



Software Requirements: An Evolution Point of View

Julio Cesar Sampaio do Prado Leite
Department of Computer Science, University of Toronto
on leave from Departamento de Informática, PUC-Rio

talk at:



Summary



- Who we are
- Why are we here?
- Different Perspectives
- Evolution as a key aspect
- Results so far (from our group)
- Challenges

Who we are



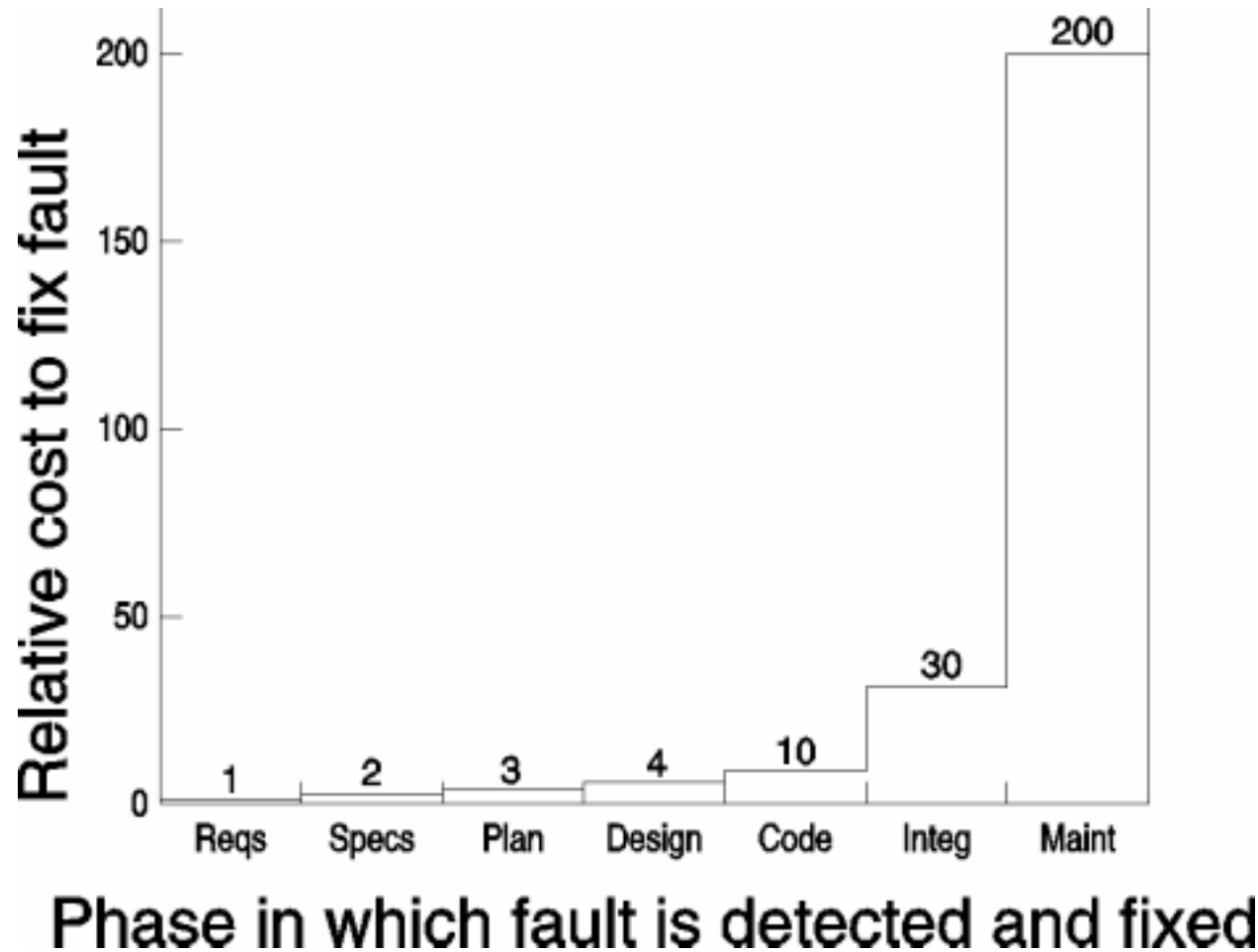
- Member of the IFIP 2.9 WG
- Previous work on Elicitation, Modeling and Analysis
- 3 Phds and 11 masters on the topic.
- Lexicon, Scenarios, Viewpoints, Requirements Baseline, Extreme Requirements
- See more at: www.inf.puc-rio.br/~julio
- On sabbatical at UofT, involved in the goal/agent (**Tropos**) method (Prof. Mylopoulos)

Why are we here?



- von Neumann:
“There is no sense in being precise when you don’t even know what you are talking about”
- Standish Group
74% of the projects had failed!
- Tom de Marco
56% of the errors in a software can be traced back to the requirements

Why are we here?





