Introduction to SQL

Chris Alldredge
Trainer/Consultant

PowerSchool University 2011

Objectives

After completing this course, you will be able to:

- Become the database whisperer in your district
- Understand what it might mean when your friends choose "It's Complicated" for their relationship status on Facebook
- Give the "birds and the bees" talk about joining database tables

Meet the Trainer

Christopher Alldredge

Program Manager, Strategic Initiatives

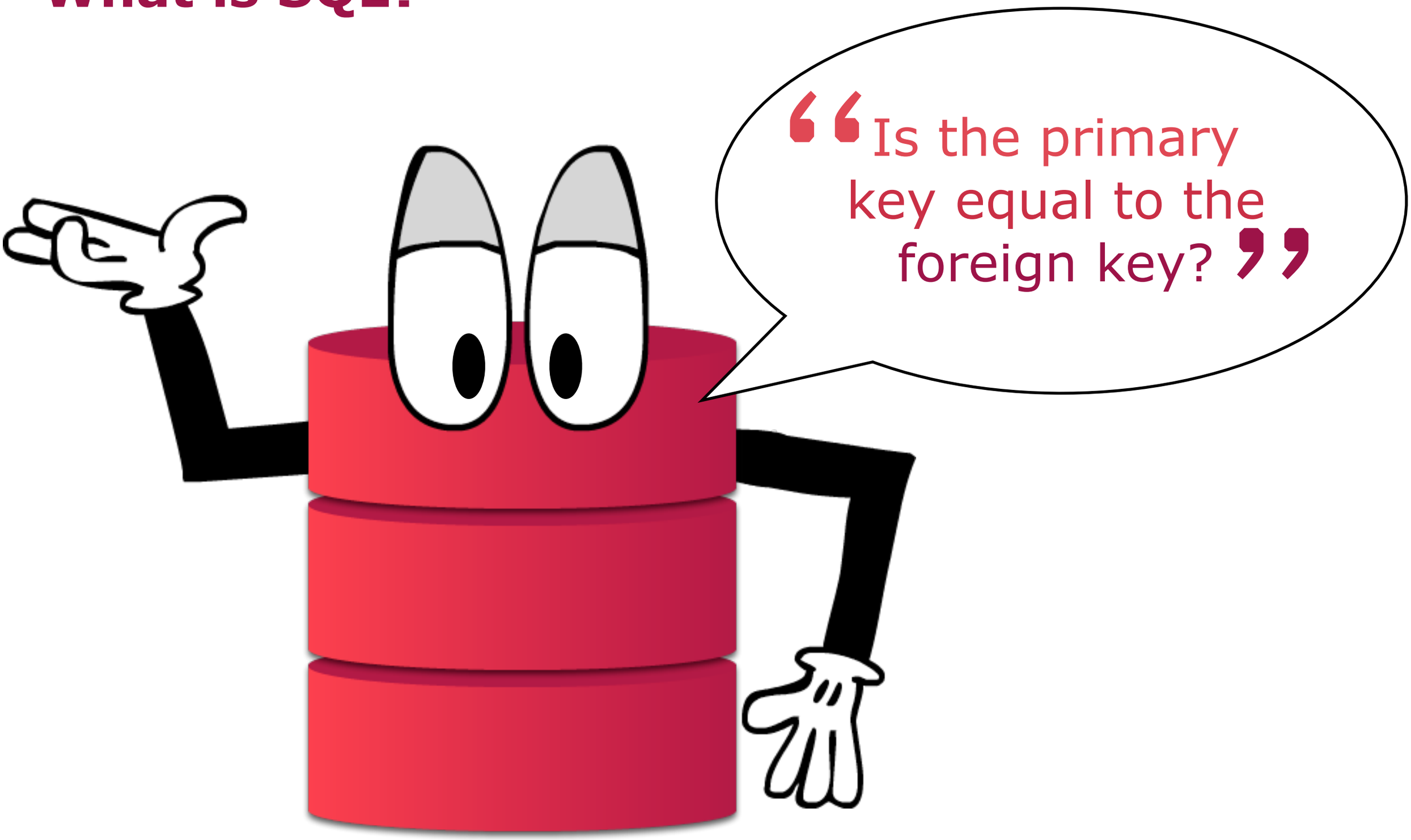
- **Bachelor of Science**
  Elementary Education
  Southern Utah University
- **Master of Arts**
  Educational Counseling
  University of Phoenix
- **Customer Education**
  Pearson
  Joined in 2000
- **PowerSchool University**
  Instructed at EVERY PSU
- **eCloud Learning**
  Visit my blog -
  www.ecloudlearning.com

The Alldredge Family

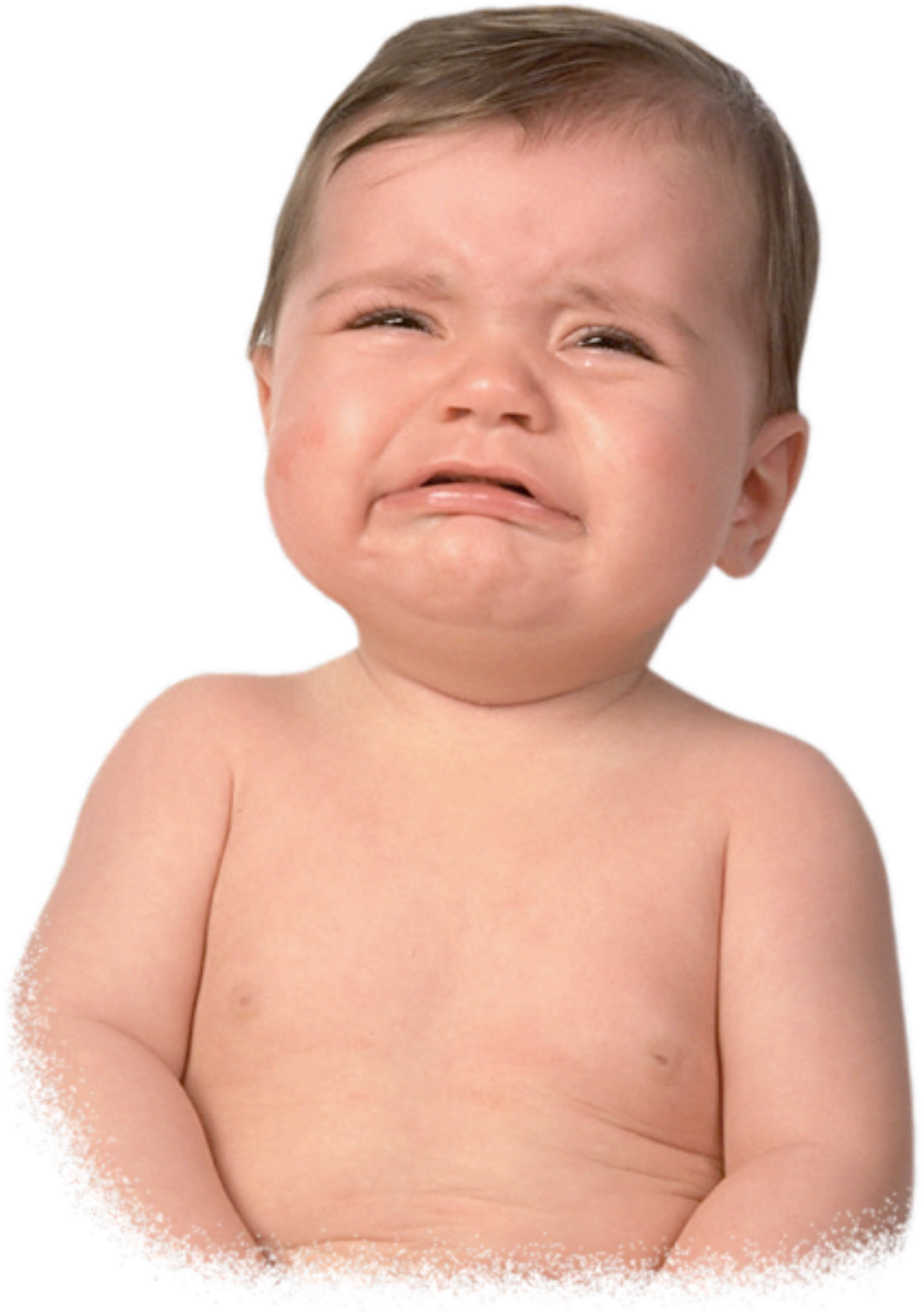
What is SQL?

