BIT 1st Year

Semester 2

IT 2405

Systems Analysis and Design

Chapter 6

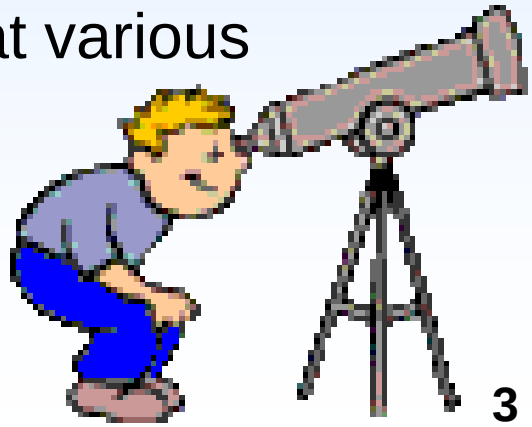
Decision Analysis Phase

- Given the Business Requirements for an improved Information System,
  - Address how the new system (including computer based alternatives) might me implemented with technology.
- Purpose of this phase is to identify candidate solutions, analyze them, and recommend a target system that will be designed, constructed, and implemented.

Feasibility Study

- **Feasibility**
  - The measure of how beneficial / practical an information system will be to an organization
  - Should be measured through out the life-cycle

- **Feasibility Analysis**
  - The process by which the feasibility is measured
  - An ongoing evaluation of feasibility at various checkpoints in the life cycle



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Feasibility Checkpoints in the Software Development Life Cycle

- Feasibility of a project can be changed during the system development.
- For reevaluate feasibility, there are different checkpoints in the development.
- A project may be canceled, revised or continued at any checkpoint, despite whatever resources have been spent.

Feasibility Checkpoints

- Systems Analysis – Scope Definition Checkpoint
- Systems Analysis – Problem Analysis Checkpoint
- Systems Design – Decision Analysis Checkpoint

Scope Definition Checkpoint

- Measure of the urgency of the problem.
- Find the first-cut estimate of development costs.
- Answer the question,
  - Do the problems warrant the cost of a detailed study & analysis of the current system?

Problem Analysis Checkpoint

- Occurs after a more detailed study and problem analysis of the current system
- Can make a better estimate of the development cost and benefits

Minimum Value of solving a problem = cost of problem

Decision Analysis Checkpoint

- Represent major feasibility analysis activities
- Charts one of many possible implementations as the target
- Alternate solutions are defined in terms of,
  - Input/Output methods
  - Data storage methods
  - Hardware requirements
  - Software requirements
  - Processing methods
  - People implications

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Decision Analysis Checkpoint

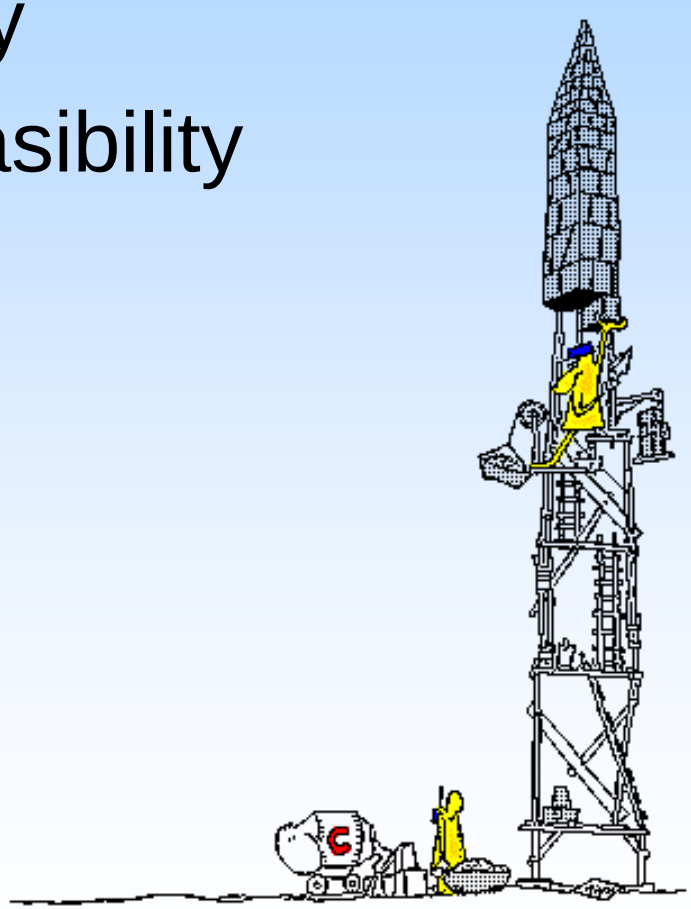
Range of options – Evaluated by the analyst

