Lecture 8:
Computer Security

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.

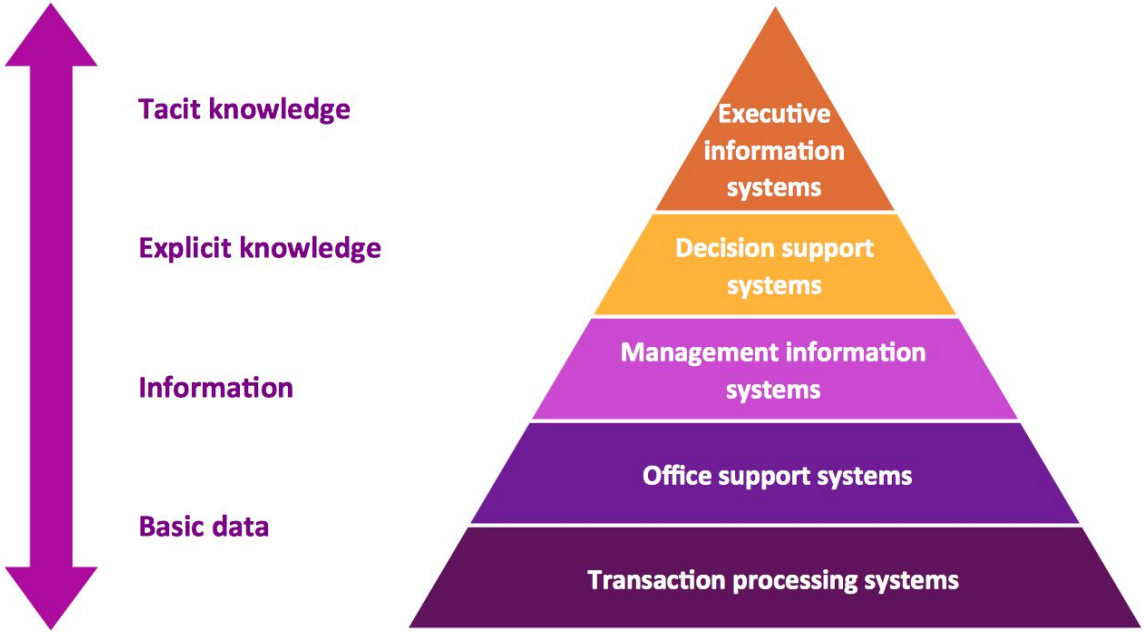
Networking Devices

- 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.

Module 3

- Explain the role and objectives of Customer Relationship Management (CRM) and Supply Relationship Management (SRM).
- 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



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.

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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

