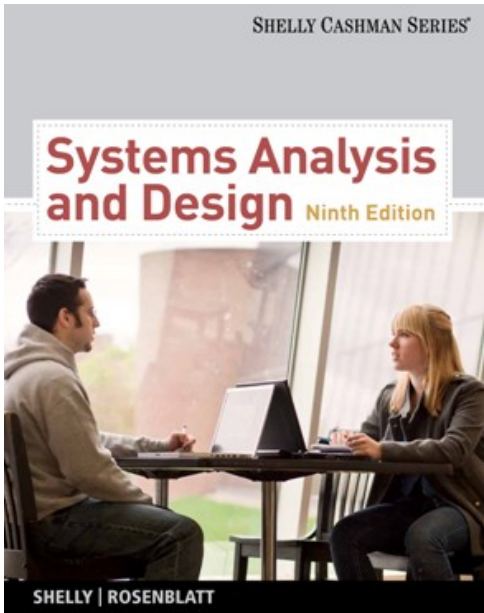
COURSE TECHNOLOGY
CENGAGE Learning

Systems Analysis and Design 9th Edition

Chapter 1

Introduction to Systems Analysis and Design



Chapter Objectives

- Discuss the impact of information technology on business strategy and success
- Define an information system and describe its components
- Explain how profiles and models can represent business functions and operations
- Explain how the Internet has affected business strategies and relationships
- Identify various types of information systems and explain who uses them

Chapter Objectives

- Distinguish between structured analysis, object-oriented analysis, and agile methods
- Compare the traditional waterfall model with agile methods and models
- Apply five basic guidelines for systems development
- Discuss the role of the information technology department and the systems analysts who work there

Introduction

- Companies use information as a weapon in the battle to increase productivity, deliver quality products and services, maintain customer loyalty, and make sound decisions
- Information technology can mean the difference between success and failure

The Impact of Information Technology

- Information Technology (IT)
  - Combination of hardware and software products and services that companies use to manage, access, communicate, and share information
- The Future
  - Three issues that will shape the future
    - Changes in world
    - Changes in technology
    - Changes in client demand

The Impact of Information Technology

- Systems Development
  - Business information systems are developed by people who are technically qualified, business-oriented, and highly motivated
  - Must be good communicators with strong analytical and critical thinking skills

The Impact of Information Technology

- Systems Analysis and Design
  - Systems Analysis and Design
    - Step-by-step process for developing high-quality information systems
  - Systems Analyst
    - Plan, develop, and maintain information systems

The Impact of Information Technology

- Who develops Information Systems?
  - In-house applications
  - Software packages
  - Internet-based application services
  - Outsourcing
  - Custom solutions
  - Enterprise-wide software strategies
  - How versus What

Information System Components

- A system is a set of related components that produces specific results
- A Mission-critical system is one that is vital to a company's operations
- Data consists of basic facts that are the system's raw material
- Information is data that has been transformed into output that is valuable to users
- Information systems have five key components: hardware, software, data, processes, and people

Information System Components

- Hardware
  - Is the physical layer of the information system
  - Moore's Law
- Software
  - System software
  - Application software
  - Enterprise applications

Information System Components

- Software
  - Horizontal system
  - Vertical system
  - Legacy systems
- Data
  - Tables store data
  - Linked tables work together to supply data

Horizontal software

These software are designed to serve a broad range of industries and functions. They provide **generic solutions** that can be adapted or customized to fit various business processes across different sectors

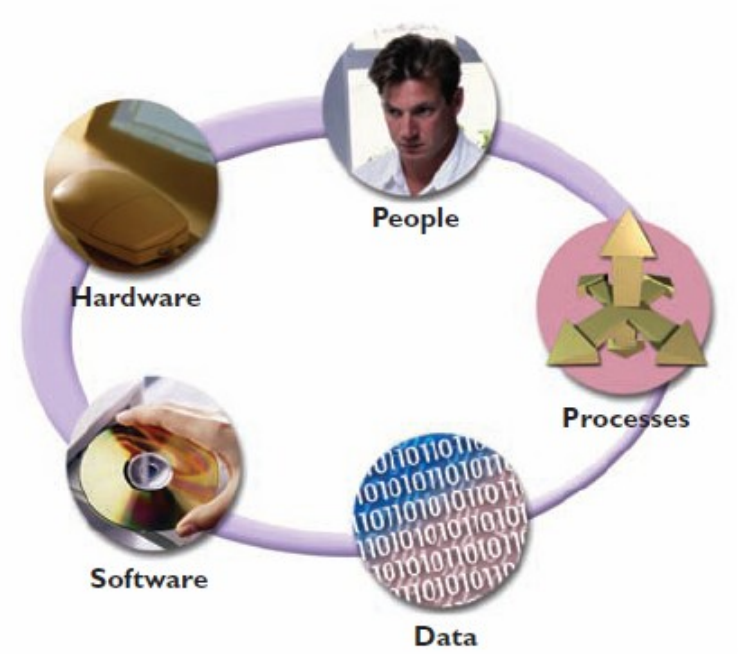
Example: Software like Microsoft Office or Google Workspace, which provides general productivity tools applicable across industries.

