Lesson 4

Systems Analysis and Requirements:

Self-Referral Dynamics Present At Every Point Of Creation

Problem Analysis

1. First step in a project is to understand the problem to be solved or the opportunity to be realized. This is accomplished by System Analysts in conjunction with stakeholders

2. This step is known as Problem Analysis. Performing this analysis requires sufficient knowledge of the domain. The problems to be solved must be agreed upon by all stakeholders of the system.

Who Are The Stakeholders?

1. A Stakeholder is anyone who represents an interest group whose needs must be satisfied by the project. The role may be played by anyone who is (or potentially will be) materially affected by the outcome of the project.

2. Different projects may have widely varying stakeholders, and stakeholders may belong to seemingly unrelated groups. Determination of the stakeholders for a project requires careful consideration for each project.

3. Typical examples of interest groups that might be considered Stakeholders for a project:

- Customer or customer representative
- User or user representative
- Investor
- Shareholder
- Owner
- Board member
- Production manager
- Buyer
- Designer
- Tester
- Documentation writer

Using a Business Model For Domain Knowledge

1. In order for to acquire sufficient domain knowledge, it is sometimes necessary to build a Business Model, which captures the relationships and dynamics of the relevant current business processes. This is done by a Business-Process Analyst.

2. The same tools that are used for performing analysis for the new system are often used to understand the "as-is" set of business processes.

3. Relevant artifacts for Business Models include Business Use Case model, Business Glossary, Business Analysis Model (including sequence and class diagrams), Business Vision, and Business Rules.

Problems → Needs → Features

1. Problems to be solved are typically reformulated as *user needs*, and from these, an initial set of *features* for the new system are listed.

2. Each of these steps of refinement moves in the direction of a concrete specification of requirements for the system. In fact, the goal of System Analysis is ultimately a Software Requirements Specification.

3. The difference between Problems, Needs, and Features is a matter of both detail and orientation. Every problem should be mapped to one or more needs, and every need should be mapped to one or more features that would meet the need.

4. Example:

Problem	Need	Feature
Paper catalogs are clumsy and unsatisfactory to customers	Online catalog	a) System should support online browsing of catalog b) System should support online purchases
System response time is too slow	The part of order processing that depends on paper processing needs to be automated	System should permit orders to be submitted online. Order fulfillment staff should be able to access orders that are stored via a handheld device.

The Vision Document

1. The main artifact emerging from Problem Analysis is the Vision Document.

2. The Vision Document documents the problem, the key needs and features, the business case for the project, and clarifies the scope of the project. It also provides a list of the stakeholders.

3. From RUP:

   “The Vision Document defines the stakeholders’ view of the product to be developed, specified in terms of the stakeholders’ key needs and features. Containing an outline of the envisioned core requirements, it provides the contractual basis for the more detailed technical requirements.”

4. The Vision document is a primary goal of the Inception phase of development.

Needs And Features → Requirements

1. The Needs and Features discussed in the Vision document are further refined into a list of detailed requirements.

2. Requirements differ from needs and features in the following important way: Requirements are *testable.*

3. Example:

Needs/Features from Vision Doc	Software Requirements
Feature 6.1 The defect-tracking system will provide trending information to help the user assess project status	SR6 3.1 Trending information will be provided in a histogram report shoing time on the x-axis and the number of defects found on the y-axis SR6 3.2 The user can enter the trending period in units of days, weeks or months SR6 3.3 An example trend report is shown in attached Figure 1.

Requirements Elicitation

1. Requirements elicitation has inherent challenges because stakeholders are not typically accustomed to thinking about or discussing the kinds of ideas that lead to a software solution. Therefore, requirements (as well as needs and features) often need to be *elicited.*

2. Techniques for eliciting requirements:
    a. Interviewing
    b. Requirements workshops
    c. Brainstorming
    d. Use Cases
    e. Role playing (become the user for awhile)
    f. Prototyping