An introduction to relational data

Relational data is data modeled using the relational model.

* In the relational model, data is expressed as **tuples**.

* A tuple is a set of attribute / value pairs.

* For example, a tuple might be:

```
(itemid = 5, orderid = 1, item = "Chair", amount = 200.00)
```

* A set of tuples that all share the same attributes is called a relation.

Tuples expressed as tables

 A set of tuples (relations) are naturally represented as tables in a database. Each tuple is exposed as a row in the table. Unlike traditional tuples in programming however, rows in tables have an explicit ordering.

* The database schema defines the columns (headings) of each table. Each column is defined with a name

	itemid type	orderid	item	amount	rows in the table. Columns
	4	1	Chair	200.00	•
	5	1	Table	200.00	A tuple as a row in a
•	6	1	Lamp	123.12	table

Referential integrity

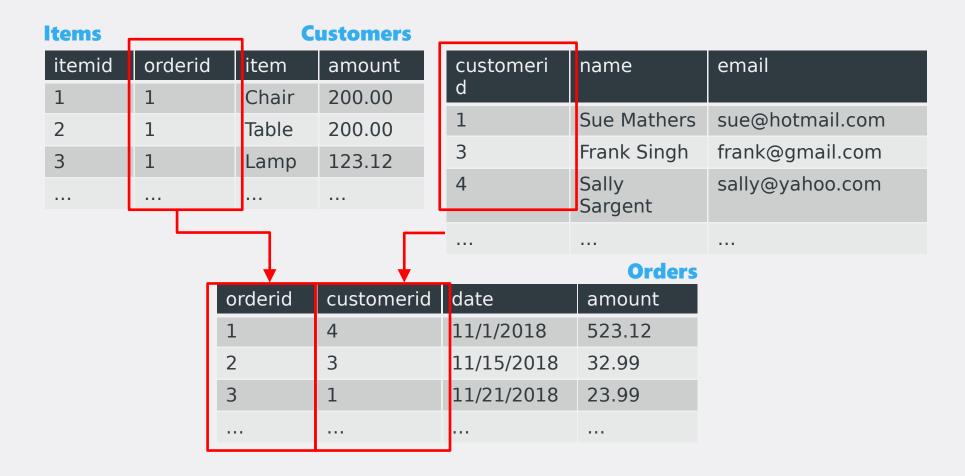
* A data store that organizes data using the relational model is referred to as a relational database.

Primary keys uniquely identify rows within a table.

* **Foreign key fields** are used in one table to refer to a row in another table by referencing the primary key of the other table.

* Foreign keys are used to maintain **referential integrity**, ensuring that the referenced rows are not altered or deleted while the referencing row depends on them.

A sample database model that shows relationships between tables



Constraints

Relational databases support various types of constraints that help to ensure data integrity:

• Unique constraints ensure that all values in a column are unique.

* **Foreign key constraints** enforce a link between the data in two tables. A foreign key references the primary key or another unique key from another table. A foreign key constraint enforces referential integrity, disallowing changes that cause invalid foreign key values.

* **Check constraints**, also known as **entity integrity constraints**, limit the values that can be stored within a single column, or in a relationship to values in other columns of the same row.

The Structured Query Language (SQL)

 Most relational databases use the Structured Query Language (SQL) language that enables a declarative approach to querying.

* The query describes the desired result, but not the steps to execute the query. The engine then decides the best way to execute the query. This differs from a procedural approach, where the query program specifies the processing steps explicitly.

Relational databases can store executable code routines in the form of stored procedures and functions,
which enables a mixture of declarative and procedural approaches.