Vertical software

These software are specialized solutions designed **to cater to the needs of a specific industry or sector**. These systems address the unique requirements, regulations, and workflows of a particular domain.

Example: Software like Epic or Cerner, which is specifically designed for hospitals and healthcare providers, focusing on patient

Information System Components



- Processes
  - Describe the tasks and business functions that users, managers, and IT staff members perform to achieve specific results
- People
  - Stakeholders
  - Users, or end users

Understanding The Business

- Business Process Modeling:

It is the practice of representing the processes of an organization in a visual format. This involves mapping out the steps involved in completing a particular business activity or process, typically using flowcharts, diagrams, or models. The goal is to provide a clear and detailed representation of how business processes function, identify inefficiencies, and suggest improvements.

- Business Profile: It is a comprehensive overview of a company's essential information, including its mission, vision, products or services, target market, competitive advantages, and financial status. It serves as a snapshot of the organization, highlighting key aspects that define the business and its operations

Understanding The Business

- New Kinds of Companies
  - Production-oriented
  - Service-oriented
  - Internet-dependent
  - Dot-com (.com)
  - Brick-and-mortar

Impact of the Internet

- E-Commerce or I-Commerce
- B2C (Business-to-Consumer)
- B2B (Business-to-Business)
  - EDI
  - Extensible markup language (XML)
  - Supply chain management (SCM)
  - Supplier relationship management (SRM)

Business Information Systems

- In the past, IT managers divided systems into categories based on the user group the system served
  - Office systems
  - Operational systems
  - Decision support systems
  - Executive information systems

Business Information Systems

- Today, identify a system by its functions and features, rather than by its users
  - Enterprise computing systems
  - Transaction processing systems
  - Business support systems
  - Knowledge management systems
  - User productivity systems

Business Information Systems-cont.

1. Enterprise Computing Systems

- **Functions and Features**: These systems are designed to manage the entire operations of large organizations. They handle large-scale integration of core business functions like human resources, finance, manufacturing, and supply chain.
- **Key Features**: Scalability, integration with various other systems (ERP, CRM), automation of business processes, high levels of security, data management.
- **Example**: ERP (Enterprise Resource Planning) systems that integrate all departments and functions into a single IT platform.
- **Identified By**: Their ability to unify and optimize various operations across an organization

Business Information Systems-cont.

- **2. Transaction Processing Systems (TPS)**
  - **Functions and Features**: These systems manage and record the day-to-day operations or transactions of a business, such as sales, payroll, orders, and payments.
  - **Key Features**: Real-time processing, high availability, reliability, support for large volumes of transactions, data consistency, and security.
  - **Example**: Point of Sale (POS) systems, ATM systems, or online payment gateways.
  - **Identified By**: Their focus on processing, validating, and storing high volumes of transactions

Business Information Systems-cont.

3. Business Support Systems (BSS)

- **Functions and Features**: These systems provide functionalities to support business operations and decision-making processes. They typically support back-office operations and are tailored to improve efficiency in financial management, customer service, and order processing.
- **Key Features**: Analytical tools, financial management, CRM (Customer Relationship Management), inventory management.
- **Example**: Billing systems or customer relationship management platforms.
- **Identified By**: Their role in supporting business-critical tasks and decision-making processes.

Business Information Systems-cont.

4. Knowledge Management Systems (KMS)

- **Functions and Features**: These systems facilitate the organization, sharing, and retrieval of knowledge within an organization. They are used to capture both explicit knowledge (documented information) and tacit knowledge (expertise).
- **Key Features**: Document management, collaboration tools, search functionalities, expertise management, knowledge bases.
- **Example**: Wikis, corporate intranets, or expert systems.
- **Identified By**: Their ability to manage and disseminate information and expertise across the organization to improve decision-making and innovation.

Business Information Systems-cont.

