NEW PERSPECTIVES

Chapter 10
Information Systems Analysis and Design
Computer Concepts 2014

10 Chapter Contents

- Section A: Information Systems
- Section B: Systems Analysis
- Section C: System Design
- Section D: Implementation and Maintenance
- Section E: Corporate Data Security

10 FastPoll True/False Questions
Answer A for True and B for False

- 100100 Tactical and operational planning define long term goals for an organization.
- 100200 When managers encounter unstructured problems, a transaction processing system can usually supply the answers.
- 100300 An OLTP system processes transactions in real time as they are entered.
- 100400 An ad hoc report is a customized report that provides information not available in regularly scheduled reports.
- 100500 An expert system uses a knowledge base and inference engine.
- 100600 An SDLC provides a general outline of how an information system evolves.

10 FastPoll True/False Questions
Answer A for True and B for False

- 100700 System requirements are also called success factors.
- 100800 DFDs and UML are used to document information systems.
- 100900 Unit testing is a process that tests all the hardware and software components of an information system to make sure it performs according to specifications.
- 101000 Throughput refers to the amount of data processed in a particular time interval.
- 101100 MTBF refers to the average time between failures of a hardware component.

10 Section A: Information Systems

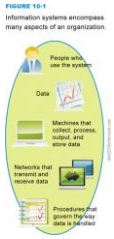
- Information Systems in Organizations
- Transaction Processing Systems
- Management Information Systems
- Decision Support Systems
- Expert Systems and Neural Networks

10 Question

- 102100 Information systems are classified based on the type of information they collect and provide. What types of information systems are you as an average consumer likely to interact with?
  - A. Transaction processing systems and expert systems
  - B. Management information systems and transaction processing systems
  - C. Decision support systems and executive information systems
  - D. Expert systems and neural networks

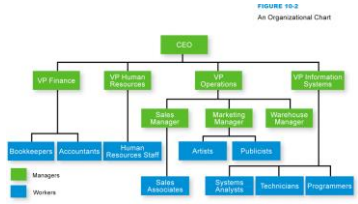
10 Information Systems in Organizations

- An information system collects, stores, and processes data to provide useful, accurate, and timely information
- An organization is a group of people working together to accomplish a goal
  - Business
  - Nonprofit organization
  - Mission
    - Mission statement



10 Information Systems in Organizations

- Organizational charts depict the hierarchy of employees in an organization



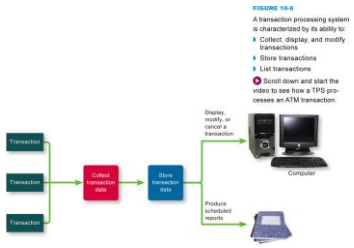
10 Information Systems in Organizations

- Information systems can:
  - Automate routine tasks
  - Make decisions in response to problems
    - Structured problem
    - Semi-structured problem
    - Unstructured problem
  - Collect and store internal or external information

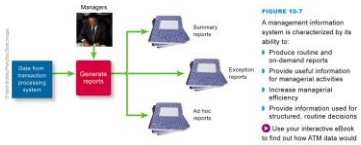
10 Transaction Processing Systems

- Provide a way to collect, process, store, display, modify, or cancel transactions
  - Payroll, accounting, airline reservations, inventory, point of sale and cellular phone billing
- Batch processing vs. online processing
  - OLTP system
    - Commit or rollback strategy
- Detail reports

10 Transaction Processing Systems



10 Management Information Systems



10 Management Information Systems

FIGURE 10-9
A library's TPS performs different functions than its MIS.

10 Decision Support Systems

- Helps people make decisions by directly manipulating data, analyzing data from external sources, generating statistical projections, and creating data models of various scenarios
  - Executive information system
- DSSs design decision models and make decision queries

10 Decision Support Systems

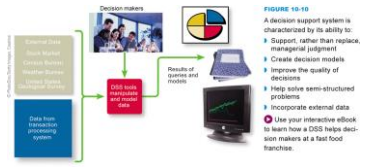


FIGURE 10-10
A decision support system is characterized by its ability to:
- Support, rather than replace, managerial judgment
- Create decision models
- Improve the quality of decisions
- Help solve semi-structured problems
- Incorporate external data

Use your interactive eBook to learn how a DSS helps decision makers at a fast food franchise.

