Lecture 3:
Types of Information Systems

CSS 200 - Intro to Information Systems

Module 1

- What is an information system?
- Where do we use information systems?
- What is the difference between Data, Information and Knowledge?

What is an information system?

- An information system is a combination of technology, people, and processes that work together to collect, store, manage, and share data. It helps organizations make decisions, solve problems, and improve efficiency by providing accurate and timely information.

Where do we use information systems?

- Information systems are used in various sectors like business, education, and healthcare to support daily operations and long-term planning. They include hardware, software, databases, and networks, all designed to process and distribute information to users who need it.

What is the difference between Data, Information and Knowledge?

- Data refers to raw, unorganized facts or figures that by themselves have no meaning. For example, numbers, dates, or a list of names are considered data.
- Information is what you get when data is processed, organized, or structured in a way that adds context and meaning. For instance, data about sales figures organized in a report becomes information that can be used to understand business performance.
- Knowledge goes a step further and is the understanding or insight gained from analyzing information. It involves interpreting information and applying it to make decisions or solve problems, such as using sales information to predict future trends or improve strategies.

Module 2

- Explain the role of Enterprise Architecture in IT Governance
- Networking Devices: Hub, Repeater, Switch, Router, Gateway

Understanding Enterprise Architecture in IT Governance

What is Enterprise Architecture (EA)?

- Think of EA as a framework for how an organization's IT (technology) and business processes work together. It helps visualize and organize the different components like systems, data, and processes.

What is IT Governance?

- IT Governance is like a set of rules and guidelines that ensure the organization's IT supports its goals. It helps make sure that technology is used wisely and responsibly.

How Does EA Help with IT Governance?

- Alignment with Business Goals: EA ensures that IT projects and initiatives align with what the business wants to achieve. It's like making sure everyone is moving toward the same goal.
- Standardization: EA helps create standard processes and systems across the organization. This consistency makes it easier to manage and reduces confusion.
- Risk Management: By providing a clear view of all IT components, EA helps identify potential risks (like security issues) and allows organizations to plan ahead to avoid them.
- Informed Decision-Making: EA gives leaders a comprehensive view of technology and business processes, enabling them to make better decisions about where to invest and how to improve.
- Performance Measurement: EA often includes metrics that help track how well IT is performing. This allows organizations to see what's working and what isn't.

How Does EA Help with IT Governance?

- Managing Change: As businesses evolve, EA provides guidance on how to introduce new technologies or processes smoothly, reducing disruption.
- Improved Communication: EA acts as a common language that helps different parts of the organization communicate better, making collaboration easier.
- Regulatory Compliance: EA helps organizations ensure they are following laws and regulations related to technology, making it easier to prove compliance when needed.
- Resource Optimization: By identifying overlapping technologies or processes, EA helps organizations use their resources more effectively, saving time and money.
- Long-term Planning: EA encourages looking ahead and planning for future technology needs, ensuring the organization remains adaptable and sustainable.

Networking Devices

- Network Definition: A network is a group of connected devices that share data and resources. These networks can vary in scale, from small home setups to global enterprise systems.
- Hub: Broadcasts data to all connected devices. It lacks intelligence, sending data to everyone instead of the intended recipient.
- Switch: Intelligently forwards data only to the intended device within a local network, reducing congestion and allowing full-duplex communication.
- Router: Connects different networks and determines the best path for data between them using IP addresses. Essential for internet connectivity.
- Repeater: Amplifies and retransmits weak signals to extend network range. Operates at the physical layer.
- Gateway: Acts as a translator between different networks, enabling communication by converting protocols.

What will we cover today?

- MLO 1: Explain the role and objectives of Customer Relationship Management (CRM) and Supply Relationship Management (SRM).
- MLO 2: Develop hands-on experience using MS Office.
- MLO 3: Enhance Analytical Skills

Types of Information Systems Overview

- Transaction Processing Systems (TPS)
- Office Automation Systems (OAS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)
- Executive Information Systems (EIS)