- Leave current system alone
- Re-engineer the manual process
- Enhance existing computer processes
- Purchase packaged software
- Design and construct a new computer-based system

After defining these options, each option should be analyzed.

Tests for Feasibility

- Operational Feasibility
- Cultural / Political Feasibility
- Technical Feasibility
- Schedule Feasibility
- Economic Feasibility
- Legal Feasibility

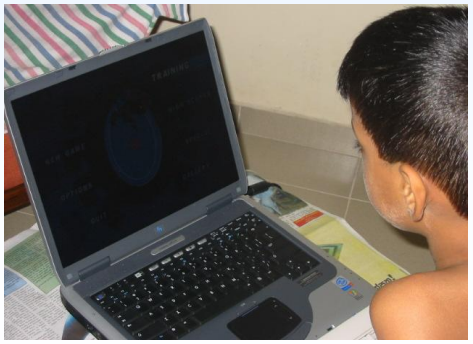


Operational feasibility.

- A measure of how well a solution meets the identified system requirements to solve the problem.

- Take advantage of the opportunities identified during the scope definition and problem analysis phases.

  - Will the solution fulfill the users' requirements? To what degree?
  - How will the solution change the users' work environment?
  - How do users feel about such a solution?



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Cultural (or Political) Feasibility

- A measure of how well the solution will be accepted in a given organizational climate
- Deals with how the end users feel about the proposed system.
- Evaluates whether a system will work in a given organizational climate.

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Technical feasibility.

- A measure of the
  - Practicality of a technical solution
  - Availability of technical recourses and expertise

- Addresses three major issues
  - Is the proposed technology or solution practical?
  - Do we currently possess the necessary technology (Hardware/Personnel) ?
  - Do we possess the necessary technical expertise?

Schedule feasibility

- A measure of how reasonable a project time table is.
  - Can the solution be designed and implemented within an acceptable time period?
  - how much time is available to build the new system?
  - when it can be built ?

- Mandatory / Desirable deadlines.

Economic feasibility.

- a measure of the cost-effectiveness of a project
  - Is the solution cost-effective?
  - Whether the solution will pay for itself?
  - How profitable the solution is?

- Once the specific requirements and solutions have been identified
  - Weight the costs and benefits of each alternative (Cost benefit Analysis)

e.g. Personnel cost, Computer cost, Training, Software, Tangible and Intangible benefits

Legal Feasibility

- A measure of how well a solution can be implemented within existing legal and contractual obligations.

- understand potential legal and contractual ramifications of the system
  * copyright law
  * non-disclosure clauses and non-compete clauses
  * code ownership (if developed with outside assistance) -- be VERY specific
  * labor laws
  * foreign trade, and labor regulations
  * Financial & Accounting standards
  * governmental constraints, and pending legislation

Cost Benefit Analysis

- Determines the cost effectiveness of a project or solution
- The purpose of a cost/benefit analysis is to answer questions such as:

  - Is the project justified (because benefits outweigh costs)?

  - Can the project be done, within given cost constraints?

  - What is the minimal cost to attain a certain system?

  - What is the preferred alternative, among candidate solutions?

How much will the system cost?

- Two types of costs, costs associated with
  - Developing the system
    - Can be estimated from the outset of a project
    - Should be refined at the end of each phase
    - One time costs (will not recur after the project has been completed
  - Operating a system
    - Can be estimated only after specific computer-based solutions have been defined
    - Recur throughout the lifetime of the system

How much will the system cost?

