Introduction to Systems Analysis and Design

Text Book: System Analysis and Design
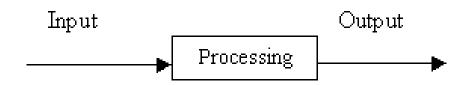By: Elias M. Awad

What is Systems Analysis and Design?

- Systems are created to solve problems.

- Think of the systems approach as an organized way of dealing with a problem.

- System Analysis and Design, mainly deals with the software development activities.

Defining A System

- This term is derived from a Greek word *systema* which means an organized relationship among functioning units and components.

- A collection of components that work together to realize some objective forms a system.

- Basically there are three major components in every system, namely input, processing and output.

Input   Output

———————→ | Processing | ———————→

- **Systems Analysis**: understanding and specifying in detail *what* an information system should do

- **System Design**: specifying in detail *how* the parts of an information system should be implemented

System analysis and design focus on three main things:

Systems: complete knowledge required for the makeup of the system which in turn requires knowledge about the <u>functioning of an organization</u> for which the system is being designed

Processes

Technology

- Thus a <u>system</u> is a way of thinking bout an organization and their problems which involves techniques that helps in solving those problems.

Basic implications of a System

- A system <u>exists</u> because it is designed to achieve one or more objectives.

    As we know that the system consists of <u>small sub systems</u> where none of the sub systems is of much use as a single independent system

So there are three basic implications:

- A system must be designed to achieve predetermined objectives.

- Interrelationships and interdependencies <u>must</u> exist among the components.

- The objectives of an organization must be given higher priority than the objectives of the sub system.

Characteristics of a system:

- organization (order),
- interaction,
- interdependence,
- integration
- central objective

Characteristics of a system contd..

1. Organization
   - structure and order
   - Example: Hierarchical organization in a company.
   - Computer system: organization of various components like input devices, output devices, CPU and storage devices

2. Interaction
   - Between sub systems or the components
   - Example: the main memory holds the data that has to be operated by the ALU.

3. Interdependence
   - Component linkage
   - Component dependence

4. Integration
   - How subsystems are tied together to achieve the system objective

5. Central Objective
   - Should be known in early phases of analysis

Elements of a System

A system is a set of components working together to achieve some goal.

The basic elements of the system may be listed as:

- Resources-h/w, s/w and liveware (human)
  - Example: Banking system- computers, trained staff

- Procedures- set of rules to accomplish the goal of the system.
  - Example: Banking systems have their predefined rules for providing interest at different rates for different types of accounts.
- Data/Information -inputs/outputs

- <u>Intermediate Data-</u> intermediate transformation of data before final output
  - ◦ Output depends on it

- <u>Processes</u>-operational elements to convert i/p into o/p
  - ◦ Example: the processing of a cheque as a process.
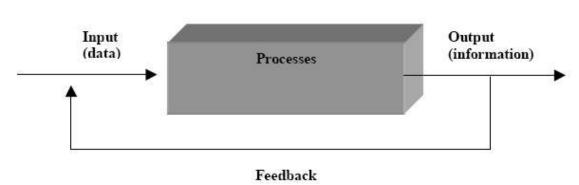 - ◦ A cheque passes through several stages before it actually gets processed and converted

- <u>Environment</u>
  - ◦ System should adapt to the environment

◦ Example: Y2K problem for computer systems. Those systems, which are not Y2K compliant, will not be able to work properly after year 2000. For computer systems to survive it is important these systems are made Y2K compliant or Y2K ready.

- <u>Feed Back</u>

Compares the output against a performance standard.

Useful to improve the system to meet the user needs.

Input (data) → Processes → Output (information)

Feedback

Fig 1.1
A system converts input data into output information

- Boundaries and Interfaces
  - Every system has defined <u>boundaries</u> within which it operates. Beyond these limits the system has to <u>interact</u> with the other systems.

  - <u>Interfaces</u> are another important element through which the system interacts with the outside world

    - Should be customized to the user needs. These should be as user friendly as possible.

Thanks to all