Types of Information Systems Overview

# Types of Information Systems Overview

Tacit knowledge

Explicit knowledge

Information

Basic data

Executive information systems

Decision support systems

Management information systems

Office support systems
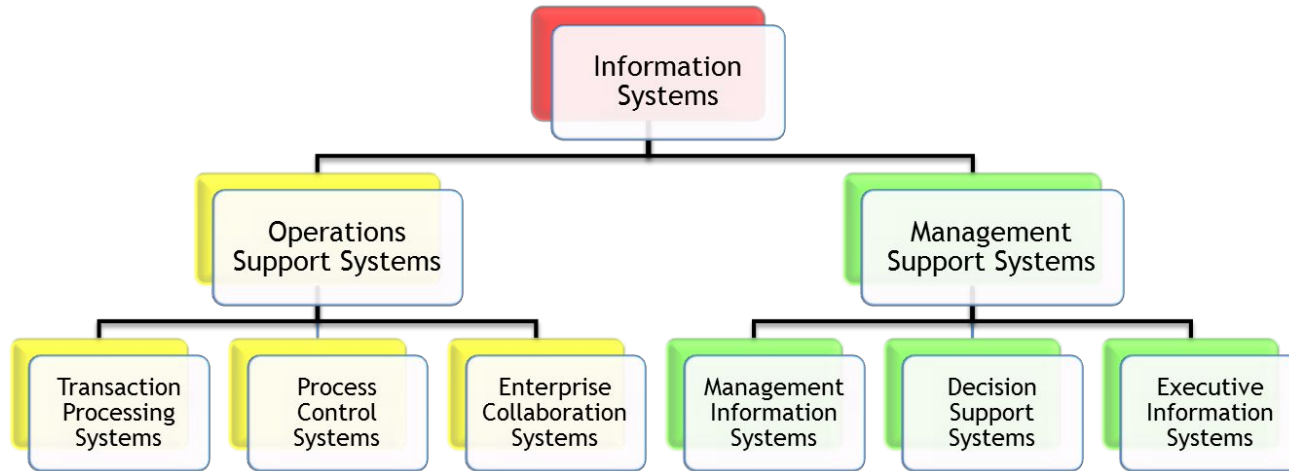
Transaction processing systems
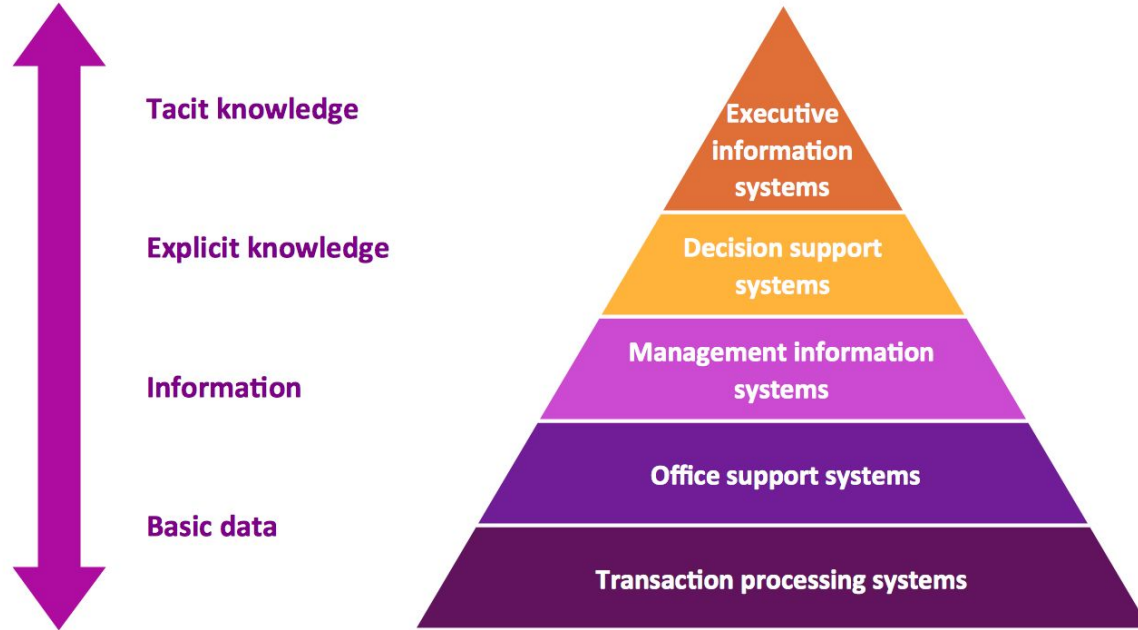
Hierarchy of Information Systems: From Data to Knowledge

- Transaction Processing Systems (TPS): These systems handle basic data, primarily concerned with the day-to-day transactions of an organization. They are foundational, dealing with large volumes of operational data like sales, inventory, and payroll.
- Office Support Systems (OSS): These systems help with the daily operations within an office environment, such as document management, communication (e.g., email), and basic collaboration tools.
- Management Information Systems (MIS): At this level, systems are used to convert raw data from transaction systems into more structured information. MIS provides middle management with reports and summaries, supporting routine decision-making.
- Decision Support Systems (DSS): These systems are used for more complex decision-making, offering tools for data analysis, forecasting, and simulation. DSS helps in processing explicit knowledge, giving managers insights to make informed decisions on non-routine matters.
- Executive Information Systems (EIS): At the top of the hierarchy, these systems are designed for top-level executives. They focus on summarizing and presenting key performance indicators and strategic information, often dealing with tacit knowledge (unwritten, intuitive knowledge) that guides high-level decision-making.

