System Analysis and Design

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Objectives

- Define the terms system, system analysis, and system design.
- Types of systems.
- Describe the principal functions of the systems analyst.
- List and describe the phases of the systems development life cycle.
- Describe the various data gathering and analysis tools.
- Describe a selection of systems design tools.
- Alternative approaches to Structured analysis & Design to the SLDC
- Explain the role of the maintenance task in the systems development life cycle.

Contents

- What is System Analysis and Design?
- System Analyst.
- System Development Life Cycle.
- Feasibility Analysis.
- Design.
- Development
- Implementation.

System Analysis and Design: w*hat is it?*

Firstly we will define the system, than system analysis and system design as well.

• System

A set of detailed **methods**, **procedures** and **routines** established or **formulation** to carry out **specify activity**, **perform a duty** or **solve a problem**.

- **System Analysis**

- The dissection of a system into its component pieces to study how those component pieces interact and work.

(1) **The survey and planning**

(2) **The study and analysis**

(3) **The definition**

- **System Design**

The process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements.

Need for System Analysis and Design

- Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse
- Lends structure to the analysis and design of information systems
- A series of processes systematically undertaken to improve a business through the use of computerized information systems

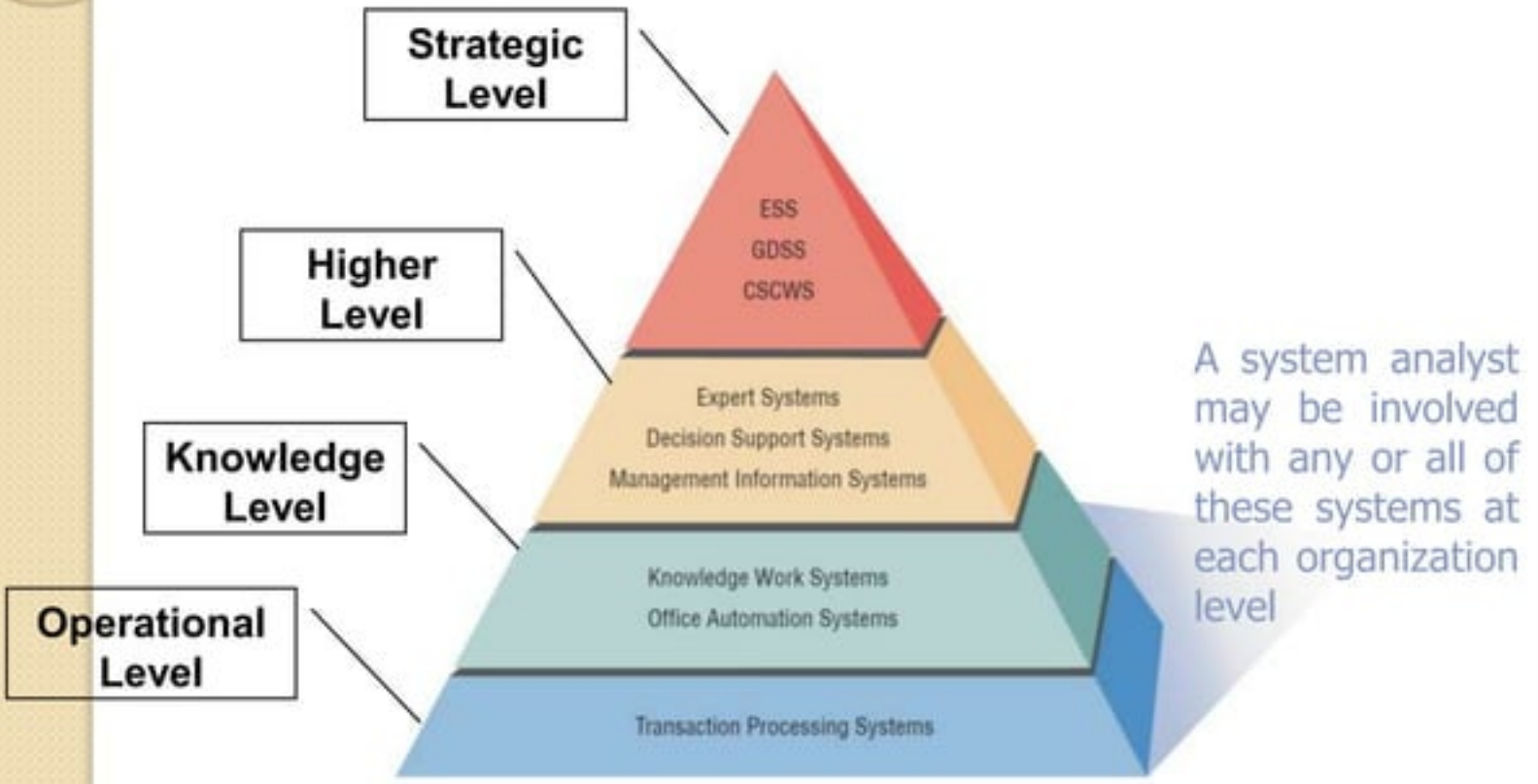
Roles of the System Analyst

- The analyst plays a key role in information systems development projects.
- Must understand how to apply technology to solve business problems.
- Analyst may serve as change agents who identify the organizational improvement.