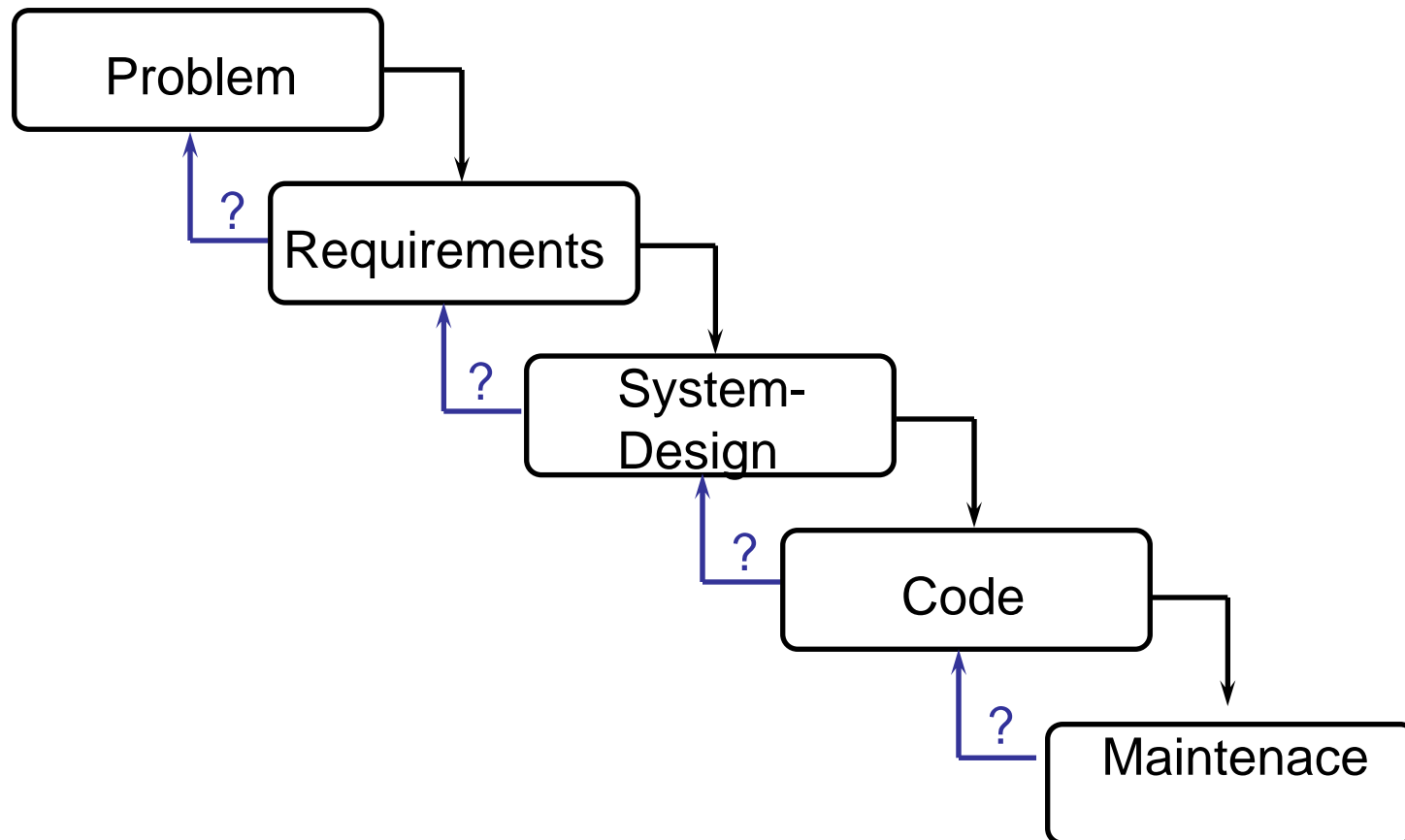
Different Perspectives



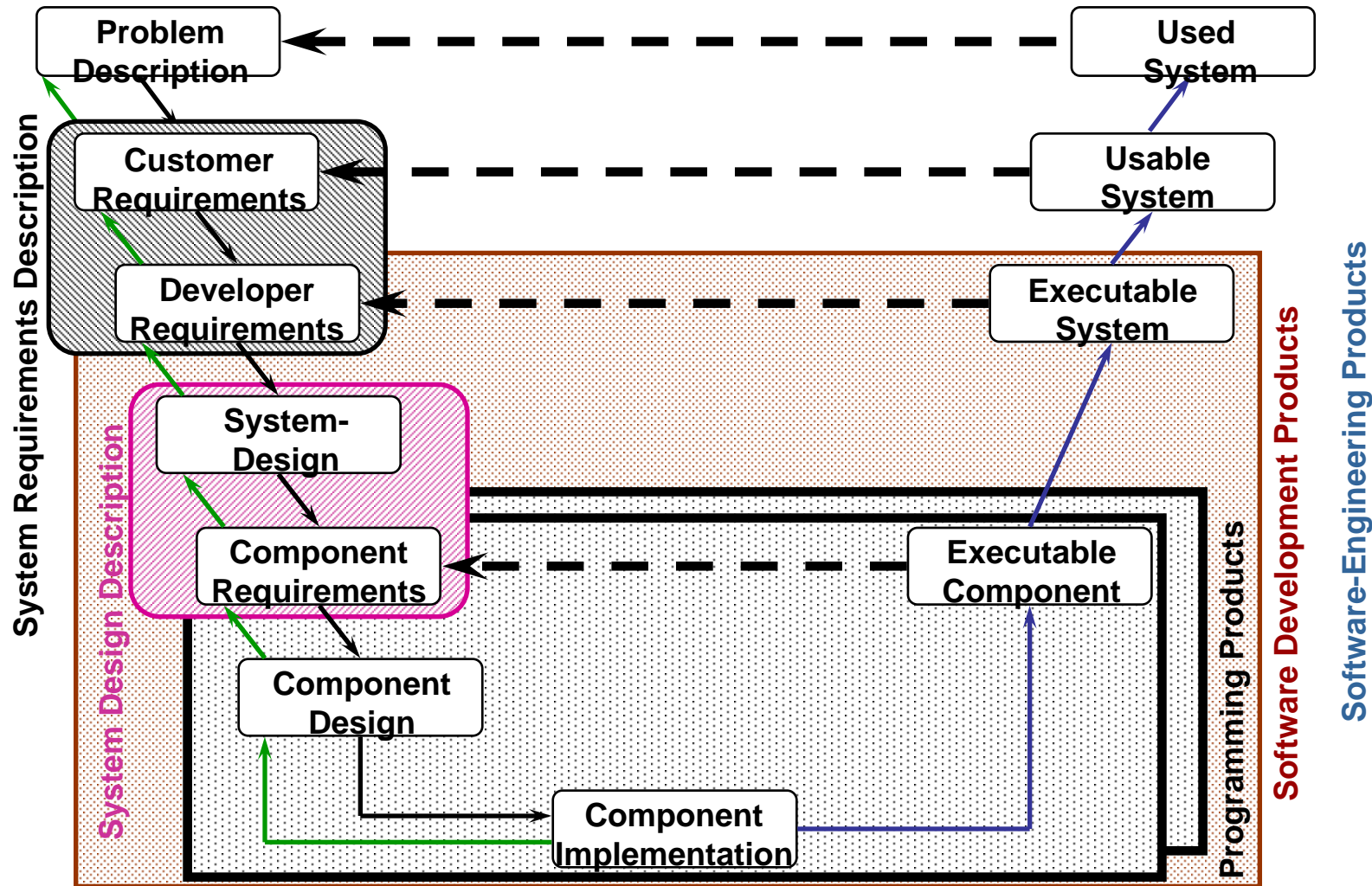
- Waterfall Model
- V Model
- Spiral Model
- Extreme Programming
- Open Source
- Tropos

