Database Management Systems

- Course structure and expectations
- Introduction to DBMS

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Instructor

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Course Breakdown

- Website – www.cse.wustl.edu/~dshook/cse530
- Homework – 70%
  - 5 over the course of the semester
  - Groups of 2
- Exams – 30%
  - Midterm and Final

Policies

- Grading will be done on a straight scale
  - Curved if necessary (hint: it probably won't be)
- Class attendance is not mandatory
- Late work / Extensions

Academic Dishonesty

- Collaboration is encouraged!
- Over the line
  - Working in groups of more than 3
  - Showing your work to another group
  - Internet usage:
    - Finding sources, ideas, examples – OK
    - Copying text, ideas, code – Not OK
- Zero Tolerance

DBMS

- What's your experience with Databases?
- What do you think the role of a DBMS is?

Roles of a DBMS

- Definition
- Construction
- Manipulation
- Sharing
  - Integrity
- Security
- Performance

Users

- Back End
- Front End

Contents

- What does a database contain?
  - What does a DBMS need to do its job?

Relational database model

- Data is stored in tables
  - One or more columns (fields)
  - Many, many, rows (records)
- Modeled after real world entities
  - Attributes
  - Instances
- Primary keys are used to identify each record
  - Must be unique!

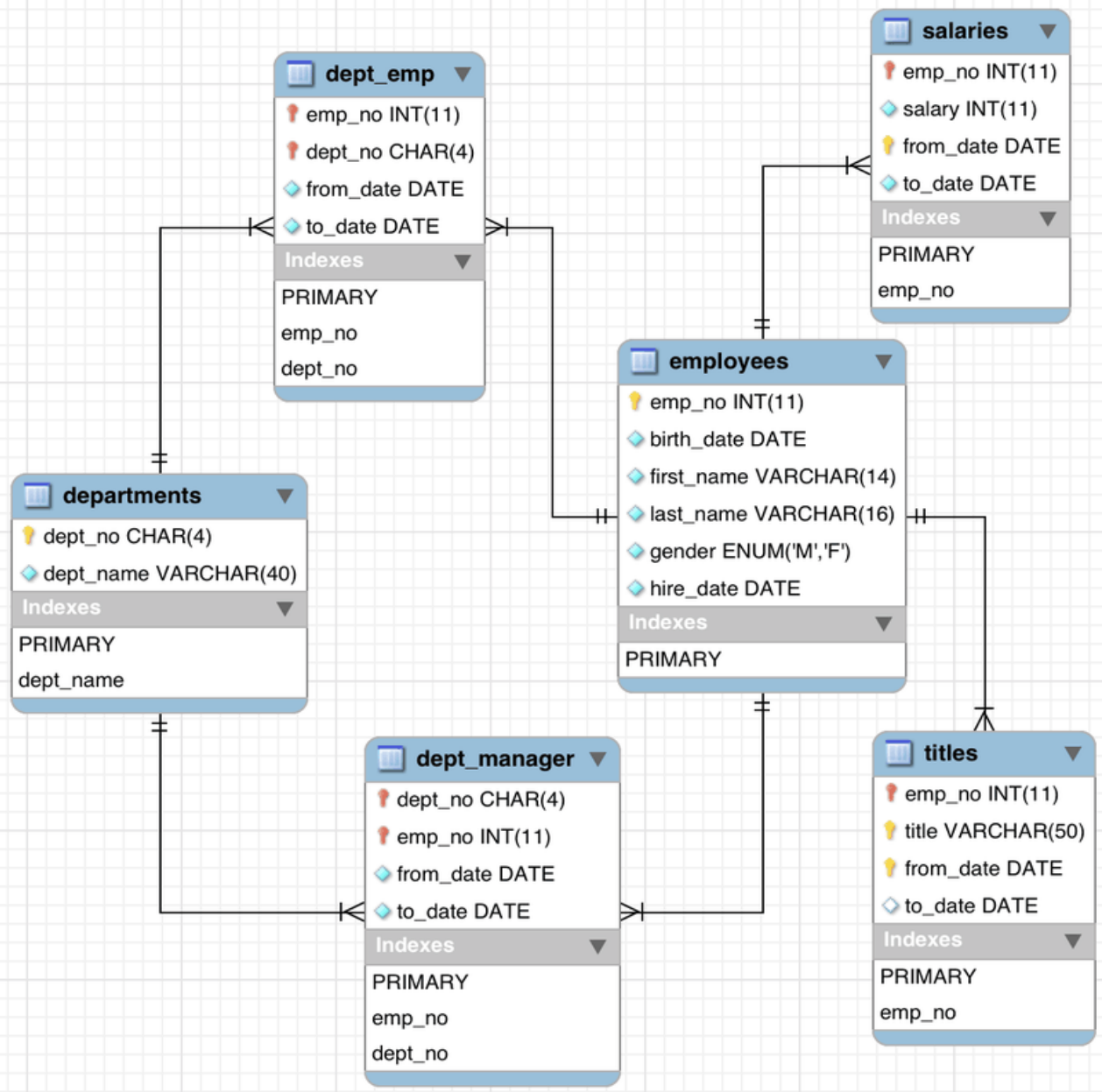
Relational database model

emp_no	birth_date	first_name	last_name	gender	hire_date
10001	1953-09-02	Georgi	Facello	M	1986-06-26
10002	1964-06-02	Bezalel	Simmel	F	1985-11-21
10003	1959-12-03	Parto	Bamford	M	1986-08-28
10004	1954-05-01	Chirstian	Koblick	M	1986-12-01
10005	1955-01-21	Kyoichi	Maliniak	M	1989-09-12
10006	1953-04-20	Anneke	Preusig	F	1989-06-02
10007	1957-05-23	Tzvetan	Zielinski	F	1989-02-10
10008	1958-02-19	Saniya	Kalloufi	M	1994-09-15
10009	1952-04-19	Sumant	Peac	F	1985-02-18
10010	1963-06-01	Duangkaew	Piveteau	F	1989-08-24
10011	1953-11-07	Mary	Sluis	F	1990-01-22
10012	1960-10-04	Patricio	Bridgland	M	1992-12-18
10013	1963-06-07	Eberhardt	Terkki	M	1985-10-20
10014	1956-02-12	Berni	Genin	M	1987-03-11

Relational database model

- Relationships are defined between two tables
  - One-to-one
  - One-to-many
  - Many-to-many

Relational database model



Comparison with file systems

- Databases...
  - Are consistent
    - Same basic structure for all data
  - Are easier to maintain
    - Due to centralization
  - Can perform validations
  - Can enforce relationships
  - Can access many records at once
  - Allow concurrent access
- Performance considerations?

Access

- How will users access the database?
  - What does this depend on?

Data Models

- High Level
  - Schema
- Low Level
  - Physical

Heap Files

- Simple unit of physical storage
- How do we....
  - Add data?
  - Find data?
  - Remove data?
- How would you describe the structure of a heap file?

Data Independence

- Logical
- Physical

- How do these types of changes affect our mappings?

Language

- Two primary sections:
  - Data Definition
  - Data Manipulation

Data Retrieval

- SELECT
- FROM
- WHERE
- GROUP BY
- ORDER BY