Qualities of the System Analyst

- Problem solver
- Communicator
- Strong personal and professional ethics
- Self-disciplined and self-motivated

System Analyst Recommend, Design, and Maintain Many Types of Systems for Users



OPERATIONAL LEVEL

Transaction Processing System (TPS)

It is a process of large amounts of data for routine business transactions.

- **Boundary-Spanning**
  Its *concerned with the detection of information*. It has **two primary sources** and **two main sources**.

Primary sources of Information

(1) Detect information
(2) Send information into the environment presenting the company in a favorable light.

Main sources of Information

(1) ***Business intelligence.***
(2) ***Competitive information***

- **Support the day-to-day operations of the company**
  Example: Payroll Processing, Inventory Management.

KNOWLEDGE LEVEL

Office Automation System (OAS)

- Supports data workers who share information, but do not usually create new knowledge

Examples: Word processing, Spreadsheets etc.

Knowledge Work System (KWS)

- Supports professional workers such as scientists, engineers, and doctors

Examples: computer-aided design systems, virtual reality systems, investment workstations

Higher Level

- **Management Information System (MIS)**

To supports data worker who share information but do not usually create new knowledge.

Example: Word processing, Spreadsheets, Desktop publishing, Email Electronic scheduling, Communication through voice mail, Email, Video

- **Decision Support System (DSS)**

Aids decision makers in the making of decisions

Examples: financial planning with what-if analysis, budgeting with modeling

- **Expert System (ES)**

Captures and uses the knowledge of an expert for solving a particular problem which leads to a conclusion or recommendation.

Examples: **MYCIN** (an early ***xpert system*** that used **artificial intelligence** ;

XCON (e**X**pert **CON**figurer)