Different Perspectives

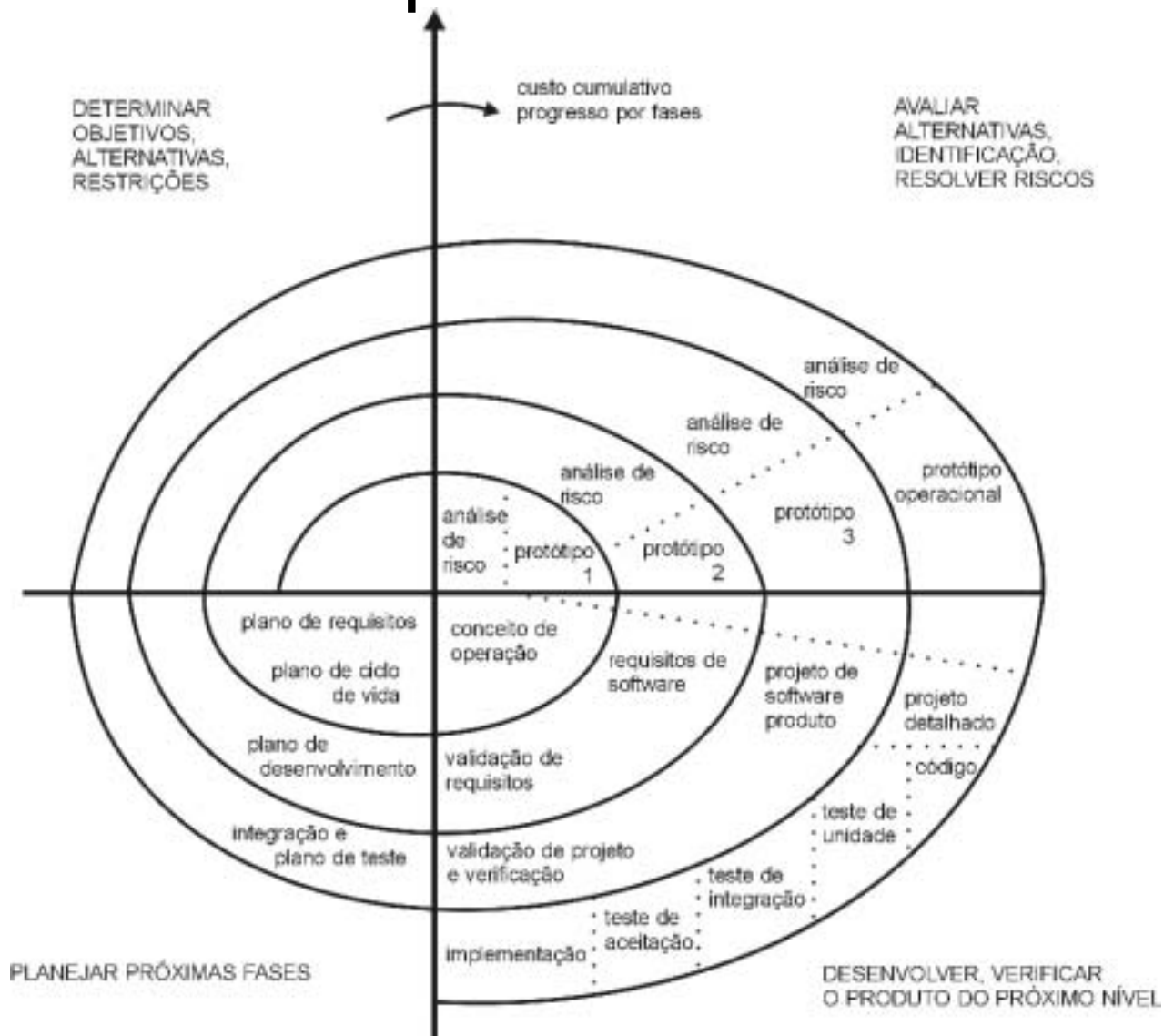
Waterfall Model



Different Perspectives V Model



Different Perspectives Spiral Model



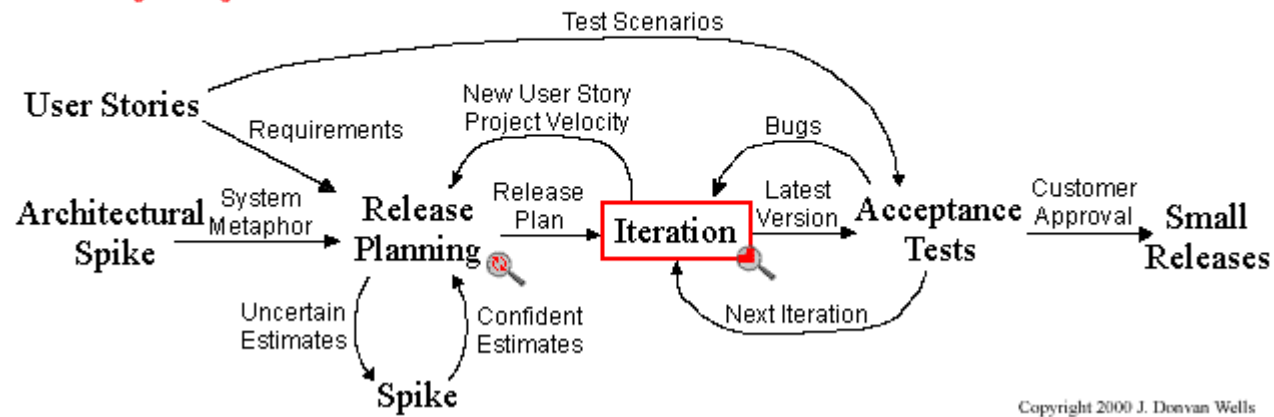
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Different Perspectives

