Week 1

Introduction to Data Design

Matthew Bebis

UNIVERSITY of GUELPH

NISSAN

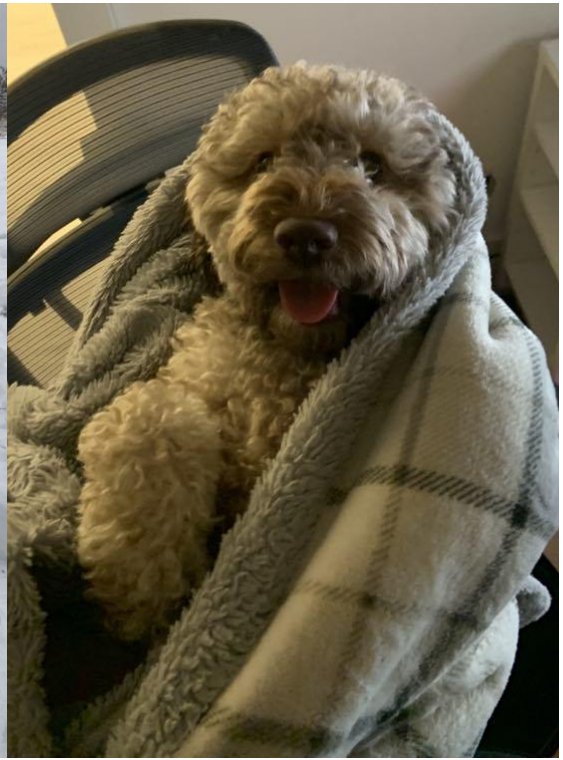
CALL OF DUTY

TORONTO

TORONTO FC

TORONTO MAPLE LEAFS

Chewbacca



Class Expectations

1. Ask questions if you are confused
2. Try not to distract your classmates
3. During lessons, use technology only for legitimate class activities (note-taking, assigned tasks)
4. Participate when asked

Instructor Expectations

What do you expect from me?

This Week

- Introduction to Data Design
- Lab 1 (5%)

The Need for Data Design

- To understand **what and why** we want to create software
  - To build a movie website, information above movies should be defined first
- By **defining data and its format** needed first, we **structure information** and gain the ability **to make future decisions** about how to build/design our software

Data	Raw values	4164390000
↓		
Information	Data with context	416-439-0000
↓		
Knowledge	Ability to make decisions	

What is Data?

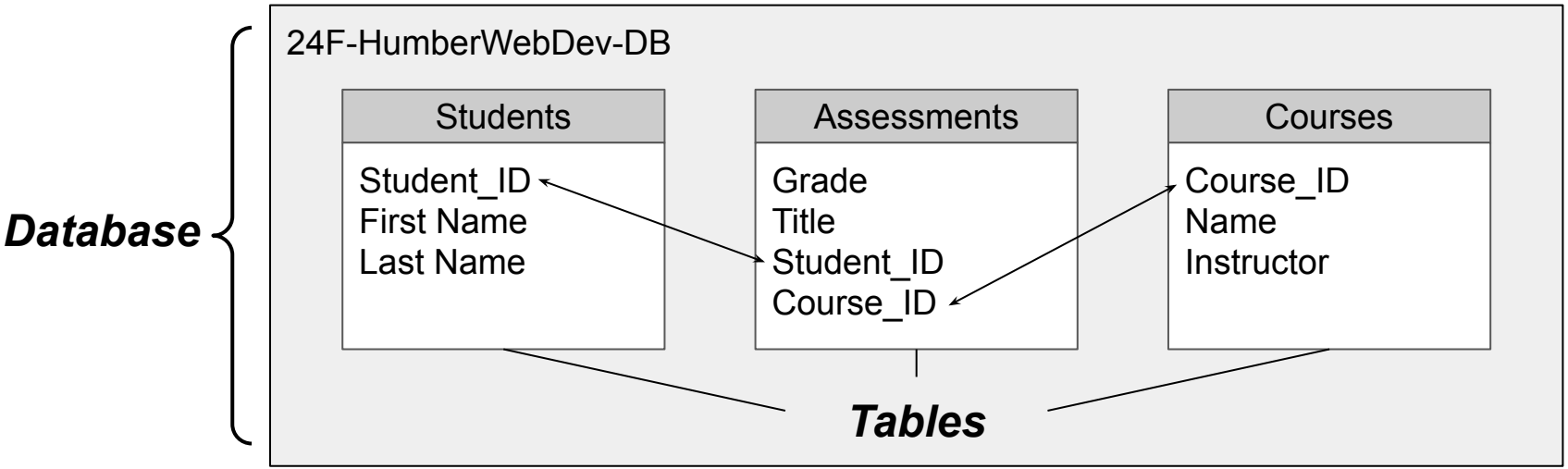
- Data is a collection of information
- An individual piece of information is a ‘datum’
  - Datum is the singular form of data
- Every application utilizes data in some way and that data usually needs to be stored somewhere
- **Databases** are the solution for storing data

