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**Chapter 4**

4.1 Under what circumstances is it appropriate to represent an SRS using informal techniques only?

It would be appropriate to represent an SRS written with informal techniques during the requirements analysis and agreements phase of requirements engineering. During both of these processes, the customers and other stakeholders should be able to easily understand the requirements so that the former can be sure that the latter have properly translated their needs. Another instance where representing an SRS informally would be if you are writing a behavioral specification (since they are identical) and in the discovery phase. During this time, the engineer is trying to guess how the system should behave, so there may still need to be some discussion with the stakeholders. Of course, once the discovery phase is complete, the document should be updated using formal methodologies.

4.2 What can the behavioral specification provide that a requirements document cannot?

Something the behavioral specification will provide that a requirements document cannot, or may not, is an understanding of unexpected behavior. If the system is already developed and no useful requirement exists, there may be a gap in knowledge between what a certain piece of the system should be doing versus what it is actually doing and why. Another piece of information unique to the behavioral specification may be specific requirements for a given state of the system when influenced by user input. When looking through a user manual, for example, behavioral requirements can be extracted for each specific way that a user may be able to interact with the system. Whereas in a requirements specification, it may only have the requirement rather than the requirement relating to a specific state.

4.3 If the customer requests that future growth and enhancement ideas be kept, where can these ideas be placed?

A good place to keep track of future growth opportunities would be in user stories. User stories are great for representing goals for the system at every given iteration.

4.5 Here are some more examples of vague and ambiguous requirements that have actually appeared in real requirements specifications. Discuss why they are vague, incomplete, or ambiguous. Provide improved versions of these requirements (make necessary assumptions).

| 4.5.1 The tool will allow for expedited data entry of important data fields needed for subsequent reports. | * “will” - should be in shall form * “expedited data entry” - vague. It should include a specific time metric. * “important data fields” - vague/incomplete. It should specify the necessary fields * “subsequent reports” - irrelevant. Are the report names relevant to the requirement of increased speed of the data fields? | The system shall handle a 30% increase of speed for entry of data fields X, Y, Z. |
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| 4.5.2 The system will provide an effective means for identifying and eliminating  undesirable failure modes and/or performance degradation below acceptable limits. | * “will” - should be in shall form * “effective means” - ambiguous. It should specify the approach. * “failure modes and/or performance degradation below acceptable limits.” - using ambiguous logical statements * “below acceptable limits.” - vague. It should specify the acceptable limits | Assume “undesirable failure modes” are defined elsewhere in the document  The system shall identify undesirable failure modes  The system shall eliminate undesirable failure modes  The system shall perform within 100ms |
| 4.5.3 The database creates an automated incident report that immediately alerts the necessary individuals. | * Doesn’t use shall statement * “That” - vague pronoun * “necessary individuals” - ambiguous. These individuals should be explicit | The system shall alert the administrator group when an incident report is generated  The system shall automatically generate an incident report |
| 4.5.4 The engineer shall manage the system activity, including the database | * “manage the system activity” - vague. It is not verifiable. What does the term manage specifically entail? * Not centered around the system | Assume “system operation” is defined elsewhere in the document  The system shall be operated by the engineer |
| 4.5.5 The report will consist of data, in sufficient quantity and detail, to meet the requirements | * “will” - should be in shall form * “sufficient quantity” - ambiguous. What is the exact quantity? * “And” ambiguous logical statement | The system shall generate a report containing 10 of the most recent log reports  The system shall capture the previous 20 lines of the stack trace in a log report |
| 4.5.6 The data provided will allow for a sound determination of the events and conditions that precipitated the failure. | * wa“will” - should be in shall form * “sound determination of the events and conditions” vague/ambiguous - how will the system determine the event/conditions? * “that” - vague pronoun | The system shall store function stack after a failure |
| 4.5.7 The documented analysis report will include, as appropriate, investigation findings, engineering analysis, and laboratory analysis. | * “will” - should be in shall form * “as appropriate” - loophole * Long winded statement * “And” - ambiguous logical statement | Assume structure of a “documented analysis report” is defined elsewhere  The system shall contain a documented analysis report |

**Chapter 5**

5.3 List five NFRs for an autonomous passenger automobile. How would these differ (if at all) for an autonomous delivery truck?

Five NFRs for an autonomous passenger automobile (APA) would include:

* Safety: This would have to be the number one NFR. The APA system shall transport adults, children, the elderly safely from point A to point B
* Performance: The APA shall operate to performance requirements of the environment in rain, snow, or sunshine.
* Interoperability: The system shall work seamlessly with other travel related systems such as GPS monitoring and mapping software. It will operate flawlessly with other systems in the environment, i.e. other vehicles (autonomous or not)
* User Experience: The APA must be comfortable, easy to use, and a positive experience overall for the different types of stakeholders that use the system. Adults need to be able to easily operate it, children need to be comfortable while riding, people with disabilities should easily be able to operate and ride in the system, etc.
* Reliability: The system should behave as expected every time. It should be able to operate whenever the user needs it and it should be able to complete any journey without failure.

Some of these would differ from an autonomous delivery truck (ADT). Let’s assume this is a local ADT, like an Amazon or UPS delivery style truck. The focus for User Experience wouldn’t necessarily be comfort for children or multiple occupants, rather it would be more focused on the courier. The reliability NFR might be more focused on short term rides since maintenance can be done at night when packages aren’t being delivered. I didn’t mention security as an NFR for the APA, but the security for an ADT would also be different. It will contain addresses of clients, so that data would need high security.