University of Central Florida
CGS 2545
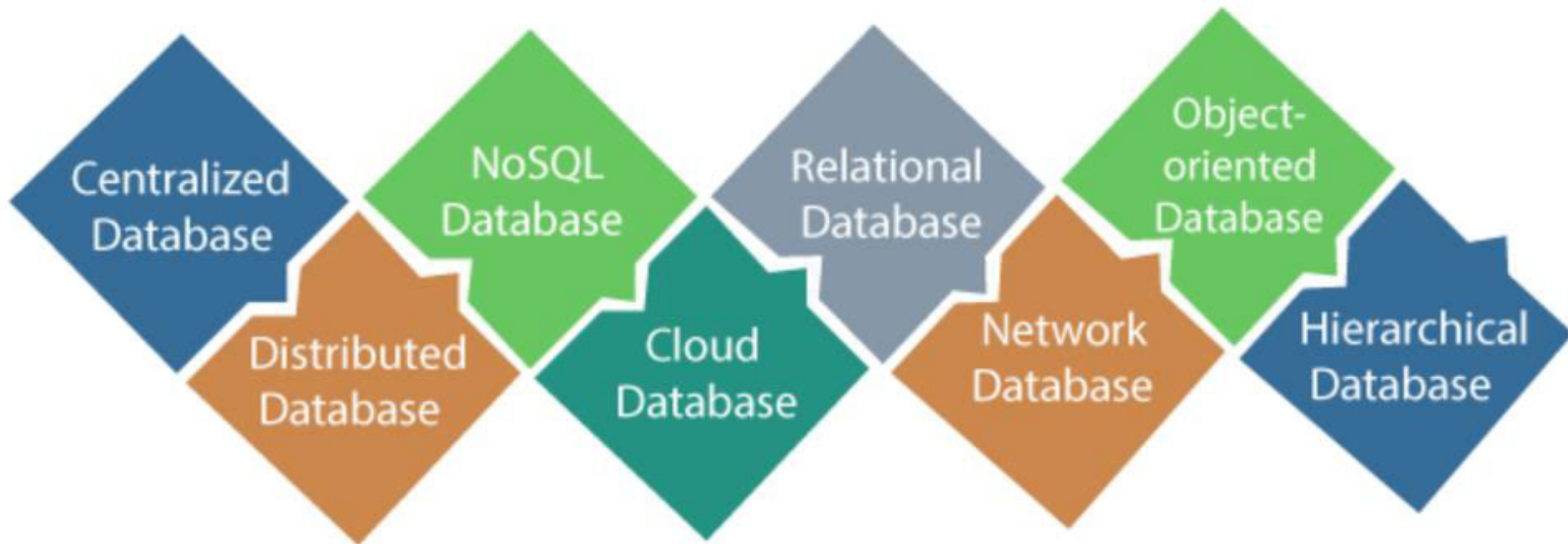# Database Concepts

Types of Databases

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Types of Databases

- There are various types of databases used for storing different varieties of data
  - Centralized Database
  - Distributed Database
  - Relational Database
  - NoSQL Database
  - Cloud Database
  - Object-oriented Databases
  - Hierarchical Databases
  - Network Databases
  - Personal Database
  - Operational Database
  - Enterprise Database

Types of Databases

- Centralized Database
  - stores data at a centralized database system
  - users access the stored data from different locations through several applications
  - applications use an authentication process to let users access data securely

Types of Databases

- Distributed Database
  - data is distributed among different database systems of an organization
  - database systems are connected via communication links that help end-users to access the data easily
  - two variations
    - **Homogeneous DDB** database systems execute on the same operating system and use the same application process and carry the same hardware devices
    - **Heterogeneous DDB** database systems execute on different operating systems under different application procedures, and carry different hardware devices

Types of Databases

- Relational Database
  - based on the relational data model, which stores data in the form of rows (tuple) and columns (attributes), and together forms a table (relation)
  - uses SQL for storing, manipulating and maintaining the data
  - E.F. Codd invented the database in 1970.
  - Each table in the database carries a key that makes the data unique from others

Types of Databases

- NoSQL Database
  - Non-SQL/Not Only SQL is a type of database that is used for storing a wide range of data sets
  - it is not a relational database as it stores data not only in tabular form but in several different ways
  - It came into existence when the demand for building modern applications increased
  - Thus, NoSQL presented a wide variety of database technologies in response to the demands

Types of Databases

- NoSQL Database
  - Further divide a NoSQL database into the following four types
    - **Key-value storage:** the simplest type of database storage where it stores every single item as a key (or attribute name) holding its value, together.
    - **Document-oriented Database:** used to store data as JSON-like document; helps developers in storing data by using the same document-model format as used in the application code.

Types of Databases

- NoSQL Database
  - Further divide a NoSQL database into the following four types
    - **Graph Databases:** used for storing vast amounts of data in a graph-like structure; social networking websites use the graph database
    - **Wide-column stores:** similar to the data represented in relational databases; data is stored in large columns together, instead of storing in rows

Types of Databases

- Cloud Database
  - data is stored in a virtual environment and executes over the cloud computing platform
  - provides users with various cloud computing services (SaaS, PaaS, IaaS, etc.) for accessing the database
  - there are numerous cloud platforms
    - Amazon Web Services(AWS)
    - Microsoft Azure
    - Kamatera
    - PhonixNAP
    - ScienceSoft
    - Google Cloud SQL

Types of Databases

- Object-oriented Databases
  - uses the object-based data model approach for storing data in the database system
  - data is represented and stored as objects which are similar to the objects used in the object-oriented programming language

Types of Databases

- Hierarchical Databases
  - stores data in the form of parent-children relationship nodes
  - it organizes data in a tree-like structure
  - data get stored in the form of records that are connected via links
  - each child record in the tree will contain only one parent
  - each parent record can have multiple child records

Types of Databases

- Network Databases
  - follows the network data model
  - the representation of data is in the form of nodes connected via links between them
  - it allows each record to have multiple children and parent nodes to form a generalized graph structure

Types of Databases

- Personal Database
  - collecting and storing data on the user's system
  - designed for a single user
- Operational Database
  - creates and updates the database in real-time
  - designed for executing and handling the daily data operations in several businesses

Types of Databases

- Enterprise Database
  - large organizations or enterprises use this database for managing a massive amount of data
  - helps organizations to increase and improve their efficiency
  - simultaneous access to users