5. User Productivity Systems

- **Functions and Features**: These systems are designed to help users perform specific tasks more efficiently and effectively. They enhance individual or group productivity by providing tools for communication, collaboration, and data manipulation.
- **Key Features**: Word processing, spreadsheets, email, project management, collaboration platforms (like Slack or Microsoft Teams).
- **Example**: Microsoft Office Suite, Google Workspace.
- **Identified By**: Their emphasis on boosting user efficiency and providing tools for day-to-day productivity

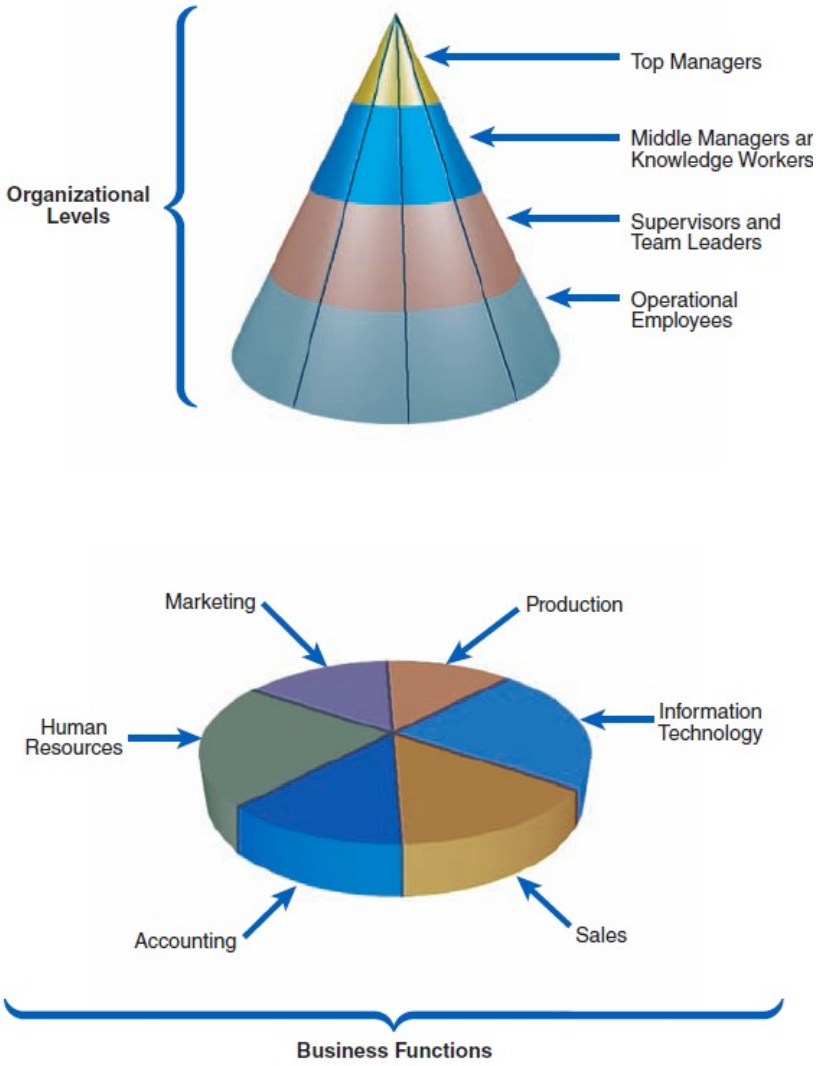
Business Information Systems

- Knowledge management systems
  - Called expert systems
  - Simulate human reasoning by combining a knowledge base and inference rules
  - Many knowledge management systems use a technique called fuzzy logic

