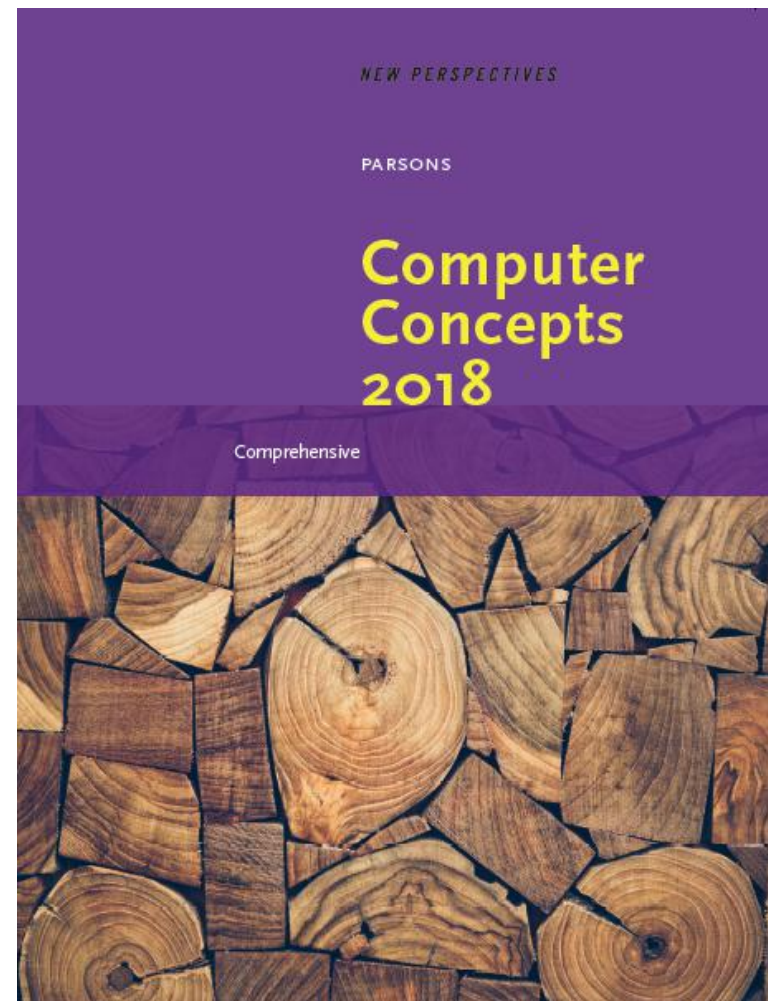


# Computer Concepts 2018



## Module 9 Information Systems

# Module Contents

- Section A: Information System Basics
- Section B: Enterprise Applications
- Section C: Systems Analysis
- Section D: Design and Implementation
- Section E: System Security

# Section A: Information Basics

- Enterprise Basics
- Transaction Processing Systems
- Management Information Systems
- Decision Support Systems
- Expert Systems

# Section A: Objectives (1 of 2)

- Explain the relationship between an organization, its mission, and its information system
- Provide examples of vertical and horizontal market applications
- Match strategic, tactical, and operational planning needs to employees at each level of an organizational chart

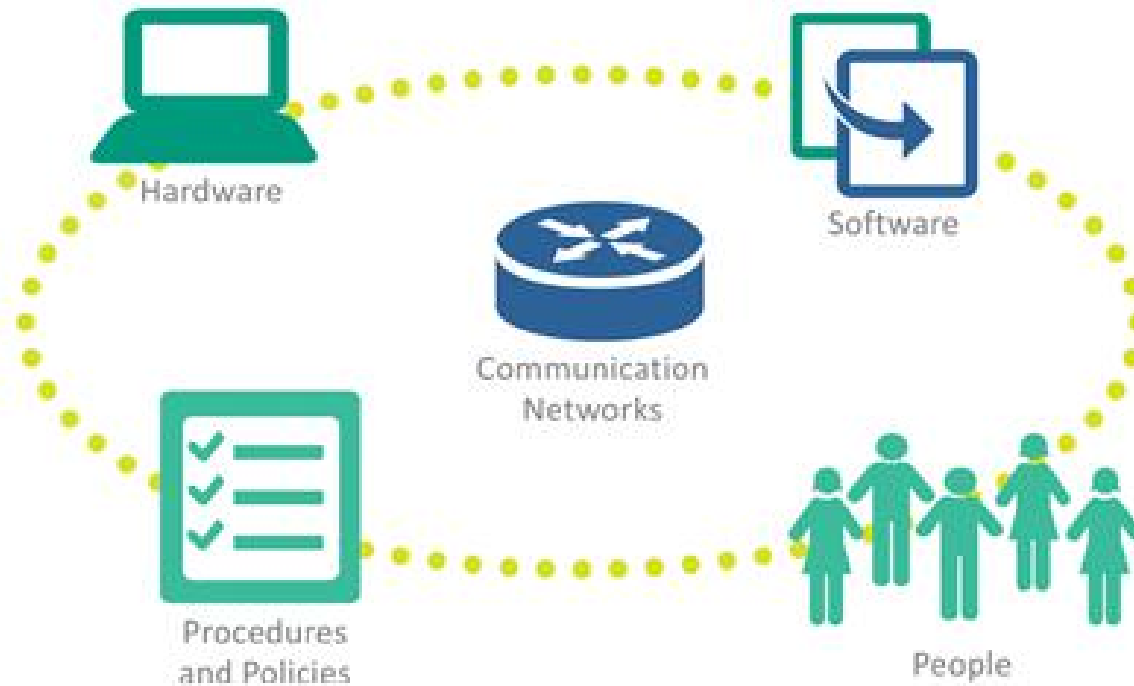
# Section A: Objectives (2 of 2)

- Describe three classifications of problems
- Describe the characteristics of TPS, MIS, DSS, and expert systems
- Use the terms *decision model* and *decision query* in a sentence
- Explain how fuzzy logic is used by expert systems

# Enterprise Basics (1 of 6)

- An **information system** collects, stores, and processes data to provide useful, accurate, and timely information, typically within the context of an organization
- An **organization** is a group of people working together to accomplish a goal
- Any organization that seeks profit by providing goods and services is called a business or an **enterprise**
- An organization's goal or plan is referred to as its **mission**; its **mission statement** describes not only an organization's goals, but also the way in which those goals will be accomplished

# Enterprise Basics (2 of 6)



# Enterprise Basics (3 of 6)

- **Vertical market** software is designed for a specific industry or enterprise; the software that controls touchscreen order entry at fast-food restaurants is an example of software designed for vertical markets
- **Horizontal market** software is designed for common elements of many businesses



# Enterprise Basics (4 of 6)

- An **organizational chart** depicts the hierarchy of employees in an organization
- **Workers** are the people who directly carry out the organization's mission
- **Managers** determine organizational goals and plan how to achieve those goals; managers use the following methods:
  - **Strategic planning** – emphasis on long-range and future goals
  - **Tactical planning** – setting incremental goals that can be achieved in a year or less
  - **Operational planning** – covers activities that make day-to-day operations run smoothly