XP

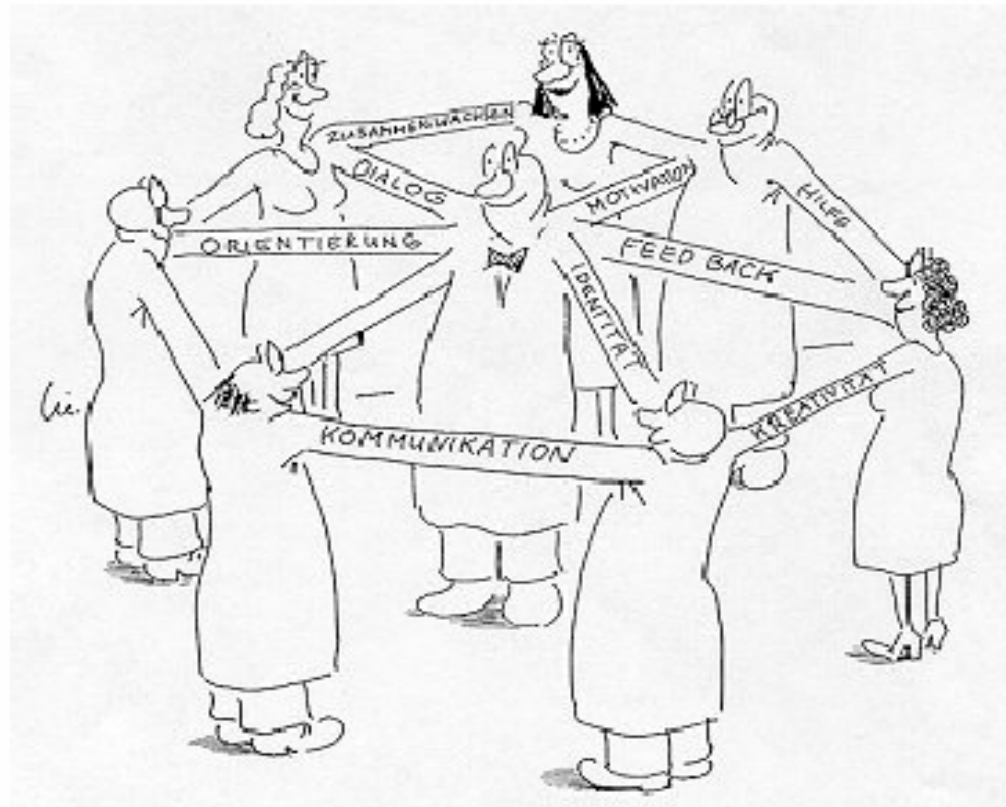


Extreme Programming Project



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Different Perspectives Open Source



Picture taken from:

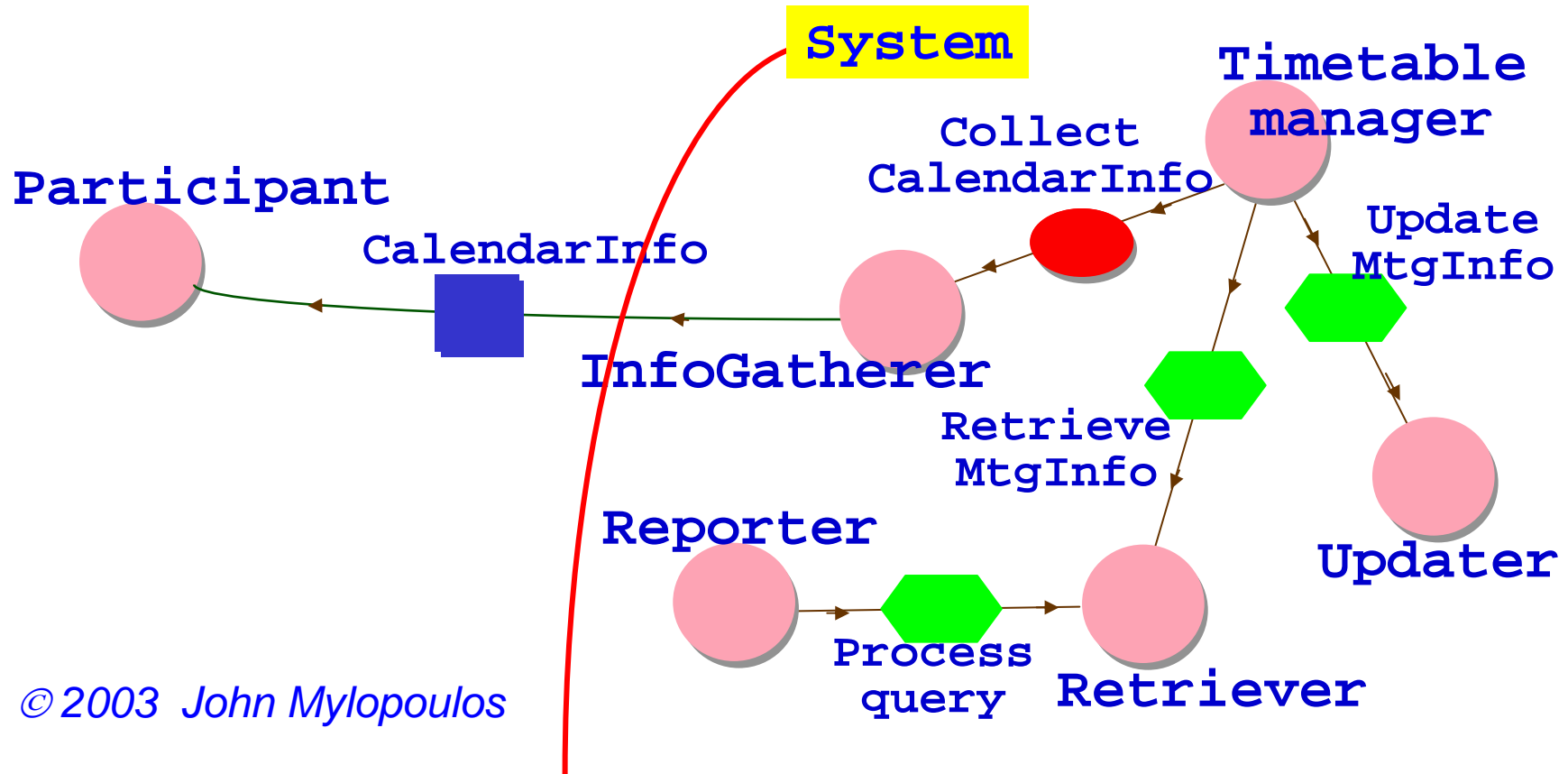
http://www.sti-ev.de/veranstaltungen/jahrestagung/2001/unterlagen/rupp_sti.pdf