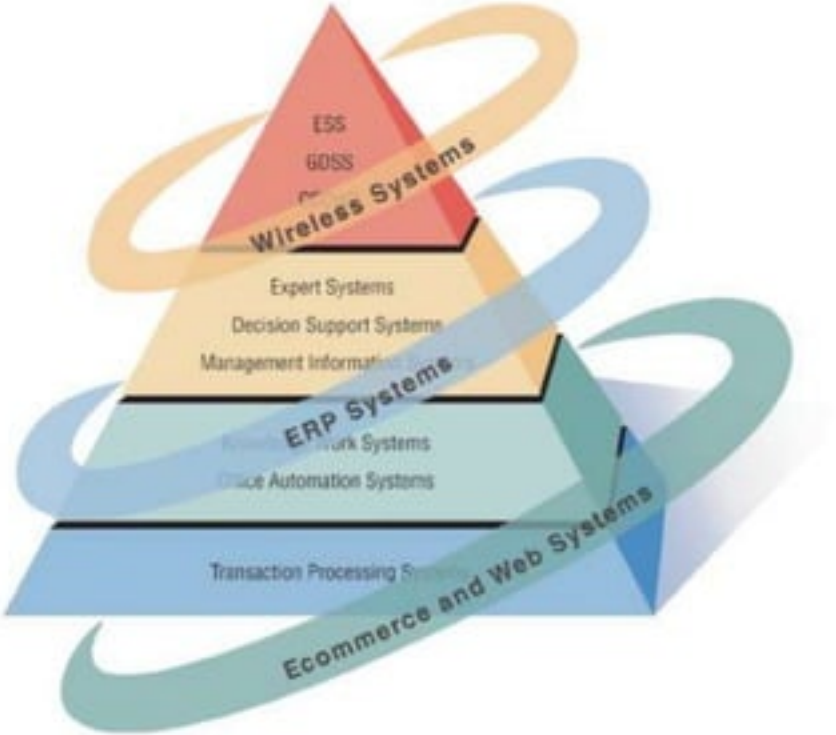
Strategic Level

- **Executive Support System (ESS)**
  - Helps executives to make unstructured strategic decisions in an informed way
    Examples: drill-down analysis, status access
- **Group Decision Support System (GDSS)**
  - Permit group members to interact with electronic support
    Examples: email, Lotus Notes
- **Computer-Supported Collaborative Work System (CSCWS)**
  - CSCWS is a more general term of GDSS. It may include software support called "*groupware*" for team collaboration via network computers.
    Example: video conferencing, Web survey system

Integrating New Technologies into Traditional Systems

- Ecommerce and Web Systems.
- Enterprise Resource Planning Systems.
- Wireless Systems.
- Open Source Software.
- Need for Systems Analysis and Design.

Systems analysts need to be aware that integrating technologies affects all types of system



Ecommerce and Web Systems

Benefits

- Increasing user awareness of the availability of a service, product, industry, person, or group.
- The possibility of 24-hour access for users.
- Improving the usefulness and usability of interface design.
- Creating a system that can extend globally rather than remain local, thus reaching people in remote locations without worry of the time zone in which they are located.

Enterprise Resource Planning Systems (ERPS)

- Performs integration of many information systems existing on different management levels and within different functions

Example: SAP, Oracle

Wireless Systems

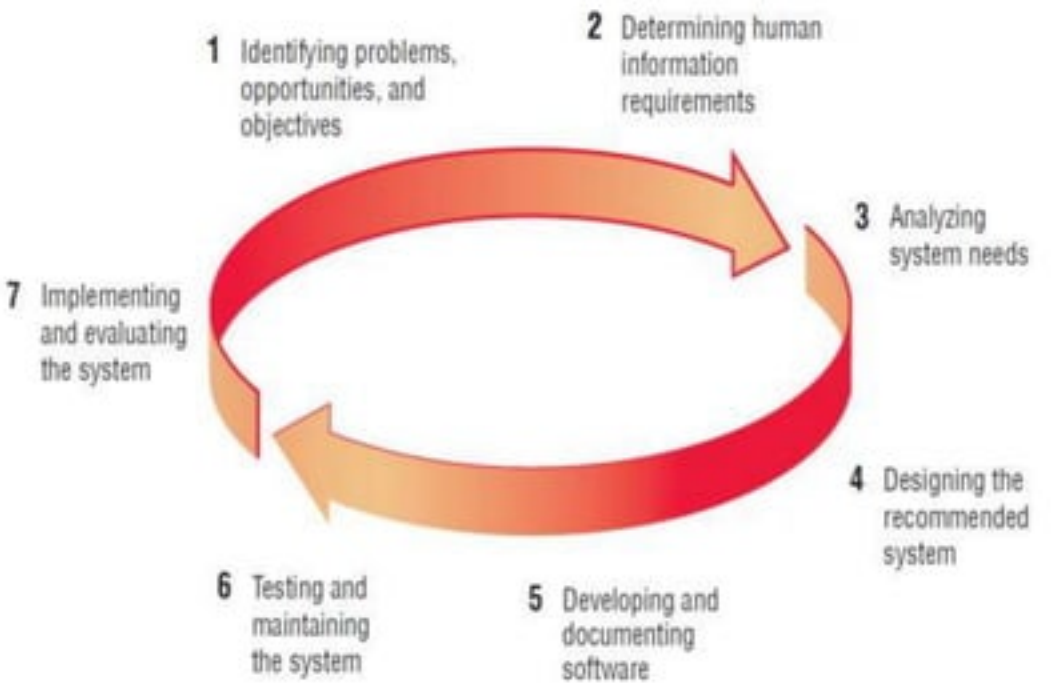
- System analyst may be asked to design standard or wireless communication networks that integrate voice, video and email into organizational intranets or industry extranets
- System analyst may also be asked to develop intelligent agents
- Example: Microsoft's new software based on Bayesian statistics
- Wireless communication is referred as m-commerce (mobile commerce)