Business Information Systems

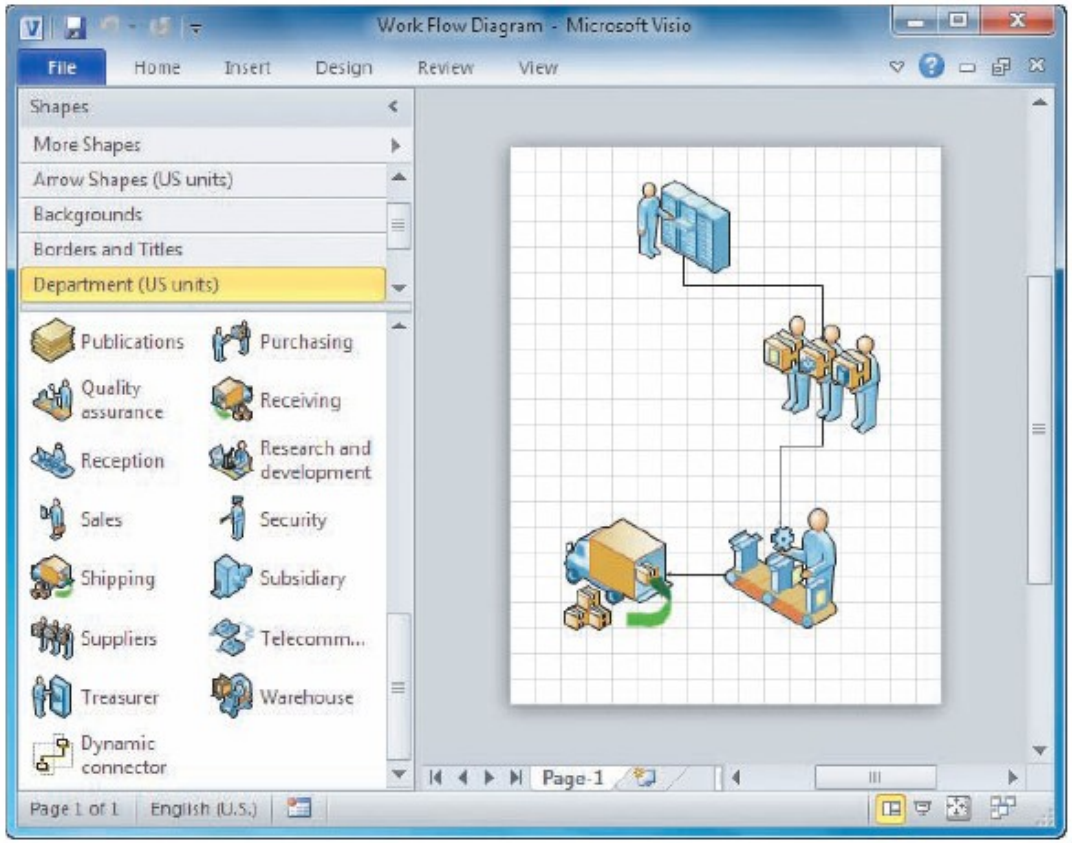
- User productivity systems
  - Technology that improves productivity
  - Groupware
- Information systems integration
  - Most large companies require systems that combine transaction processing, business support, knowledge management, and user productivity features

What Information Do Users Need?



Systems Development Tools

- Modeling
  - Business model
  - Requirements model
  - Data model
  - Object model
  - Network model
  - Process model



Systems Development Tools

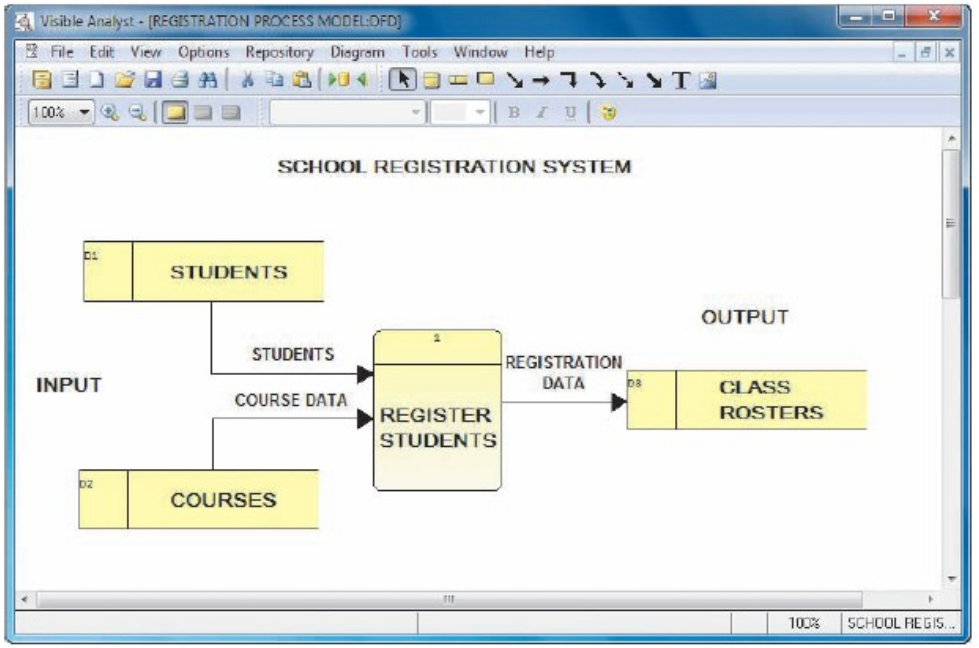
- Prototyping
  - Prototype
  - Speeds up the development process significantly
  - Important decisions might be made too early, before business or IT issues are thoroughly understood
  - Can be an extremely valuable tool