# Enterprise Basics (5 of 6)



**Phase 1:** Recognize a problem or a need to make a decision.



**Phase 2:** Devise and analyze possible solutions to the problem.



**Phase 3:** Select an action or a solution.

# Enterprise Basics (6 of 6)

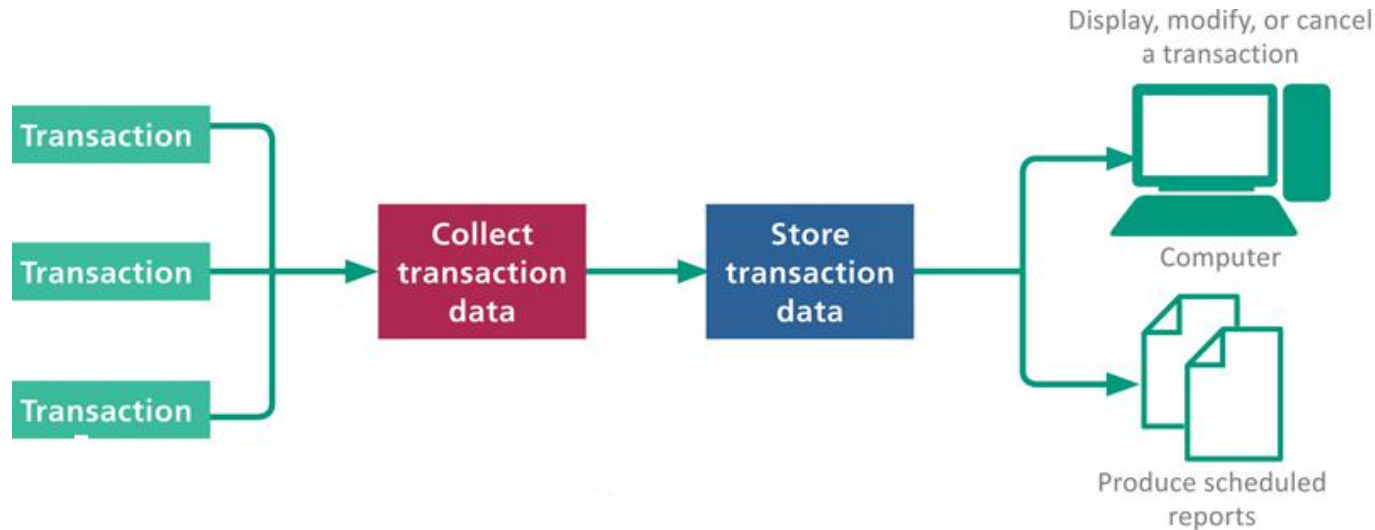
- All can be classified into three types: structured, semi-structured, and unstructured

TYPE OF PROBLEM	EXAMPLES	METHODOLOGY
A structured problem is an everyday, run-of-the-mill, routine problem. When you make decisions in response to structured problems, the procedure for obtaining the best solution is known, the objective is clearly defined, and the information necessary to make the decision is easy to identify.	Which customers should receive over-due notices?	The information for this decision is usually stored in a file cabinet or computer system. The method for reaching a solution is to look for customers with outstanding balances, and then check whether the due dates for their payments fall before today's date.
A semi-structured problem has a known procedure for arriving at a solution; however, the process might involve some degree of subjective judgment. Also, some of the information regarding the problem might not be available, might lack precision, or might be uncertain.	How many mountain bikes should a store stock for the holidays?	The decision can be based on the previous year's sales; but because future consumer spending is uncertain, determining the appropriate amount of holiday inventory might require some guesswork.
An unstructured problem requires human intuition as the basis for finding a solution. Information relevant to the problem might be missing, and few parts of the solution can be tackled using concrete models. If experts are presented with a problem but they disagree on a solution, it is likely an unstructured problem.	Should Saks Fifth Avenue stock Japanese-inspired evening gowns?	The purchasing agent for women's clothing makes this decision based on her intuition of customer taste and fashion trends.

# Transaction Processing Systems (1 of 2)

- In an information system context, a **transaction** is an exchange between two parties that is recorded and stored in a computer system
- A **transaction processing system** (TPS) provides a way to collect, process, store, display, modify, or cancel transactions
- Transaction processing systems, such as banking, use **online processing**—a real-time method in which each transaction is processed as it is entered; this system software is often referred to as an **OLTP** (online transaction processing) system
- **Detail reports** provide a basic record of complete transactions

# Transaction Processing Systems (2 of 2)



- A transaction processing system is characterized by its ability to:
  - Collect, display, and modify transactions
  - Store transactions
  - List transactions

# Management Information Systems (1 of 2)

- The term **management information system** refers to any computer system that processes data and provides information within a business setting
- Managers depend on these reports to make routine business decisions
- A **summary report** combines, groups, or totals data
- An **exception report** contains information that is outside of normal or acceptable ranges

# Management Information Systems (2 of 2)



A management information system is characterized by its ability to:

- Produce routine and on-demand reports
- Provide useful information for managerial activities
- Increase managerial efficiency
- Provide information used for structured, routine decisions