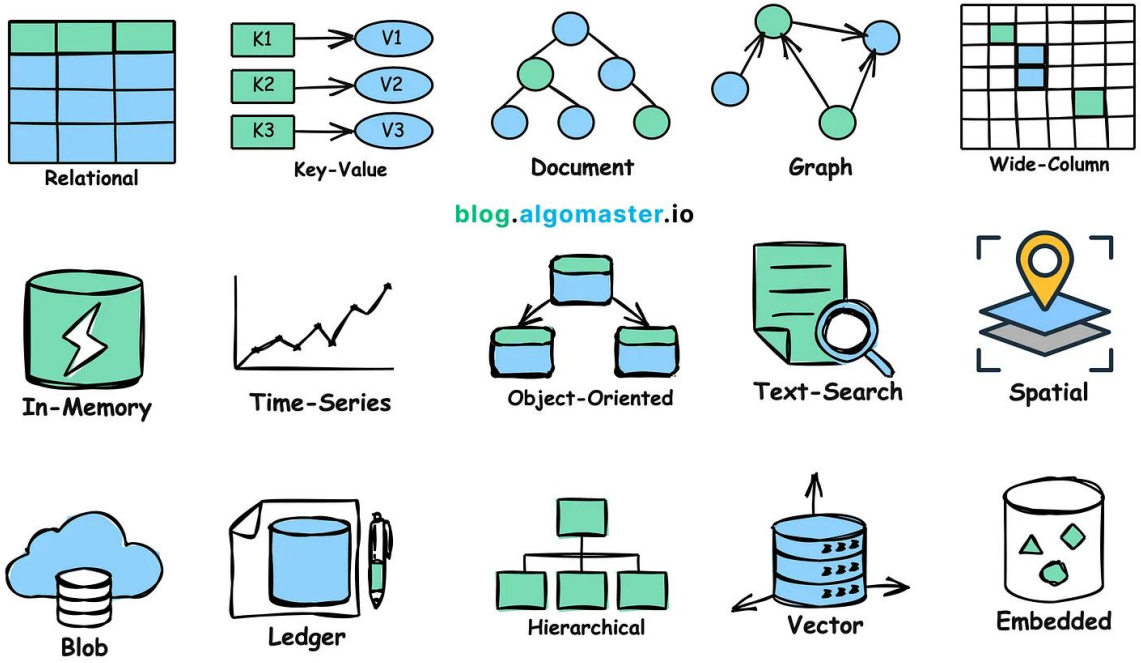
Module 4

- Microsoft Access
- Relational Databases (RDBMS)
- Key-Value Store
- Document Databases
- Graph Databases
- Object-Oriented Databases
- Hierarchical Databases

Database vs. Database Management System (DBMS)

- A Database and a Database Management System (DBMS) are closely related terms, but they serve different purposes:
- A database is a structured set of data. The data can be structured or unstructured and stored in various formats like tables, documents, and key-value pairs. It could be anything from a simple shopping list to a picture gallery or the vast amount of information in a corporate network.
- A Database Management System (DBMS) is software used to interact with a database. It provides an interface for users or applications to manipulate data, making the handling of large amounts of data more efficient and less error-prone. A DBMS oversees core administrative tasks such as data storage, retrieval, security, and query processing.