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Tropos



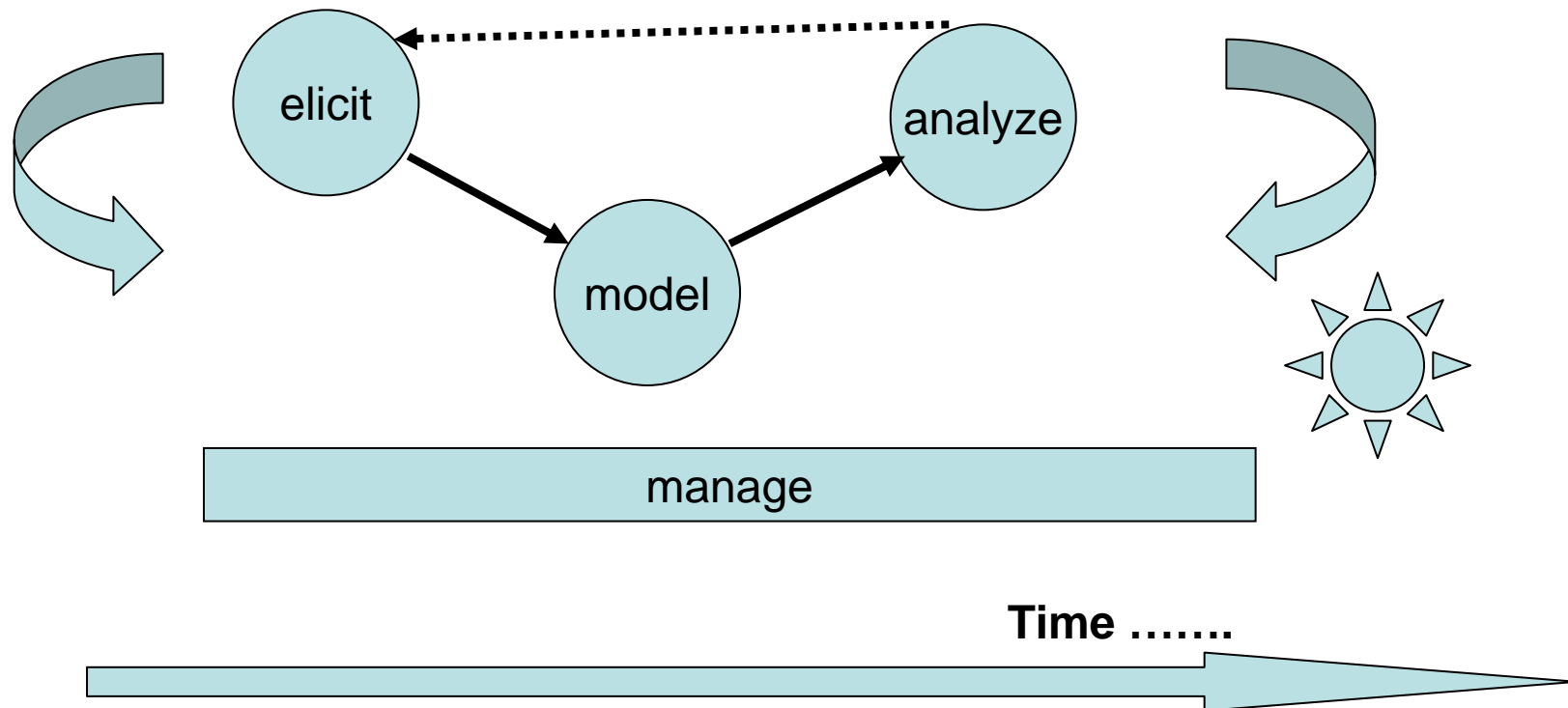
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UofT Evolution as a Key Aspect



- Requirements process
- Change of perception
- Requirements Baseline
- Is “Quality is job one” still valid?

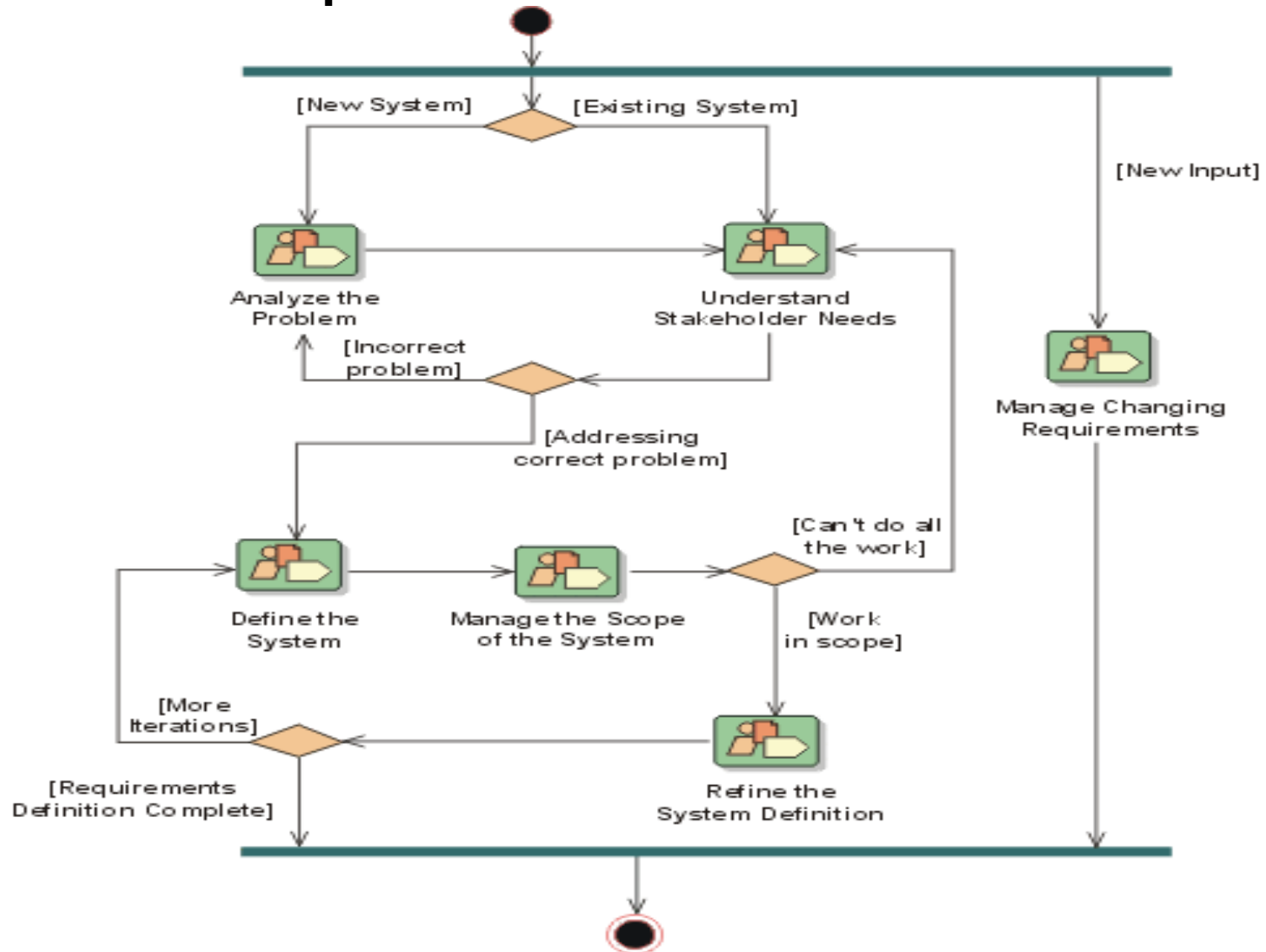
Evolution as a Key Aspect Requirements Process