# Decision Support Systems (1 of 3)

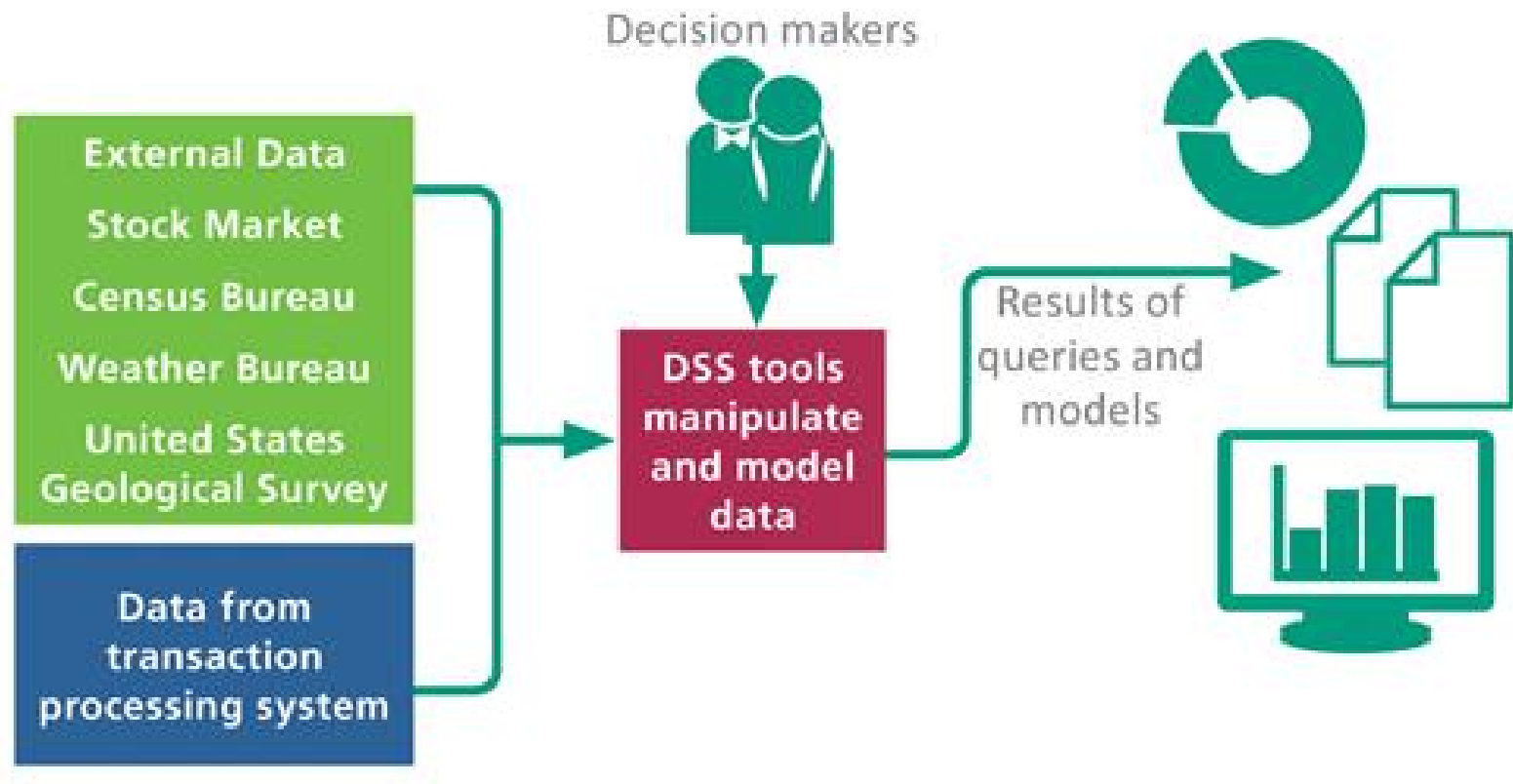
- A **decision support system** (DSS) helps people make decisions by directly manipulating data, accessing data from external sources, generating statistical projections, and creating data models of various scenarios
- An **executive information system** (EIS) is a type of decision support system designed to provide senior managers with information relevant to strategic management activities



# Decision Support Systems (2 of 3)

- A **decision model** is a numerical representation of a realistic situation, such as a cash-flow model of a business that shows how income adds to cash accounts
- A **decision query** is a question or a set of instructions describing data that must be gathered to make a decision

# Decision Support Systems (3 of 3)



# Expert Systems (1 of 4)

- An **expert system**, sometimes referred to as a knowledge-based system, is a computer system designed to analyze data and produce a recommendation, diagnosis, or decision based on a set of facts and rules
- The facts and rules are incorporated into a **knowledge base** that is stored in a computer file and can be manipulated by software called an **inference engine**
- The process of designing, entering, and testing the rules in an expert system is referred to as **knowledge engineering**

# Expert Systems (2 of 4)



## RULE 1:

IF you turn the key and there is no response,  
THEN the battery is dead and you should recharge the battery.

## RULE 2:

IF you turn the key and the engine sputters,  
THEN you might be out of gas and you should check the fuel gauge.

## RULE 3:

IF you turn the key and the engine sounds normal,  
THEN the transmission might be malfunctioning. Check the position of the shift lever.

## RULE 4:

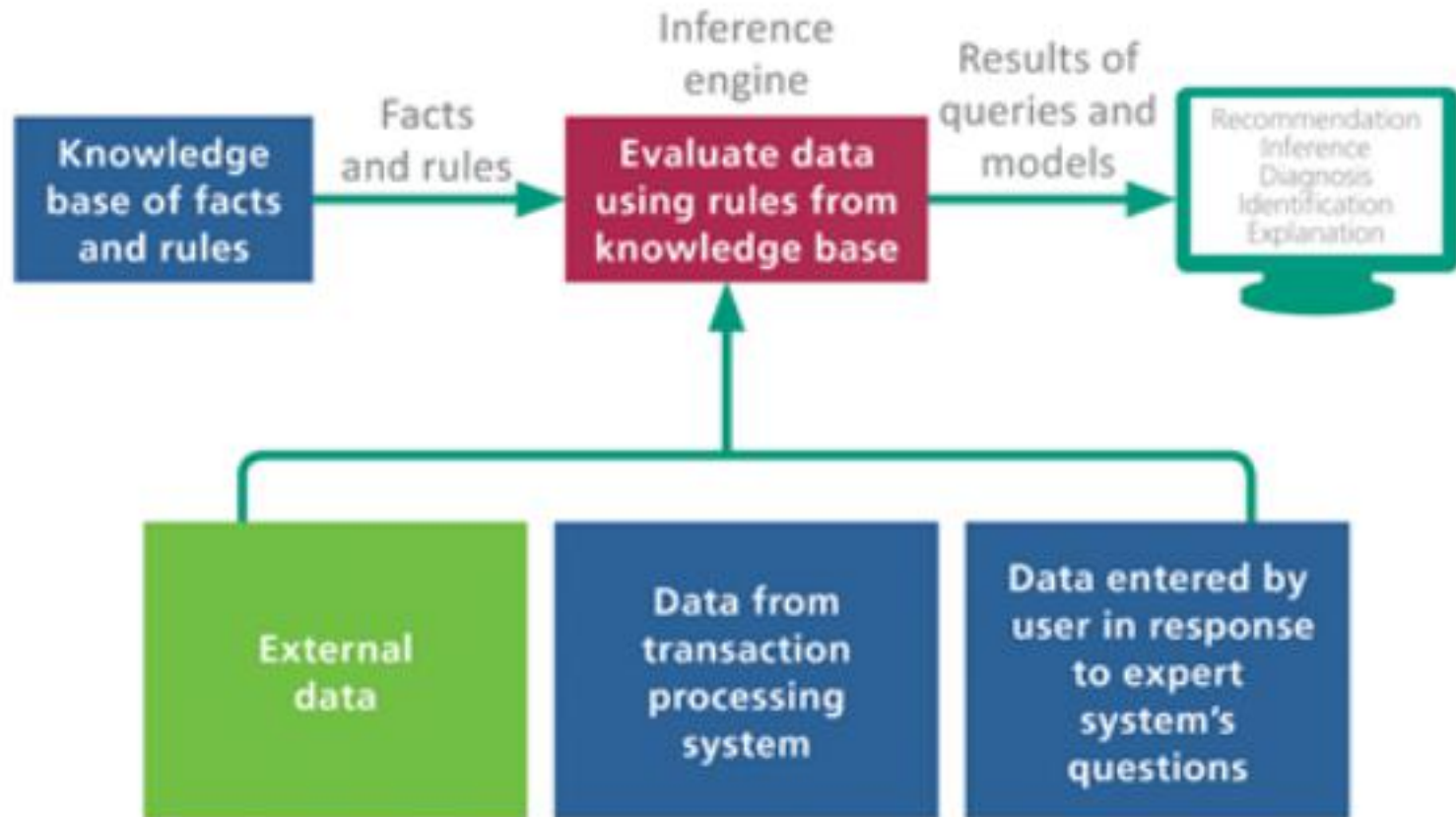
IF none of the above choices applies to the problem,

THEN the expert system will ask additional questions.

