Database management systems (DBMS)

* Bridge users with data
* Consistent, secure, accurate and manageable
* Uses normalization, splitting large tables into smaller ones to remove repetition, common in relational databases
* Can be relational, hierachial, object oriented, and network

Relation Database model

* Proposed by British E.F Codd in 1970
* A database model that uses linked tables/ relations
* Each row is one instance, with columns equating to features of that instance
* Can be searched using structured query language (SQL)

Data models

* Conceptual: what the system contains
  + Attributes to each entit/table, and rules governing those attributes
* Logical: how the system should be implemented regardless of DBMS
* Physical: how the system will be implemented with a specific DBMS system

Relational Database management systems (RDBMS)

* Keep nomenclature and values consistent for data integrity
* With relations we can remove data redundancy (duplicate information) and quickly amend all rows if an attribute needs updating.
* Related tables will have a primary key and foreign key pair that link tables together.
* You can also have a unique/composite key which represents a specific instance and comes from a group of attributes representing a unique row.
* Entities become tables, entity features become attributes , and relationships become key pairs in tables.
* Relationships can be one to one, one to many, or many to many
* Relationships can be graphed in Entity relationship diagrams (ER diagrams)
* When many to many relationships exist, a bridging table is introduced to remove redundancy.

Normalization

* Turning wide lists into multiple long lists with relationships is called normalization.
* Rules must be followed, these are called First normal form (1NF) up to 3 normal form (3NF).
* Essentially this means that every row in the table must have one value per attribute (1NF). And that tables must be split from the original when more than one entity is incorporated (2NF). And all attributes must be directly dependent on the primary key, with no transitive dependencies on non-primary-key attributes (3NF)

Distributed Database Management Systems

* Global connectivity relevance, crucial for real time access

Oriented Database Management systems

* Represent data intuitively

Microsoft Azure uses transact-SQL or T-SQL

NoSQL Database management systems operate on unstructured or semi-structured data (MongoDB, Cassandra, etc.)

RDBMS include mySQL/MariaDB, Oracle, SQL Server