Different Types Of Databases



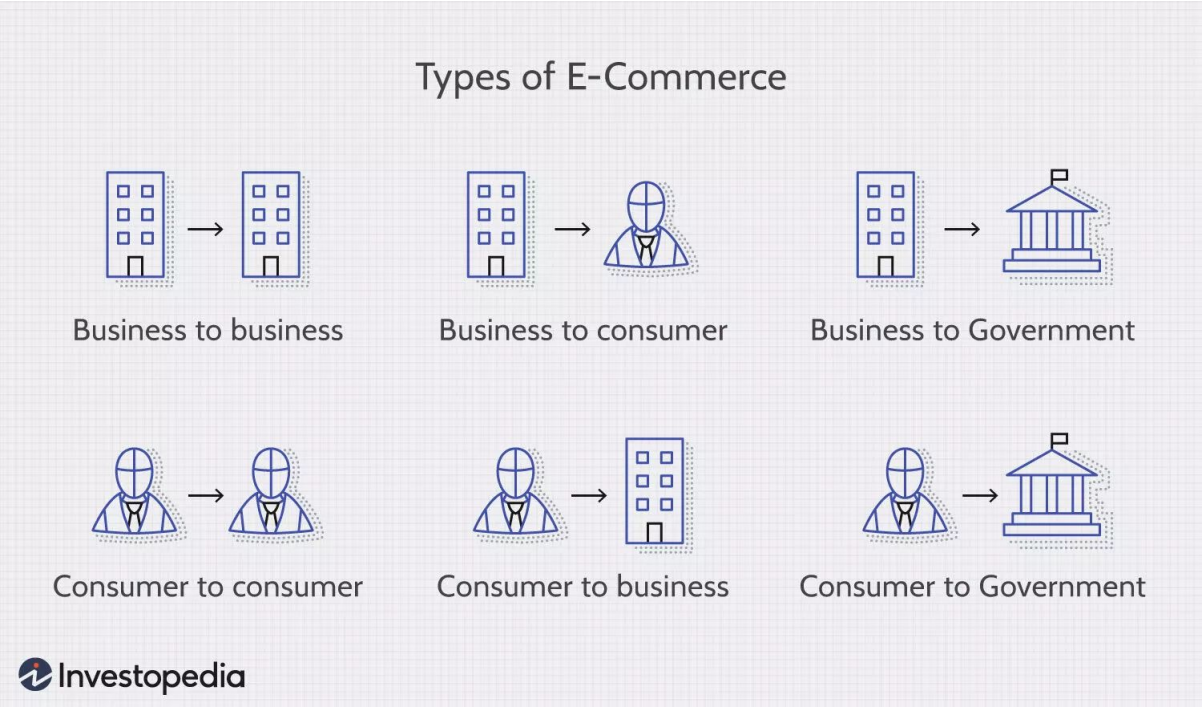
Summary

Database Type	Data Structure	Use Cases	Advantages	Examples
Relational Databases	Tables with rows and columns, structured relationships (SQL-based)	Enterprise applications, banking, e-commerce platforms	Data integrity, complex queries	MySQL, PostgreSQL, Oracle DB
Key-Value Store	Key-value pairs	Caching, session, storage, real-time data processing	Simple, fast retrieval, highly scalable	Redis, DynamoDB
Document Databases	Semi-structured documents	Content management, real-time analytics, IoT	Flexible schema, fast reads/writes, good for evolving data	MongoDB, Couchbase,Apache Couchbase
Graph Databases	Graphs, nodes, edges, properties	Social networks, recommendation systems, knowledge graphs	Efficient traversal of connected data, flexible querying	Neo4j, Amazon Neptune
Object-Oriented Databases	Objects (similar to OOP languages)	Object-oriented applications, multimedia databases	Seamless OOP integration, efficient object management	ObjectDB, db4o
Hierarchical Databases	Tree-like structure (parent-child relationships)	Organizational charts, file systems	Efficient for one-to-many relationships	IBM IMS, Windows Registry