Evolution as a Key Aspect Requirements Process



State of the Practice (Method) from
Rational





Evolution as a Key Aspect Requirements Process



State of the Practice (Tools)

Starbase

<http://www.tbi.com/caliberrm30/index.cfm>

Telelogic

<http://www.er.les.inf.puc-rio.br/doors.htm>

Rational

<http://www.rational.com/products/reqpro/index.jsp>

EDS

<http://www.eds.com/products/plm/teamcenter/slate/>

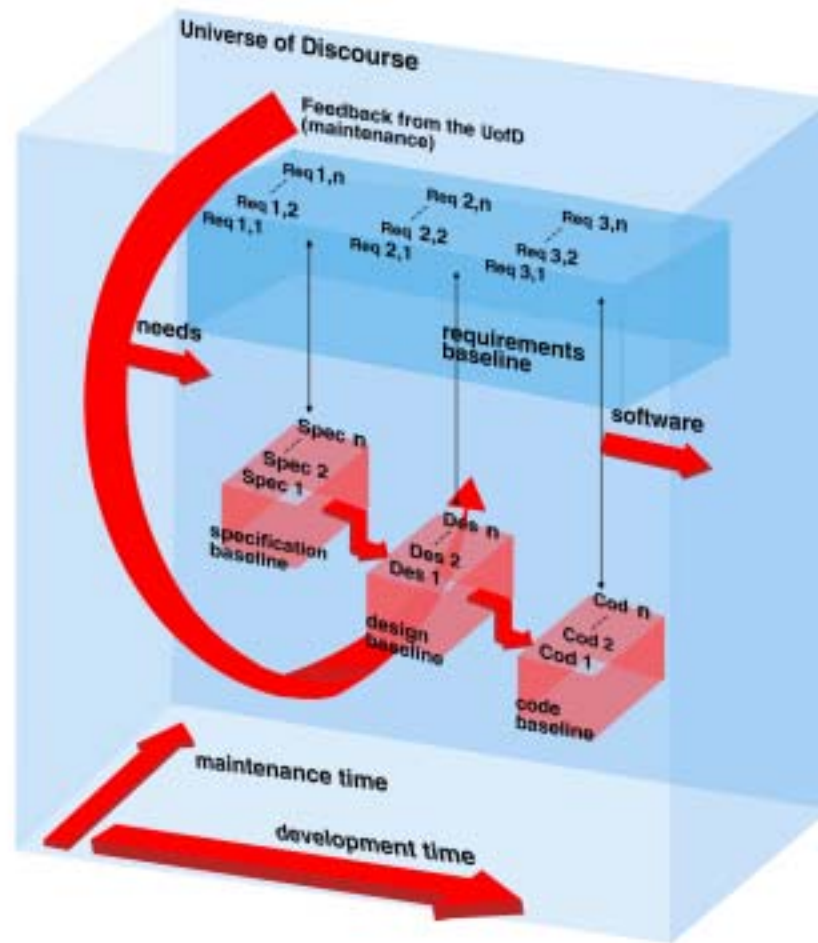


Evolution as a Key Aspect Change of Perception



- Completeness
- Consistency
- Frozen document
- Constant change
- Time to market

Evolution as a Key Aspect Requirements Baseline





Evolution as a Key Aspect

Is “Quality is Job One” still valid?



- Of course, but...
- Efficacy is measured time wise
- Functional and Non-Functional requirements are tangled even more.

Results so Far (from our group)



- Lexicon
- Scenarios
- NFR
- Scenarios Inspection (as an instance of quality driven methods)
- Extreme Requirements

Results so Far

Lexicon



Actuators / Actuator / Physical actuator

Notion:

It is a device that can be controlled by control system .

An actuator has name, abbreviation, type, range, control, reaction time and a description.

Behavioral responses:

It is controlled by the control system .

An actuator responds in linear time.
It controls light.

Sensors / Physical sensor / Sensor

Notion:

A device that can sense state of the building, users or environment.

A sensor has name, abbreviation, type, resolution, range, reaction time and conversion time .

Behavioral responses:

Analog sensors respond in exponential time.

A sensor is triggered by a physical occurrence under its range. (It is not defined in the text, here is my definition)

Reaction time

Notion:

For a sensor , it is the time from a change of the sensed property to the time when the sensor has reached 90% of the change, excluding conversion time.

For an actuator , it is the time to change from 0 to 100% / 100 to 0%, if different.

Behavioral responses:

It is not defined in the text.

It is activated by a change in the environment (this need to be elaborated) in the case o f a sensor.

It is activated by the control system in the case of an actuator.

Dimmer actuators / lle / Dimmer actuator

Notion:

It is an actuator.

It controls the output of a luminaire.

Behavioral responses:

It is used to dim individually ceiling light groups

Results so Far

Scenarios



Scenario: Reoccupied room

Goal: Return to the previous light scene

Context: Motion detector is working, value T1 is known for this room.
Any room in the 4th floor of building 32 .

