Chapter 3: Conceptual and Detailed System Design

Instructor:
Navin Gautam
Lecturer, Kantipur Engineering College
Email: navingautam84@hotmail.com
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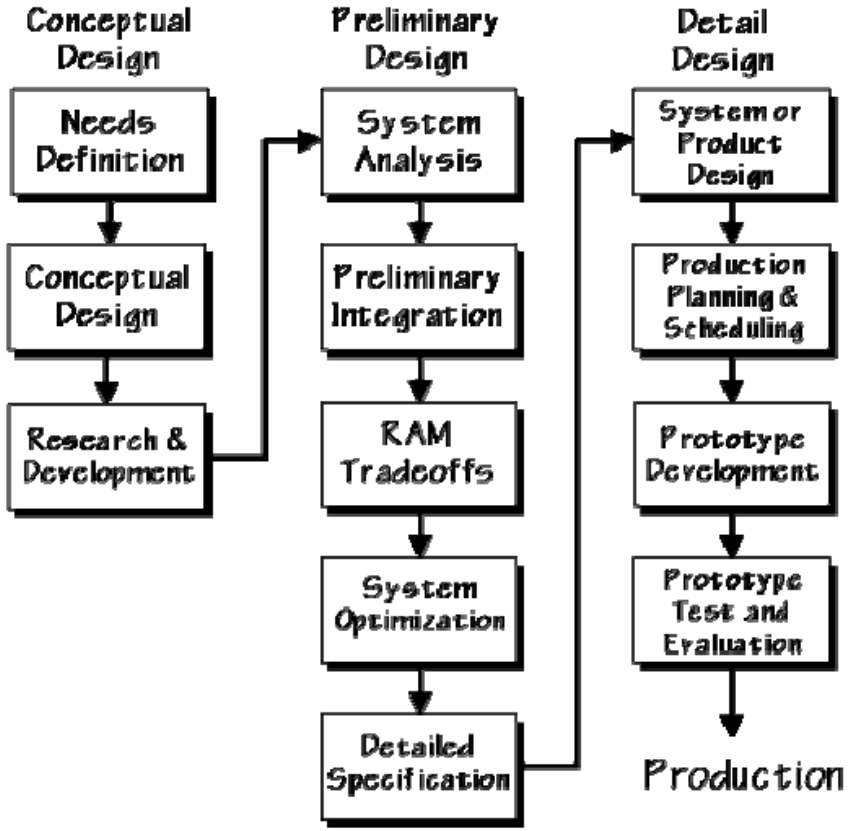
Introduction

