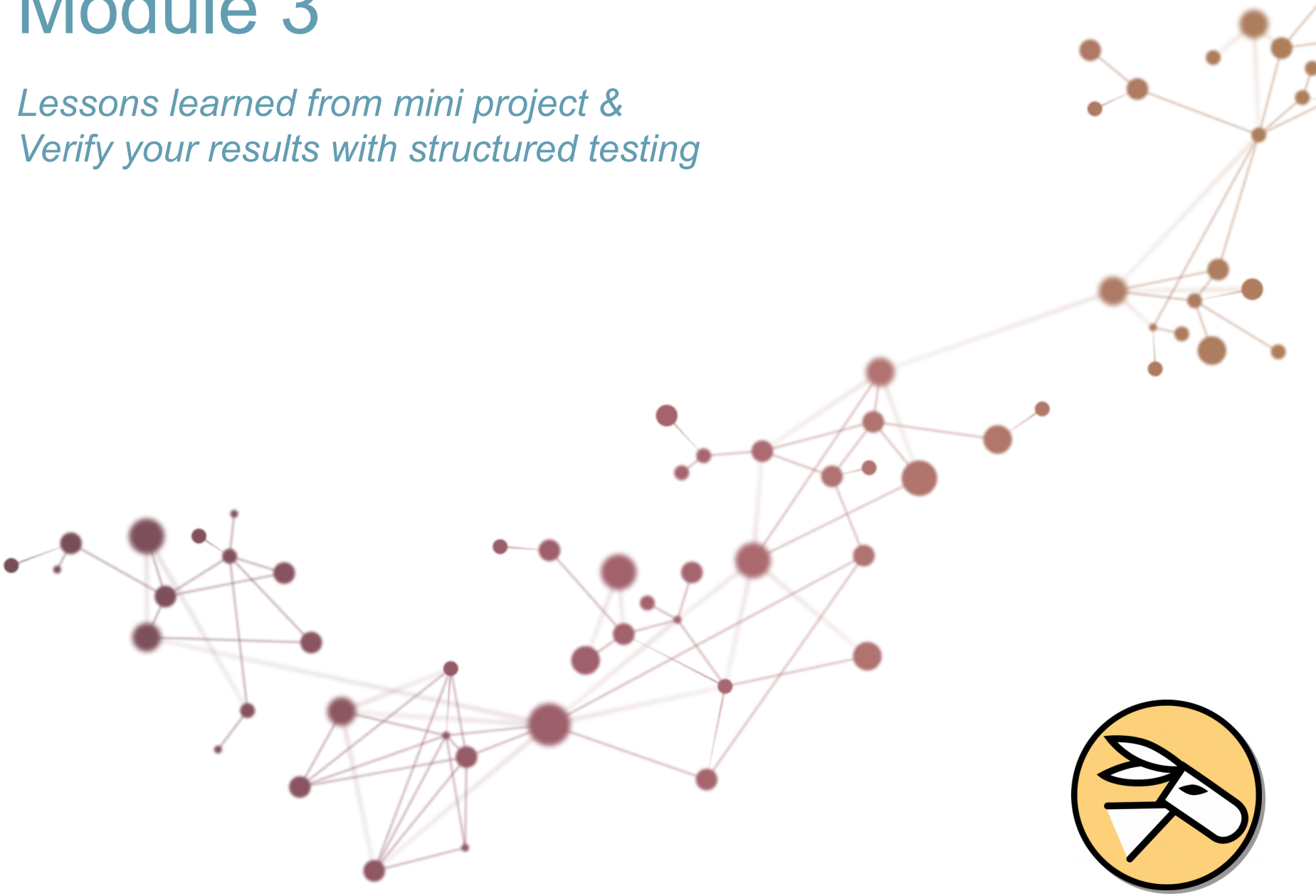
# Module 3

*Lessons learned from mini project &*
*Verify your results with structured testing*



# Lessons learned from mini project: Tops

Things you did great:

- Friendly contact with your client
- Ask context of system. This will help to retrieve better requirements
- Show stuff as soon as possible. E.g. mock ups. It will get the ball rolling
- Interactive contact with your client as soon as possible.
- Great mock up's. Ranging from paper drawings to special mock up tools
- Ask priorities (what to do first).
- Speak the language fluently (or arrange someone that can)
- Chase your client to respond/decide