Transaction Processing Systems (TPS)

- Purpose: A Transaction Processing System is used to collect, modify, and retrieve business transactions on demand. It manages a variety of transactions, including buying and selling products, bank deposits, inventory counts, and employee payment data.
- Examples
  - Payroll Systems: Manage employee compensation, tax withholdings, and benefits.
  - Stock Control Systems: Track inventory levels, orders, and sales.
  - Billing Systems: Process invoices and payments from customers.
- Key Features
  - Real-Time Processing: TPS can handle large volumes of data in real-time, ensuring quick updates and transactions.
  - Batch Processing: Manages processing time effectively by grouping transactions into batches.
  - Secure Data Storage: Safely stores customer information and transaction records, providing access as needed.
  - Stable Database Maintenance: Ensures data integrity and availability for easy retrieval.

Transcription Processing Systems
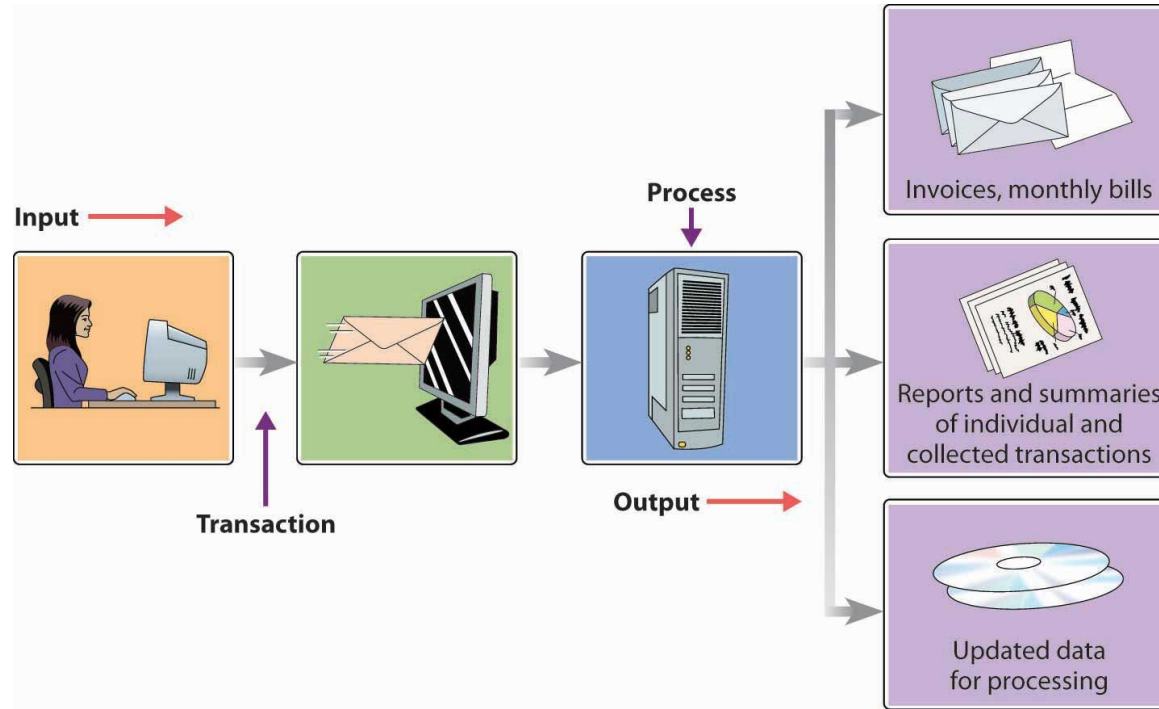
Transaction Processing Systems

- Input: On the left side, we see a user entering data into a computer system, typically by interacting with an application or interface. The "Transaction" arrow indicates that the user is submitting a transaction, such as a payment or order, which is sent to the system for processing.
- Process: The system (represented by a server) processes the incoming transaction. This involves validating the data, updating relevant records in a database, and preparing outputs based on the transaction.
- Output: The processed data leads to various outputs:
  - Invoices and monthly bills: These are generated based on the transactions, typically for billing customers.
  - Reports and summaries of individual and collected transactions: This output is generated for management or system users to review transaction data in an organized format.
  - Updated data for processing: The system updates its records based on the processed transaction and stores it for future reference or further processing.