- System development Cost Categories
  - Personnel costs
  - Computer Usage
  - Training
  - Supply, duplication, and equipment costs
  - Cost of any new computer equipment and software

What benefits will the system provide?

- Benefits
  - increase profit
  - Decrease costs
  - Can be classified as
    - Tangible benefits – a benefit that can be easily quantified.
    - Intangible benefits – a benefit that is believed to be difficult or impossible to quantify

Is the proposed system cost effective

- Cost effectiveness techniques
  - Payback Analysis
  - Return on Investment Analysis
  - Net present value Analysis

Payback Analysis

- A technique for determining if and when an investment will pay for itself
- How long will it take (usually, in years) to pay back the project, and accrued costs:
  - Total costs (initial + incremental) - Yearly return (or savings)

Return-on-Investment (ROI) Analysis

- A technique that compares the lifetime profitability of alternative solutions

$$\frac{\text{Lifetime benefits - Lifetime costs}}{\text{Lifetime costs}}$$

Net Present value Analysis

- Compares the annual discounted costs and benefits of alternative solutions
- Spreadsheets such as Excel, Lotus 1-2-3 can be used to calculate all these values

Feasibility Analysis of Candidate systems

- During the decision analysis phase of system analysis,
  - Identifies candidate system solutions
  - Analyses the solution for feasibility
- Can use two alternatives to compare and contrast candidate system solutions
  - Candidate System Matrix
  - Feasibility Analysis Matrix

} **Use A Matrix Format**

Candidate Systems Matrix

- Used to document similarities and differences between candidate systems
  - Compare candidate systems
  - Offers no analysis
  - Columns represent candidate solutions
  - Rows represent characteristics that differentiate the candidates

Candidate Systems Matrix

- Example

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Template

Candidate Systems Matrix

- Example

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Identify how the system will interact with people, and other systems

Template

Candidate Systems Matrix

- Example

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communicatio			

**Identify how data stores be implemented,
inputs will be captured,
outputs will be generated**

Template

Candidate Systems Matrix

- Example

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Identify How (manual) business process will be modified, how computer processes will be implemented

Template

Candidate Systems Matrix

- Example

	Candidate 1 Name	Candidate 2 Name	Candidate 3 Name
Stakeholders			
Knowledge			
Processes			
Communications			

Identify how processes and data will be distributed.

Template

Feasibility Analysis Matrix

- Used to rank candidate systems
  - Columns represent candidate response
  - Rows correspond to the feasibility criteria
  - Cell contain the feasibility assessment notes for each candidate

Feasibility Analysis Matrix

	Weighting	Candidate1	Candidate2	Candidate3
Description				
Operational Feasibility				
Cultural Feasibility				
Technical Feasibility				
Economic Feasibility				
Schedule Feasibility				
Legal Feasibility				
Weighted Score				

The System Proposal

- A report / presentation of a recommended solution
- Usually a formal written report or oral presentation
- Intended for system owners and users

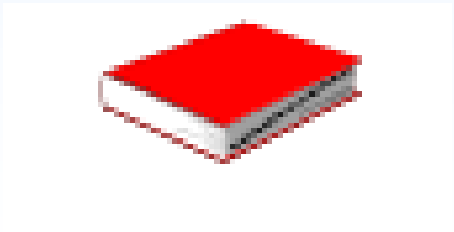
Formal written report

Oral presentation

System owners And End Users

Written Report

- The most abused method used by analysts
- Consists of
  - Primary Elements
    - Actual information
    - E.g. introduction, conclusion
  - Secondary Elements
    - Package the report
    - Reader can easily identify the report and its primary elements
    - Add a professional polish.



Secondary elements for a written report

Letter of transmittal
Title page
Tables of contents
List of Figures, illustrations, and tables
Abstract or executive summary
(primary elements are presented in this portion of the report)
Appendixes

Formal Presentation

- A special meeting
- Used to sell new ideas and gain approval for new systems
- Can be also used for

  Sell a new system, sell new ideas, sell change, head off criticisms, address concerns, verify conclusion, clarify facts and report progress.

Problems at the end of Chapter 11 in Ref. 1