1

What is SQL?



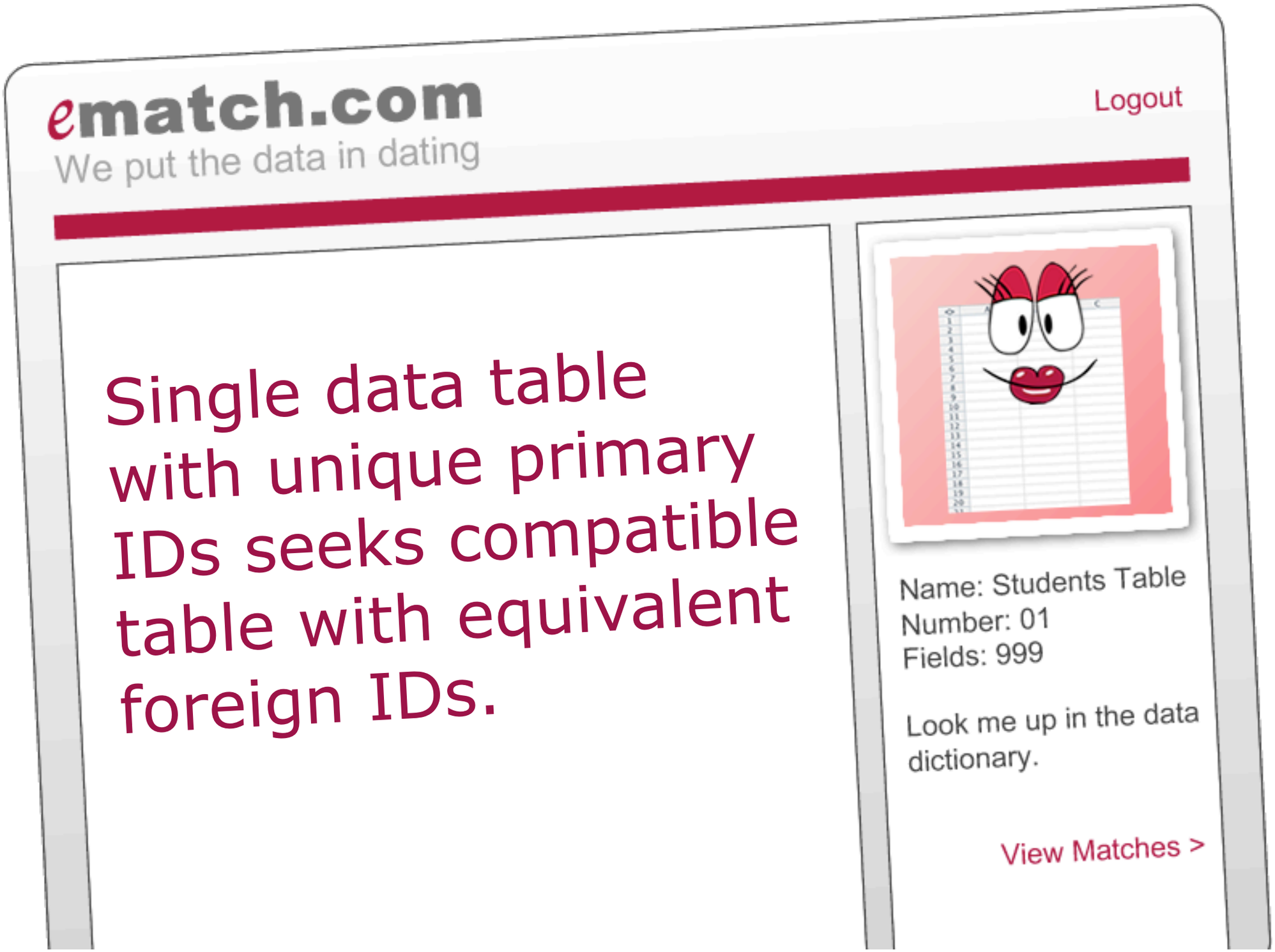
How did you learn your first language?



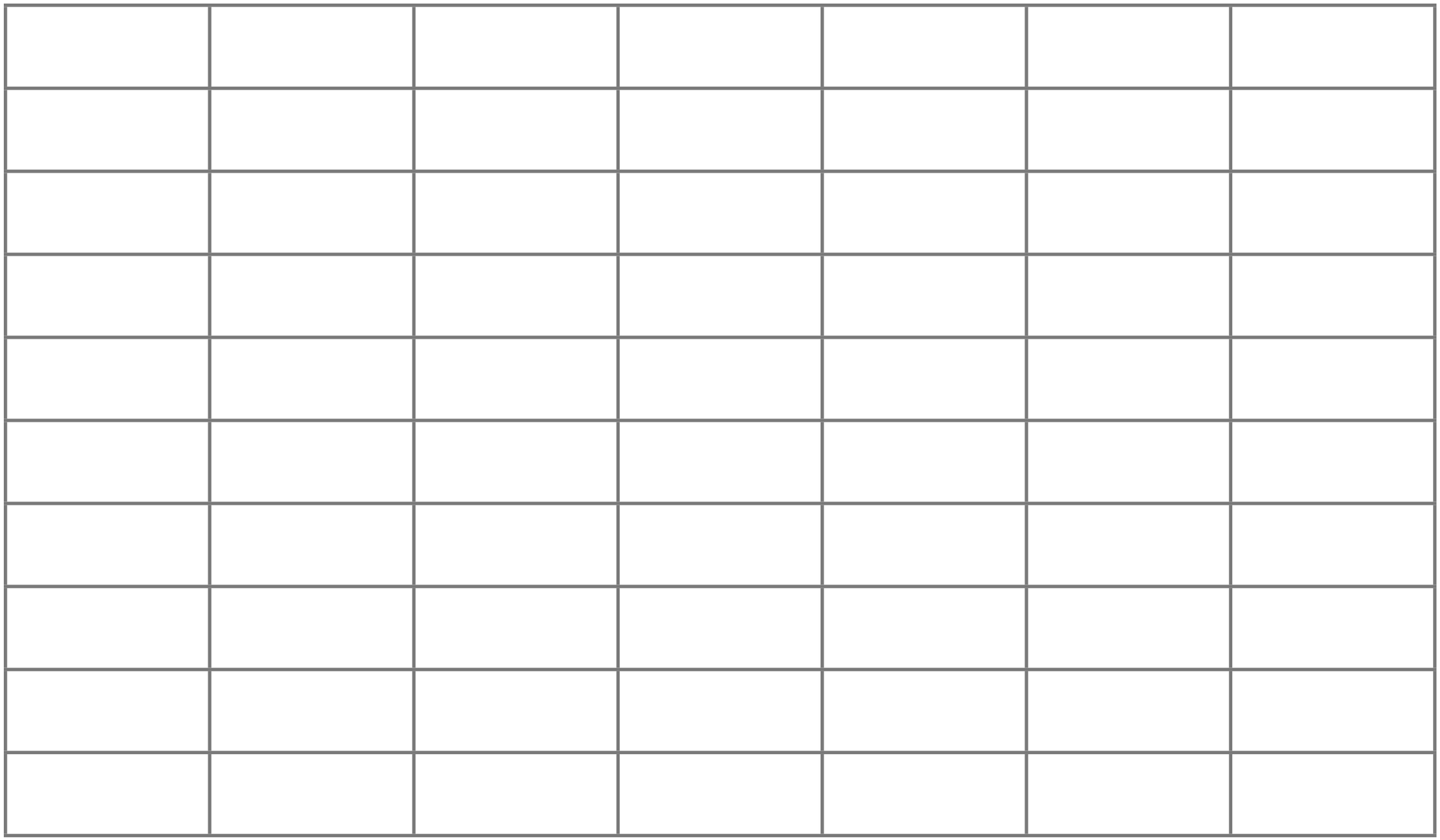
What is a Relational Database?