- System design is a fluid process



Block Diagram of System Design

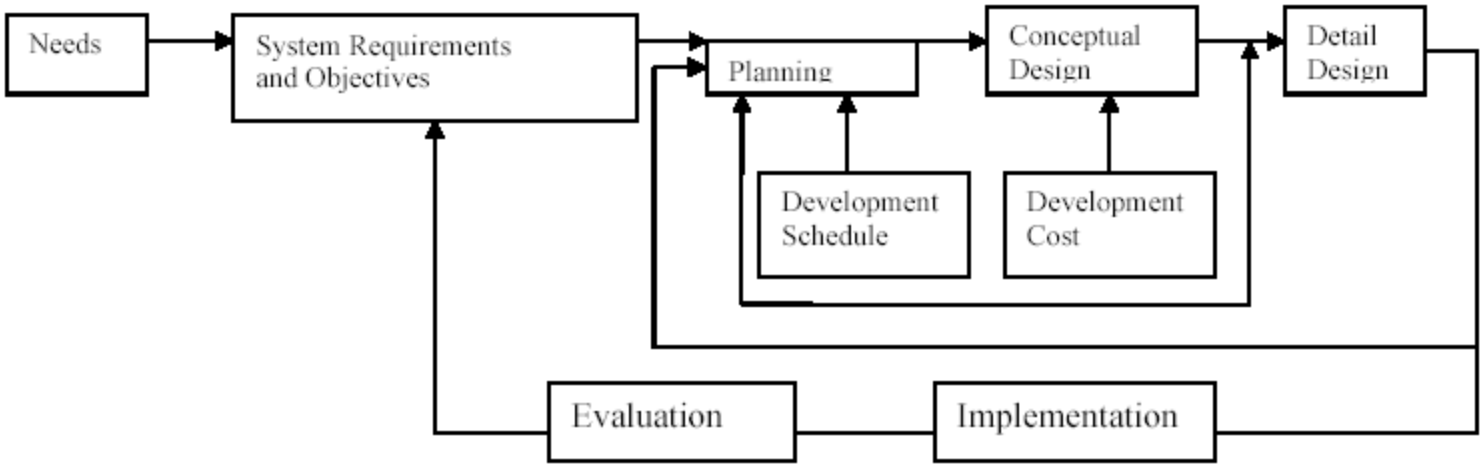
Conceptual Design

- Aka High level design or gross design or feasibility design
- Needs definition
  - Identify user needs and requirements, equipment performance specifications, regulatory constraints, market conditions and other factors impacting the system's performance
- Early research and development
- Conceptual design
  - Permits integration of technologies with user requirements
  - Development of an overview of what system looks like prior to hard tradeoffs
  - Serve as basis for go/no-go decision

Conceptual Design (Contd…)

- Formal steps of conceptual design
  - Defining problem in more detail
  - Refining management objectives to set system objectives
  - Establishing system constraints
  - Determining information needs
  - Developing alternative designs and selecting one
  - Documenting the conceptual design
- Successful conceptual design makes sure that information system can successfully be constructed
- Conceptual design is the centerpiece of the information system process

Conceptual Design (Contd…)



Block diagram of information system design

Definition of Problem

- First step in formulating problems to be solved
- Problems lead to objectives, from objectives derived plans are described
- Associated with objectives and plans are information needs
- Information needs are the problems to be solved by the IS functions
- The general statement of needs is rarely clear enough to start the design process
- Go through an iterative process of:
  - Stating the information needs
  - Asking the question about that need
  - Suggesting interpretation of that need
  - Detailing the original statement
  - Reviewing the more detailed statement need with management
- ***Cause and effect analysis:*** Leads to true understanding of problem that can lead to more creative and valuable solution