10 Expert Systems and Neural Networks

- Expert systems are designed to analyze data and produce a recommendation, diagnosis, or decision based on a set of facts and rules
  - Knowledge base
    - Inference engine
    - Knowledge engineering
  - Expert system shell
  - Fuzzy logic
- Neural networks use computer circuitry to simulate how a brain may process info, learn, and remember

10 Expert Systems and Neural Networks

FIGURE 10-12
An expert system is characterized by its ability to:
- Replicate the reasoning of a human expert
- Work with internal or external data
- Produce a recommendation or decision

Watch how an expert system determines if a student should be admitted to graduate school.

10 Section B: Systems Analysis

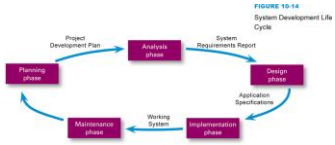
- System Development Life Cycle
- Planning Phase
- Analysis Phase
- Documentation Tools

10 Question

- 102200 If you are participating as a member of a team on a project to upgrade an information system, what can you expect the team to accomplish first?
  - A. Complete the systems analysis and design according to the systems development life cycle.
  - B. Complete the planning phase to devise a Project Development Plan.
  - C. Complete the analysis phase to produce the Systems Requirement document.
  - D. Complete the documentation of the current system using DFDs or object-oriented documentation tools.

10 System Development Life Cycle

- Systems analysis and design is a discipline that focuses on developing information systems according to the phases of an SDLC



10 Planning Phase

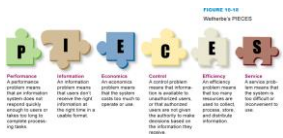
- Assemble the project team
- Justify the project
- Choose a development methodology
- Develop a project schedule
- Produce a Project Development Plan

10 Planning Phase

- Justification for new system usually emerges from a serious problem with the current system, a threat to the organization's success, or an opportunity to improve an organization's products or services through technology

10 Planning Phase

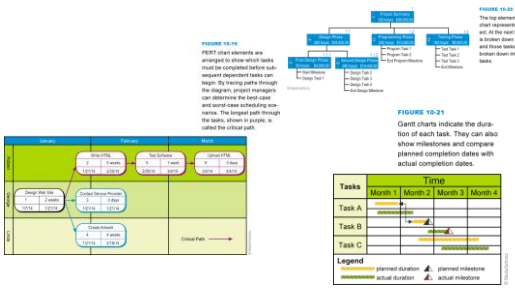
- An organization must be able to:
  - Make improvements
  - Change the industry
  - Create new products
- The PIECES framework helps classify problems in an information system



10 Planning Phase

- Development methodologies
  - Structured methodology
  - Information engineering methodology
  - Object-oriented methodology
- PERT (Program Evaluation and Review Technique)
- WBS (Work Breakdown Structure)
- Gantt chart

10 Planning Phase



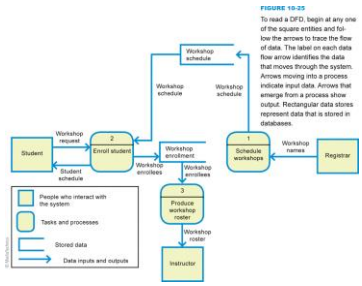
10 Analysis Phase

- Produce a list of requirements for a new or revised information system
- Analysis phase activities:
  - Study the current system
  - Determine system requirements
  - Write System Requirements Report
- System requirements are the criteria for successfully solving problems identified in an information system
  - Success factors

10 Documentation Tools

- The core documentation tool for project teams using structured methodology is the data flow diagram (DFD)
  - External entity
  - Data store
  - Process
  - Data flow

10 Documentation Tools



10 Documentation Tools

- Current standard for object-oriented documentation is referred to as UML (Unified Modeling Language)
- A use case diagram documents the users of an information system and the functions they perform
  - Actors
- A class diagram provides the name of each object, a list of each object's attributes, a list of methods, and an indication of the cardinality between objects
- A sequence diagram depicts the detailed sequence of interactions that take place for a use case

10 Documentation Tools

10 Section C: System Design

- Design Phase
- Evaluation and Selection
- Application Specifications

10 Question

- 102300 Suppose you've just heard through the office grapevine that your company is going to be getting a turnkey computer system. What can you expect?
  - A. The system won't be operation for quite a long time because lots of programming and setup will be required.
  - B. You'll be getting the same system used by business competitors.
  - C. You might be asked to join a project team to carry out system analysis and design.
  - D. You might have to change some procedures to match the new information system.