Resources: ceiling light groups , task lights , push-buttons , control panel

Actors: user, control system, motion detector , dimmer actuators , status lines, control system ,

Episodes:

user enters the room.

motion detector signals to control system.

system verifies how long the room has been empty

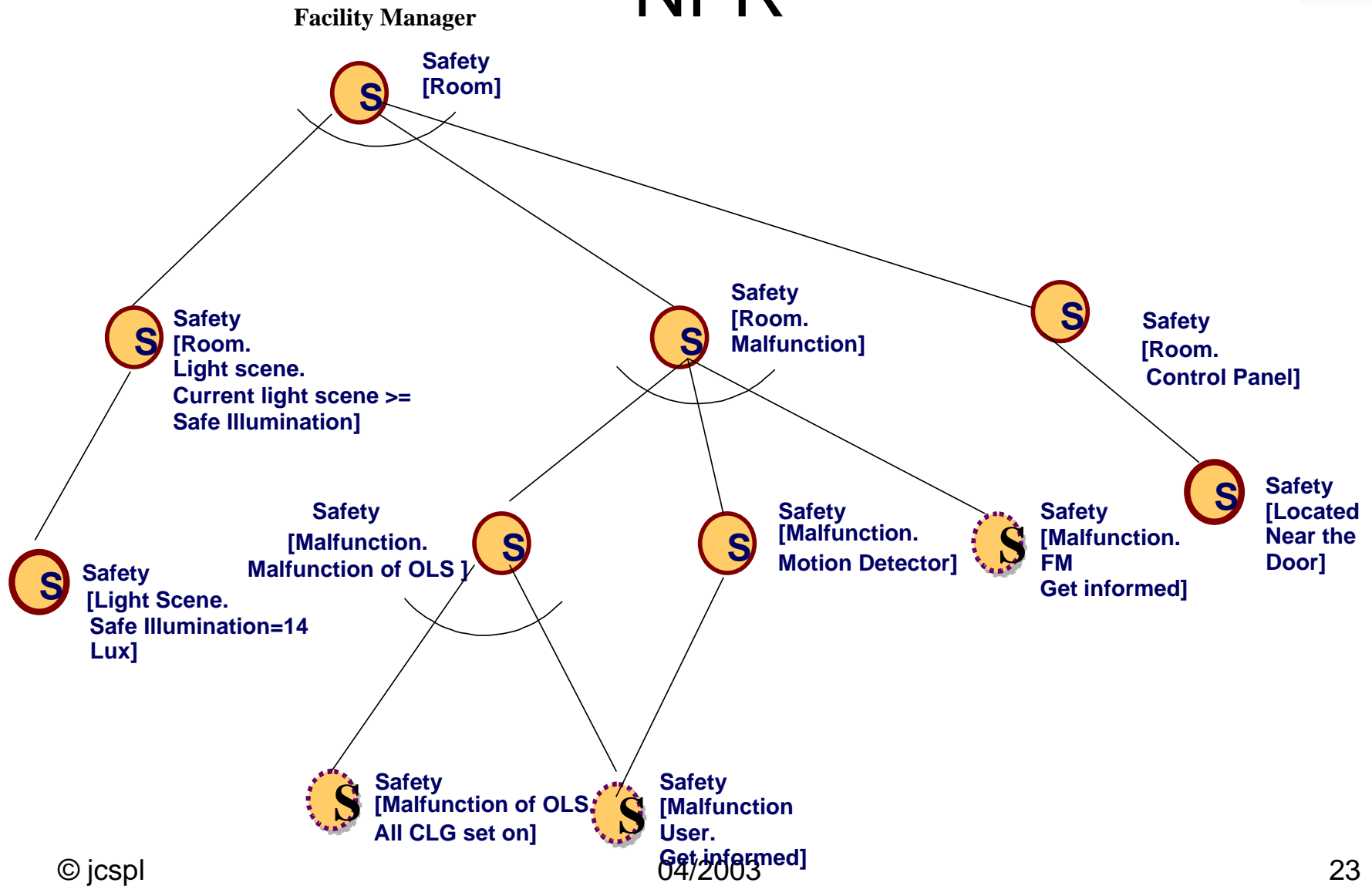
If time has been shorter than T1 the system retrieves the last chosen light scene Exception: OCCUPIED ROOM