# Lessons learned from mini project: Tips

Things you can improve:

- You do not have to hesitate about asking about the price
- Obvious copy paste errors e.g. "We are happy to inform you that your building permit request has been denied.“
- Early push back which is still client friendly
- Have a signed contract from the start
- Bring bad news interactively and in person (if possible).
- Profit = Price – Cost
- Suggest features, but you may want to add these in price.
- Be clear on conditional flow in designs

# Lessons learned from mini project: Questions

- How much would Bill have accepted?
- How much would Bill have payed?
- Which deliverables do you need?
  - Client control: e.g. contract (what should that contain?)
    - What will be achieved
    - At what price
    - At what time
    - What if something changes?
  - Reqs (always) because this defines what to achieve
  - Design (in user interactivity always, optional when fully automated)
  - Realization (always)
  - Test (always)
  - Acceptance (always but can be part of contract)
  - Deployment/Delivery (always)
- How to handle fixed contracts with agile approach?
- ……
- ……

# What is structured (functional) testing

Test if a process produces the agreed upon result by creating one or more test cases. Each test case has a:

a. **Start state:** the state the system need to be in before the test script(s) can be executed (usually some data is already in the system).
In many cases there is just one start state for all test cases.

b. **Script:** a set of non conditional steps to execute

c. **Predicted outcome:** the actual result that should be there after the script is executed.


# Test design techniques

As described in http://en.wikipedia.org/wiki/Black-box_testing and described in this lecture:

- Decision table testing: e.g. If A then B else C (2 test cases)
- Boundary value analysis: e.g. If A < *boundary* then C else D (3 test cases)

Not described in this lecture

- All-pairs testing
- State transition Analysis
- Equivalence partitioning
- Cause–effect graph
- Error guessing

# Most used test design techniques

Decision table testing:

1. E.g. If A then B else C (␣ 2 test cases)
2. E.g. If A1 or A2 then B else C (␣ Question: How many test cases?)
3. E.g. If A1 or A2 or A3 then B else C (␣ Question: How many test cases?)

Boundary value analysis:

4. E.g. If x < 10 then B else C (␣ 3 test cases)
5. E.g. if 5 < x and x < 10 then B else C (␣ Question: How many test cases?)

Brainstorm?: Which version would cost more testing effort (blue or green)?:

if A1 then B1
else if A2 then B2
else if …. etc;

if A1 then B1;
if A2 then B2;
and if …..etc;

# Class exercise: *Which test cases are needed for the following (part of the) specification (assume no start state):*

{ If **“Order contains deposit products”**

then *‘You can retrieve the deposits on the deposits products when you return the packaging.’* }

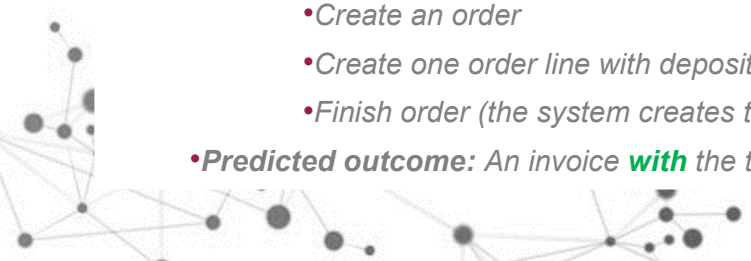
**Functional explanation:**
An order has multiple order lines with chosen products. Some of those products are “deposit products” (in Dutch “producten met statiegeld”). This piece of specification defines a conditional result on the invoice.

# Answer (as Test cases)

1. *Test case: No deposit products delivered at all*
   - ***Start state: customer is logged in***
   - ***Script:***
     - *Create an order*
     - *Create two order lines but don't choose deposit products*
     - *Finish order (the system creates the invoice)*
   - ***Predicted outcome:*** *An invoice* ***without*** *the text "You can retrieve the deposits …"*

2. *Test case: Only deposit products*
   - ***Start state: customer is logged in***
   - ***Script:***
     - *Create an order*
     - *Create two order lines, both with deposit products*
     - *Finish order (the system creates the invoice)*
   - ***Predicted outcome:*** *An invoice* ***with*** *the text "You can retrieve the deposits …"*