Open Source Software (OSS)

- An alternative of traditional software development where proprietary code is hidden from the users
- Open source software is free to distribute, share and modify
- Characterized as a philosophy rather than simply the process of creating new software
- **Example:** Linux Operating System, Apache Web Server, Mozilla Firefox Web browser, Koha, Newgenlib, Evergreen, OPALS, Greenstone, DSpace, Plone, Drupal, Eprint, and Joomla.

SYSTEMS DEVELOPMENT LIFE CYCLE (SDLC)

- Typically the SDLC has 7 **steps** in the in the development and improvement of a computer system



Identifying Problems, Opportunities, and Objectives

- **Activity:**
  - Interviewing user management
  - Summarizing the knowledge obtained
  - Estimating the scope of the project
  - Documenting the results
- **Output:**
  - Feasibility report containing problem definition and objective summaries from which management can make a decision on whether to proceed with the proposed project

Determining Human Information Requirements

- **Activity:**
  - Interviewing
  - Sampling and investing hard data
  - Questionnaires
  - Observe the decision maker's behavior and environment
  - Prototyping
  - Learn the who, what, where, when, how, and why of the current system
- **Output:**
  - Analyst understands how users accomplish their work when interacting with a computer; and begin to know how to make the new system more useful and usable. The analyst should also know the business functions and have complete information on the people, goals, data and procedure involved

Analyzing System Needs

- Activity:
  - Create data flow diagrams.
  - Complete the data dictionary.
  - Analyze the structured decisions made.
  - Prepare and present the system proposal.
- Output:
  - Recommendation on what, if anything, should be done.

Designing the Recommended System

- **Activity:**
  - Design procedures for data entry
  - Design the human-computer interface
  - Design system controls
  - Design files and/or database
  - Design backup procedures
- **Output**
  - Model of the actual system

Developing and Documenting Software

- **Activity:**
  - System analyst works with programmers to develop any original software
  - Works with users to develop effective documentation
  - Programmers design, code, and remove syntactical errors from computer programs
  - Document software with help files, procedure manuals, and Web sites with Frequently Asked Questions
- **Output:**
  - Computer programs
  - System documentation

Testing and Maintaining the System

- **Activity:**
  - Test the information system
  - System maintenance
  - Maintenance documentation
- **Output:**
  - Problems, if any
  - Updated programs
  - Documentation

