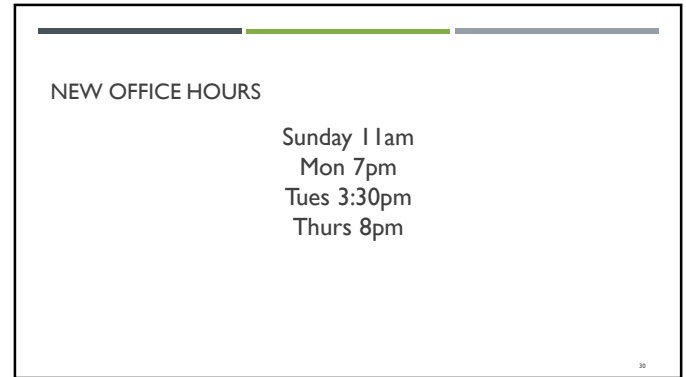**COMP 20
WEB PROGRAMMING**

WEEK 11
LISA DIORIO
LISA.DIORIO@TUFTS.EDU
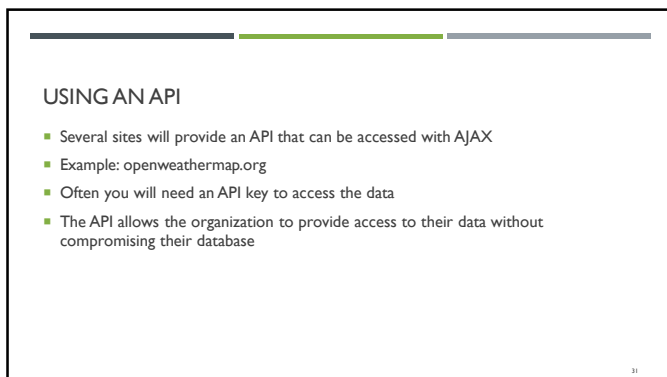
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NEW OFFICE HOURS

Sunday 11am
Mon 7pm
Tues 3:30pm
Thurs 8pm

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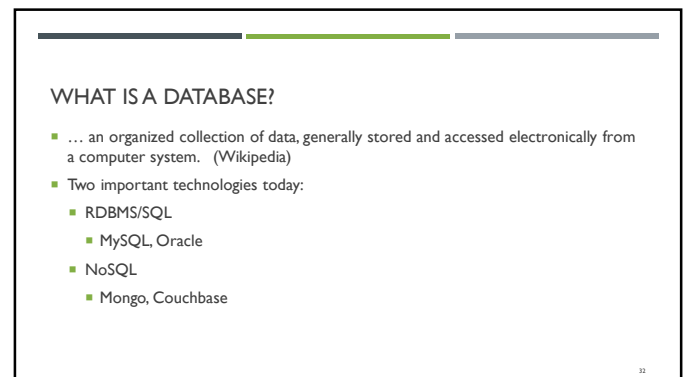
USING AN API

- Several sites will provide an API that can be accessed with AJAX
- Example: openweathermap.org
- Often you will need an API key to access the data
- The API allows the organization to provide access to their data without compromising their database

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WHAT IS A DATABASE?

- … an organized collection of data, generally stored and accessed electronically from a computer system. (Wikipedia)
- Two important technologies today:
  - RDBMS/SQL
    - MySQL, Oracle
  - NoSQL
    - Mongo, Couchbase

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RDBMS

- Entities are placed in separate units called *tables*
- Reduction of *redundancy*
- *Optimized for size and efficiency* of data
- Query using SQL

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NOSQL (NOT ONLY SQL)

- Originated in 1998
- Better for massive amount of data
- No schema
- No tables (documents)
- Key value pairs
- No query language

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RELATIONAL DATABASES AND SQL

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RELATIONAL DATABASE MODEL

Relational Database

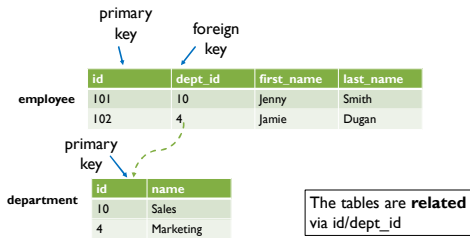Procedures   Tables   Views

Rows (records)   Columns(fields)
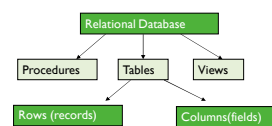
Tables have columns and rows (records)

columns

id	name	email

rows
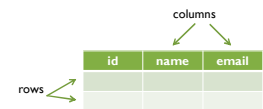
Columns have a name and a data type