What is a Database?

- A database is a structured way to store **data**
- Databases are systems used to **access**, **manage**, and **update** data
- There are many types of databases, each structuring data in specific formats
- One of the most common is the **relational database**
    - Relational DBs (databases) are also the main focus of this course

Relational Databases

- Relational databases hold **tables**
- Tables store data in rows and columns (Just like a spreadsheet!)
- Tables within a database may hold related data, hence why these databases are **relational**



Tables

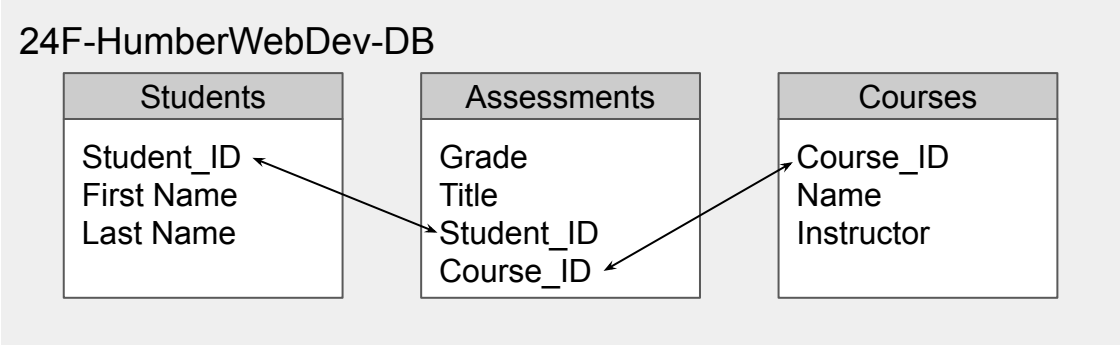
- Tables should represent an **object, subject,** or **concept**
- Each **column** represents an **individual** data **property** of the object
  - Ex: a student table would have a student ID and a name

Students
Student_ID First Name Last Name

- Each **row** represents an **individual instance** of that represented **object**
  - Ex: an individual student would have an id “*n12345678”* and name *“George Springer”*

Student_ID	First Name	Last Name
n12345678	George	Springer
n09876543	Auston	Matthews
n00000000	Natalie	Spooner
n99999999	Lorenzo	Insigne