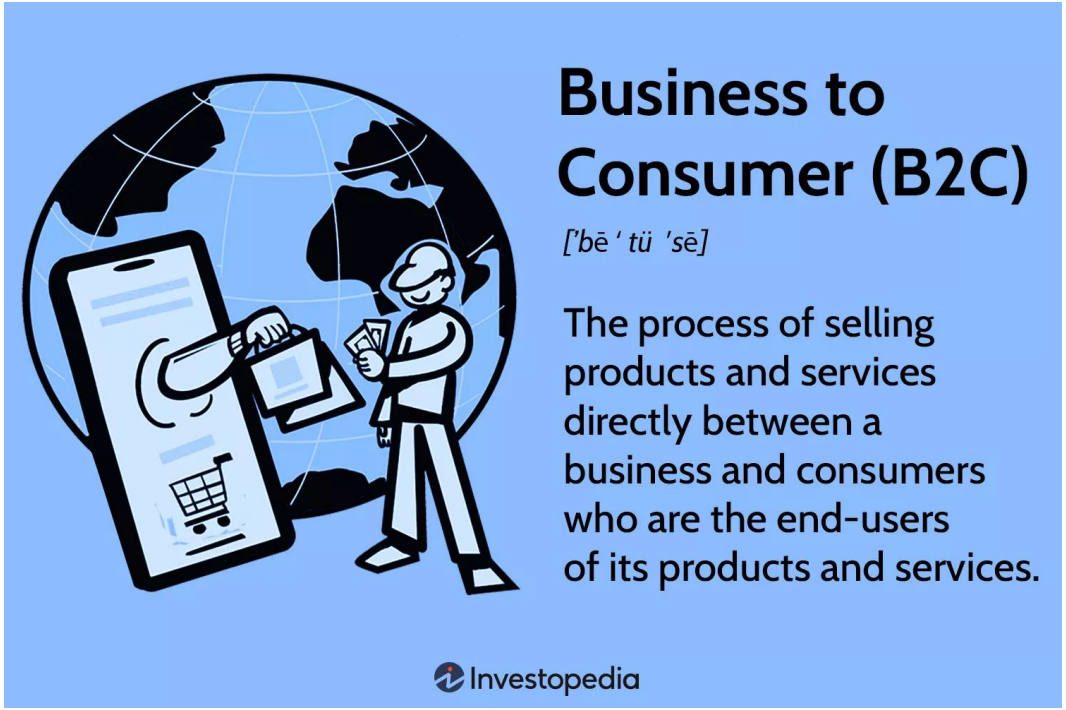
Module 5

- What is e-commerce?
- What types of e-commerce are there?
  - B2C
  - B2B
  - C2C
- What is HTML?
  - Headings
  - Paragraphs
  - Links
  - Lists
  - Forms
- What is CSS?

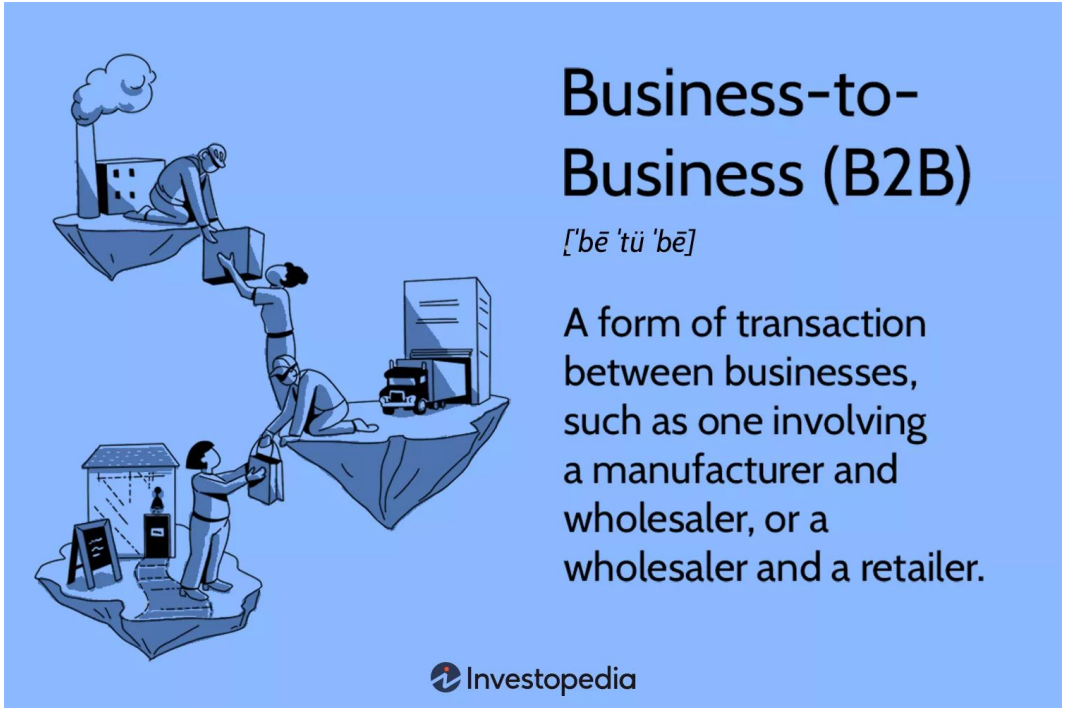
Types of e commerce



Business to Consumer (B2C)



Business to Business (B2B)



Customer to Customer (C2C)

