



MIS 381N – INTRO. TO DATABASE MANAGEMENT

Databases

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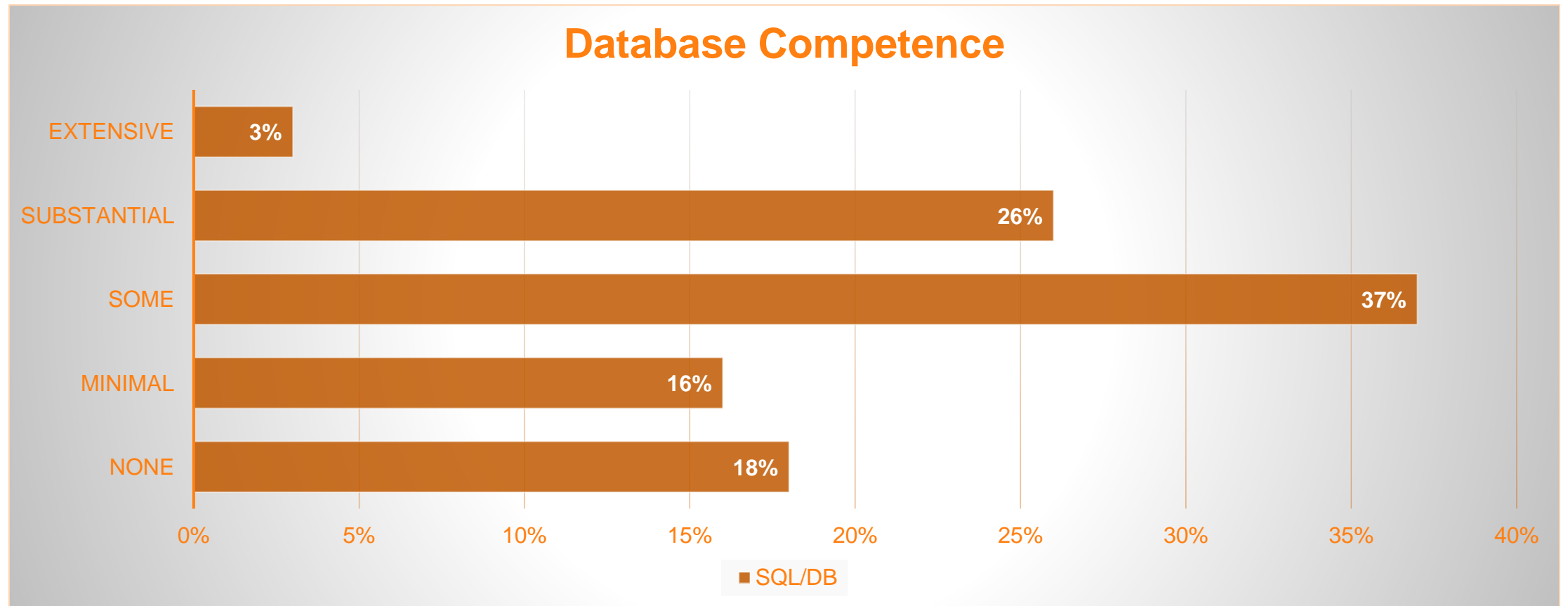
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QUESTIONS

Any questions
before we begin ...



PRE-COURSE SURVEY



AGENDA



Lecture

**What is a database?
Relational DBMS**



Form Teams

**Maximum 6
Mix of skills**



Looking Forward

**Follow Canvas
Quiz**



What is a database?



DATABASE

- An information system used to organize, store, and retrieve data
- Prior to digital databases, businesses used file cabinets with paper files



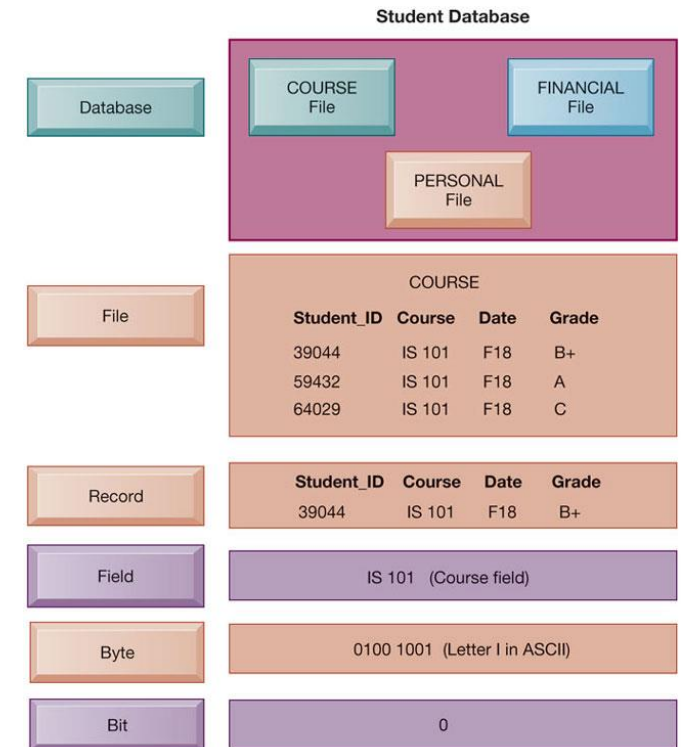


QUESTION

What are the benefits of databases versus file cabinets with paper files?

DATABASE TERMS AND CONCEPTS

- **Entity:** Person, place, thing on which we store information (file, table)
- **Attribute:** Each characteristic, or quality, describing entity (field, column)
- **Record:** Group of related fields (tuple, row)





QUESTION

Do we really need separate tables for each entity?