Systems Development Tools

- Computer-Aided Systems Engineering (CASE) Tools
  - Also called computer-aided software engineering
  - CASE tools
  - Can generate program code, which speeds the implementation process

Systems Development Methods

- Structured Analysis
  - Systems development life cycle (SDLC)
  - Predictive approach
  - Adaptive approach
  - Uses a set of process models to describe a system graphically
  - Process-centered technique
  - Waterfall model



Systems Development Methods

- Structured Analysis
  - Deliverable or end product
  - Disadvantage in the built-in structure of the SDLC, because the waterfall model does not emphasize interactivity among the phases
  - This criticism can be valid if the SDLC phases are followed too rigidly
  - Adjacent phases usually interact

Systems Development Methods

- Structured Analysis
  - The SDLC model usually includes five steps
    - Systems planning
    - Systems analysis
    - Systems design
    - Systems implementation
    - Systems support and security

Systems Development Methods

- Structured Analysis
  - Systems Planning
    - Systems planning phase
    - Systems request – begins the process & describes problems or desired changes
    - Purpose of this phase is to perform a preliminary investigation
    - Key part of preliminary investigation is a feasibility study

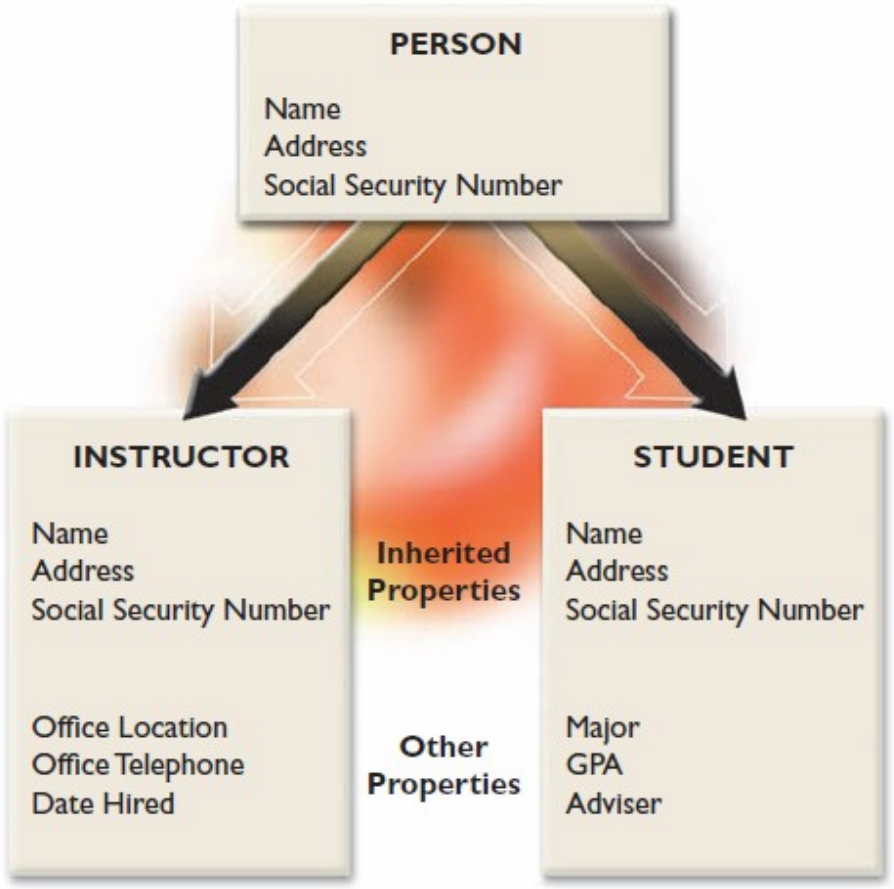
Systems Development Methods

- Structured Analysis
  - Systems Analysis
    - Deliverable is the System requirements document
  - Systems Design
    - Deliverable is system design specification
    - Management and user involvement is critical

Systems Development Methods

- Structured Analysis
  - Systems Implementation
    - New system is constructed
  - Systems Support and Security
    - A well-designed system must be secure, reliable, maintainable, and scalable
    - Most information systems need to be updated significantly or replaced after several years of operation