2

What is a Relational Database?



A table is similar to a spreadsheet…



A table is similar to a spreadsheet…

ID	Last_Name	First_Name	Grade_Level	Gender	DOB	SchoolID

Columns

A table is similar to a spreadsheet…

ID	Last_Name	First_Name	Grade_Level	Gender	DOB	SchoolID

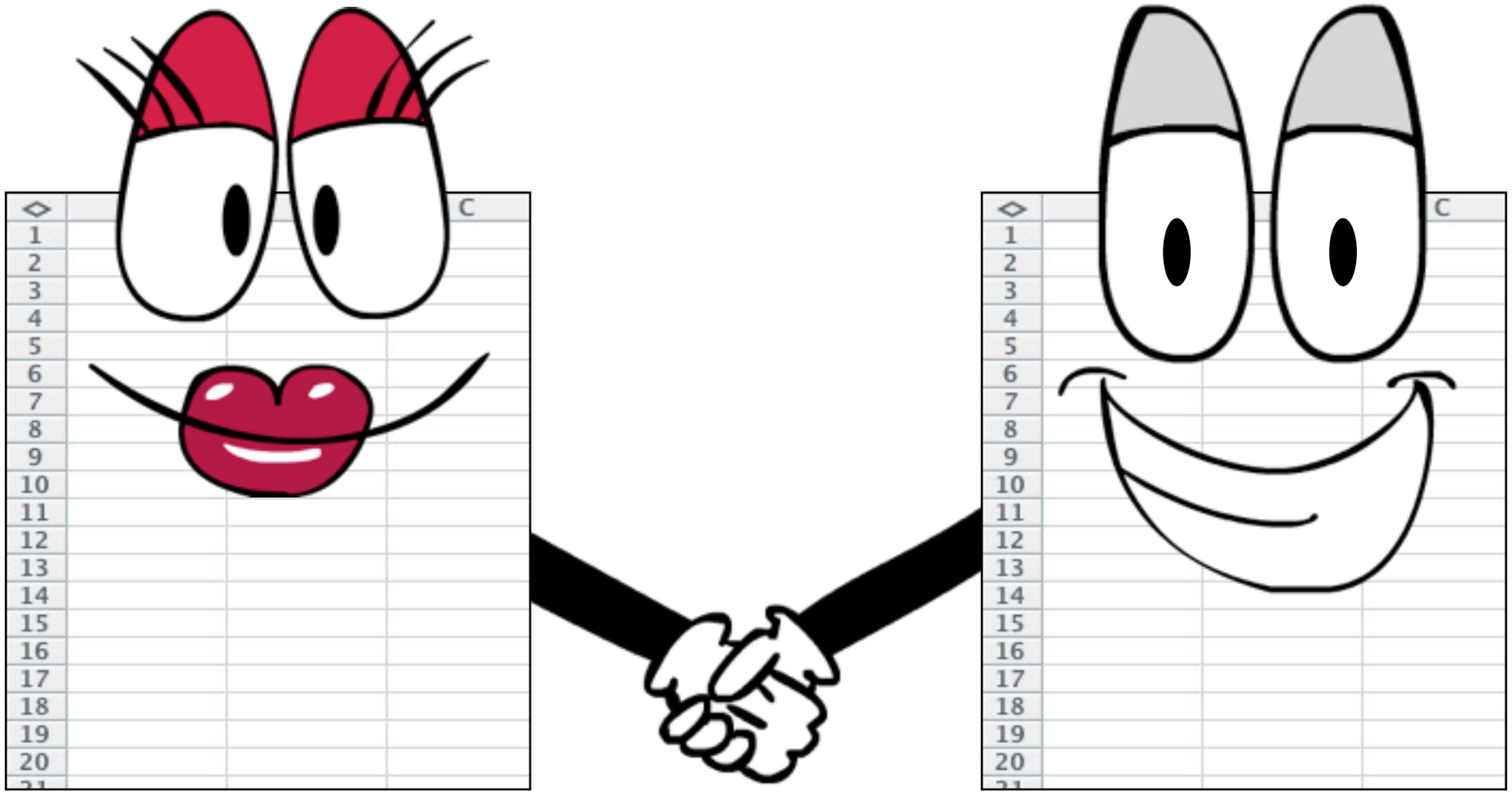
Rows

A table is similar to a spreadsheet…

ID	Last_Name	First_Name	Grade_Level	Gender	DOB	SchoolID
104	Adams	Drew	10	M	9/15/1996	100
105	Anderson	Michael	11	M	2/17/1995	100
106	Andrews	Sam	10	M	12/3/1995	100
107	Brady	Suzy	11	F	4/15/1995	100
108	Bowen	Brook	11	F	1/5/1995	100
109	Clements	Jason	12	M	3/2/1994	100
110	Cox	Chelsea	12	F	7/24/1994	100
111	DeMonja	Rocky	10	M	11/29/1995	100
112	Dunn	Amy	9	F	7/30/1997	100

Data

Relationships between tables...



Relationships between tables...

Students

ID	Last_Name	First_Name	Grade_Level	Gender	DOB	SchoolID
104	Adams	Drew	10	M	9/15/1996	100
105	Anderson	Michael	11	M	2/17/1995	100
106	Andrews	Sam	10	M	12/3/1995	100
107	Brady	Suzy	11	F	4/15/1995	100
108	Bowen	Brook	11	F	1/5/1995	100
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111	DeMonja	Rocky	10	M	11/29/1995	100
112	Dunn	Amy	9	F	7/30/1997	100

Primary Key

Relationships between tables...

StoredGrades

ID	Course_Name	Course_Number	Grade	StoreCode	Absences	StudentID
5161	French 1	FL140	B+	S1	2	108
5162	Health	HE100	A	S1	2	108
5163	Phys Ed	PE450	A	S1	3	108
5164	Biology	SCI400	C+	S1	2	108
5165	Drama 1	PA145	A	S1	2	108
5166	Pottery	FA220	B-	S1	2	108
5167	Art 3	FA120	A	S1	2	108
5168	Geometry	MAT300	B	S1	2	108
5169	English 10	ENG200	C	S1	5	108

Foreign Key

Relationships between tables...