C2C / B2C / B2B Comparison

Characteristic	C2C	B2C	B2B
Definition	Transaction between consumers	Transactions between businesses and consumers	Transactions between businesses
Target Audience	Individual consumers	General public	Other businesses or organizations
Platform Type	Marketplaces or auction sites	Retail websites	Wholesale platforms or direct sales
Example Business	eBay	Amazon	Alibaba

Introduction to HTML

- What is HTML?
  - HTML stands for HyperText Markup Language. It's the language used to create web pages.
  - HyperText refers to links that connect web pages.
  - Markup Language means that it uses tags to define elements within a document.
- What does HTML do?
  - It structures content on the web. It DOESN'T style or control how the content looks (that's CSS).
  - HTML is the foundation of any web page. It organizes text, images, links, and other content into a coherent structure.

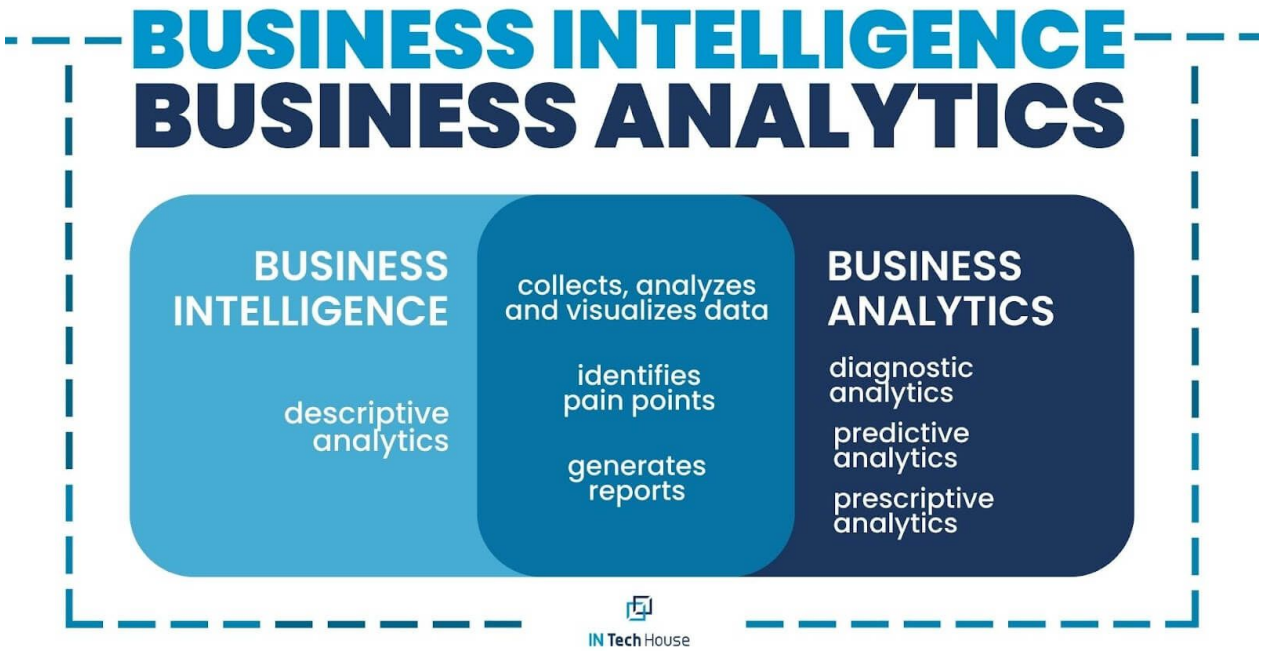
Introduction to CSS

- What is CSS?
  - CSS stands for Cascading Style Sheets. It's used to style and layout web pages.
- What does CSS do?
  - CSS controls the appearance of HTML elements, such as colors, fonts, layout, and spacing.
  - Separates the structure (HTML) from the presentation (CSS).

Module 6

- What is Business Intelligence?
- What is Business Analytics?
- Difference between Business Intelligence and Business Analytics
- Decision Support Systems
- Types of Decision Support Systems
- Components of a Decision Support System
- Examples of Decision Support System Software

Business Intelligence vs. Business Analytics



What is Business Intelligence?

