Analysis Concepts and Principles
Chapter 11 Pressman
Chapter 4 Sommerville

- **Process of requirements derivation has four principal stages:**
  - **feasibility study**
  - **Requirements capture and analysis**
  - **definition**
  - **specification**

Feasibility study

- **Purpose:**
- **the purpose of the feasibility study is essentially to figure out whether the project is possible given the constraints, and in that case, the cost of the project.**
- **Carried out on the basis of problem request/problem statement**

- one / two page Problem Request

Examples of Problem Request/Statement of Purpose

- **A Station Management system is required to handle ticketing and passenger entry and exit at a large railway station. Up to date financial information must be available to station management at all times.**

- **Program to play 'Hangman' which will run on PC is required.**

- **A library management system is required to support the indexing, searching, reservation and loaning of library items including books, journals, audio and video cassettes, floppy and CD disks, and Thesis copies.**

Three categories of users, i.e., Faculty, Staff and Students and three types of loans Standard loan, Short loan and Over-night loan are to be supported. Loaning management also includes a fine scheme for late returns.

International library numbering system for library items is to be used. All the library administration operations must be supported.

- **A Student's Record System is required which keep the record of the students from when they are admitted to a university till they finish their studies and leave. The system keeps the record of the personal details, and keeps track of all academic undertakings exams and grades achieved for each students during each semester. The system also produces a yearly performance report for each student at the end of each year of study. At the end the degree an overall performance transcript for each student is produced**

Feasibility study

- **Activities**

- **The activities are estimation of resources needed for the project, such as personnel, time, equipment, system size, investments, hardware, etc.**
- **In some cases, these activities pose little or no problem - Compiler**
- **In other cases, estimating resources is hard, if not impossible - military aircraft**

Feasibility study

- **Documents**
- **The documents produced after the feasibility study may vary depending on the development situation and the specific project. Some examples are**
  - **Justifications of final product vs. cost**
  - **Time savings**
  - **Market polls**
  - **Cost/revenue analyses**
- **The size of such documents may vary greatly from a few hundred pages or less to several thousand pages produced over two or more years**

Feasibility study

- **Problems**
- **Lack of objectivity due to bias because same people are involved**
- **Very few feasibility studies result in canceled projects, even though that would be the wisest thing to do.**
- **Common difficulties in this phase are:**
  - **that the customer does not know what he or she wants**
  - **Language problems**

- **Requirements Analysis**
  - **The first technical step in the software engineering process**
- **It is a process of**
    - **discovery**
    - **refinement**
    - **modeling**
    - **specification**
  - **Both developer and customer take an active role**

Requirements Analysis

- **Areas of Effort**
  - **Problem Recognition**
    - **study system specification and project plan**
    - **communication for analysis**
    - **recognition of the basic problem elements as perceived by the user/customer**

Requirements Analysis

- Problem Evaluation and Solution Synthesis
  - focus on “what”
    - data objects, info flow, functions, behavior, interface, constraints
  - architecture for implementation
- Modeling
- Specification
- Review
  - prototyping

Communication techniques

- **Initiating the Process**
  - **conduct a preliminary meeting or interview**
- **Context-Free Questions**
  - **focus on customer, goals, and benefits**
  - **example**
    - **Who is behind request for work?**
    - **Who will use solution?**
    - **What are Economic Benefits of successful solution?**
    - **Is there an alternate source for solution?**

Preliminary Meeting/Interview

- **Focus on Problem and Solution**
  - **What are characteristics of "good output"?**
  - **What problem(s) will this solution address?**
  - **What is the environment where solution will be used?**
  - **Are there special Performance Issues or Constraints?**

Preliminary Meeting/Interview

- **Focus on the Effectiveness of the Meeting**
  - **Are you the right person to answer these questions?**
  - **Are your answers “official”?**
  - **Are my questions relevant to problem?**
  - **Am I asking too many questions?**
  - **Is there anyone else who can provide more information?**
  - **Is there anything else I should be asking you?**

- **This Q and A approach is used for the first encounter only and is then replaced by a meeting format aimed at:**
  - **problem solving:**
  - **negotiation**
  - **specification**
- **Two popular approaches**
  - **FAST**
  - **QFD**

FAST

- **Facilitated Application Specification Techniques [FAST]**
  - **create a joint team of customers and developers**
    - **identify the problem**
    - **propose elements of the solution**
    - **negotiate different approaches**
    - **specify solution requirements**

FAST

- **Basic Guidelines**
  - **Both customers and developers meet at a neutral site**
  - **Rules for preparation and participation are established**
  - **Agenda**
    - **Formal enough to cover all important points**
    - **Informal enough to encourage free flow of ideas**

FAST Basic Guidelines

- A “facilitator” controls the meeting
  - Customer
  - Developer
  - Outsider
- A “definition mechanism” is used
  - Work Sheets
  - Flip Charts
  - Wall Stickers
  - Wall Board

- **Inputs to FAST**
  - **Problem Request**
  - **Information gathered in Preliminary Interviews**

- **Problem statement characterized by**
  - **ambiguities**
  - **ommissions**

- **Before FAST meeting each attendee makes lists of**
  - **objects**
  - **services**
  - **performance criteria**
  - **Constraints**
- **Combined List produced**
- **Sub teams prepare mini specifications for all entries**
  - **this uncover new objects, services etc.**

Quality Function Deployment

- **Quality Function Deployment**
  - **translate the needs of the customer into requirements for software**

Quality Function Deployment

- **Requirement Types**
  - **Normal Requirements**
    - **Customer Satisfied if present**
  - **Expected Requirements**
    - **Implicit, Fundamental**
    - **Significant dissatisfaction if absent**
  - **Exciting Requirements**

Quality Function Deployment

- **Steps**
  - **Function Deployment - value**
  - **Information Deployment- I/O**
  - **Task Deployment - behaviour**
  - **Value Analysis- priority**
  - **Customer Voice Table - requirements**