# Expert Systems (3 of 4)

- An **expert system shell** is a software tool containing an inference engine and a user interface that developers use to enter facts and rules for a knowledge base
- These systems are designed to deal with data that is imprecise or problematic; using a technique called **fuzzy logic**, an expert system can deal with this type of data by working with confidence levels

# Expert Systems (4 of 4)



# Section B: Enterprise Applications

- Ecommerce
- Supply Chain Management
- Customer Relationship Management
- Enterprise Resource Planning

# Section B: Objectives

- Provide at least two examples of businesses that engage in each of the following types of ecommerce: B2C, B2B, C2C, and B2G
- List the cookie-related events that occur during an online shopping session
- Explain how just-in-time inventory is related to SCM
- Draw a diagram of a supply chain
- Describe how loyalty programs are related to CRM
- List the six major components of an ERP application
- List at least five benefits of ERP systems



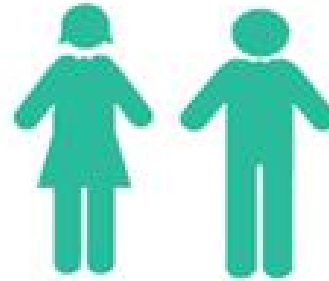
# Ecommerce (1 of 3)

- **Ecommerce** refers to business transactions that are conducted electronically over a computer network



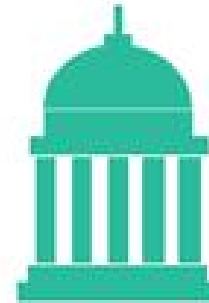
**B2C**

Online storefronts such as Zappos, Amazon, and Dell offer merchandise and services to consumers.



**C2C**

Consumers sell to each other at popular auction and list sites, such as eBay and Etsy.



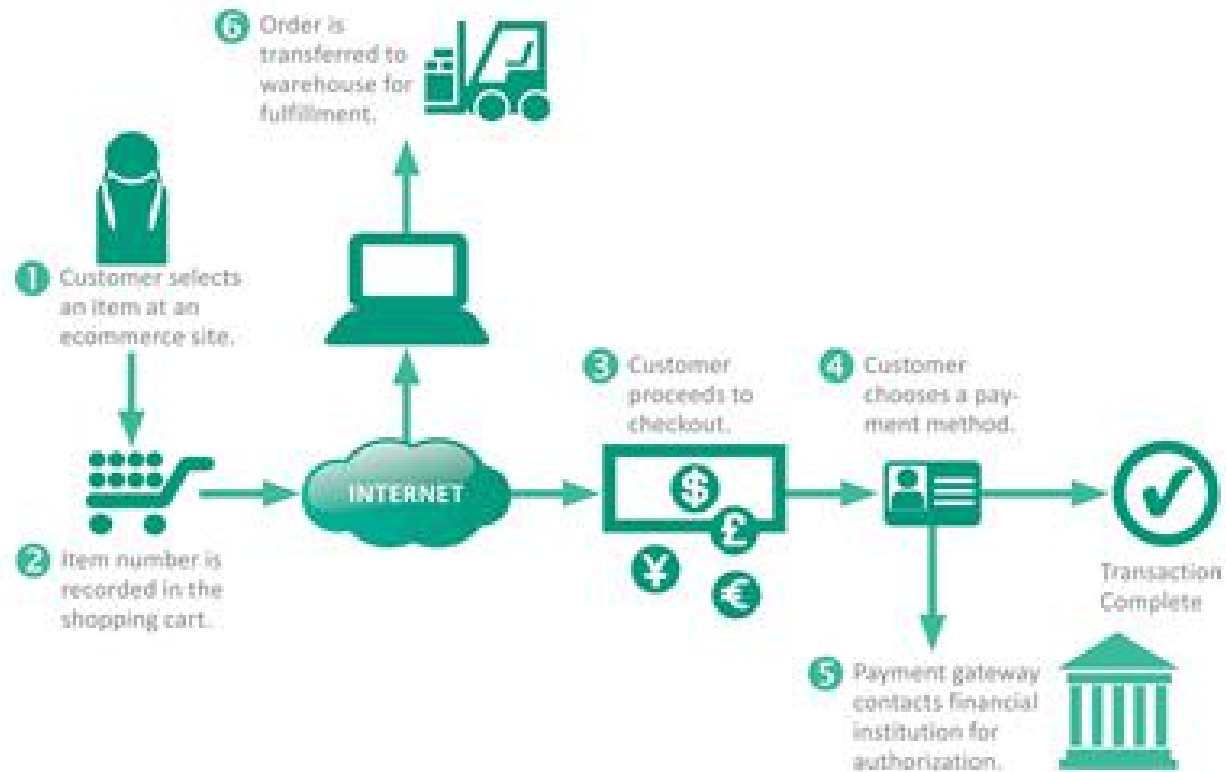
**B2B and B2G**

Web sites such as FedBid, Oracle, and Ingram sell goods and services to other businesses or to the government.

# Ecommerce (2 of 3)

- An **ecommerce application** is the software that handles ecommerce transactions
- Payment processing is based on an online **payment gateway** that authorizes credit and debit cards, PayPal, and Apple Pay transactions

# Ecommerce (3 of 3)



# Supply Chain Management

- A **supply chain** is the sequence of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer
- Supply chains are complex, so businesses use **SCM** (supply chain management) to maximize efficiency and profitability

# Customer Relationship Management

## (1 of 2)

- The acronym **CRM** stands for customer relationship management and refers to practices and technologies that companies use to analyze and improve interactions with customers
- A major source of data for CRM is produced by **loyalty programs**, or a rewards program, which are marketing efforts that provide customers with incentives for making purchases

# Customer Relationship Management (2 of 2)

- Customer Facing
  - Enhance the ecommerce site with search, recommendations, and reviews.
  - Collect customer email addresses from loyalty programs and build profiles in a database.
  - Target customers in the database with email marketing.
  - Provide customer service through online chat and easy returns.
  - Promote products in blogs and social media ads.
- Back Office
  - Provide analytics for back-office demand fore-casting and online metrics, such as the number of visitors, mentions, and likes.