Relational Databases Example



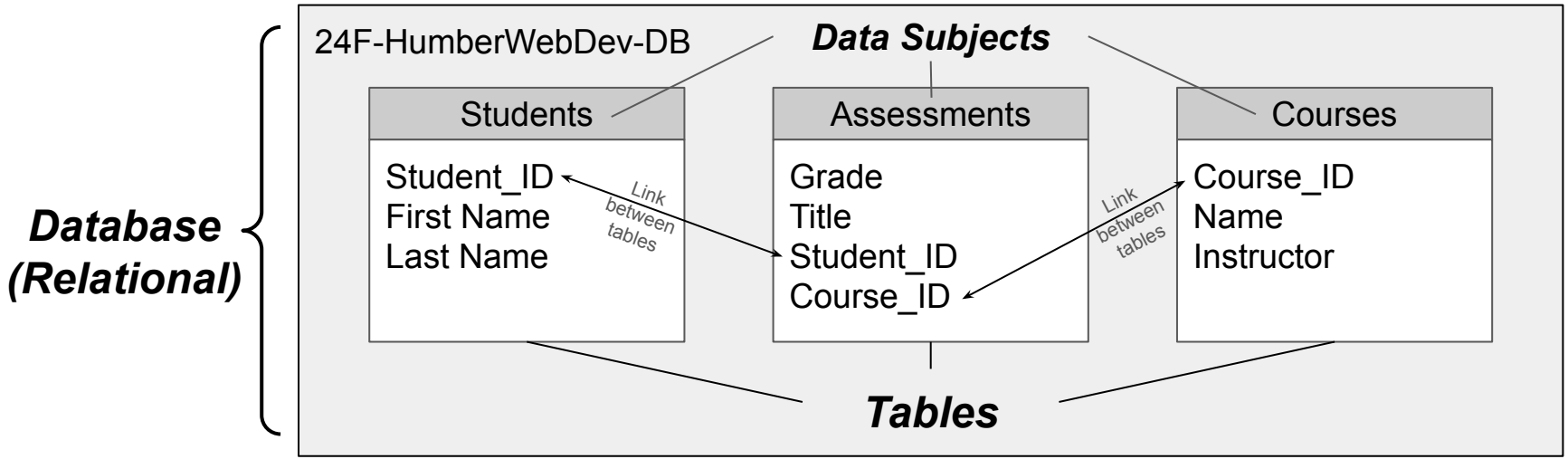
Student_ID	First Name	Last Name
n12345678	George	Springer
n09876543	Auston	Matthews
n00000000	Natalie	Spooner
n99999999	Lorenzo	Insigne

Course_ID	Name	Instructor
HTTP5126	Database Design & Development	Matthew Bebis
HTTP5122	Front End Web Development	Sean Doyle

Grade	Title	Student_ID	Course_ID
99%	Lab 1	n12345678	HTTP5126
66%	Lab 1	n09876543	HTTP5126
88%	Lab 1	n00000000	HTTP5126
77%	Lab 1	n99999999	HTTP5126
100%	Quiz 1	n12345678	HTTP5126
60%	Quiz 1	n09876543	HTTP5126
80%	Quiz 1	n00000000	HTTP5126
90%	Quiz 1	n99999999	HTTP5126

Relational Databases Summary

- **Databases** hold **Tables**
- **Tables** hold pieces of **Data** about a single **subject**
- **Relational Databases** allow **Tables to connect (relate) to each other** to each other



Designing Databases (Ex. Social Media)

- What data do we need to show the user?
- How can we organize the data?
- What data relates to a single object, subject, or context?
- What data is connected?

Week 1 Terminology

- **Data:** a collection of information for reference or analysis
- **Datum:** An individual data value
  - Datum is the singular form of data
- **Database (DB):** Organized collection of structured information (data)
  - **DB** is an acronym from the original "data base", this acronym is common in com-sci field
- **Relational Database:** Organized collection data of one or more tables. Tables are related through shared fields.
- **Tables:** Data stored in columns and rows. Spreadsheets are an example of a table, but a spreadsheet is NOT a database.
  - Tables should represent a single subject that may have multiple properties
  - **Columns:** 1 property of the subject stored in a table
  - **Rows:** 1 instance of the subject stored in a table

Next Week

- Introduction to SQL
- Accessing Data
- Lab 2 (5%)