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Database Types

Relational Databases Basics

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There are lot of other database types…

- Card-index
- Network (graph)
- Hierarchical
- **Relational**
- Online analytical processing (OLAP)
- Object-oriented
- Deductive
- NoSQL (not only SQL)

Card-index

Card-index database – an ordered (alphabetically, by date, etc.) collection of data in the form of records (“cards”), each of which provides information about a database object.

Modern analogy: Excel spreadsheet, a single table in a relational database.

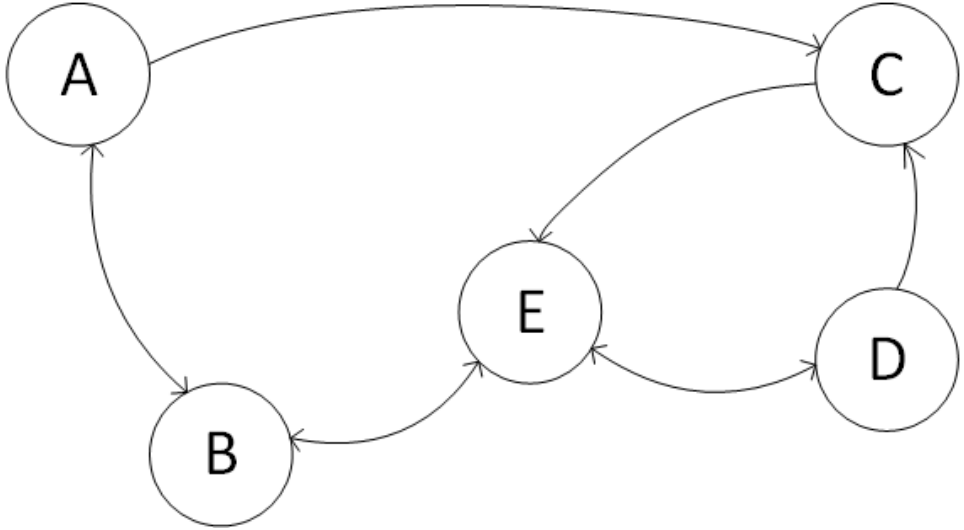
	A	B	C
1	**Author**	**Book**	**Year**
2	Asimov A.	Foundation	1951
3	Asimov A.	Second Foundation	1952
4	Asimov A.	Foundation and Empire	1953

b_id	b_author	b_name	b_year
1	1	Foundation	1951
2	1	Second Foundation	1952
3	1	Foundation and Empire	1953

Network (graph)

Network (graph) database – a database wherein multiple member records or files can be linked to multiple owner files and vice versa.

Software: AllegroGraph, Amazon Neptune, JanusGraph, Neo4j, etc.

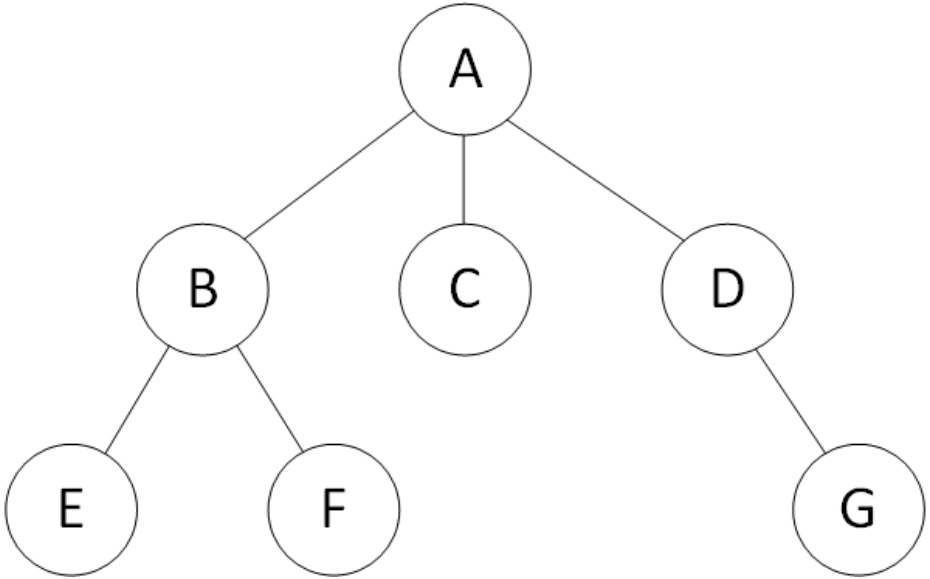


Hierarchical

Hierarchical database – a database that uses a one-to-many relationship for data elements, i.e. a tree structure that links a number of several elements to one “owner” (“parent”) primary record.

