

# Chapter 1

## Assuming the Role of the Systems Analyst



Systems Analysis and Design  
Kendall and Kendall  
Fifth Edition

# Major Topics

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

# Information

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- Identifying
  - Problems
  - Opportunities
  - Objectives
- Personnel involved
  - Analyst
  - User management
  - Systems management

# Phase 2

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- 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

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- Personnel involved
  - Analyst
  - User management
  - User operations workers
  - Systems management

# Phase 3

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- 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

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- Personnel involved
  - Analyst
  - User management
  - Systems management



# Phase 4

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- 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

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

# Phase 5

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- 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

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- Personnel involved
  - Analyst
  - System designer
  - Programmers
  - Systems management

# Phase 6

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

# Phase 6

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- Personnel involved
  - Analyst
  - System designer
  - Programmers
  - Systems management



# Phase 7

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

# Phase 7

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

# Rapid Application Development

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

# System Maintenance

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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- 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

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