Tests and Perception:
a Vaster Scope

CCCA11

Yves Chaumette, Francis Rousseaux

Stakes

- Progress questions certainty
- And goes toward fluidity and subtlety
- Perception completes judgment and propositions (A = B)
- We'll try to model perception for increasing synthesis (versus analysis)

Approach

1. Setting the problem
2. Example of a query
3. Recourse to the mathematics
4. The operation of negation: 3 worlds
5. Models of tests and query
6. Further added value

---

1. Setting the problem
"Double path" principle

- Test are checking an expected behaviour
- The principle has been enunciated by Pohl & al.
- Commutative squares are frequent in the theory of categories
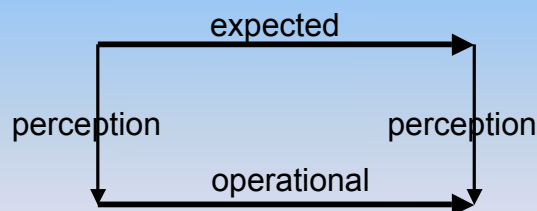
Analysis of requirements

- Analysis reduces the impact of perception
- Comparison is merely an equality and thus neglected
- Synthesis is assumed and minimized

expected

A mere
equality =

operational

A mere
= equality

---
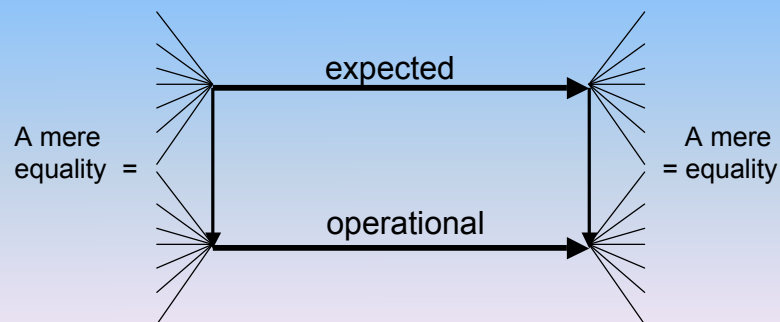
2. Example: test of a query

- Let us assume we are looking for a reference of the double path principle
- What is tested is our understanding of a research engine
- Shall we get the results we expect?
- Have we put the right words?
- "Test principle software - biology - medicine- chemistry"
- It gives 844 000 items
- Yet 6 books in 2 pages
- Among them twice this principle and more ideas

Myers Principle

- A necessary part of a test case is a definition of the expected output or result
- A test case must consist of two components
    1. A description of the input data to the program
    2. A precise description of the correct output of the program for that set of input data   [page 16]

- After a programmer has designed and coded **constructively** a program, it is extremely difficult to suddenly change perspective to look at the program with a **destructive** eye

                                   [page17]

Pohl & al., page VI

III. Book Overview

Framework for product line engineering

The book is organised according to our framework for software product line engineering, which has been developed based on our experience in product line engineering gained over the last eight years. The framework stresses the key differences of software product line engineering in comparison with single software-system development:

Two processes

a) *The need for two distinct development processes*: domain engineering and application engineering. The aim of the *domain engineering* process is to define and realise the commonality and the variability of the software product line. The aim of the *application engineering* process is to derive specific applications by exploiting the variability of the software product line.

Variability

b) *The need to explicitly define and manage variability*: During domain engineering, variability is introduced in all domain engineering artefacts (requirements, architecture, components, test cases, etc.). It is exploited during application engineering to derive applications tailored to the specific needs of different customers.

General results

- Confirmation of the double path in 2 references
- 30 Principles listed in a paper, principles are a mere guide for action
- Testability, a new quality is viewed in this quest
- The search ends after 40 minutes

3. Recourse to Mathematics
The theory of category

- A category is a set of arrows (transition between states)
- They have a partial composition law
- Sources and goals of arrows = objects are identified with identity loops (neutral elements for the composition)
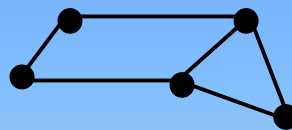- Most categories concern algebraic structures: groups, sets, ordered sets, vectorial spaces
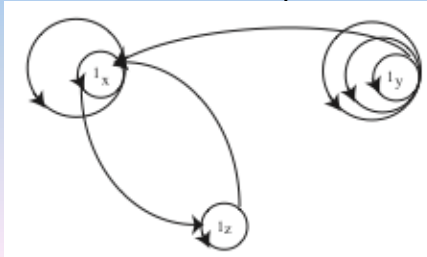
2 based structures

- Graph

- An edge is a ternary between 2 vertices

- Half edge
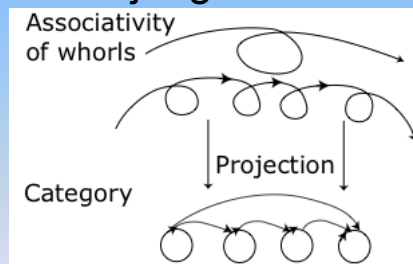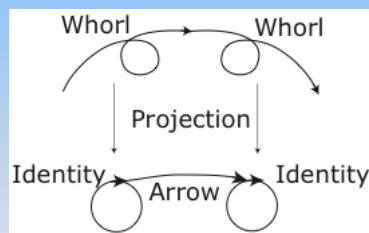- Vertex and half edges
- Whorl

Interiority and relational ability

Tests and perception

Composition of whorls

- A = B

or 2 perceptions produce a judgement

Limits and sketches

- The human mind sets limits for knowing what one is dealing with
  - Limits for budgets, plans, contracts
  - Transformation = Transition between states
  - Precision, definition, analysis, judgment
- However the movement (becoming, consciousness) does not stop
  - Gesture, perception, quest
  - State = dynamic equilibrium
  - Creativeness, evolution
- A 2-based Trend is not reliable