Software: Apache Directory, OpenLDAP, BaseX, etc.

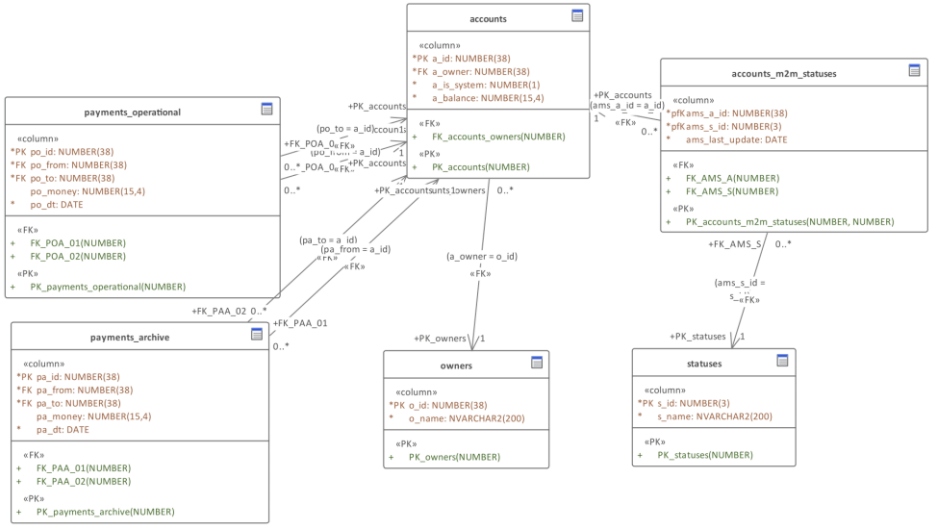
Also: any FS, Active Directory, Windows registry, etc.



Relational

Relational database – a database based on the relational model of data (which is based on a set of relations).

Software: MySQL, MariaDB, MS SQL Server, Oracle Database, PostgreSQL (and dozens of others – this is the most common database type nowadays).

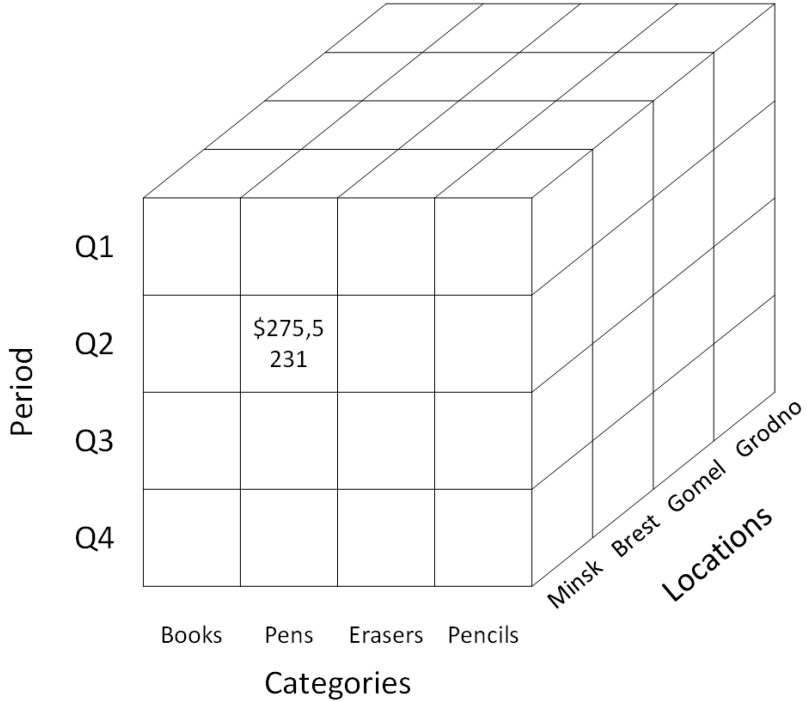


Online analytical processing (OLAP)

OLAP database – a database that processes multi-dimensional analytical queries for business intelligence purposes.

Software: Dundas BI, Sisense, IBM Cognos Analytics, InetSoft, SAP Business Intelligence, Halo.