Students

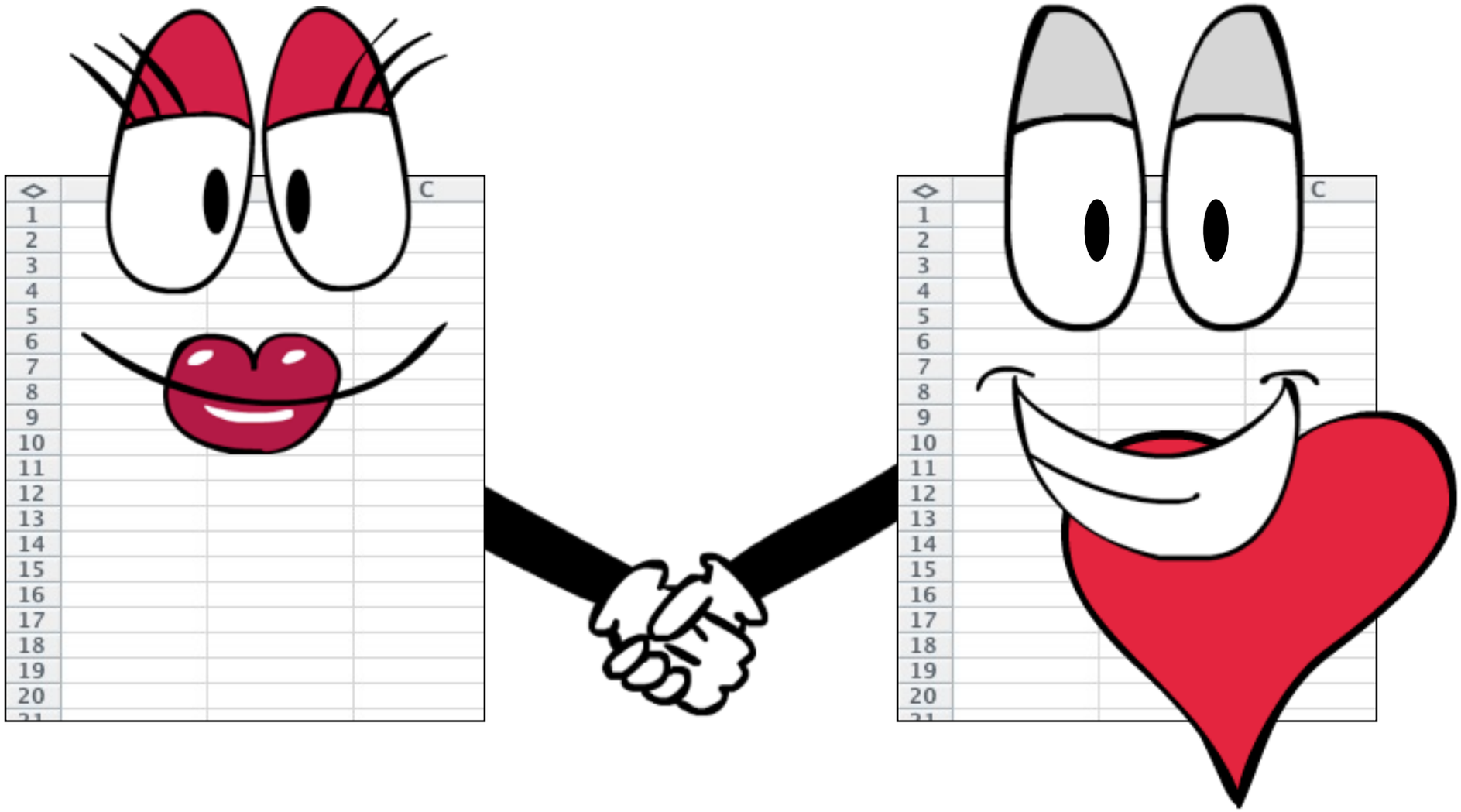
ID	Last_Name	First_Name	G
104	Adams	Drew	
105	Anderson	Michael	
106	Andrews	Sam	
107	Brady	Suzy	
108	Bow	Brook	
109	Clements	Jason	
110	Cox	Chelsea	
111	DeMonja	Rocky	
112	Dunn	Amy	

StoredGrades

de	Course_Name	Grade	StudentID
	French 1	B+	108
	Health	A	108
	Phys Ed	A	108
	Biology	C+	108
	Drama 1	A	108
	Pottery	B-	108
	Art 3	A	108
	Geometry	B	108
	English 10	C	108

Primary Key = Foreign Key

Relationships between tables...



Primary Key = Foreign Key

Now It's Your Turn

Complete hands-on activity 1:

Examining Tables and Diagrams

Table Relationship Diagrams

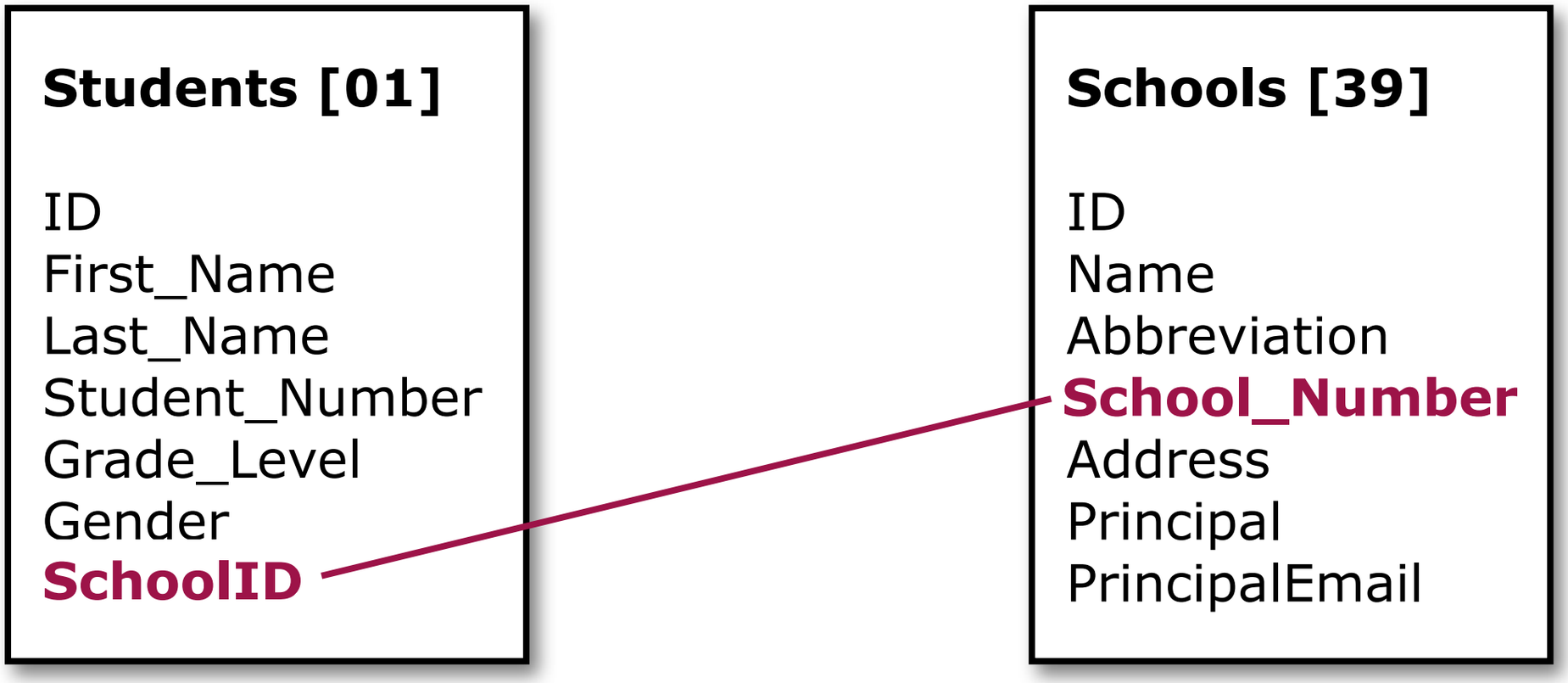


Table Relationship Diagrams

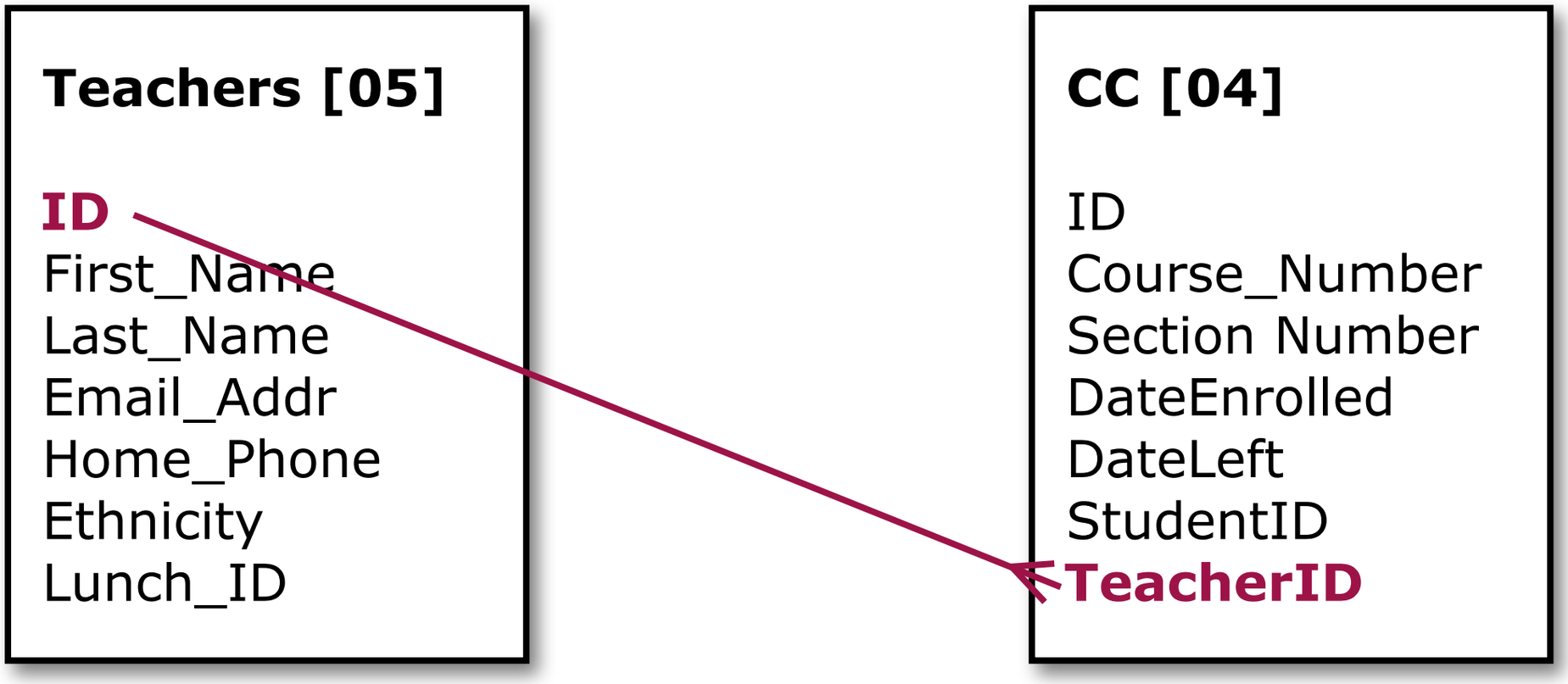
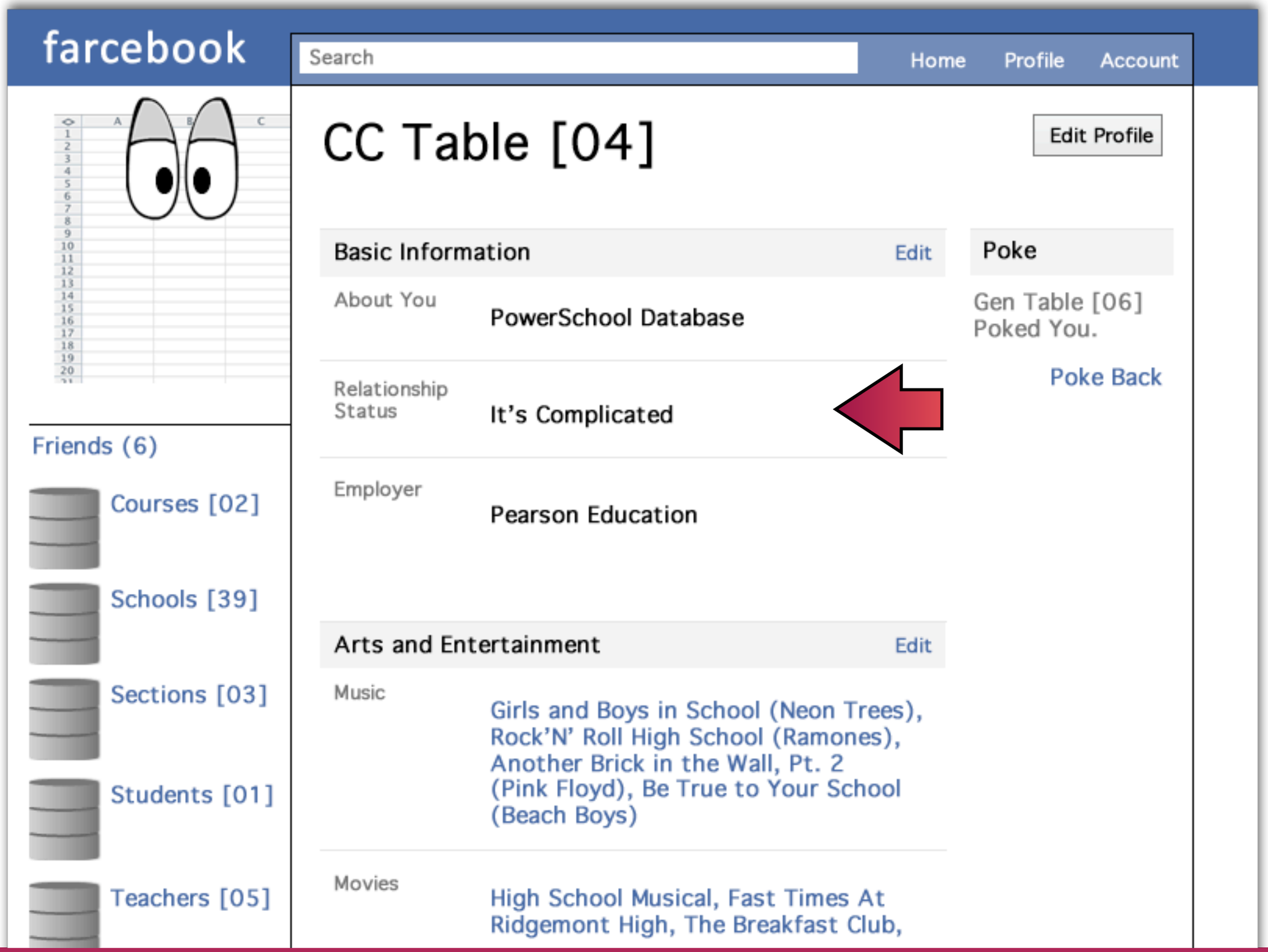


Table Relationship Status



What Are Your Query Needs?

3

What Are Your Query Needs?

Quick Export

- Primary tables are Students and Teachers
- Export data from limited additional tables
- Limited to the school you are working in
- Can’t save queries

Export Using Template

- Export data from Students, Courses, CC, Teachers, and StoredGrades
- Limited to the school you are working in
- CAN save queries

Direct Database Export

- Export from any table
- Match fields from other tables
- Export from multiple schools
- More filtering
- Can’t save queries

SQL

- Export data from any table
- Export from unlimited tables simultaneously
- Export from multiple schools
- Detailed data filters
- CAN save queries

The Language of SQL

4

SQL - The Database Whisperer

SQL

Basic SQL Grammar and Vocabulary…

Get What?

`SELECT field name(s)`

A list of names

From Where?