- Traditionally, business intelligence has been defined as the use of data to manage day-to-day operational management within a business.
- Business intelligence tools can include a variety of software tools and other systems. Some of these include spreadsheets, online analytical processing, reporting software, business activity monitoring software, and data mining software.
- Overall, business intelligence helps leaders navigate organizational and industry-related challenges and ensures that companies stay focused on their primary target to successfully get where they want to go.

What is Business Analytics?

- Business analytics has generally been described as a more statistical-based field, where data experts use quantitative tools to make predictions and develop future strategies for growth.
- For example, while business intelligence might tell business leaders what their current customers look like, business analytics might tell them what their future customers are doing.
- Business analytics tools are employed for many functions, including correlational analysis, regression analysis, forecasting analysis, text mining, image analytics, and others.

Decision Support Systems Definition

- A decision support system (DSS) is an interactive information system that analyzes large volumes of data for informing business decisions.
- A DSS supports the management, operations, and planning levels of an organization in making better decisions by assessing the significance of uncertainties and the tradeoffs involved in making one decision over another.

Module 6

- What is Knowledge Management?
- What is a Knowledge Management system?
- Describe at least two types of Knowledge Management systems.
- Types of Knowledge

What is knowledge management?

- Knowledge management involves a sequence of processes involving the storage, management, sharing, and usage of an organization's knowledge and information.
- The objective is to efficiently store organizational knowledge for optimal utilization.
- This continuous process emphasizes identifying and refining organizational knowledge, ensuring accessibility, and fostering a culture of continuous sharing and learning.

What is a knowledge management system?

- A knowledge management system (KMS) is software designed to facilitate the creation, organization, sharing, and utilization of knowledge within an organization.
- It includes features that facilitate the systematic gathering, storage, retrieval, and sharing of knowledge.
- A KMS aims to enhance overall organizational efficiency by providing tools and processes that enable individuals and teams to access, contribute to, and leverage the collective knowledge of the organization.

