Software Requirements Elicitation Techniques

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Software requirements are engineered by iteratively following the below mentioned activities:

i) Software Requirements Elicitation
ii) Software Requirements Analysis
iii) Documenting Software Requirements Specifications

This paper focuses on the first activity above, namely, the Software Requirements Elicitation and attempts to describe and illustrate a set of questionnaire that can be used either,

i) while interviewing the business users or
ii) while studying the reference documents provided by the business users,

in order to understand the operations of the business users in a top-down fashion and gradually drill down into the details of the functions that need to be automated. Such a top-down approach will enable the software developers to cope with and manage the complexity of the business operations, which need to be automated, through divide-and-conquer technique until unambiguous, correct, complete, consistent and verifiable 'situation-response sequences' tagged with priorities and traceability are elicited, documented, reviewed and approved.

The outcome of the elicitation sessions is to come-up with,

a) Minutes-of-Meeting document after each interview session, and
b) Software Requirements Specifications document (in IEEE standard format),

which are reviewed and approved by the head of the business users' community.

Questionnaire for eliciting Software Requirements Specifications:

This questionnaire can be iteratively used to elicit software requirement specifications in an incremental fashion until the software development team gets a nearly complete set of requirements, which are unambiguous, correct, consistent and approved by the business users' head.

Q1. Getting to know the purpose of going in for the automation project:

(a) What is the purpose of undertaking the automation project?

(b) Are there specific goals / objectives to be achieved out of this investment? Are there major bottlenecks / pain-points to be addressed? What among these are quantifiable goals?

These questions lead you to identify the goals that the 'To-Be-Developed' software package is expected to satisfy. These goals often have an impact on the architecture of the TBD software as well as on the non-functional quality attributes and the priorities within each phase of RUP-based development.

Q2. Getting an overview of the high-level business processes:

(a) Can you give us an outline of the major business processes of within your operations?

(b) Can you prioritize these business processes from the point of view of the automation project?

(c) Are there any business manuals that will facilitate the task of understanding the business processes?

Q3. Getting to know the software product perspective:

(a) What are the major facilities expected from the TBD software package?

(b) In your view, who are the major categories of business users to be benefited from the above facilities?

These questions lead you to identify the software product perspective and product scope within each RUP phase.

Q4. Getting the business activities within each of the business processes:

(a) Can you give us the flow of activities within each of the high priority business processes?

(b) Would any of the business activities within a business process remain manual even after automation? If so, why?

(c) What are major information records being created, processed and stored as part of each business process?

(d) Can you give us sample copies of these information records?

Q5. Extracting the Situation-Response-Sequences:

(a) For each activity identified in Q4 (a), can you describe to us the sequence of 'situation of the business / environment', the action performed by the user, 'response expected from the TBD software'?

(b) Are there any sets of business rules applied during the above 'situation-response' sequences? Are these business rules documented in any business manual?

(c) For each sequence of 'situation-response', can you show us the details of the information records being created / modified / deleted / stored?

(d) Are there any interactions with external hardware devices / software packages that are required in order to complete the above 'situation-response' sequences?

These questions lead you to extract the 'situation-response' sequences, the user-interfaces, the external interfaces and business rules of each business activity of each business process.

Q6. Arriving at the non-functional requirements:

(a) Keeping in mind the goals of this automation exercise (as discussed in Q1 above), can you help us to come-up with what software quality attributes (such as the performance, security, etc.) that must be satisfied by the TBD software?

(b) To come-up with specifications for the performance attribute, can you describe to us, the average and peak load on the TBD software in terms of,
   a. The concurrent users of the software during normal and peak hours,
   b. The average number and maximum number of data records that the TBD software needs to deal with,

c. The average and maximum throughput per day (or week) that the TBD software has to deliver?

(c) Under the average and peak load conditions as described above in Q6 (b), can you state the expected turn around time, in terms of average and worst-case expectations?

(d) Similarly, can you help us to come-up with specifications for the other software quality attributes that are identified above in Q6 (a)?

These questions lead you to identify the software quality attributes that must be addressed during the development and maintenance phases, and to come-up with the specifications for each of these quality attributes, under the average and worst-case situations.