# Enterprise Resource Planning (1 of 3)

- The acronym **ERP** stands for enterprise resource planning; it is a suite of software modules that integrate major business activities; it is sometimes described as “the central nervous system of an enterprise”



# Enterprise Resource Planning (2 of 3)

- An ERP system can provide the following benefits to an enterprise:
  1. Improved overall performance by standardizing business processes based on best practices
  2. Minimized technology overhead for managers and other workers who interact with a single, centralized, and integrated set of software modules
  3. Increased efficiency and productivity from streamlined workflows
  4. Improved access to information from a single database



# Enterprise Resource Planning (3 of 3)

5. Enhanced customer satisfaction based on efficient sales and distribution
6. Reduced costs and errors when transferring data between systems, such as accounting and human resources
7. Increased profitability from the ability to collect analytics all aspects of business operations
8. Reduced inventory costs resulting from better planning, forecasting, modeling, and tracking

# Section C: Systems Analysis

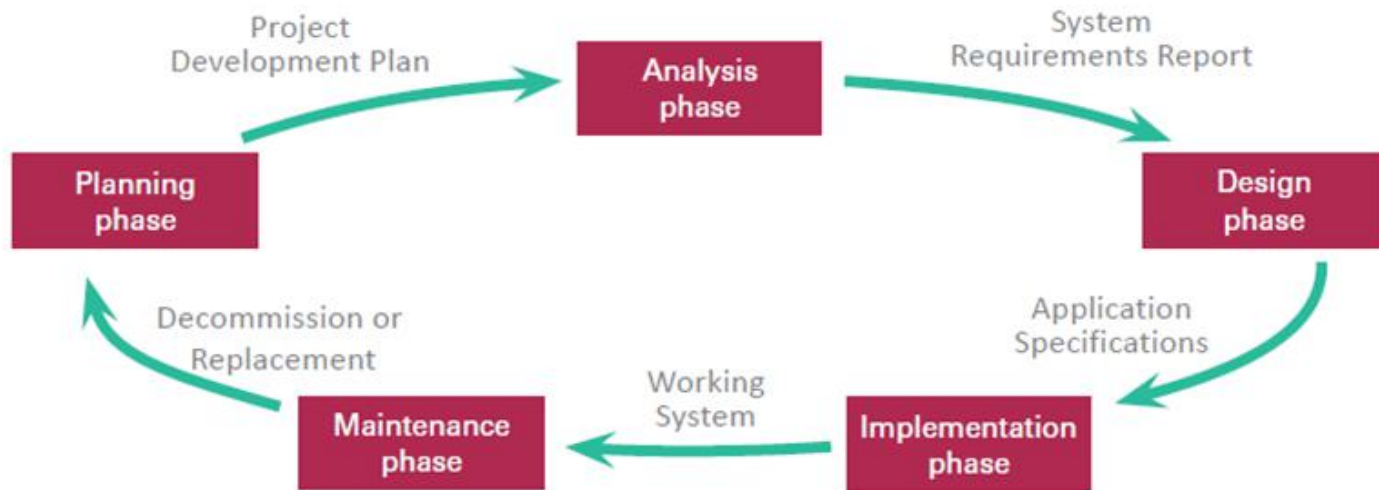
- System Development Life Cycle
- Planning Phase
- Analysis Phase
- Documentation Tools

# Section C: Objectives

- List the five phases of the SDLC
- List five tasks that are completed during the planning phase
- Draw a diagram of Michael Porter's Five Forces model
- Define BI, BPM, JIT, MRP, and TQM
- Use PIECES to classify problems and opportunities
- Describe the three activities that take place during the analysis phase
- Briefly describe at least six tools used by systems analysts

# System Development Life Cycle (1 of 2)

- An information system progresses through several phases as it is developed, used, and retired; these phases encompass as **system development life cycle** or SDLC



# System Development Life Cycle (2 of 2)

- **Systems analysis and design** is a discipline that focuses on developing information systems according to the phases of an SDLC
- The scope of systems analysis and design encompasses the people, procedures, computers, communications networks, and software involved with handling information in an organization

# Planning Phase (1 of 10)

- The **planning phase** for an information system project includes:
  - Assembling the project team
  - Justifying the project
  - Choosing a development methodology
  - Developing a project schedule
  - Producing a project development plan

# Planning Phase (2 of 10)

- The goal of these activities is to create a **project development plan**; this planning document includes:
  - A short description of the project including its scope
  - An estimate of the project costs and potential financial benefits
  - A list of project team participants
  - A schedule for the project, including an outline of its phases

# Planning Phase (3 of 10)

- To be successful, an enterprise has a choice of three fundamental responses:
  - Make improvements
  - Change the industry
  - Create new products



# Planning Phase (4 of 10)

- Project team members can identify problems and opportunities using a variety of techniques, such as interviews and data analysis
- The **PIECES framework** helps classify problems in an information system; each letter of *PIECES* stands for a potential problem

# Planning Phase (5 of 10)

- BI (Business Intelligence): An integrated set of technologies and procedures used to collect and analyze data pertaining to sales, production, and other internal operations of a business in order to make better business decisions.
- BPM (Business Process Management): A structured methodology for improving business performance by monitoring, measuring, and modifying processes that support the people, systems, and goals in an enterprise.

# Planning Phase (6 of 10)

- JIT (Just In Time): A manufacturing system in which the parts needed to construct a finished product are produced or arrive at the assembly site just when they are needed. JIT tends to reduce costs by eliminating substantial warehousing expenses and obsolete parts.
- MRP (Manufacturing Resource Planning): Calculates and maintains an optimum manufacturing plan based on master production schedules, sales forecasts, inventory status, open orders, and invoices. If properly implemented, it improves cash flow and increases profitability. MRP provides businesses with the ability to

# Planning Phase (7 of 10)

be proactive rather than reactive for the management of their inventory levels and material flow.

- TQM (Total Quality Management): A technique initiated by top management that involves all employees and all departments, and focuses on quality assurance in every product and service offered to customers.

# Planning Phase (8 of 10)

## Performance

A performance problem means that an information system does not respond quickly enough to users or takes too long to complete processing tasks.

## Economics

An economics problem means that the system costs too much to operate or use.

## Efficiency

An efficiency problem means that too many resources are used to collect, process, store, and distribute information.



## Information

An information problem means that users don't receive the right information at the right time in a usable format.

## Control

A control problem means that information is available to unauthorized users or that authorized users are not given the authority to make decisions based on the information they receive.

## Service

A service problem means that the system is too difficult or inconvenient to use.