`FROM table`

The Students table

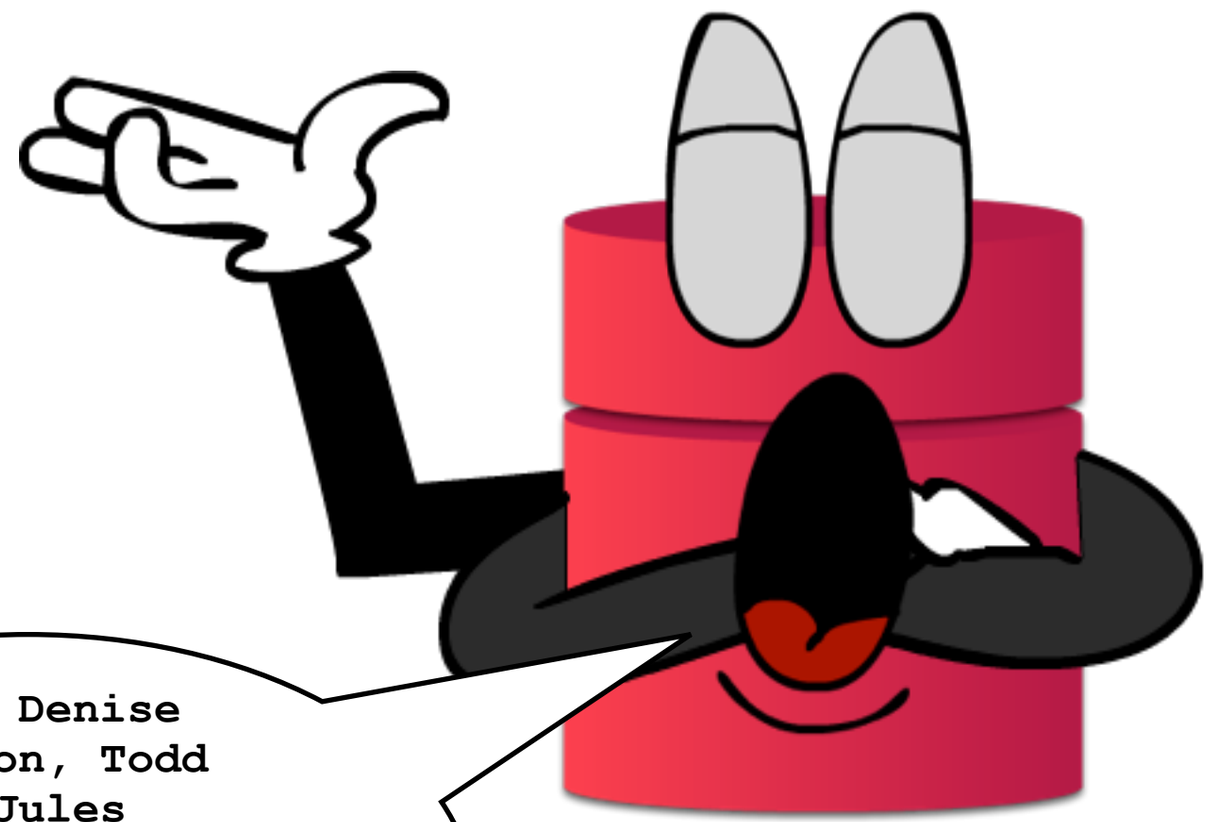
Special Instructions:

`WHERE`

Only graders only

Basic SQL Grammar and Vocabulary...

```
SELECT lastfirst
FROM students
WHERE grade_level=9
```