10 Design Phase

- The project team must figure out how the new system will fulfill the requirements specified in the System Requirements Report

10 Design Phase

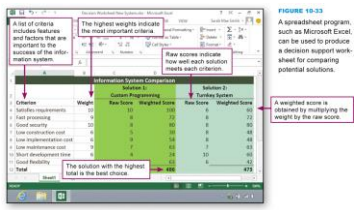
- The project team has to consider the overall architecture based on:
  - Level of automation
  - Processing methodology
    - Centralized processing
    - Distributed processing
  - Network technology

10 Design Phase

- Software alternatives
  - Programming tools
  - Application development tools
  - Application software
  - Turnkey systems

10 Evaluation and Selection

- Decision support worksheet



10 Evaluation and Selection

- A request for proposal (RFP) describes the information system problem and the requirements for the solution

FIGURE 10-34
RFP Excerpt

RFP for the University Library Information System

The purpose of this request for proposal (RFP) and subsequent vendor presentations is to identify a vendor with whom the University will negotiate a contract to supply, install, and support an integrated library system. This system must be capable of supporting an online public access catalog, cataloging and authority control, acquisitions and serials control, circulation, and reserve. It should be capable of supporting media booking, interlibrary loan and document delivery, and preservation control. Proposals are due 10 August 3:00pm, Purchasing Dept.

A letter of intent to propose should be received by the University by 5:00pm CDT, July 13, 2014. Letters should be sent to the following address:

10 Evaluation and Selection

- A request for quotation (RFQ) is a request for a formal price quotation on a list of hardware and software

FIGURE 10-35
RFQ Excerpt

City Hall Information System RFQ

The Information Technology Office is seeking qualified vendors for the quotation of network equipment required for the expansion of the city hall facility. A list of hardware and software is provided below. Prospective vendors MUST provide the total price including shipping charges and the applicable sales tax. Any deviation from the specifications MUST be noted on the quotation and a written explanation is strongly encouraged to support the substitutions. Bids submitted with equipment other than those stated in the specifications may be rejected.

Part Description	Part Number	Quantity	Price
1. Cisco Catalyst 3750 24 10/100/1000T + 4 SFP Enhanced Multilayer Switch	WS-C3750G-24TS-E	1	
2. Cisco Catalyst 3750 24 10/100/1000T + 4 SFP Standard Multilayer Switch	WS-C3750G-24TS-S	2	

10 Application Specifications

- Describe the way the information system's software should interact with users, store data, process data, and format reports
- Feature creep refers to the failure to constrain change
- Changes should be managed formally, including written change requests

10 Section D: Implementation and Maintenance

- Implementation Phase
- Development and Testing
- Documentation and Training
- Conversion and Cutover
- Maintenance Phase

10 Question

- 102400 Suppose you're the system administrator for a large corporate information system that was installed about a year ago. What is most likely your biggest concern?
  - A. Feature creep
  - B. Quality of service
  - C. Pilot conversion
  - D. Application specifications

10 Implementation Phase

- Project team supervises the tasks necessary to construct the new information system

FIGURE 10-37

10 Development and Testing

- Software customization is the process of modifying a commercial application to reflect an organization's needs
- Application testing is performed in three ways:
  - Unit testing
  - Integration testing
    - Test area
  - System testing

10 Development and Testing

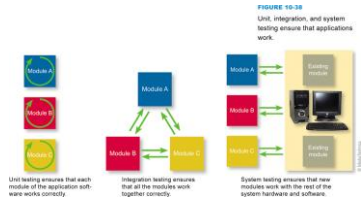


FIGURE 10-38
Unit, integration, and system testing ensure that applications work.

10 Documentation and Training

- System documentation
  - Describes a system's features, hardware architecture, and programming
- User documentation
  - Describes how to interact with the system to accomplish specific tasks
  - Procedure handbook
    - Contains step-by-step instructions for performing specific tasks

10 Conversion and Cutover

- System conversion
  - Deactivating an old information system and activating a new one
  - Several conversion strategies:
    - Direct conversion
    - Parallel conversion
    - Phased conversion
    - Pilot conversion
- Acceptance testing is designed to verify that the new information system works as required

10 Maintenance Phase

- Involves day-to-day operation of the system, making modifications to improve performance, and correcting problems
- The term quality of service (QoS) refers to the level of performance a computer system provides