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PRIMARY KEY – FOREIGN KEY RELATIONSHIPS

primary key

foreign key

id	dept_id	first_name	last_name
101	10	Jenny	Smith
102	4	Jamie	Dugan

employee

primary key

department

id	name
10	Sales
4	Marketing

The tables are **related** via id/dept_id

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EXAMPLE DATABASE: NORTHWIND

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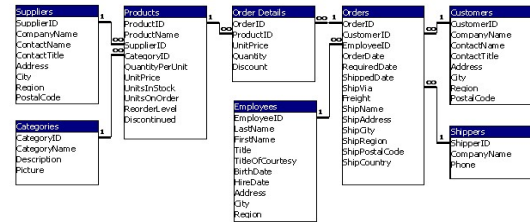
38

SQL: STRUCTURED QUERY LANGUAGE

select lastname, region
from employees

lastname		region
Davolio		WA
Fuller		WA
Leverling		WA
Peacock		WA
Buchanan		
Suyama		
King		
Callahan		WA
Dodsworth		

select lastname, region
from employees
where region='WA'

lastname	region
Davolio	WA
Fuller	WA
Leverling	WA
Peacock	WA
Callahan	WA

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WORKING WITH MULTIPLE TABLES: JOINS

- Example: Show all products and the company name of the supplier for all products that cost less than $10

select productname, companyname
FROM products INNER JOIN suppliers
ON products.supplierid = suppliers.supplierid
where unitprice < 10

SQL Practice: https://www.w3schools.com/sql/trysql.asp?filename=trysql_op_in

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TRY IT

- Use * as a wildcard to indicate all columns
- Separate multiple columns with a comma
  - select * from table1   *show all columns*
  - select col1, col2 from table1   *show column1 and column2 only*
- The clause ORDER BY specifies the sort column

- *Get the first and last name of employees*
- *Get all product names and their price*
- *Get all product names and their price sorted from highest to lowest price*

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TRY IT

- The **DISTINCT** modifier limits the results to unique values
  - select distinct city from employees

- *List all countries in which there are suppliers – no repeats*
- *How could this be useful?*

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LOGICAL & COMPARISON OPERATORS
USE WITH WHERE CLAUSE

- =   equals
- <>   not equals
- <   less than
- >   greater than
- <=   less than or equal
- >=   greater than or equal

- select * from table1 where col1 = 4

Sometimes you will want to apply two or more criteria

In this case use OR or AND to combine logical comparisons

where col1 < 10 **or** col2 ='x'

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TRY IT

- *Show all products that cost less than $10*
- *Show all products from Tokyo Traders*

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SPECIAL CLAUSES

- Checking for Values in a Range
  - Use BETWEEN clause
    - WHERE salary **BETWEEN** 10 **AND** 20
    - WHERE salary **NOT BETWEEN** 10 **AND** 20

- Checking for Missing Values - IS NULL
  - select * from employees **where region is null**

- IN clause
  - Allows multiple values for value criteria
  - **WHERE state IN ('ma', 'ct', 'vt', 'me')**

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WORKING WITH DATES

- To reference a date, use quotes
  select lastName, birthdate from employees
  where birthdate= '1948-12-11'

- Date functions: month(), day(), year()
  select lastName, birthdate from employees
  where year(birthdate)= 1948

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LIKE CLAUSE

- Allows criteria similar to regular expression
  - %   any number of chars
  - _   any single char

- *Example: Get employees whose last names begin with "D"*

  select lastname from employees where lastname **like 'd%'**

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TRY IT

- *Show order details for orders 10250 and 10251*
- *Display all employees born in Oct through December*
- *Display all products that begin with the word "Chef"*
- *Show categories that include "bread" products*
- *Now show all products that belong to those categories (use the category id)*

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INNER JOIN SYNTAX

- Show all products and the company name of the supplier for all products that cost less than $10

select productname, companyname

FROM products INNER JOIN suppliers

ON products.supplierid = suppliers.supplierid

where unitprice < 10

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TRY IT

- *Show all products from Tokyo Traders*
- *Display orders for companies located in London*

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