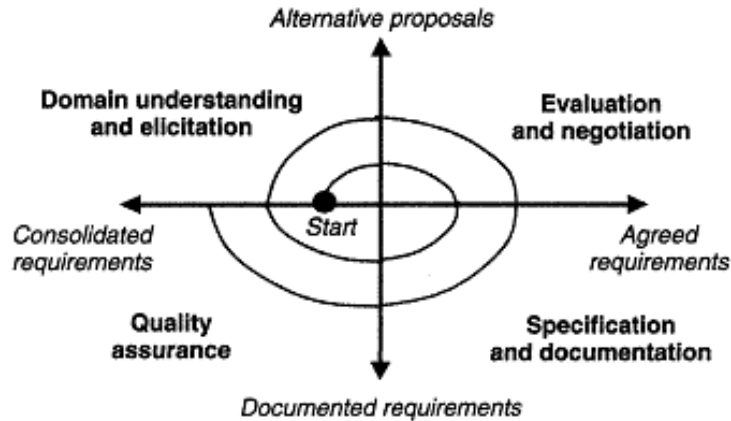


Série de TD N°3
Besoins fonctionnels et non fonctionnels
Solution Série de TD N°3

1- Processus d'IdB



2- Besoins fonctionnels et besoins non fonctionnels

besoins fonctionnels

- The bibliographical search engine shall provide a list of all library books on a given subject.
- The train control software shall control the acceleration of all the system's trains.
- The meeting scheduler shall determine schedules that fit the diary constraints of all invited participants.

besoins non fonctionnels

- Train doors may be opened only when the train is stopped.
- The meeting scheduler shall issue a warning when the constraints entered by a participant are not valid.

3- Taxonomie des besoins non fonctionnels

sûreté (safety) : The controlled accelerations of trains shall always guarantee that a worst-case stopping distance is maintained between successive trains.

confidentialité : A non-staff patron may never know which books have been borrowed by others.

vie privée (privacy) : The diary constraints of a participant may never be disclosed to other invited participants without his or her consent.

intégrité : The return of book copies shall be encoded correctly and by library staff only.

disponibilité : Information about train positions shall be available at any time to the vital station computer.

précision (accuracy) : The information about train positions used by the train controller shall accurately reflect the actual position of trains up to X metres at most.

performance : Responses to bibliographical queries shall take less than 2 seconds.

interface : The format for bibliographical queries and answers shall be accessible to students from any department.

interopérabilité : The meeting scheduling software should be interoperable with the wss Agenda Manager product.

conformité (compliance) : The value for the worst-case stopping distance between successive trains shall be compliant with international railways regulations.

architecture : The meeting scheduling software should cooperate with email systems and e-agenda managers of participants distributed worldwide.

développement : The train control software should be operational within two years.

4- Mauvais besoins

Omission	No requirement about the expected state of train doors in case of emergency stop.
Contradiction	<p>Train doors must always be kept closed between stations.</p> <p><i>And elsewhere:</i></p> <p>Train doors must be opened once a train is stopped after an emergency signal.</p>
Inadequacy	<p>If a book copy has not been returned one week after the third reminder has been issued, the negligent borrower shall be notified that he or she has to pay a fine of £X.</p> <p><i>Rather than</i></p> <p>If a book has not been returned one week after the third reminder has been issued, a fine of £x shall be retained from the borrower's registration deposit and a notification will be sent to the borrower.</p>
Ambiguity	<p>Train doors shall be opened as soon as the train is stopped at a platform.</p> <p><i>(Possible interpretations:)</i></p> <p>The front of the train is (stopped) at a platform <i>or</i> The whole train is (stopped) at a platform?</p>
Unmeasurability	Information panels inside trains shall be user-friendly.

Noise	Every train car will be equipped with a software-controlled information panel together with non-smoking signs posted on every window.
Overspecification	The <code>setAlarm</code> method must be invoked on receipt of a <code>stopAlarm</code> message.
Unfeasibility	The meeting scheduler will also make travel arrangements such as flight, car and hotel reservations for every participant who needs to travel to attend the meeting.
Unintelligibility	A requirement statement containing five acronyms.
Poor structuring	Intertwining of book acquisition and loan management aspects.
Forward reference	Multiple uses of the concept of 'participating in a meeting' in the requirements document and then, several pages later, the definition: A person <i>participates</i> in a meeting if he or she attends that meeting from beginning to end.
Remorse	After multiple uses of the undefined concept of 'participating in a meeting', the last one is directly followed by an incidental definition between brackets such as: (a person <i>participates</i> in a meeting if he or she attends that meeting from beginning to end).
Poor modifiability	Use of fixed numerical values for quantities throughout the requirements document (e.g. for <i>maximum loan period</i> , <i>meeting notification deadline</i> or <i>train speed thresholds</i>), when such values are subject to change over time or from one variant to another.
Opacity	A requirement such as: the commanded speed of a train must always be at least 7 mph above its physical speed, without any contextual information about the origin of and rationale for this requirement, and its impact on other requirements.

5- Exemple d'un mauvais besoin

A famous example is the Lufthansa A320 Airbus flight to Warsaw, in which the plane off the end of the runway, resulting in injuries and loss of life. The reverse thrust was disabled for up to nine seconds after landing on a waterlogged runway (Ladkin, 1995). In terms of the satisfaction argument, the problem might be recollected in simplified form as follows (Jackson, 1995a). The autopilot had the system requirement that reverse thrust be enabled if and only if the plane is moving on the runway:

(SysReq:) *ReverseThrustEnabled SSI MovingOnRunway*

The software requirement given to developers in terms of software input/output variables was:

(SoJReq:) *reverse = 'on' SSI WheelPulses = 'on'*

An argument that this software requirement entails the corresponding system requirement had to rely on assumptions on the wheels sensor and reverse thrust actuator, respectively:

*(Asm:) WheelPulses = 'on' SSI WheelsTurning
reverse= 'on' SSI ReverseThrustEnabled,*

together with the following domain property:

(Dom:) MovingOnRunway SSI WheelsTurning

This domain property proved to be inadequate on the waterlogged Warsaw runway. Due to aquaplaning, the plane there was moving on the runway without wheels turning.

6- Un autre exemple de mauvais besoin

A similar case occurred recently where a car driver was run over by his luxurious computerized car while opening a gate in front of it. The software controlling the handbrake release had the system requirement:

'The handbrake shall be released if and only if the driver wants to start.'

The software requirement was:

'The handbrake control shall be "off" if and only if the normal running of the motor is raised.'

The assumption that

'The driver wants to start if and only if he presses the acceleration pedal'

is adequate; but the domain property stating:

'The normal running of the motor is raised if and only if the acceleration pedal is pressed'

proved to be inadequate on a hot summer's day. The car's air conditioner started automatically, due to the car's door being open while the driver was opening the gate in front, which resulted in the normal running of the motor being raised and the handbrake being released.