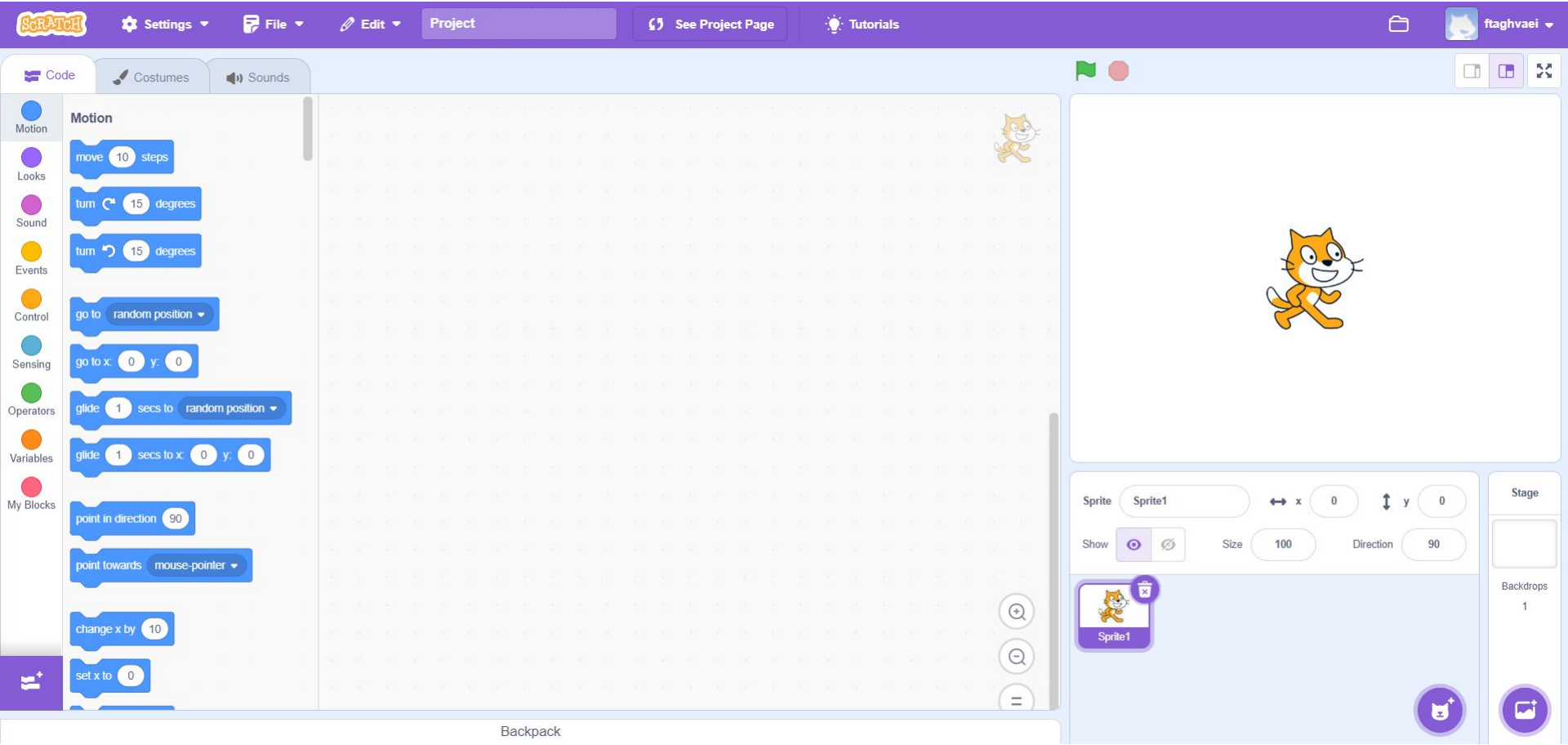
Types of Knowledge

What will we cover today?

- MLO 1: Analyze Online Resources.
- MLO 2: Explain human side of information systems.
- MLO 3: Develop hands-on animation skills Using Scratch.
- MLO 4: Create interactive slides.
- MLO 5: Interpret the significance of stock trends, supporting the analysis with visual evidence and statistical summaries.

What is Scratch?

- A block-based programming language developed by MIT.
- No need to write code—drag and drop colored blocks to build programs.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Motion
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Events
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Sensing
Operators
Variables
My Blocks
Motion
move 10 steps
turn 15 degrees
turn 15 degrees
go to random position
go to x: 0 y: 0
glide 1 secs to random position
glide 1 secs to x: 0 y: 0
point in direction 90
point towards mouse-pointer
change x by 10
set x to 0
Sprite
Sprite1
x 0
y 0
Show
Size 100
Direction 90
Stage
Backdrops 1
Backpack

Scratch Interface Overview

- Stage: Where you see your project.
- Sprite List: Shows all the characters (sprites) in your project.
- Script Area: Workspace where you build code by stacking blocks.

Scratch Interface Overview

Block Categories:

- Motion: Controls movement.
- Looks: Manages appearance and speech.
- Sound: Adds sound effects.
- Events: Starts actions, such as clicking a flag or key.
- Control: Adds loops, waits, and conditional blocks.
- Sensing, Operators, Variables: For advanced control.

Motion Blocks (for Movement and Positioning)

- Move [10] Steps: Moves the character forward by a specified number of steps.
- Turn [15] Degrees: Rotates the sprite clockwise by the given degrees.
- Turn [15] Degrees (Counter-Clockwise): Rotates the sprite counterclockwise by the given degrees.
- Go to x: [0] y: [0]: Moves the character to a specific x and y coordinate.
- Glide [1] Seconds to x: [0] y: [0]: Smoothly moves the sprite to a location over a specified time.
- Point in Direction [90]: Sets the character to face a specific direction (e.g., 90° for right).
- If on Edge, Bounce: Makes the character reverse direction if it touches the edge of the screen.