control system terminates the standard light scene

system implements last chosen light scene **Exception:** Light Malfunction

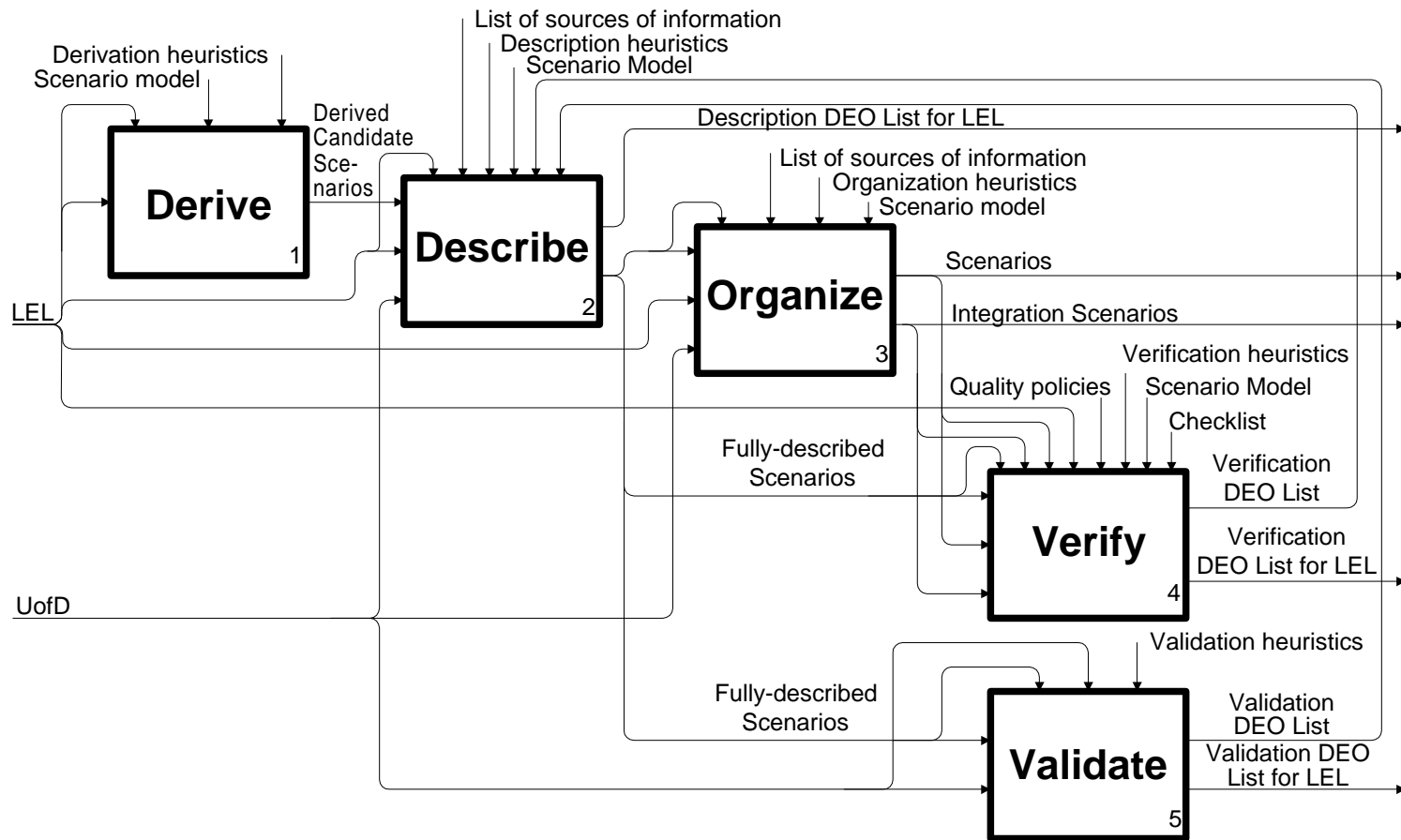
Results so Far

NFR



Results so Far

Scenarios Inspection



A0

Build

Results so Far

Extreme Requirements

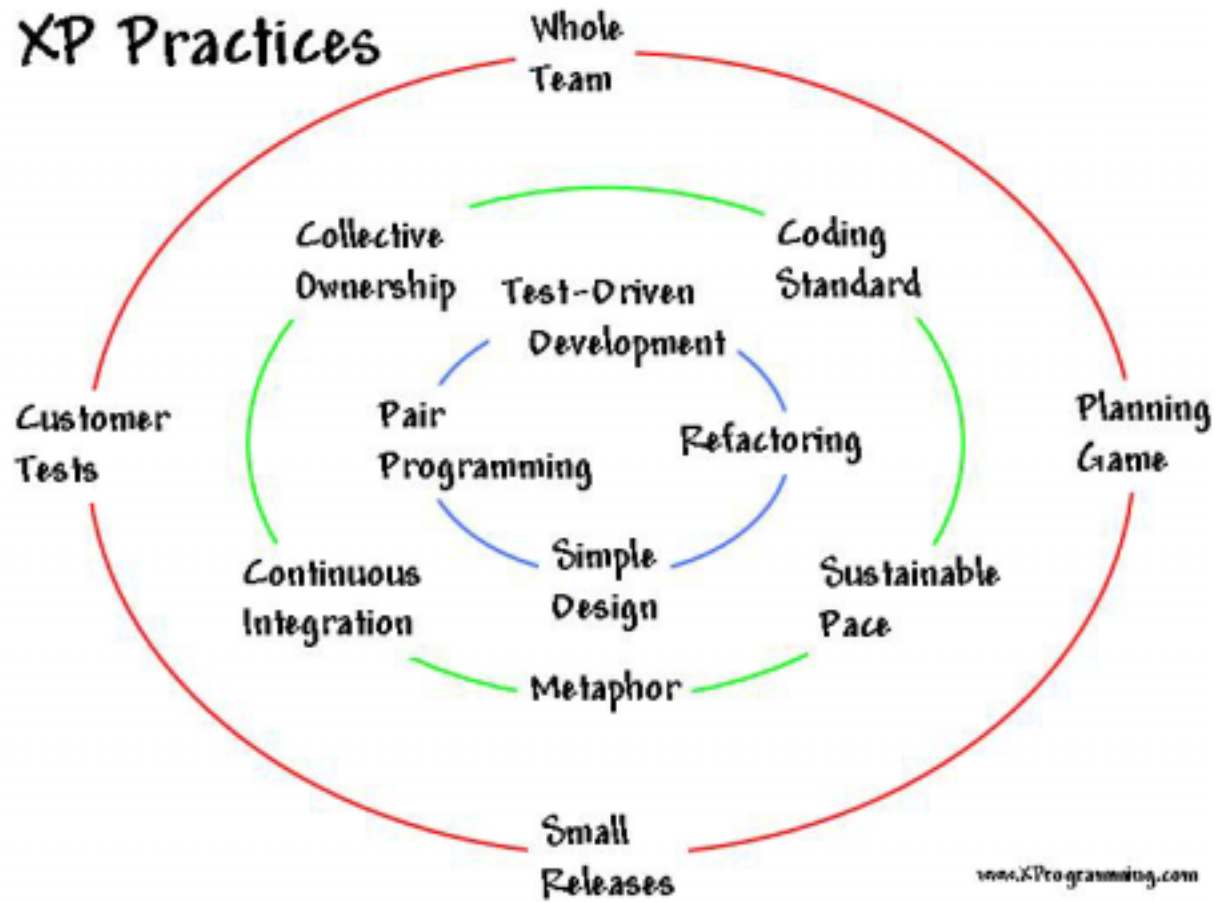


XP Problems

- **The assumption that, in the planning game, the business could be represented by just one customer.**
- **The lack of consideration of non-functional requirements from the standpoint of the business.**
- **The lack of explicit links between stories and tasks cards to the code**
- **The lack of a process for producing functional tests.**
- **The lack of a process for producing stories and tasks.**

Results so Far

Extreme Requirements



Challenges



- Produce software that is more flexible, more reliable and more quick to enter the market.
- Goal oriented approach seems to be an important step forward towards evolution
- Engineering methods for goal/agent based methods