Office Automation Systems (OAS)

- Purpose: Office Automation Systems comprises computers, communication-related technology, and personnel assigned to perform official tasks. It covers office transactions and supports official activities at every level in the organization, subdivided into managerial and clerical activities.
- Examples
  - Email: Covers communication and file attachments, including audio, video, and documents.
  - Voice Mail: Records and stores phone messages in the system's memory for later retrieval.
  - Word Processing: Involves creating documents such as memos, reports, and letters, with features for editing and formatting.
- Key Features
  - Document Creation and Editing: Allows users to create, copy, edit, and store text efficiently.
  - Grammar and Spelling Checks: Provides tools to ensure written communication is error-free.
  - Message Storage and Retrieval: Ensures important communications are saved and can be accessed anytime.
  - File Attachments: Enables sending various types of files (audio, video, documents) through email.

Management Information Systems (MIS)

- Purpose: A Management Information System (MIS) studies the people, technology, organization, and the relationships between them. It provides suitable information for management to deduce investment strategies and emphasizes service through technology, focusing on data analysis and project management.
- Examples
  - HR Management System: Generates reports on employee attendance, performance, and payroll, aiding managers in workforce management.
  - Sales Reporting System: Provides insights into sales performance, trends, and forecasts to guide strategic decisions.
- Key Features
  - Summarized Data Reports: Presents data in an easily digestible format, focusing on key metrics.
  - Regular Reporting: Generates periodic reports (daily, weekly, monthly) to keep managers informed.
  - User-Friendly Interfaces: Designed for ease of use, allowing managers to access and interpret data without extensive training.

Decision Support Systems (DSS)

- Purpose: The Decision Support System (DSS) is a management-level, interactive, computer-based information system that helps managers make informed and intelligent decisions. It provides the necessary information to analyze and summarize large amounts of data, making it easier for managers to compare and analyze information.
- Examples
  - Financial Forecasting System: Utilizes data analysis and modeling to assist executives in making investment decisions by predicting future market trends.
  - Interactive Mapping Systems: Provides real-time route optimization and transportation options for efficient travel planning.
- Key Features
  - Interactive Data Analysis: Offers tools for manipulating data, allowing managers to add or delete information and see the corresponding effects.
  - Visualization Tools: Summarizes data in charts and tables for quicker understanding and analysis.
  - Rapid Decision-Making: Enhances the ability to make effective decisions at a faster pace by simplifying complex data.

Decision Support Systems
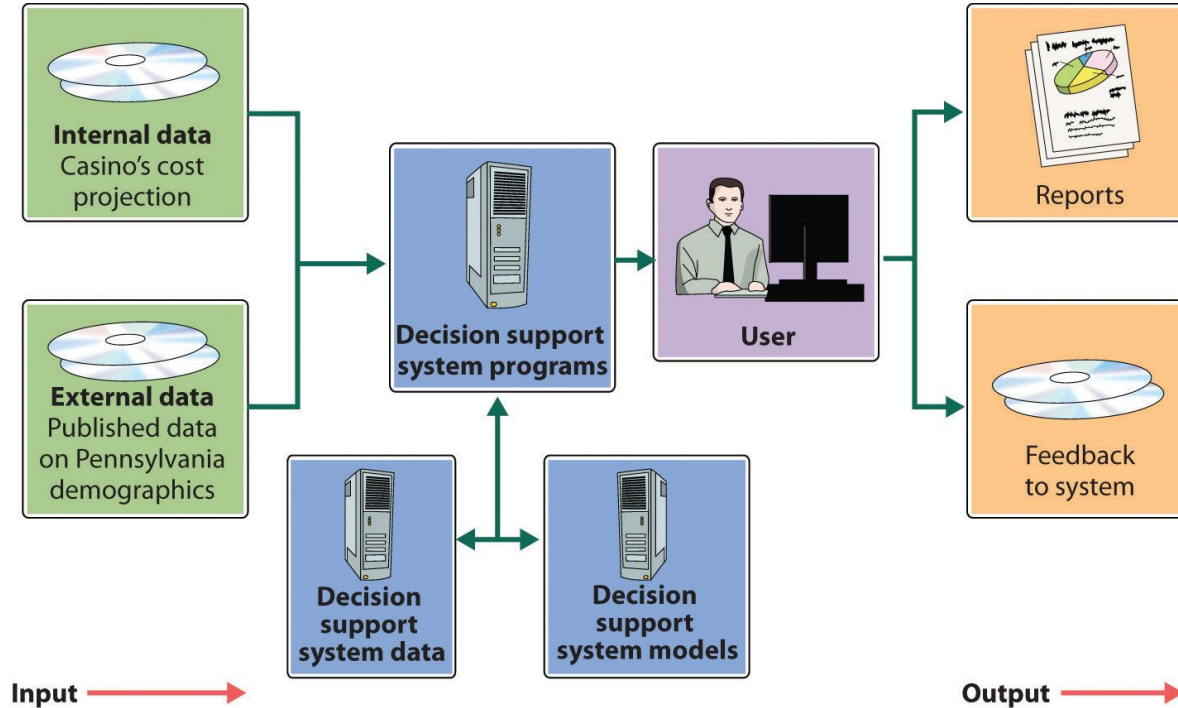
Decision Support Systems

