


Chapter 1

Assuming the Role of the Systems Analyst



Systems Analysis and Design
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Major Topics

- Information systems
- Phases of analysis and design
- System maintenance
- CASE tools
- Alternate methodologies

Information

- Information is an organizational resource which must be managed as carefully as other resources
- Costs are associated with information processing
- Information processing must be managed to take full advantage of its potential

Categories

- Information systems fall into one of the following eight categories:

- Transaction processing systems (TPS)
- Office automation systems (OAS)
- Knowledge work systems (KWS)
- Management information systems (MIS)
- Decision support systems (DSS)
- Expert systems (ES)
- Group decision support systems (GDSS)
- Executive support systems (EES)

New Technologies

- New technologies are being integrated into traditional systems
 - Ecommerce uses the Web to perform business activities
 - Enterprise Resource Planning (ERP) has the goal of integrating many different information systems within the corporation
 - Wireless and handheld devices, including mobile commerce (mcommerce)
 - Open source software

Advantages of Using the Web

- Increasing awareness of the availability of the service, product, industry, person, or group
- 24-hour access for users
- Standard interface design
- Creating a global system

Nature of Analysis and Design

- Systems analysis and design is a systematic approach to identifying problems, opportunities, and objectives; analyzing the information flows in organizations; and designing computerized information systems to solve a problem

Systems Analyst

- Systems analysts act as
 - Outside consultants to businesses
 - Supporting experts within a business
 - As change agents
- Analysts are problem solvers, and require communication skills
- Analysts must be ethical with users and customers

Systems Development Life Cycle

- The systems development life cycle is a systematic approach to solving business problems
- It is divided into seven phases
- Each phase has unique activities

Phase 1

- Identifying

- Problems
- Opportunities
- Objectives

- Personnel involved

- Analyst
- User management
- Systems management

Phase 2

- Determining information requirements
 - Interview management, operations personnel
 - Gather systems/operating documents
 - Use questionnaires
 - Observe the system and personnel involved
- Learn the who, what, where, when, and how, and the why for each of these

Phase 2

- Personnel involved

- Analyst
- User management
- User operations workers
- Systems management

Phase 3

- Analyzing system needs
 - Create data flow diagrams
 - Document procedural logic for data flow diagram processes
 - Complete the data dictionary
 - Make semistructured decisions
 - Prepare and present the system proposal
 - Recommend the optimal solution to management

Phase 3

- Personnel involved

- Analyst

- User management

- Systems management

Phase 4

- Designing the recommended system
 - Design the user interface
 - Design output
 - Design input
 - Design system controls
 - Design files and/or database
 - Produce program specifications
 - Produce decision trees or tables

Phase 4

- Personnel involved

- Analyst
- System designer
- User management
- User operations workers
- Systems management

Phase 5

- Developing and documenting software
 - Design computer programs using structure charts, Nassi-Schneiderman charts, and pseudocode
 - Walkthrough program design
 - Write computer programs
 - Document software with help files, procedure manuals, and Web sites with Frequently Asked Questions

Phase 5

- Personnel involved

- Analyst
- System designer
- Programmers
- Systems management

Phase 6

- Testing and maintaining the system
 - Test and debug computer programs
 - Test the computer system
 - Enhance system

Phase 6

- Personnel involved

- Analyst
- System designer
- Programmers
- Systems management

Phase 7

- Implementing and evaluating the system
 - Plan conversion
 - Train users
 - Purchase and install new equipment
 - Convert files
 - Install system
 - Review and evaluate system

Phase 7

- Personnel involved

- Analyst
- System designer
- Programmers
- User management
- User operations workers
- Systems management

Rapid Application Development

- Rapid Application development (RAD) is an object-oriented approach to systems development

System Maintenance

- System maintenance is
 - Removing undetected errors, and
 - Enhancing existing software
- Time spent on maintenance typically ranges from 48-60 percent of total time

System Enhancements

- Systems are enhanced for the following reasons:
 - Adding additional features to the system
 - Business and governmental requirements change over time
 - Technology, hardware, and software are rapidly changing

CASE Tools

- CASE tools are automated, microcomputer-based software packages for systems analysis and design
- Four reasons for using CASE tools are:
 - To increase analyst productivity
 - Facilitate communication among analysts and users
 - Providing continuity between life cycle phases
 - To assess the impact of maintenance

CASE Tool Categories

- CASE tools may be divided into several categories
 - Upper CASE (also called front-end CASE) tools, used to perform analysis and design
 - Lower CASE (also called back-end CASE). These tools generate computer language source code from CASE design
 - Integrated CASE, performing both upper and lower CASE functions

Upper CASE

■ Upper CASE tools

- Create and modify the system design
- Store data in a project repository
- The repository is a collection of records, elements, diagrams, screens, reports, and other project information
- These CASE tools model organizational requirements and define system boundaries

Lower CASE

- Lower CASE tools generate computer source code from the CASE design
- Source code may usually be generated in several languages

Advantages of Generating Code

- Time to develop new systems decreases
- The time to maintain generated code is less than to maintain traditional systems
- Computer programs may be generated in more than one language
- CASE design may be purchased from third-party vendors and tailored to organizational needs
- Generated code is free from program coding errors

Reverse Engineering

- Reverse engineering is generating the CASE design from computer program code
- Source code is examined, analyzed, and converted into repository entities

Reverse Engineering Produces

- Reverse engineering produces (depending on the tool set used)
 - Data structures and elements, describing the files, records, and field
 - Screen designs, if the program is online
 - Report layouts for batch programs
 - A structure chart showing the hierarchy of the modules in the program
 - Database design and relationships

Advantages of Reverse Engineering

- It has the following advantages:
 - Reduced system maintenance time
 - Program documentation is produced for loosely documented programs
 - Structured programs may be generated from unstructured, older programs
 - Future system maintenance is easier to implement
 - Unused portions of programs may be eliminated

Object-Oriented Analysis and Design

- Object-oriented (O-O) analysis and design is used to build object-oriented programs
- This includes not only data but the instructions about operations that manipulate the data

Types of Object-Oriented Analysis and Design

- There are three types of object-oriented analysis and design:
 - Object-oriented analysis (OOA)
 - Object-oriented design (OOD)
 - The Unified Modeling Language (UML), a standardized object-oriented modeling language

Nature of Analysis and Design

- Structured analysis and design provides a systematic approach to developing systems and is cyclic in nature
- Analysis and design errors detected in the later phases of the systems development life cycle cost more to fix than if detected in earlier phases

Alternate Methodologies

- Alternate methodologies are available for analyzing systems
- These include
 - Prototyping
 - ETHICS
 - Project champions
 - Soft Systems Methodology
 - Multi-view