# Planning Phase (9 of 10)

- There are many standard system development methodologies:
  - **Structured methodology** focuses on the processes that take place within an information system
  - **Information engineering methodology** focuses on the data an information system collects before working out ways to process that data
  - **Object-oriented methodology** treats an information system as a collection of objects that interact to accomplish tasks

# Planning Phase (10 of 10)

- **Project management software** is an effective tool for planning and scheduling
- Industry standard tools for scheduling and project management include:
  - **PERT** (Program Evaluation and Review Technique) – used for analyzing the time needed to complete each project task
  - **WBS** (work breakdown structure) – breaks a complete task into a series of subtasks
  - **Gantt charts** – shows the duration of development tasks as they occur over time

# Analysis Phase (1 of 2)

- The goal of the **analysis phase** is to produce a list of requirements for a new or revised information system; tasks for this phase include:
  - Studying the current system
  - Determining system requirements
  - Writing a requirements report



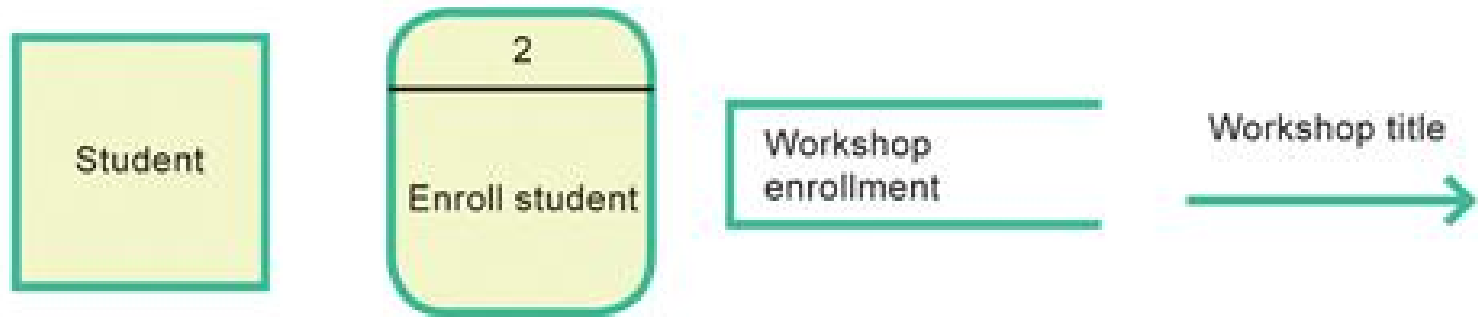
# Analysis Phase (2 of 2)

- **System requirements** are the criteria for successfully solving problems identified in an information system
- They also serve as an evaluation checklist at the end of a project, so they are sometimes referred to as **success factors**
- System requirements are incorporated into a document called a **system requirements report** that describes the objectives for the information system

# Documentation Tools (1 of 6)

- The core documentation tool for project teams using structured methodology is the **data flow diagram** (DFD), which graphically illustrates how data moves through an information system
- In DFD terminology:
  - An **external entity** is a person, organization, or device used outside the information system that originates or receives data
  - A **data store** is a medium that holds data
  - A **process** is a routine that changes data by performing a calculation
  - An arrow symbolizes a **data flow** and indicates how data travels

# Documentation Tools (2 of 6)



An external entity is represented by a square labeled with a noun.

A process is represented by a rounded rectangle, which is numbered and labeled with a verb phrase.

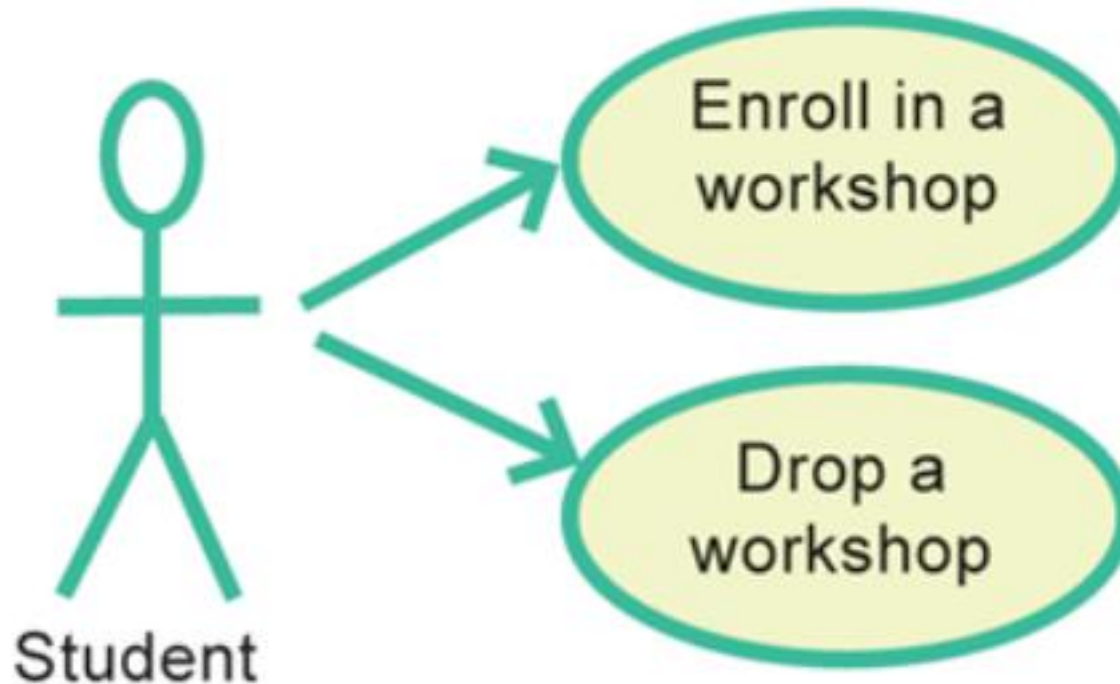
A data store is represented by an open rectangle labeled with the name of a data file.

A data flow is represented by an arrow labeled with a description of the data.

# Documentation Tools (3 of 6)

- The current standard for object-oriented documentation is referred to as **UML** (Unified Modeling Language)
- Three of the most frequently used UML tools include use case diagrams, sequence diagrams, and class diagrams
- A **use case diagram** documents the users of an information system and the functions they perform
- In object-oriented jargon, the people who use the system are called **actors**; any task an actor performs is called a **use case**