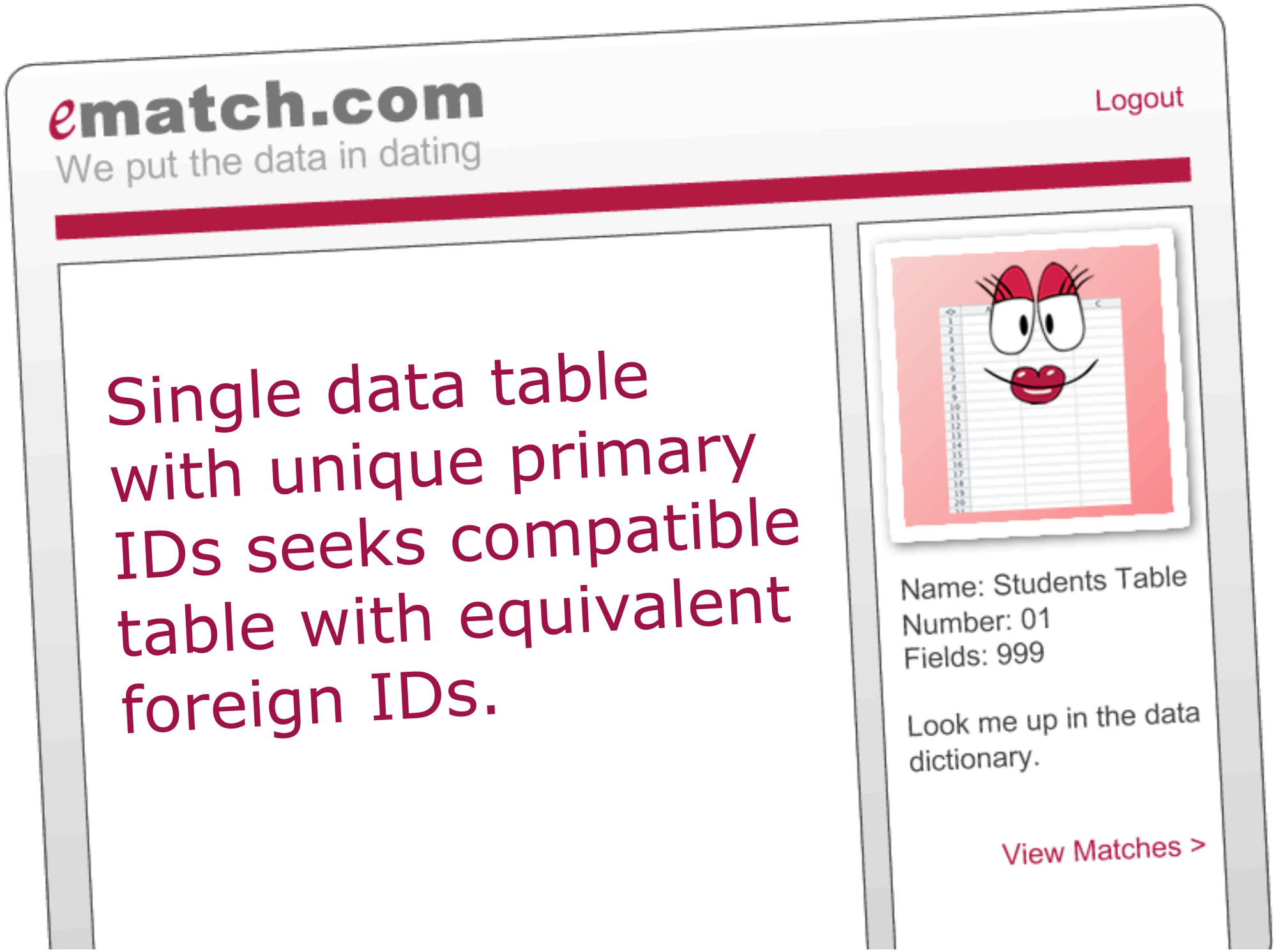


Now It's Your Turn

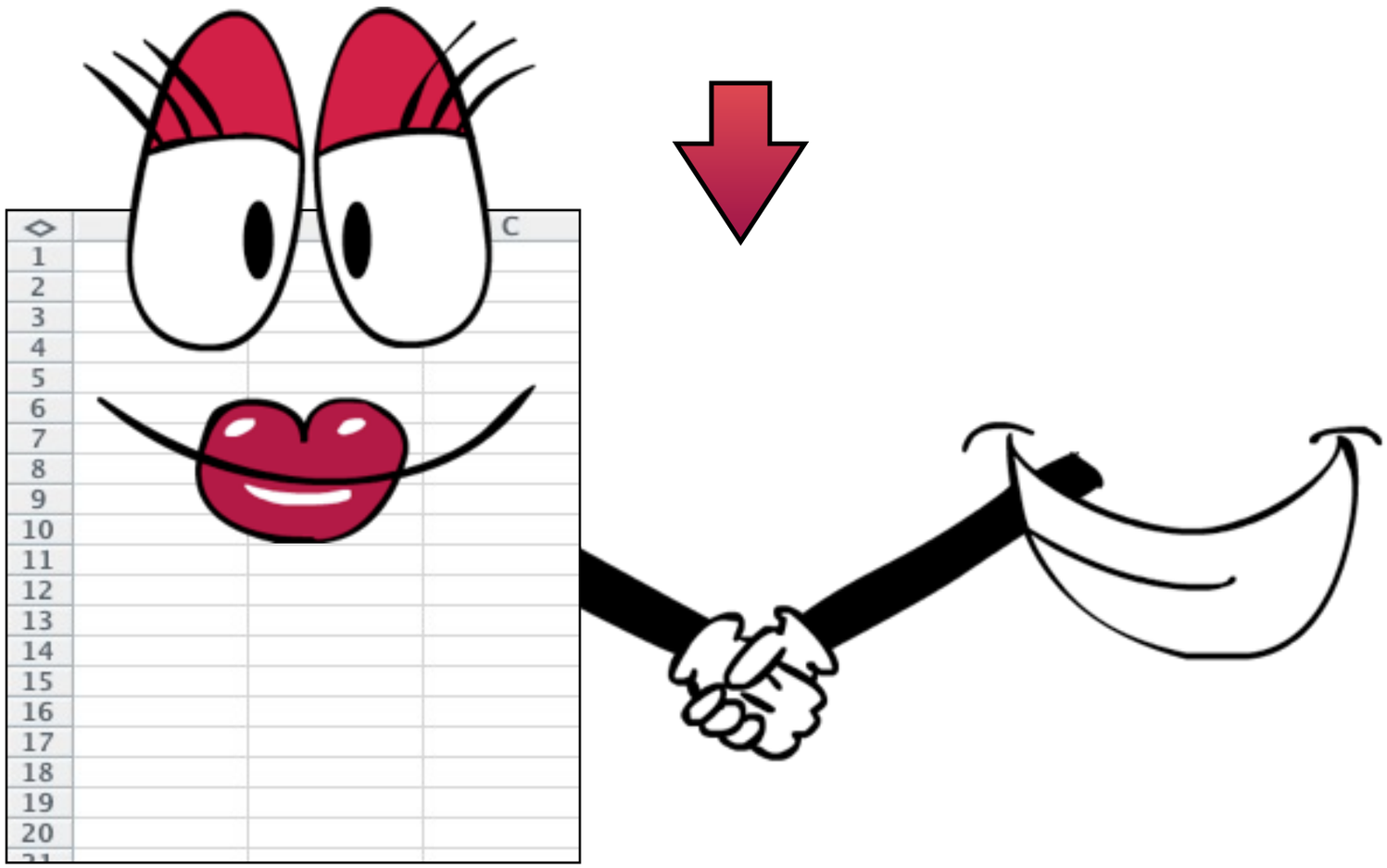
Complete hands-on activity 2:

Writing SQL Queries

What if a single table isn't enough?

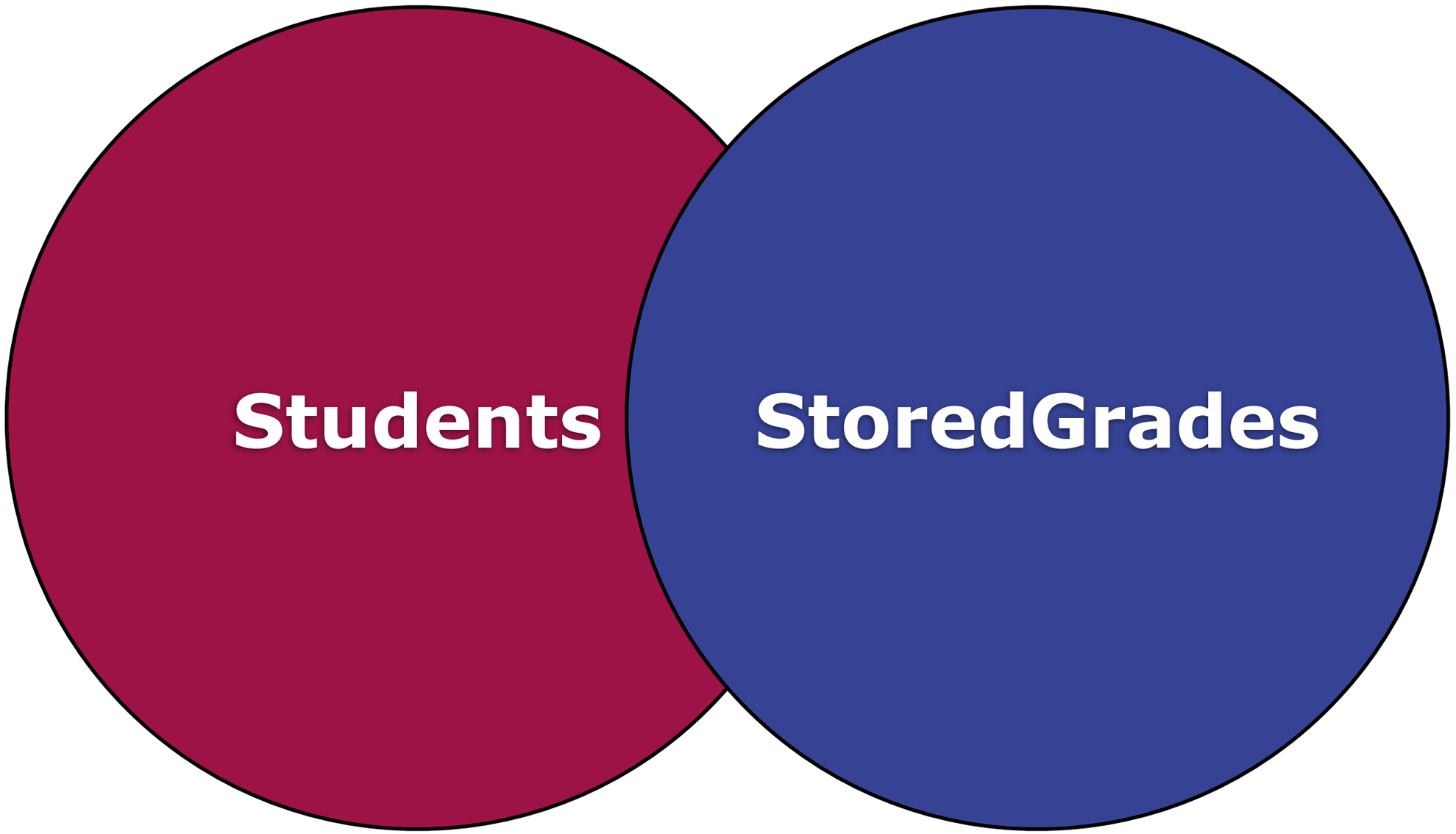


What if a single table isn’t enough?



JOIN

The "Birds and Bees" of a JOIN…



How a JOIN Works

Students

ID	Last_Name	First_name
109	Adams	Denise
110	Anderson	Todd
111	Chen	Jules
112	Dunn	Amy

StoredGrades

StudentID	Course	Grade
109	Algebra	A
109	Biology	B+
109	Art	A-
111	Geometry	B-
111	US History	A
112	Algebra 2	C+
113	Chemistry	B-
114	Civics	A