Looks Blocks (for Appearance and Display)

- Say [Hello!] for [2] Seconds: Displays a speech bubble for the character for a set time.
- Switch Costume to [Costume1]: Changes the character's appearance by switching its costume.
- Switch Backdrop to [Backdrop1]: Changes the background of the stage.
- Show: Makes a hidden character visible.
- Hide: Hides the character from view.
- Change Size by [10]: Increases or decreases the character's size by a set amount.
- Go to Front Layer: Brings the character to the front of the stage.
- Set Color Effect to [Color]: Applies a color effect to the sprite, good for visuals.

Sound Blocks (for Adding Sound Effects and Music)

- Play Sound [Meow] Until Done: Plays a sound file completely before moving to the next block.
- Start Sound [Meow]: Plays a sound immediately and continues to the next block.
- Change Volume by [-10]: Increases or decreases the sound volume.
- Set Volume to [100]%: Sets the volume level for sounds.
- Stop All Sounds: Stops all currently playing sounds.

Events Blocks (for Actions)

- When Green Flag Clicked: Starts the program when the green flag is clicked.
- When [Space] Key Pressed: Begins an action when a specific key is pressed.
- When This Sprite Clicked: Triggers code when the sprite is clicked.
- Broadcast [Message1]: Sends a message to other sprites to trigger their actions.
- When I Receive [Message1]: Starts code when a specific message is received.
- When Backdrop Switches to [Backdrop1]: Runs code when the background changes.
- When Loudness > [10]: Triggers actions based on the loudness detected by the microphone.

Control Blocks (for Loops and Conditionals)

- Wait [1] Seconds: Pauses the code for a specific amount of time.
- Repeat [10]: Loops the contained code a specific number of times.
- Forever: Loops the code inside indefinitely.
- If <Condition> Then: Executes code inside only if a condition is true.
- If <Condition> Then, Else: Executes one set of code if true, another if false.
- Wait Until <Condition>: Pauses until a condition is met.
- Repeat Until <Condition>: Loops until a specific condition becomes true.
- Stop All: Ends all scripts in the project.

Sensing Blocks (for Interactivity)

- Touching [Mouse Pointer]?: Checks if the sprite is touching a specified object.
- Touching Color [Color]?: Checks if the sprite is touching a specific color.
- Ask [What's your name?]: and Wait – Asks a question and waits for a typed response.
- Answer: Stores the user's answer from the last question asked.
- Mouse X and Mouse Y: Detects the current x and y coordinates of the mouse.
- Key [Space] Pressed?: Checks if a specific key is pressed.
- Loudness: Returns the microphone loudness level, useful for sound-based interactions.
- Timer: Returns the time since the project started, for time-based control.

Operators Blocks (for Math and Logic)

- [+][-][*][/]: Basic math operations: add, subtract, multiply, divide.
- Pick Random [1] to [10]: Returns a random number in a specified range.
- [50] > [25] : Compares two values to see if one is greater than the other.
- [50] = [50]: Checks if two values are equal.
- [Condition1] AND [Condition2] : True if both conditions are met.
- [Condition1] OR [Condition2]: True if either condition is met.
- Not [Condition] : Returns the opposite of a condition’s truth value.
- Join [Hello] [World]: Combines two pieces of text into one.

Variables Blocks (for Data Storage and Manipulation)

- Make a Variable: Creates a new variable to store values.
- Set [Variable] to [0]: Sets a variable to a specific starting value.
- Change [Variable] by [1]: Increases or decreases the value of a variable.
- Show Variable [Variable]: Displays the variable's value on the stage.
- Hide Variable [Variable]: Hides the variable from the stage display.