- Input:
    - Internal data: This refers to data from within the organization, such as a casino's cost projection, which provides financial or operational data that impacts decisions.
    - External data: This includes data from external sources, such as published demographics for a specific area (e.g., Pennsylvania), which could help in market analysis or planning.
- Decision Support System Programs: These are the core programs responsible for analyzing both the internal and external data. These programs often include algorithms and tools for data analysis, forecasting, and modeling.

Decision Support Systems

- Decision Support System Data and Models:
    - Data: This refers to the datasets the DSS accesses and processes to assist in decision-making.
    - Models: These are mathematical or statistical models that help in simulating different scenarios and making predictions. The system uses these models to create meaningful interpretations of the input data.
- User Interaction: The user (typically a decision-maker, like a manager or analyst) interacts with the DSS programs to analyze data, receive insights, and make decisions.
- Output:
    - Reports: The DSS generates detailed reports, including visualizations like charts or graphs, to summarize the analyzed data and help the user understand key insights.
    - Feedback to the system: This refers to the feedback loop where the system can refine or update its models and data based on the output and the user's interaction.

Executive Information Systems (EIS)

- Purpose: Executive Information System (EIS) provide top executives with quick access to summarized, high-level information that is critical for strategic decision-making.
- Examples
  - Dashboard Applications: Visual displays of key performance indicators (KPIs) across various departments.
  - Performance Monitoring Tools: Track progress toward strategic goals, alerting executives to areas needing attention.
- Key Features
  - High-Level Summaries: Information is presented in a concise manner, focusing on strategic insights rather than operational details.
  - Data Integration: Combines data from various sources, providing a comprehensive view of organizational performance.
  - Visualization Tools: Use graphs and charts to represent data, making trends and patterns easier to identify.

Summary

System	Purpose	Users	Key Features	Example
TPS	Handle routine, high-volume transactions	Operational staff (clerks, cashiers)	Structured, repetitive, real-time processing	POS systems, payroll systems
OAS	Automate routine office tasks	Clerical staff, knowledge workers	Productivity software (word processing, emails, etc.)	Microsoft Office suite
MIS	Provide reports for decision-making	Middle management	Summarized reports from structured data	Sales management systems
DSS	Support decision-making with data analysis	Managers, analysts	Analytical tools, "what-if" analysis, simulations	Forecasting, investment systems
EIS	Provide top-level information for executives	Executives, senior managers	High-level summaries, real-time dashboards	Executive dashboards

Customer Relationship Management Systems (CRM)

- Purpose: Customer Relationship Management (CRM) systems manage an organization's interactions with current and potential customers, enhancing relationships and satisfaction.
- Examples
  - Salesforce: Offers tools for sales tracking, customer service management, and marketing automation.
  - HubSpot: Provides a suite of tools for inbound marketing, sales, and customer service.
- Key Features
  - Centralized Customer Database: Stores all customer information in one place, making it easily accessible.
  - Sales Forecasting and Reporting: Analyzes customer data to predict future sales trends and identify opportunities.
  - Interaction Tracking: Logs customer interactions across various channels, helping personalize service and communication.

Supplier Relationship Management (SRM)

- Purpose: Supplier Relationship Management (SRM) systems manage an organization's interactions with suppliers, enhancing supplier relationships, performance, and collaboration to optimize the supply chain.
- Examples
  - Oracle SRM Cloud: Helps organizations manage supplier onboarding, track performance, and maintain compliance with procurement processes.
- Key Features
  - Supplier Database: Centralizes supplier information, including contracts, pricing, and performance data, making it easily accessible for teams.
  - Supplier Performance Monitoring: Tracks supplier performance metrics like quality, delivery times, and cost compliance, enabling proactive management.
  - Contract and Risk Management: Helps manage supplier contracts, ensuring compliance and mitigating risks through better supplier oversight and collaboration.