
Relational Data Model

Definitions

- An entity class is a collection of entity instances that have a common structure. For example, a whole collection of student records could form an entity class.
- An entity instance represents a particular object of interest that is to be represented and tracked. For example, a student record is an entity instance that represents an individual student.
- An attribute represents a piece of interesting information, or a measurable fact, about the instances of an entity class. For example, year of first registration is a fact about students that might be represented as an attribute of all the instances of the entity class student
- A domain is a set of values that can be assigned to an attribute; for example, the attribute birthday could be given values from the domain date.
- A relationship is an association between entities. Entities are often identified by nouns in a requirements specification, and relationships by verbs. For example, owns might form a relationship between entities person and vehicle. Relationships can be described as relationships between entity classes, or between entity instances.
- Mathematically, a relation consists of a heading, which is a subset of the Cartesian product of a set of (attribute name, domain) pairs, and a body, which contains (attribute name, value) pairs. For example, the entity class student could be represented as a heading, (student number, integer), (student name, text) and a body containing values like (student number, 123),(student name, Bloggs) A relation is implemented as a table in a relational database.
- A candidate key is a minimal set of attributes that identifies each individual row in a table (each tuple in a relation). For example, suppose there was a relation Slotroom,day,time in a timetabling application. Then room,day,time or class,day,time would serve as alternative candidate keys for the relation.
- The primary key is the candidate key that has been nominated to identify individual rows in a table. For example, in the timetabling relation above, room,day,time would be likely to form a suitable primary key because class is likely to change.

ACID

- Atomicity - something is either done completely, or not done at all. The state of doing it is not visible outside the database.
- Consistency - The database is in a legal state at all times. When a transaction occurs, it can not break the rules. These rules are about integrity, what is allowed and what is not allowed in certain locations of the database.
- Isolation - There can be more than one transaction occurring at the same time. A certain transaction will not see changes made by other transactions.
- Durability - When a transaction is done, it will be committed. After it is committed, it can no longer be undone.