4. Operation of negation

- Results can be negated (cognitive field)
  - Actions can be inverted   (action field)
  - Example: a test result is OK or not
- Perceptions can't be negated, they escape judgment
  - They have a reverse: an absence or modification
  - "I'm looking over there", a test game
- A question can't be false and has no reverse
  - A value for action has no reverse and no negation
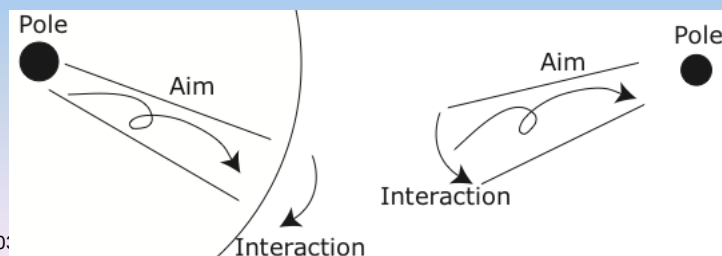 - Example: customer service, reliability, truth

The world of poles - types

- Questions, values have no inverse
- For these poles all interactions collapse
- They might be represented as black holes
- Gestures and perceptions are interfaces between actions and poles
  - Whorls project on poles and on arrows
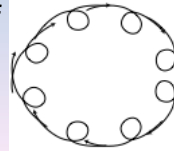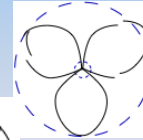 - Such an interface encompass a class of whorls

Movement

There are two ways of returning to the self = identity

1. By the outside = rotation
   – Going to the Other
2. By the inside = pulsation
   – Staying in link with itSelf
3. By a composition of both: spiraling
   - It gives helix and blades
   - A ring of whorls return to the self
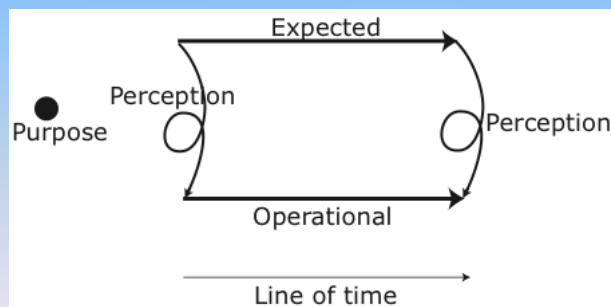

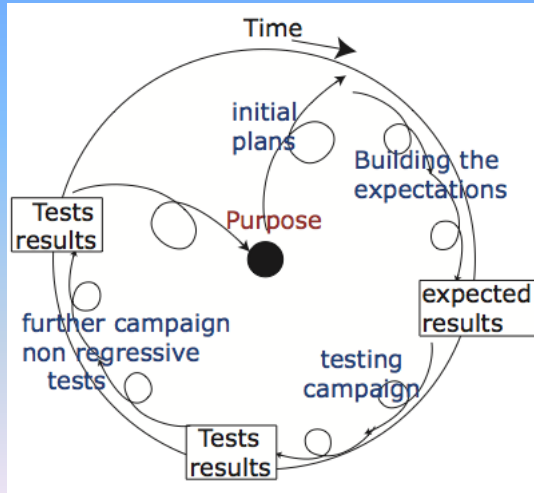# 5. Models: 3 worlds in testing

• The double path principle is enriched

Test life cycle

Cycle of a query
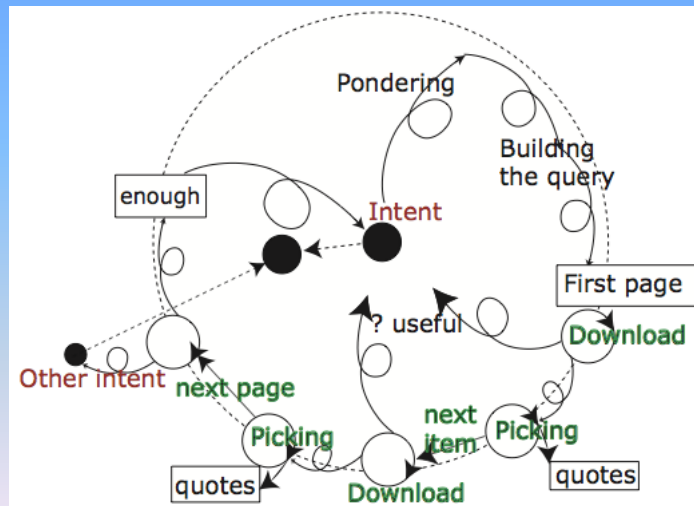
6. Further added value
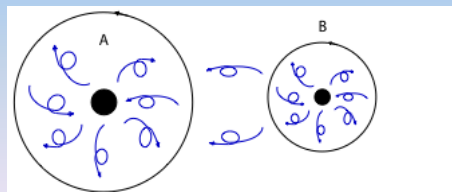
- Whorls do not apply only on a query or on a test
- It describes also the transmission of ideas from one project to another resulting in an import of patterns

Threats and perspectives

- Threat : Fixity of mind
  - To use determined objects
- Threat : Any whorl projects on an arrow
  - Any gesture is an act or interaction
  - However hint of a ratio of 10^6 perceptions for one object
- Use : Gestation of an idea
  - Creativeness
  - Emerging priorities before a decision
  - Real-time computing

References

- Husserl, Merleau-Ponty, Patocka, Badiou, Barbaras
- Mac Lane, Eilenberg, Bailly & Longo, Guitart
- Gilles Châtelet, Alunni, Jedrejewski
- Pohl, Myers, Gibbs

Unending thinking

- Thanks for your attention

- Let us ponder together