3. *Test case: Some deposit products and some are not*
   - ***Start state: customer is logged in***
   - ***Script:***
     - *Create an order*
     - *Create one order line with deposit products and one order line with deposit free product*
     - *Finish order (the system creates the invoice)*
   - ***Predicted outcome:*** *An invoice* ***with*** *the text "You can retrieve the deposits …"*



# Requirements / Specs coverage

*Create a permit system that makes it possible for a CIVILIAN to enter a request for a building permit. He needs to enter:*

- *The construction start date  of the building and*
- *The height in meters  (`integer`)*

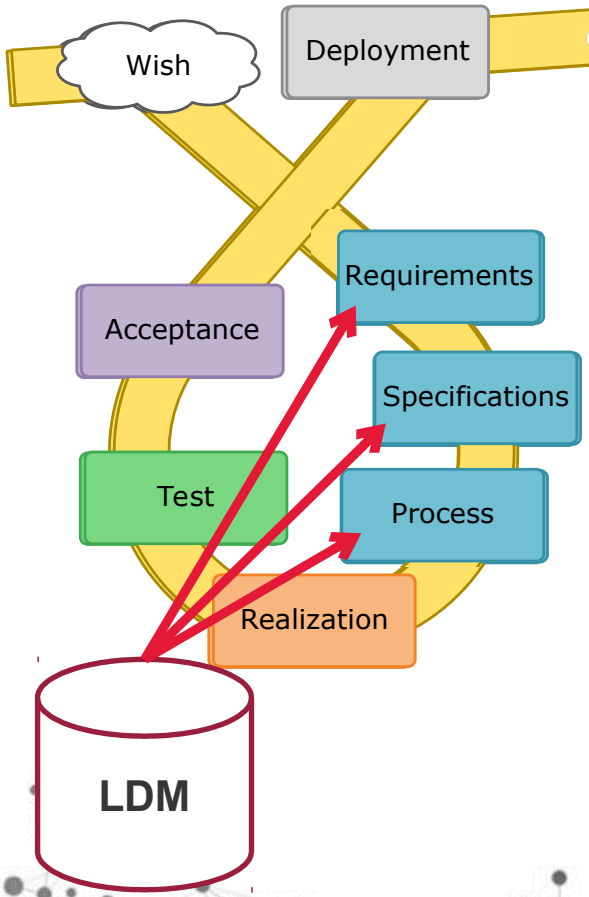
*The system will automatically add the following information:*

- *The REQUESTOR (which is CIVILIAN who entered the request).*
- *The current date (with function `currentDate()`)*

*Expand the permit system with an automatic approval if the height of the building is between 3 and 5 meters. If not an approval by an APPROVER.*

*Expand the permit system with an message send to the REQUESTOR informing him / her of the result (approved or not).*

# Testing linked to Reqs, Specs, Process & LDM




- ***Do we create test cases for (functional) requirements?***
  - *No, but why?*
  - *Because the functional requirements always have specifications*
- ***What part of the test case can be created from the specs?***
  - *Predicted end result*
  - *Start state*
- ***Does one spec have one predicted end result?***
  - *No, it has one or more*
- ***What part of the test case can be created from the process?***
  - *Test scripts*
- ***Can you use the LDM and if so how?***
  - *Yes, to see how information is defined.*
  - *But for actual testing you need more. What?*
  - *You need to know how the information of the LDM is actually stored (e.g. in a table, file, message) and….*
  - *How to check the actual end result (e.g. database browser, system screen, file viewer, etc.)*

# Module 3 Assignment

1. ***Create test cases:*** *Based on sheet "Requirements / Specs coverage", create a set of test cases in a docx or pdf file. The test cases should be optimized for efficiency. For instance by creating test cases that test many things at once. Only include a maximum of 6 test cases. If you have to choose, choose the ones that test the most functionality and/or the ones you think Bill will find the most important.*

2. ***Solve ambiguities:*** *you may find ambiguities which you did not yet solve during you sessions with Bill. Solve the ambiguities you find by adding assumptions in a separate docx/pdf that make these ambiguities clear.*

3. ***Upload your results before 9th of April on*** https://brightspace.ru.nl/ ***under "2020-02-27 Create test cases and solve ambiguities"***

***Use same groups as mini-project. If this is impossible somehow or if there are special circumstances, please describe these circumstances***