Systems Development Methods



Object-oriented Analysis

- Combines data & processes that act on the data into things called objects
- Object is a member of a class
- Objects possess properties
- Methods change an object's properties

Systems Development Methods

- Object-Oriented Analysis
  - A message requests specific behavior or information from another object
  - Usually follow a series of analysis and design phases that are similar to the SDLC
  - Interactive model

Systems Development Methods

- Agile Methods
  - Are the newest development
  - Emphasize continuous feedback
  - Iterative development
  - Agile community has published the Agile Manifesto
  - Spiral model

Systems Development Methods

- Agile Methods
  - Agile process determines the end result
  - Other adaptive variations and related methods exist
  - Two examples are Scrum and Extreme Programming (XP)
  - Analysts should understand the pros and cons of any approach before selecting a development method

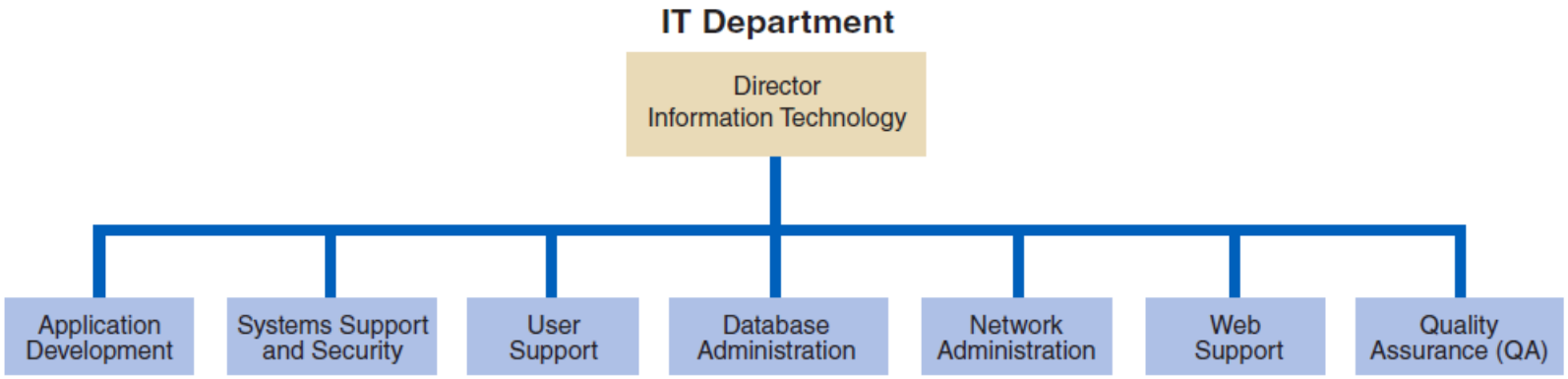
Systems Development Methods

- Other Development Methods
  - Joint application development (JAD)
  - Rapid application development (RAD)
  - Might encounter other systems development techniques
  - Rational Unified Process (RUP®)
  - Microsoft Solutions Framework (MSF)

Systems Development Guidelines

- Develop a project plan
- Involve users and listen carefully to them
- Use project management tools to identify tasks and milestones
- Develop accurate cost and benefit information
- Remain flexible

Information Technology Department



The Systems Analyst

- Responsibilities
  - Translate business requirements into IT projects
- Knowledge, Skills, and Education
  - Needs technical knowledge, strong oral and written communication skills and analytic ability, an understanding of business operations, and critical thinking skills
- Certification
  - Important credential

The Systems Analyst

- Career Opportunities
  - Job titles
  - Company organization
  - Company size
  - Corporate culture
  - Salary, location, and future growth

Chapter Summary

- IT refers to the combination of hardware and software resources that companies use to manage, access, communicate, and share information
- The essential components of an information system are hardware, software, data, processes, and people
- Successful companies offer a mix of products, technical and financial services, consulting, and customer support

Chapter Summary

- Information systems are identified as enterprise computing systems, transaction processing systems, business support systems, knowledge management systems, or user productivity systems
- Organization structure includes top managers, middle managers and knowledge workers, supervisors and team leaders

Chapter Summary

- The IT department develops, maintains and operates a company's information systems
- Systems analysts need a combination of technical and business knowledge, analytical ability, and communication skills
- Systems analysts need to consider salary, location, and future growth potential when making a career decision

Chapter Summary

- Chapter 1 complete