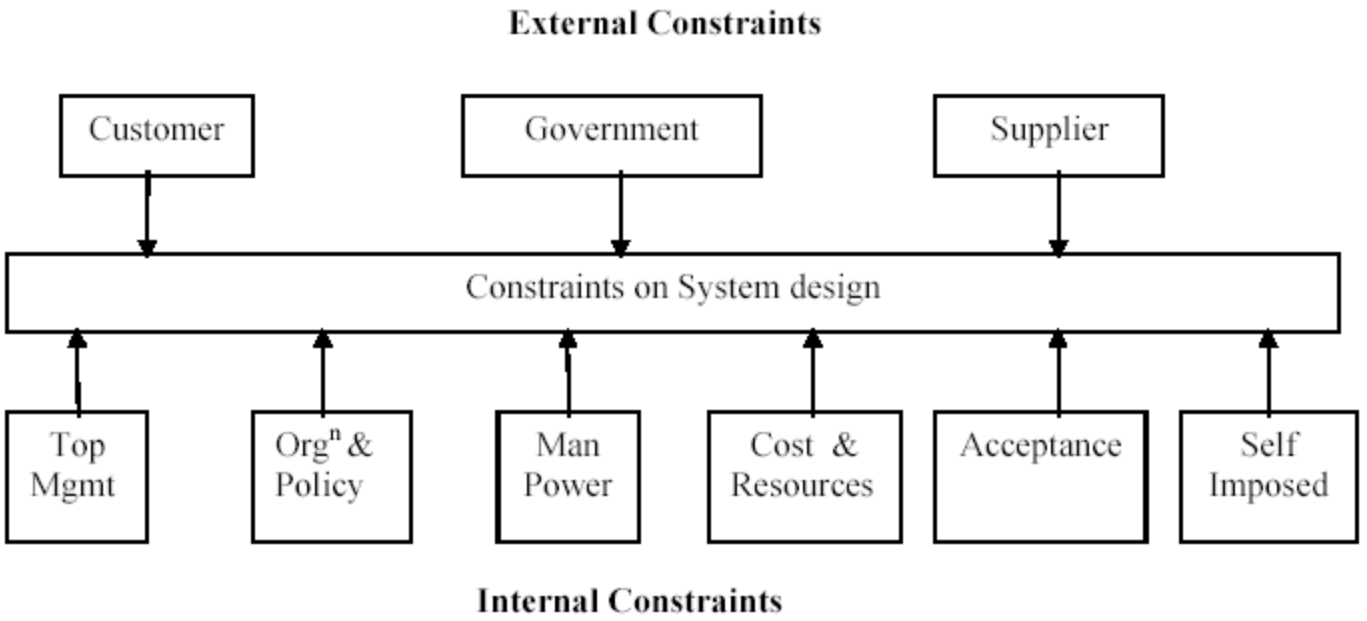
Set system objectives

- It is something that you expect to achieve if given sufficient resources
- Objectives are measures of success
- Considerations to be made:
  - For each verified and significant problem, the analyst and user should define specific system development objectives. Also, the constraints which may limit or prevent them from achieving the objectives should be defined
  - Objectives should be precise and measurable
  - Today's system design must take account of tomorrow's environment

Establish System Constraints

- Constraints are something that will limit your flexibility in defining a solution to your objectives
- Constraints define the problem bounding or restriction
- Constraints enable designer to specify the condition under which objectives may be obtained and to consider the limitation that restrict the design
- Identification of the problem and setting objectives may be evident, but the situation is not always easy. Establishing the constraint will help you ensure the design is realistic

Establish System Constraints (Contd…)



External and Internal Constraints

Develop Alternative Conceptual Design

- Creative process that involves synthesizing knowledge into particular patterns
- The concept of IS would consists of major decision paints, patterns of information flow, channels of information and roles of manager functional operating system both existing and planned
- The concept is the sketch or skeleton of any IS, guiding restring the form of detailed design
- Conceptual design: skeleton and detailed design: flesh
- Contenders have pros and cons

Develop Alternative Conceptual Design (Contd..)

- When there are several good contenders, careful evaluation of each is required. The most practical are:
  - Compare the anticipated performance of the conceptual design with the objectives of the system as previously developed
  - Prepare the rough or preliminary cost effectiveness analysis of the system. This faces some quantified comparisons among system.
  - Identify the strong or weak point of each conceptual design.
  - Exposed the conceptual design in more detail if none of these provides the preferred design.

Develop Alternative Conceptual Design (Contd..)

- To analyze the candidate solutions (alternative concepts), we can use
  - Candidate System matrix
  - Feasibility Analysis matrix

Develop Alternative Conceptual Design (Contd..)

- Candidate System matrix:-
  - Candidate System matrix documents similarities and differences between alternative designs, however it offers no analysis.
  - Approaches for identifying candidate solution:
    - Recognizing ideas and opinions expressed by user.
    - Consulting methodology and architecture standards.
    - Brainstorming possible solutions.
    - Seeking References.
    - Browsing appropriate journals and periodicals.
- Feasibility Analysis matrix:
  - This method makes analysis and ranking of each alternative conceptual design.

Documentation

- More detailed description of the system concept such as
  - Flowchart or other documents of the flow of the information through the system
  - The inputs and outputs
  - A narrative description of the operation
- Managers participation is must for the system design
- The manager should be involved so that details to be worked out later by the designer include explicit instructions like
  - What date are to be captured and why?
  - The details of how processing is to be done
  - What output will be generated by the system
  - How the output files are to be distributed

Documentation (Contd…)

- The topics to document for managerial concerns are:
  - General system flow/flowchart : the data processing logic and information flow
  - System inputs : sources of inputs, consistency in inputs
  - System outputs: output data definition, report generation.

Detail Design

- Includes completion of system or product design, production planning, prototype development, and final testing and evaluation. T
- Output: a set of production-ready plans and specifications and usually a prototype system
- The following functions are performed during this phase
  - System Design
  - Production Planning and Scheduling
  - Prototype Development
  - Prototype Testing and Evaluation