Relational Databases and SQL

Dr. Chris Mayfield

Department of Computer Science
James Madison University

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Why use databases?

Manage

- Store and process large amounts of data

Organize

- Give structure (i.e., schema) to the data

Query

- Extract interesting/relevant information

Data Independence

"The ability to change the organization of the database itself without changing the application software." (see p. 408)

Database management systems

Commercial

Open Source

The relational model

title	*year*	*length*	*genre*
Gone With the Wind	1939	231	drama
Star Wars	1977	124	sci-fi
Wayne's World	1992	95	comedy

- Structure: Table
  - Columns define role played by different pieces of data
- Operations: Relational Algebra
  - Select, project, join, ...
- Constraints:
  - "Genre must be action, comedy, drama, ..."
  - "No two movies can have same title and year"

Terminology

Many DB terms come from discrete mathematics

Structure

- Relation = TABLE
- Attribute = COLUMN
- Tuple = ROW

Operations

- Project = SELECT
- Join = FROM
- Select = WHERE

Intro to SQL

Basic structure

- SELECT *desired attributes*
- FROM *one or more tables*
- WHERE *conditions apply*

```
-- select the top ten movies
SELECT title
FROM movie
WHERE rank <= 10
```

Style notes

- Write one clause per line, indent any sub-clauses
- ALL CAPS for keywords, all lowercase for names

Today's Example

http://w3.cs.jmu.edu/mayfiecs/cs101/wk-12/imdb.zip