# Documentation Tools (4 of 6)

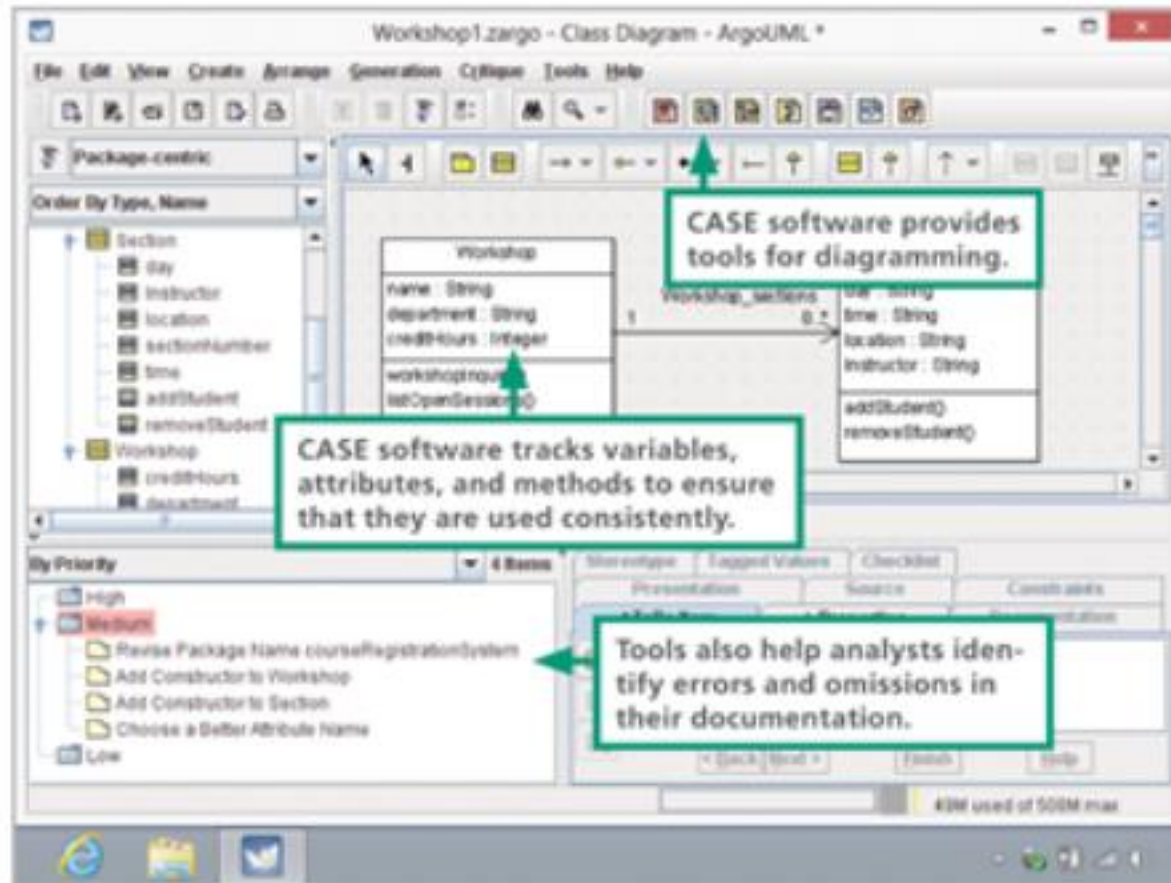


A use case diagram for a workshop registration system depicts two use cases—one in which a student (actor) enrolls in a workshop (use case 1), and one in which the student drops the workshops (use case 2).

# Documentation Tools (5 of 6)

- 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 associations between objects
- A **sequence diagram** depicts the detailed sequence of interactions that take place for a use case
- A **CASE tool** (computer-aided software engineering tool) is a software application designed for documenting system requirements, diagramming current and proposed information systems, scheduling development tasks, and developing computer programs

# Documentation Tools (6 of 6)



# Section D: Design and Implementation

- Design Phase
- Evaluation and Selection
- Application Specifications
- Implementation Phase
- Documentation and Training
- Conversion and Cutover
- Maintenance Phase



# Section D: Objectives (1 of 2)

- List five activities that take place in the design phase of system development
- Compare and contrast the four categories of software solutions that are available to the design team
- Explain why some projects have a detailed design phase while other projects do not
- Describe the significance of feature creep

# Section D: Objectives (2 of 2)

- List at least five activities that take place in the implementation phase
- Describe five types of testing that take place in the implementation phase
- Describe four cutover methods
- List and describe six QoS metrics

# Design Phase (1 of 2)

- In the **design phase** of the SDLC, the project team must figure out how the new system will fulfill the requirements specified in the system requirements report
- **Activities that take place during the design phase:**
  - Identify potential solutions
  - Evaluate solutions and select the best one
  - Select hardware and software
  - Develop application specifications
  - Obtain approval

# Design Phase (2 of 2)

- The project team has to consider the overall architecture based on:
  - Device requirements
  - Network technology
  - Cloud hosting
  - Level of automation

# Evaluation and Selection

- Using a **decision support worksheet**, the project team can assign scores to each criterion, weigh them, and compare totals for all solutions

A list of criteria includes features and factors that are important to the success of the information system.

The highest weights indicate the most important criteria.

Weighted scores are obtained by multiplying the weight by the raw score.

Raw scores indicate how well each solution meets each criterion.

Information System Comparison					
		Solution 1: Custom Programming		Solution 2: Turnkey System	
Criterion	Weight	Raw Score	Weighted Score	Raw Score	Weighted Score
Satisfies requirements	10	10	100	6	60
Fast processing	9	8	72	8	72
Good security	10	8	80	8	80
Low construction cost	6	5	30	8	48
Low implementation cost	6	9	54	8	48
Low maintenance cost	9	7	63	7	63
Short development time	6	4	24	10	60
Good flexibility	7	9	63	6	42
<b>Total</b>			<b>486</b>		<b>473</b>

The solution with the highest total is the best choice.

# Application Specifications (1 of 2)

- The team's systems analysts will create a set of **application specifications** that describe the way information system's software should interact with users, store data, process data, and format reports
- The goal of the **detailed design phase** is to create very detailed specifications for the complete information system

# Application Specifications (2 of 2)

- Some projects fail because of constant, unmanaged demand for changes, even before the system is implemented. This failure to constrain change is often referred to as **feature creep**
- Proposed changes should be managed within a formal process that includes written **change requests**, which detail the scope of a proposed change and can be evaluated by project team members

# Implementation Phase (1 of 3)

- During the **implementation phase** of the SDLC, the project team supervises the tasks necessary to construct the new information system
- Tasks that take place during this phase include:
  - Purchase or contract for hardware/software
  - Create applications
  - Test applications
  - Finalize documentation
  - Train users
  - Convert data
  - Initiate new system



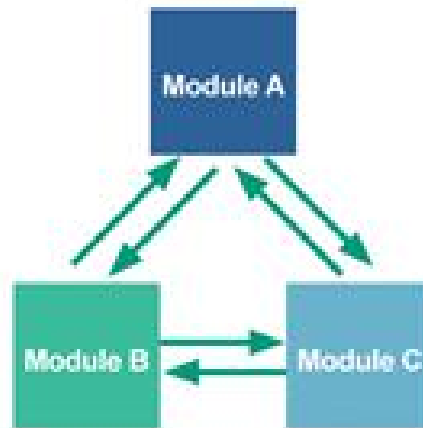
# Implementation Phase (2 of 3)

- **Software customization** is the process of modifying a commercial application to reflect an organization's needs
- **Application testing** is the process of trying out various sequences of input values and checking the results to verify that the application works as it was designed
  - As each application module is completed, it undergoes **unit testing** to ensure that it operates reliably and correctly
  - When all modules have been completed and tested, **integration testing** is performed to ensure that the modules operate together correctly
  - **System testing** ensures that all the hardware and software components work together

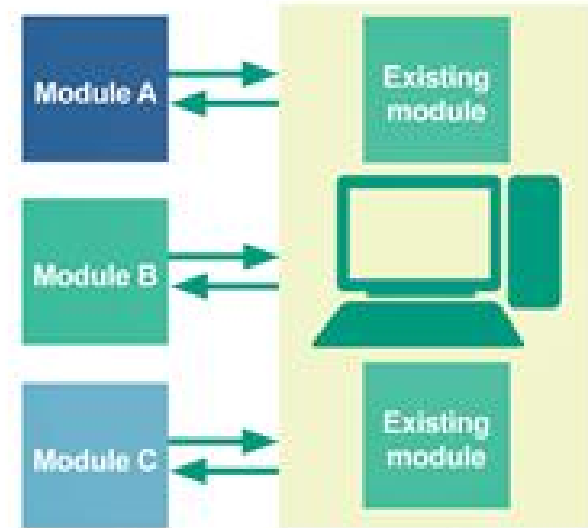
# Implementation Phase (3 of 3)



Unit testing ensures that each module of the application software works correctly.