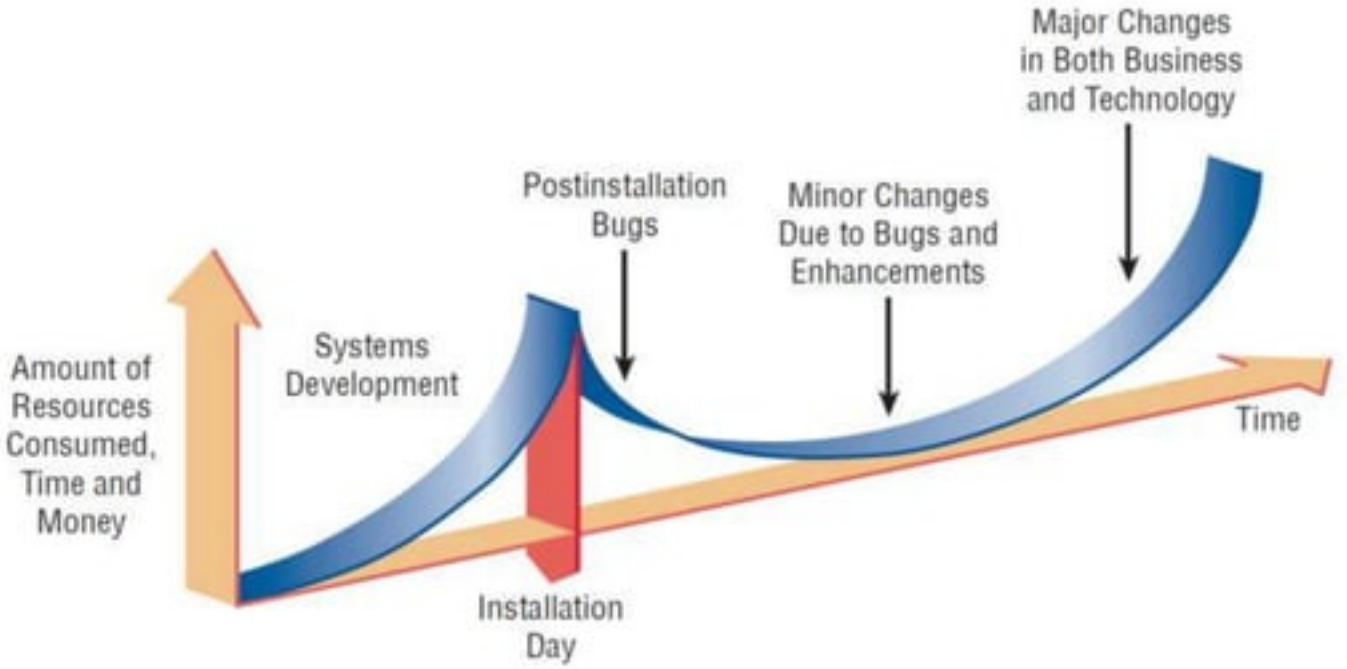
Implementing and Evaluating the System

- **Activity:**
  - Train users
  - Analyst plans smooth conversion from old system to new system
  - Review and evaluate system
- **Output:**
  - Trained personnel
  - Installed system

THE IMPACT OF MAINTENANCE

- Maintenance is performed for two reasons
  - **Removing software errors.**
  - **Enhancing existing software.**

RESOURCE CONSUMPTION OVER THE SYSTEM LIFE



FEASIBILITY ANALYSES

- Technical Feasibility: can we build it?
- Economic Feasibility: should we build it?
- Organizational Feasibility: if we build it, will they come?

TECHNICAL FEASIBILITY: CAN WE BUILD IT?

- Familiarity with application: less familiarity more risk.
- Familiarity with technology: less familiarity generates more risk.
- Project size: large projects have more risk.
- Compatibility: the hard it is so integrate the systems with the company's existing technology, the higher the risk will be.

ECONOMIC FEASIBILITY: SHOULD WE BUILD IT?

- Development Costs.
- Annual operating costs.
- Annual benefits (cost saving and revenues).
- Intangible costs and benefits.

Organizational Feasibility: if we build it, will they come?

- Project champion(s).
- Senior management.
- Users.
- Other stakeholders.
- Is the project strategically aligned with the business.

OBJECT-ORIENTED SYSTEMS ANALYSIS AND DESIGN (OOSAD)

- Analysis is performed on a small part of the system followed by design and implementation. The development cycle repeats with analysis, design and implementation of the next part and this repeats until the project is complete

Alternate Approaches to Structured Analysis and Design and to the Systems Development Life Cycle

- *Agile approach.*
- *Prototyping*
- *Ethics*
- *Project champion Approach*
- *Soft Systems Methodology (SSM)*
- *Multiview*

SUMMARY

- Information is a key resource.
- Systems analysts deal with many types of information systems.
- Integration of traditional systems with new technologies.
- Roles, qualities and skills of the systems analyst.
- The systems Development Life Cycle.
- Feasibility Analysis.
- Alternate Approaches to structured analysis and design and to the SDLC.

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thank you!