Chapter 10
Information Systems Analysis and Design

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- Section A: Information Systems
- Section B: Systems Analysis
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- Section D: Implementation and Maintenance
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FastPoll True/False Questions
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.

System requirements are also called success factors.
DFDs and UML are used to document information systems.
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.
Throughput refers to the amount of data processed in a particular time interval.
MTBF refers to the average time between failures of a hardware component.

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

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
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

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

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

Transaction Processing Systems

- A transaction processing system is characterized by its ability to handle large numbers of transactions per unit of time.
- Batch processing involves processing large batches of transactions at once, whereas online processing handles transactions in real-time.
- OLTP systems are used for applications where real-time processing is critical, such as banking and retail transactions.
- Commit or rollback strategies are used to ensure data integrity in OLTP systems.

Management Information Systems

- A management information system (MIS) provides decision-support information to managers at various levels within an organization.
- MISs are used to monitor and control organizational processes, provide information for decision-making, and support strategic planning.
- MISs typically involve the use of computer systems and software to collect, process, and distribute information relevant to management.
- Examples of MIS applications include financial management systems, production control systems, and customer relationship management systems.
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

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

Section B: Systems Analysis

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

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.

Planning Phase

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

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

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

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

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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

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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

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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
Section C: System Design

- Design Phase
- Evaluation and Selection
- Application Specifications

Question

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 operational 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.

Design Phase

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

Design Phase

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

Design Phase

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

Evaluation and Selection

Decision support worksheet
Evaluation and Selection

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

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.

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

Implementation Phase

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

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

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

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
### Maintenance Phase

- Maintenance phase costs

### Section E: Corporate Data Security

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

### 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.

### 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

### 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

- 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
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.

Guidelines help corporations deal with identity theft.

What Do You Think?

1. Would you prefer online voting to voting at a polling place?
   - A. Yes
   - B. No
   - C. Not sure

2. Do you think online voters would disproportionately vote for Republicans?
   - A. Yes
   - B. No
   - C. Not sure

3. 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