Modern Systems Analysis and Design
Third Edition

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Chapter 1
The Systems Development Environment
Learning Objectives

✓ Define information systems analysis and design
✓ Discuss the modern approach to systems analysis and design
✓ Describe four types of information systems:
✓ Describe the information systems development life cycle (SDLC)
✓ Discuss alternatives to the systems development life cycle
✓ Discuss the role of computer-aided software engineering (CASE) tools in systems development
Introduction

• Information Systems Analysis and Design
  – Complex process whereby computer-based information systems are developed and maintained

• Application Software
  – Result of systems analysis and design
  – Designed to support specific organizational functions or processes

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Introduction

• Software engineering processes have been developed to assist in analysis and design
  – Methodologies
    • Comprehensive, multi-step approaches to systems development
  – Techniques
    • Processes that are followed to ensure that work is well thought-out, complete and comprehensible to others on the project team
  – Tools
    • Computer programs to assist in application of techniques to the analysis and design process
Introduction

• Information Systems Analysis and Design
  – A method used by companies to create and maintain systems that perform basic business functions
  – Main goal is to improve employee efficiency by applying software solutions to key business tasks
  – A well thought-out approach must be used in order to ensure success
Introduction

• Systems Analyst performs analysis and design based upon:
  – Understanding of organization’s objectives, structure and processes
  – Knowledge of how to exploit information technology for advantage
Organizational Responsibilities in Systems Development

• Systems Analysts work in teams
  – Project Based
  – Includes
    • IS Manager
    • System Analysts
    • Programmers
    • End Users and Business managers
    • Other specialists
  – Characteristics of Successful Teams
    • Diversity of backgrounds
    • Tolerance of diversity
    • Clear and complete communication
    • Trust
    • Mutual Respect
    • Reward structure that promotes shared responsibility

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Organizational Responsibilities in Systems Development

• IS Manager
  – May have a direct role in systems development if the project is small
  – Typically involved in allocating resources to and overseeing system development projects.

• Systems Analyst
  – Key individuals in the systems development process
Organizational Responsibilities in Systems Development

• Skills of a Successful Systems Analyst
  – Analytical
    • Understanding of organizations
    • Problem solving skills
    • System thinking
      – Ability to see organizations and information systems as systems
  – Technical
    • Understanding of potential and limitations of technology
  – Management
    • Ability to manage projects, resources, risk and change
  – Interpersonal
    • Effective written and oral communication skills
Organizational Responsibilities in Systems Development

• Programmers
  – Convert specifications into instructions that the computer understands
  – Write documentation and testing programs

• Business Managers
  – Have power to fund projects and allocate resources
  – Set general requirements and constraints for projects
Organizational Responsibilities in Systems Development

• Other IS Managers/Technicians
  – Database Administrator
    • Involved in design, development and maintenance of databases
  – Network and telecommunications experts
    • Develop systems involving data and/or voice communications
  – Human Factors Specialists
    • Involved in training users and writing documentation
  – Internal Auditors
    • Ensure that required controls are built into the system
Types of Information Systems and Systems Development

- **Transaction Processing Systems (TPS)**
  - Automate handling of data about business activities (transactions)

- **Management Information Systems (MIS)**
  - Converts raw data from transaction processing system into meaningful form

- **Decision Support Systems (DSS)**
  - Designed to help decision makers
  - Provides interactive environment for decision making
Types of Information Systems and Systems Development

• Expert Systems (ES)
  – Replicates decision making process
  – Knowledge representation describes the way an expert would approach the problem
Systems Development Life Cycle (SDLC)

• Series of steps used to manage the phases of development for an information system
• Consists of six phases:
  – Project Identification and Selection
  – Project Initiation and Planning
  – Analysis
  – Design
  – Implementation
  – Maintenance
SDLC

- Project identification and selection
- Project Initiation and planning
- Analysis
- Design
- Implementation
- Maintenance

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Systems Development Life Cycle

– Phases are not necessarily sequential
– Each phase has a specific outcome and deliverable
– Individual companies use customized life cycles
Phases of the Systems Development Life Cycle

- **Project Identification and Selection**
  - Two Main Activities
    - Identification of need
    - Prioritization and translation of need into a development schedule
  - Helps organization to determine whether or not resources should be dedicated to a project.

- **Project Initiation and Planning**
  - Two Activities
    - Formal preliminary investigation of the problem at hand
    - Presentation of reasons why system should or should not be developed by the organization
Systems Development Life Cycle

• Analysis
  – Study of current procedures and information systems
    • Determine requirements
      – Study current system
      – Structure requirements and eliminate redundancies
    • Generate alternative designs
    • Compare alternatives
    • Recommend best alternative

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Systems Development Life Cycle

• Design
  – Logical Design
    • Concentrates on business aspects of the system
  – Physical Design
    • Technical specifications

• Implementation
  – Implementation
    • Hardware and software installation
    • Programming
    • User Training
    • Documentation
Systems Development Life Cycle

• Maintenance
  • System changed to reflect changing conditions
  • System obsolescence
Approaches to Development

• Prototyping
  – Building a scaled-down working version of the system
  – Advantages:
    • Users are involved in design
    • Captures requirements in concrete form

• Rapid Application Development (RAD)
  – Utilizes prototyping to delay producing system design until after user requirements are clear
Approaches to Development

• Joint Application Design (JAD)
  – Users, Managers and Analysts work together for several days
  – System requirements are reviewed
  – Structured meetings
Improving IS Development Productivity

• Computer-aided software engineering (CASE) tools
  – Facilitate creation of a central repository for system descriptions and specifications