FIGURE 10-41

10 Maintenance Phase

- The computer operator is responsible for operating the computer on a day-to-day basis
- The systems programmer installs new versions of the operating system and modifies settings to maximize performance
- The help desk is staffed by technical support specialists who are familiar with the information system's software

10 Maintenance Phase

- Maintenance phase costs

FIGURE 10-44
Maintenance Phase Costs

1. When a new information system first goes live, maintenance costs are high while programmers work out bugs and users clamor for support.
2. After most of the bugs are fixed and users become familiar with the information system, maintenance costs decrease.
3. As an information system nears the end of its useful life span, repair costs rise, and changing business practices begin to require modifications that are time-consuming and expensive to implement.

10 Section E: Corporate Data Security

- Information System Data Vulnerabilities
- Information System Data Security
- Corporate Identity Theft

10 Question

- 102500 How easy it is to create a fake site that looks like one for a legitimate business?
  - A. It is very difficult because of all the corporate logos and other art work at legitimate sites.
  - B. It is very difficult because real Web sites use HTML and HTTPS for security.
  - C. It is quite easy to change the URL of a legitimate site and then put a fake site in its place.
  - D. It is easy to cut and paste graphics from a legitimate site to make a fake site at a URL that is similar but not the same as the real site.

10 Information System Data Vulnerabilities

- Threats to a corporate information system can affect thousands of people
  - Natural disasters
  - Power outages
  - Equipment failures
  - Human errors
  - Software failures
  - Security breaches
  - Acts of war
  - Malware

FIGURE 10-45
Human error was blamed for a blackout that cascaded from the Midwestern United States, across the Northeast, and into Canada.

10 Information System Data Security

- No computer system can be completely risk-free, but several proactive measures can protect information systems from threats
  - Deterrents
  - Preventative countermeasures
  - Corrective procedures
  - Detection activities

FIGURE 10-46
Biometric identification methods, such as fingerprint and retinal scans, provide one line of defense against threats.

10 Information System Data Security

- A data center is a specialized facility designed to hold and protect computer systems and data
- A disaster recovery plan is a step-by-step plan that describes the methods used to secure data against disaster and sets guidelines for how an organization will recover lost data if and when a disaster occurs

FIGURE 10-48
Publications such as the *Disaster Recovery Journal* help risk management professionals design and update disaster recovery plans.

10 Corporate Identity Theft

- When a company's brand is used without authorization, the company has become a victim of identity theft
- The Internet makes it easy to steal corporate identities and use them for phishing scams and fake Web sites
- Savvy consumers are on the lookout for phishing attacks and avoid clicking links embedded in e-mail messages

10 Corporate Identity Theft

- Guidelines help corporations deal with identity theft

FIGURE 10-49
Guidelines help corporations deal with identity theft.

- **Help customers report scams.** Provide a simple way for employees and customers to report phishing attacks that appear to originate from the company and fake versions of the corporate Web site.
- **Educate customers.** Let customers know what kinds of legitimate communications they can expect from the company. Avoid acclimatizing customers to e-mail notifications that can make them vulnerable to future attacks. Never send customers mass mailings that contain links to the company's site or ask them to send personal data as an e-mail reply. Instead, ask customers to connect to the company's site using their browsers and provide instructions for accessing a data collection form.
- **Manage URLs.** Make sure the company Web site is easy to find online. Keep the company URL simple so that users can access it directly, rather than through search engines or partner sites. Consider typical typographic errors that customers might make when typing the company URL. Try to reserve those URLs so that hackers can't take advantage of them. To minimize typographic errors, encourage customers to bookmark the company site by adding it to their Favorites lists.
- **Monitor domain name registration.** Keep up to date on the corporation's domain registration and periodically check for new registrations that might make unauthorized use of the company name or trademarks.
- **Be prepared.** Prepare for an attack before it happens by establishing relationships with law enforcement, ISPs, and others who can help locate and take down fraudulent sites.

10 What Do You Think?

- 103100 Would you prefer online voting to voting at a polling place?
  - A. Yes B. No C. Not sure
- 103200 Do you think online voters would disproportionately vote for Republicans?
  - A. Yes B. No C. Not sure
- 103300 Should online voting be available only to specific groups, such as elderly voters and military personnel stationed abroad, who currently have trouble reaching polling places?
  - A. Yes B. No C. Not sure

NEW PERSPECTIVES

Chapter 10 Complete

Computer Concepts 2014