Results

Adams	Denise
Adams	Denise

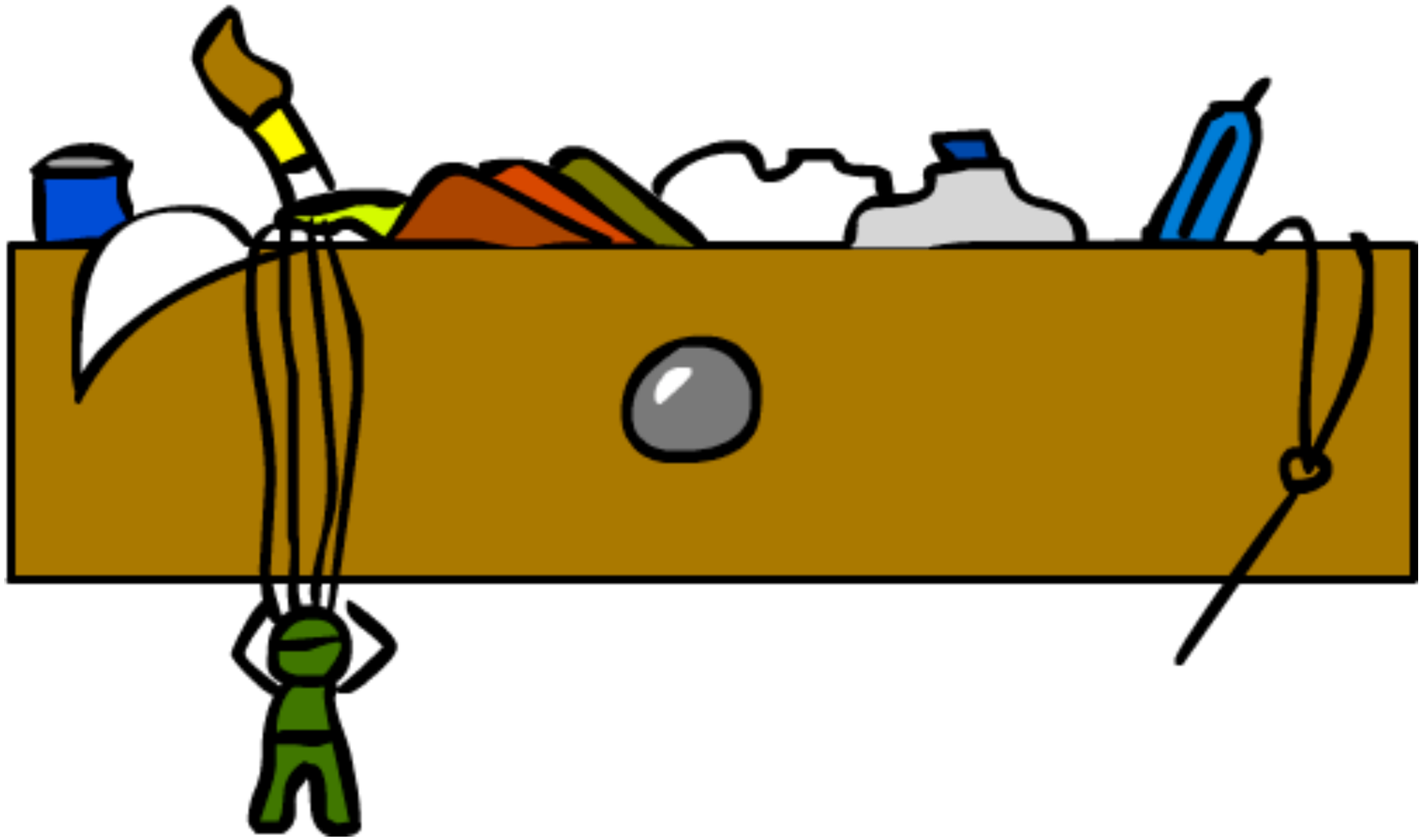
Chen	Jules

Using Views

5

What's a View?

Gen Table [06]



What's a View?

Students [01]

ID
First Name
Last_Name
Student_Number
Grade Level
Gender
SchoolID

Schools [39]

ID
School_Number
Name
Address
Abbreviation
SchoolPhone
Principal

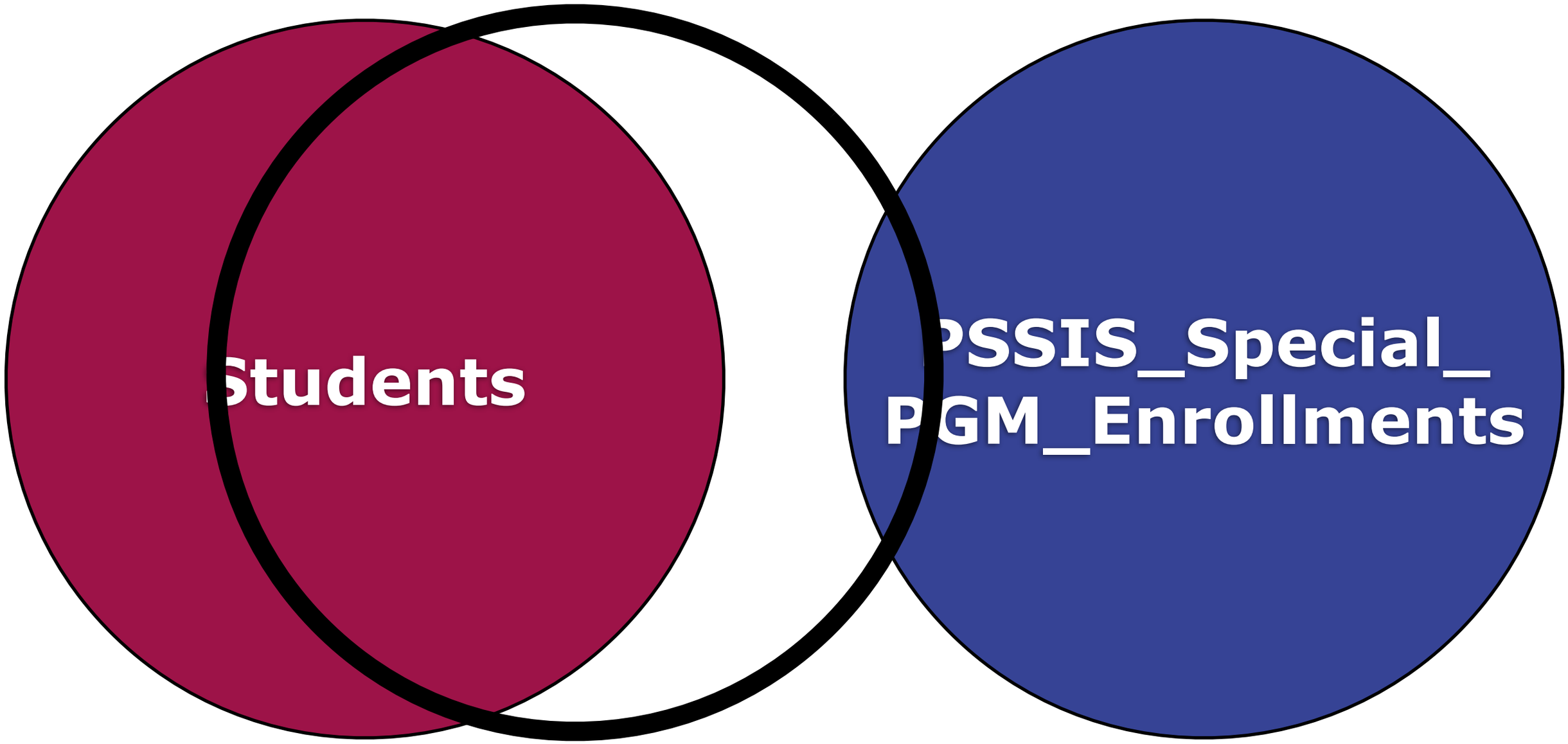
Gen [06]

ID
Cat
Name
Value
Value2
SchoolID
YearID

PSSIS_Student_Demographics

Name
Student_Number
Current_School_Abbreviation
Gender
Ethnicity_Name

Other Types of JOINS



LEFT OUTER JOIN

Now It's Your Turn

Complete hands-on activity 3:

Using Views in SQL Queries

Let’s Review…

Question 1

Who Am I?

```
SELECT name
FROM tvtherapist
WHERE degree='phd' AND books=13 AND
friend='Oprah'
```

Question 1

Question 2

What is a set of linked tables?

A Relational Database

B A Buffet

C A Spreadsheet

D Something cool in Excel

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What represents each instance in a table and must be unique and not null?

A Foreign Key

B Special ID

C Primary Key

D Important ID

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Question 4

What does the WHERE vocabulary do in SQL?

A Adds a Filter

B Makes a JOIN

C Names an Alias

D Sorts Data

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Question 5

Which of the following pulls data from multiple tables together into a “virtual table?”

A jQuery

B MS Query

C JavaScript

D A View

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PEARSON

Key Points

- Relational Database Structure
- Basic SQL Vocabulary
- Basic Joins
- Database Views

Question and Answer

Don’t Forget…

ALWAYS LEARNING