Integration testing ensures that all the modules work together correctly.



System testing ensures that new modules work with the rest of the system hardware and software.

# 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
- A **procedure handbook** is a type of user documentation that contains step-by-step instructions for performing tasks

# Conversion and Cutover

- **System conversion** refers to the process of deactivating an old information system and activating a new one; it is also referred to as a “cutover” or “to go live”
- **Acceptance testing** is designed to verify that the new information system works as required

# Maintenance Phase (1 of 3)

- The **maintenance phase** of the SDLC involves the day-to-day operation of the system, making modifications to improve performance, and correcting problems
- Changes during the maintenance phase can include the following:
  - Updates to the operating system and application software
  - User interface revisions to make the system easier to use
  - Hardware replacements necessary to retire defective equipment or enhance performance
  - Security upgrades
  - Quality-of-service enhancements

# Maintenance Phase (2 of 3)

- The term **quality of service** (QoS) refers to the level of performance a computer system provides
- A **quality-of-service metric** is a technique used for measuring a specific QoS characteristic
- Many organizations establish a **help desk** to handle end-user problems; it is staffed by technical support specialists

# Maintenance Phase (3 of 3)

QOS METRIC	DESCRIPTION
Throughput	Amount of data processed in a particular time interval
Accuracy	Number of errors occurring in a particular time interval for a particular function
Downtime	Amount of time a system is not available for processing
Capacity	Available storage space, number of users, number of connections, or number of packets
User levels	Number of users at peak, average, and low times
Response time	Time period between when a user initiates a request for information and when the request is fulfilled

# Section E: System Security

- Systems at Risk
- Data Centers
- Disaster Recovery Planning
- Data Breaches
- Security Measures



# Section E: Objectives

- List at least five kinds of disasters that put information systems at risk
- Explain three ways that a data center can reduce the risk of disasters that destroy data
- Describe the elements of a disaster recovery plan
- Name five things that can trigger a data breach
- Describe how identity thieves use stolen data
- Explain four security measures that protect data from breaches
- Describe consumer notification laws in education, health care, and banking
- List five steps that data breach victims should follow

# Systems at Risk

- The kinds of disasters that put information systems at risk include:
  - Natural disasters
  - Power outages
  - Equipment failures
  - Human errors
  - Software failures
  - Acts of war
  - Security vulnerabilities

# Data Centers (1 of 4)

- A **data center** is a specialized facility designed to hold and protect computer systems and data
- These centers may be dedicated to information systems for a single company, or they may be a **colocation center** in which several corporations lease space and equipment
- **Lights-out management** (LOM) allows system administrators to monitor and manage servers using remote control software

# Data Centers (2 of 4)



# Data Centers (3 of 4)



Below sea level or in a floodplain



In a location that is prone to hurricanes, tornadoes, or earthquakes



Near hazardous materials manufacturing, storage, or transport facilities



In an area without world-class telecommunications infrastructure



In large metropolitan areas where accidents and violence put people and equipment at risk



Near an airport flight path



In locations where power is expensive or unreliable

# Data Centers (4 of 4)



- **Bahnhof Pionen** is located 100 feet beneath Stockholm, Sweden, and sometimes called the 'James Bond' data center.
- **Iron Mountain** is located 220 feet underground in a limestone cave near Pittsburgh.
- **Smartbunker** runs on wind power and is housed in a former NATO command bunker in the Lincolnshire Wolds. U.K.
- **InfoBunker** is a 65,000-square-foot data center built in a decommissioned Air Force bunker designed to survive a 20-megaton nuclear blast

# Disaster Recovery Planning

- A **disaster recovery plan** is a step-by-step description of the methods used to secure data against disaster and a set of guidelines for how an organization will recover lost data and resume operations if and when a disaster occurs
- **Disaster recovery plans should:**
  - Ensure the safety of people on the premises at the time of a disaster Continue critical business operations
  - Minimize the duration of a serious disruption to operations
  - Minimize immediate damage and prevent additional losses
  - Establish management succession and emergency powers
  - Facilitate effective coordination of recovery tasks

# Data Breaches (1 of 2)

- A **data breach** is an incident in which personal data is viewed, accessed, or retrieved without authorization
- Data breaches can be caused by the following:
  - Malware attacks
  - Employee negligence
  - Insider theft
  - Device theft
  - System glitches



# Data Breaches (2 of 2)

- **Identity theft** is the fraudulent use of someone's personal information to carry out transactions, such as applying for loans, making purchases, collecting tax refunds, or obtaining false identity documents

# Security Measures (1 of 4)

- Measures that protect information systems can be grouped into four categories: **deterrents**, **preventative countermeasures**, **corrective procedures**, and **detection activities**
  - **Deterrents** reduce the likelihood of a deliberate attack. Physical deterrents, such as limiting access to critical servers, fall under this category. Common deterrents also include security features such as multi-level authentication, password protection, and biometric identification.

# Security Measures (2 of 4)

- **Preventive countermeasures** shield vulnerabilities to render an attack unsuccessful or reduce its impact. Firewalls that prevent unauthorized access to a system and encryption that makes stolen data indecipherable are examples of preventive countermeasures.
- **Corrective procedures** reduce the effect of an attack. Data backups, disaster recovery plans, and the availability of redundant hardware devices all are examples of corrective procedures.

# Security Measures (3 of 4)

- **Detection activities** recognize attacks and trigger preventive countermeasures or corrective procedures. For example, antivirus software detects viruses entering a system and can be configured to perform corrective procedures such as removing the virus and quarantining infected files. Theft or vandalism can be detected by periodic hardware inventories. The use of monitoring software to track users, file updates, and changes to critical systems can also help detect anomalies that indicate an intrusion or a threat.

# Security Measures (4 of 4)

- To minimize the risk of identify theft, customers should be vigilant about the information they divulge, for example:
  - Know when data is being collected
  - Find out how data is being used
  - Find out what data is retained
  - Don't trade your privacy