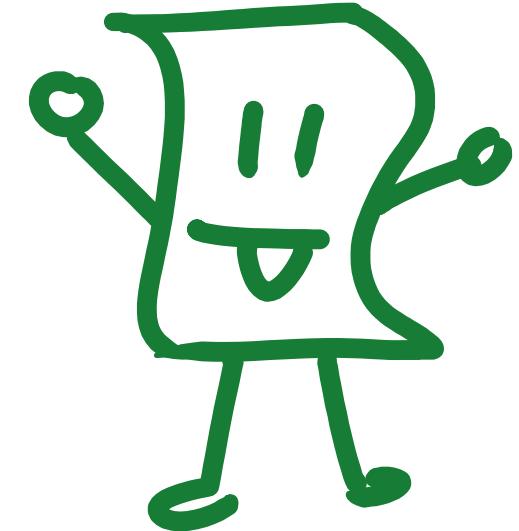
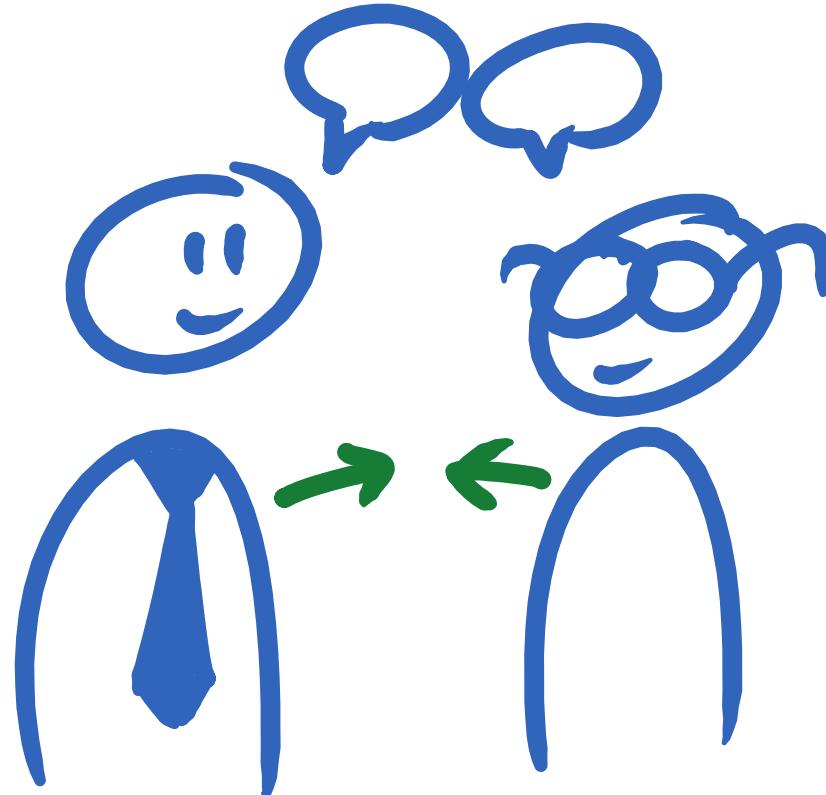
Specification by Example



Specification by Example



Specification by Example



More on SbE

<http://specificationbyexample.com/>

<http://dannorth.net/introducing-bdd/>

<http://skillsmatter.com/podcast/agile-testing/how-to-sell-bdd-to-the-business>

More on SbE the book



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the beginning

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the beginning

<http://dannorth.net/introducing-bdd/>



<http://skillsmatter.com/podcast/agile-testing/how-to-sell-bdd-to-the-business>

very good talk

More besides SbE

<http://www.clean-code-developer.de/>

<http://www.extremeprogramming.org/>

<http://theleanstartup.com/>

More besides SbE

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old but gold

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<http://theleanstartup.com/>

stop waste

rtens.org