1 Database System Architecture and System Catalog

Database Reading Group

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2 System Architecture for DBMS

- Centralized
  - all programs (user applications, user interface, and DBMS functionality) running in the same machine
- Client-server
  - specialized servers (e.g., file server, print server, DBMS server)
  - client machines provide the user with appropriate interface to utilize these servers as well as local processing power to run local applications.
  - ODBC (Open Database Connectivity) provides an API which allows client-side programs to call the DBMS (server-side), as long as both client and server machines have the necessary software installed.
  - JDBC (Java Database Connectivity) allows JAVA programs to access the DBMS through standard interface.

3 Catalog for Relational DBMS

- Information stored in a catalog:
  - relation names, attribute names, and attribute domains (data type)
  - constraints (primary keys, secondary keys, foreign keys, NULL/NOT NULL, and other types of constraints)
  - view, storage structure, and indexes
  - security and authorization information
  - statistic information about the relations (e.g., cardinality), attributes in a relation (number of distinct, low value, high value).
- Common practice
  - store the catalog as a relation
  - use the DBMS software for querying, updating, and maintaining the catalog.
- The statistics in the catalog are not automatically updated.
- Oracle provides the command **ANALIZE** for refreshing the statistics.

4 Data Dictionary and Data Repository

- Used for maintaining information on system hardware and software configurations, documentation, applications, and users, as well as other information relevant to system administration.