

8. Database People

- A. User – views DBMS as a blackbox
 - 1) DBA – Database Administrator – more advanced user that handle the management of a DB System.
 - i. DB design
 - ii. Security issues
 - iii. Performance tuning of DB. (Still need experienced human).
 - a) Building indexes
 - b) Select views to materialize
 - c) Memory distribution for queries
- B. Developer – build DBMS kernels. Developers make up large group (in thousands) of workers at companies such as Microsoft (SQL Server) and IBM (DB2).

Top two expenses of business running database: 1) Payroll 2) Electricity
 In this class we want to look form inside and outside the blackbox.

Relational Model (Mathematical Theory)

- 1. Introduction – simulates a table
 - A. Rows: records, tuples (in an instance)
 - 1) Cardinality: # of rows in a table
 - B. Columns: attributes
 - 1) Degree or Arity: # of columns in a table

Relational Schema – the details of the columns: name, type, constraints

Relational Instance – a set of rows with values satisfying relational schema

A set has no duplicates and has no order

- 2. Relational Query Language
 - A. Procedural Language
 - B. Declarative Language – non procedural

Ex: relational algebra (internal representation) vs. relational calculus (ex SQL)

- 3. Integrity Constraints (IC) Set of rules about the values that should be satisfied by all relational instances (also covers type).
 - A. Domain constraints
 - B. Key constraints: For this class, a key is a minimal key
 - 1) A_i is a key of A if
 - i. $A_i \subseteq A$, and
 - ii. the values of A_i determine values of A, and
 - iii. any subset of A_i is not a key.
 - 2) We could have multiple keys in one table
 - i. Conditional Key – all the keys
 - ii. Primary Key – arbitrarily selected from the set of keys of the schema
 - C. Referential Integrity

There can be a situation where an attribute in table A is a key in table B. This often occurs so that the attribute in A is a pointer to a record in another table. This is so only the key and not all the attributes in table B have to be duplicated in table A. Problems of referential integrity occur when the record in table B pointed to by the attribute in table A is deleted.