Also: most relational databases support OLAP functionality.

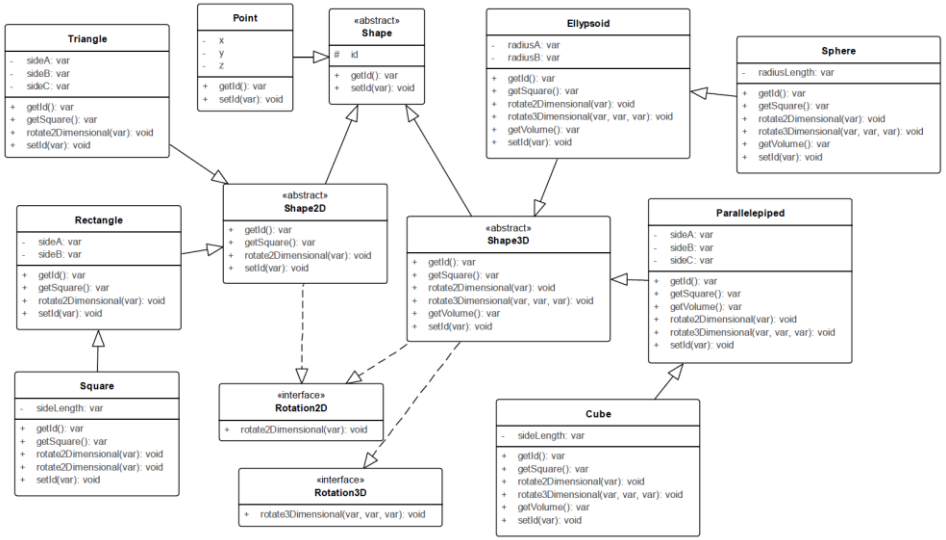


Object-oriented

Object-oriented database – a database that manipulates information represented by objects (literally like in OOP approach).

Software: InterSystems Cache, Google Cloud Storage for Firebase, dBASE PLUS, Apache OODT.

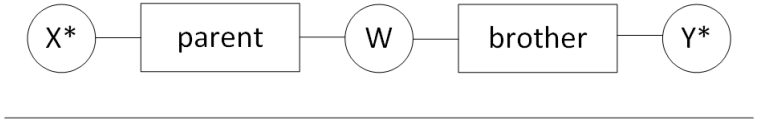
Also: some relational databases support object-oriented approach (e.g. Oracle Database).

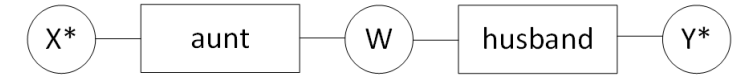


Deductive

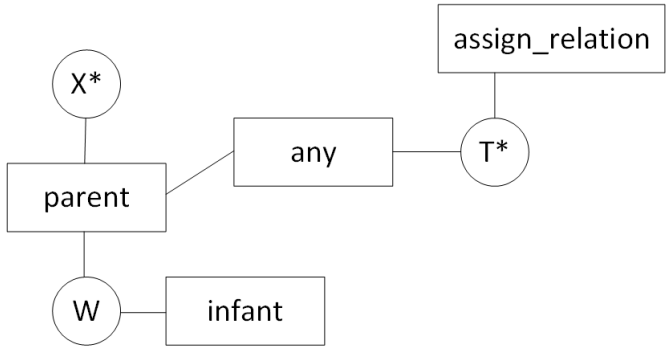
Deductive database – a database that can make deductions (i.e. conclude additional facts) based on rules and facts that already stored in the database.

Software: CORAL, LDL++, SQUALID, TensorLog.





uncle(X,Y):-aunt(X,Y),husband(W,Y)



status(X,T):-assign_relation(T),parent(X,W),infant(W),any(T,W)

NoSQL (not only SQL)

NoSQL (not only SQL) database – a database that can accommodate a wide variety of data models, including key-value, document, columnar and graph formats. NoSQL databases are especially useful for working with large sets of distributed data.

Software: Apache Ignite, Redis, MemcacheDB, MongoDB, Cassandra, etc.

```
db.collection("cities").where("capital", "==", true)
    .get()
    .then(function(querySnapshot) {
        querySnapshot.forEach(function(doc) {
         console.log(doc.id, " => ", doc.data());
        });
    })
    .catch(function(error) {
        console.log("Error getting documents: ",
                                                error);
    });
```

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