Can't we have a single table for a database?

PROBLEMS WITH THE TRADITIONAL FILING



Files maintained separately by different departments



Data redundancy



Data inconsistency



Program-data dependence



Lack of flexibility



Poor security



Lack of data sharing and availability



Others?



DATABASE MANAGEMENT SYSTEMS

- Interfaces between applications and physical data files
- Separates logical and physical views of data
- Solves problems of traditional file environment
 - Controls redundancy
 - Eliminates inconsistency
 - Uncouples programs and data
 - Enables organization to centrally manage data and data security



RELATIONAL DATABASE

- Represent data as two-dimensional tables
- Each table contains data on entity and attributes
- Table: grid of columns and rows
 - **Key field:** Field used to uniquely identify each record
 - **Primary key:** Field in table used for key fields
 - **Foreign key:** Primary key used in second table as look-up field to identify records from original table



RELATIONAL DBMS

- Enforce rules on the structure, storage, and retrieval of data
- Multiple tables that relate to one another
- Stores data efficiently, makes retrieval faster
- Reduces duplication and inconsistencies
- Helps analysts turn raw data to valuable information



RELATIONAL DATABASE TABLES

SUPPLIER

Columns (Attributes, Fields)

Supplier_Number	Supplier_Name	Supplier_Street	Supplier_City	Supplier_State	Supplier_Zip
8259	CBM Inc.	74 5 th Avenue	Dayton	OH	45220
8261	B. R. Molds	1277 Gandolly Street	Cleveland	OH	49345
8263	Jackson Composites	8233 Micklin Street	Lexington	KY	56723
8444	Bryant Corporation	4315 Mill Drive	Rochester	NY	11344

Rows (Records, Tuples)

Key Field (Primary Key)

PART

Part_Number	Part_Name	Unit_Price	Supplier_Number
137	Door latch	22.00	8259
145	Side mirror	12.00	8444
150	Door molding	6.00	8263
152	Door lock	31.00	8259
155	Compressor	54.00	8261
178	Door handle	10.00	8259

Primary Key

Foreign Key





QUESTION

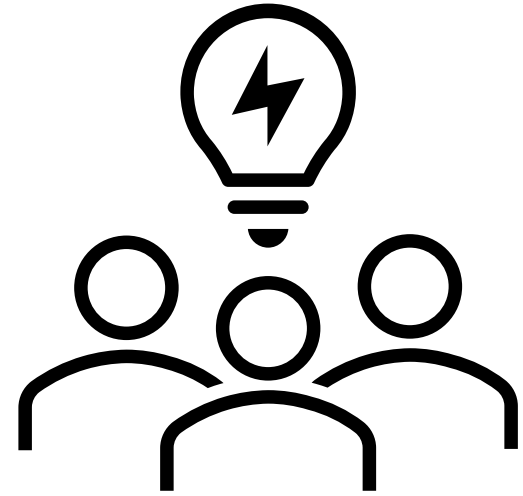
What would happen if a database table
DID NOT USE primary keys for relationships?

RDBMS WILL ALLOW YOU TO...

- Create tables
- Define column parameters
- Formalize relationships
- Create data validation rules
- Store, organize, and secure

ESTABLISHING RELATIONSHIPS

- Entity-relationship diagram
 - Used to clarify table relationships in a relational database
- Relational database tables may have:
 - One-to-one relationship
 - One-to-many relationship
 - Many-to-many relationship: Requires “Join table” or Intersection relation that links the two tables to join information





QUESTION

What is wrong with many-to-many relationships?



QUESTION

What can you do to eliminate
those many-to-many relationships?

RDBMS ALSO...

...separates the logical and physical views of the data

- **Logical view:** how end users view data
- **Physical view:** how data are actually structured and organized





QUESTION

What is the difference between
the logical view and the physical view?

ACTIVITIES TO DESIGN A DB

- Normalization
 - Process of streamlining complex groups of data to:
 - Minimize redundant data elements
 - Minimize awkward many-to-many relationships
 - Increase stability and flexibility
- Referential integrity rules
 - Used by relational databases to ensure that relationships between coupled tables remain consistent
 - E.g., when one table has a foreign key that points to another table, you may not add a record to the table with foreign key unless there is a corresponding record in the linked table





QUESTION

Are relational databases enough?

What else do I need to store in a database?

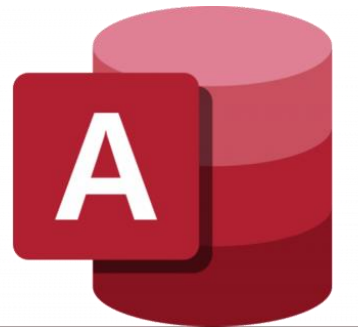
OTHER DATABASES

- Non-relational databases: “No SQL”
 - More flexible data model
 - Data sets stored across distributed machines
 - Easier to scale
 - Handle large volumes of unstructured and structured data
- Databases in the cloud
 - Appeal to start-ups, smaller businesses
 - Amazon Relational Database Service, Microsoft SQL Azure
 - Private clouds



EXAMPLES OF DBMS

- Oracle
- MySQL
- Microsoft SQL Server
- MongoDB (NoSQL)
- Microsoft Access



LET'S FORM TEAMS

Maximum 6
members





THINK / DISCUSS / SHARE

What are some examples where we interact with
databases in daily life and business?

LOOKING FORWARD

Check Canvas... regularly

Client-server model

Data strategy

Quiz (next class)



THANK YOU