Introduction to SQL

Charles Lang
Teachers College

Today

Background

AWS

Syntax

Activity

Moving Forward

History
Purpose

Create DB

DBI
Creating
Reading
Updating
Deleting
NULL
Constraints
ID Columns
Filtering
Duplicates
Conditionals
Relationships

Try out

Test
Resources
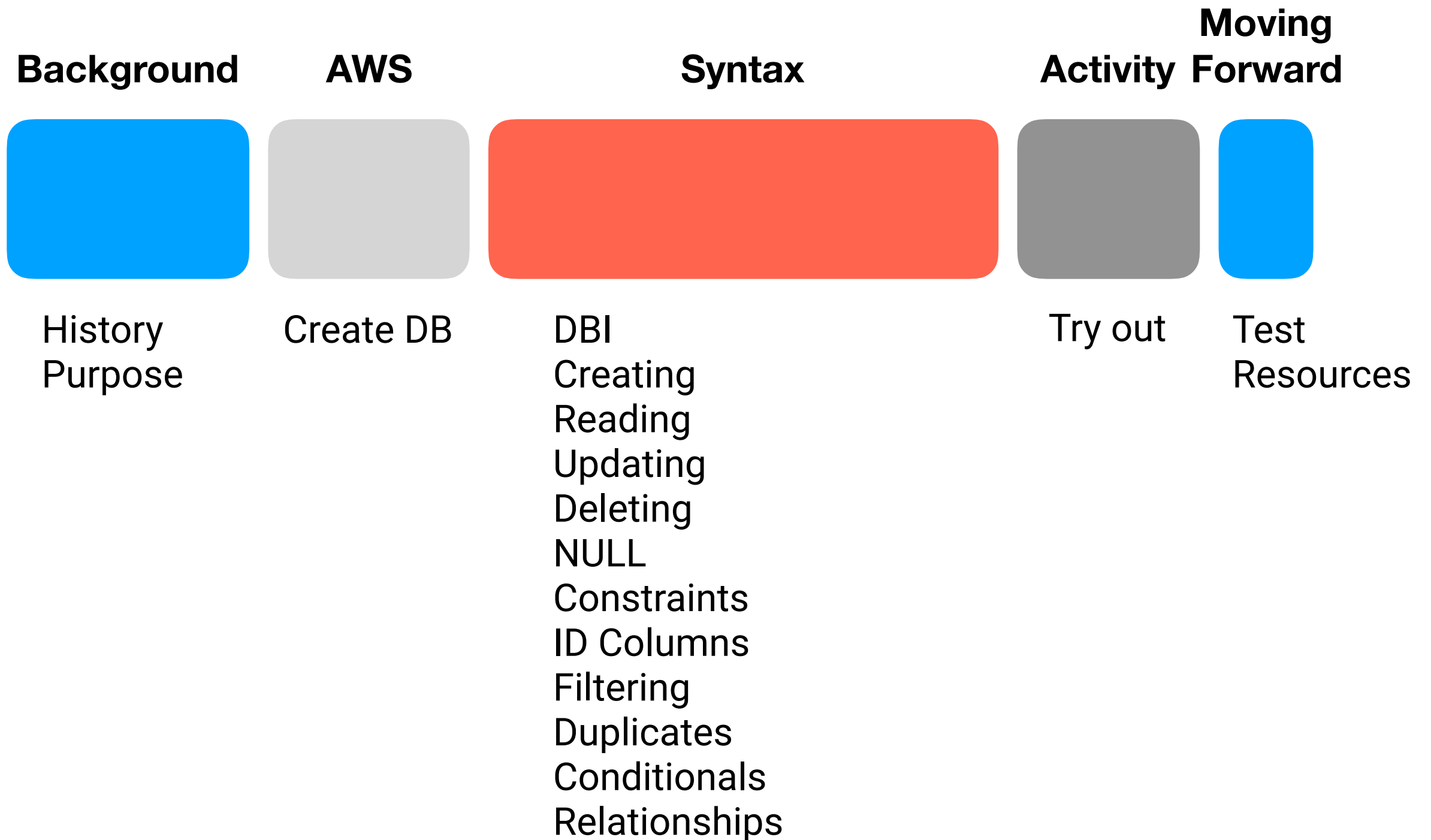
Data Science Workflow
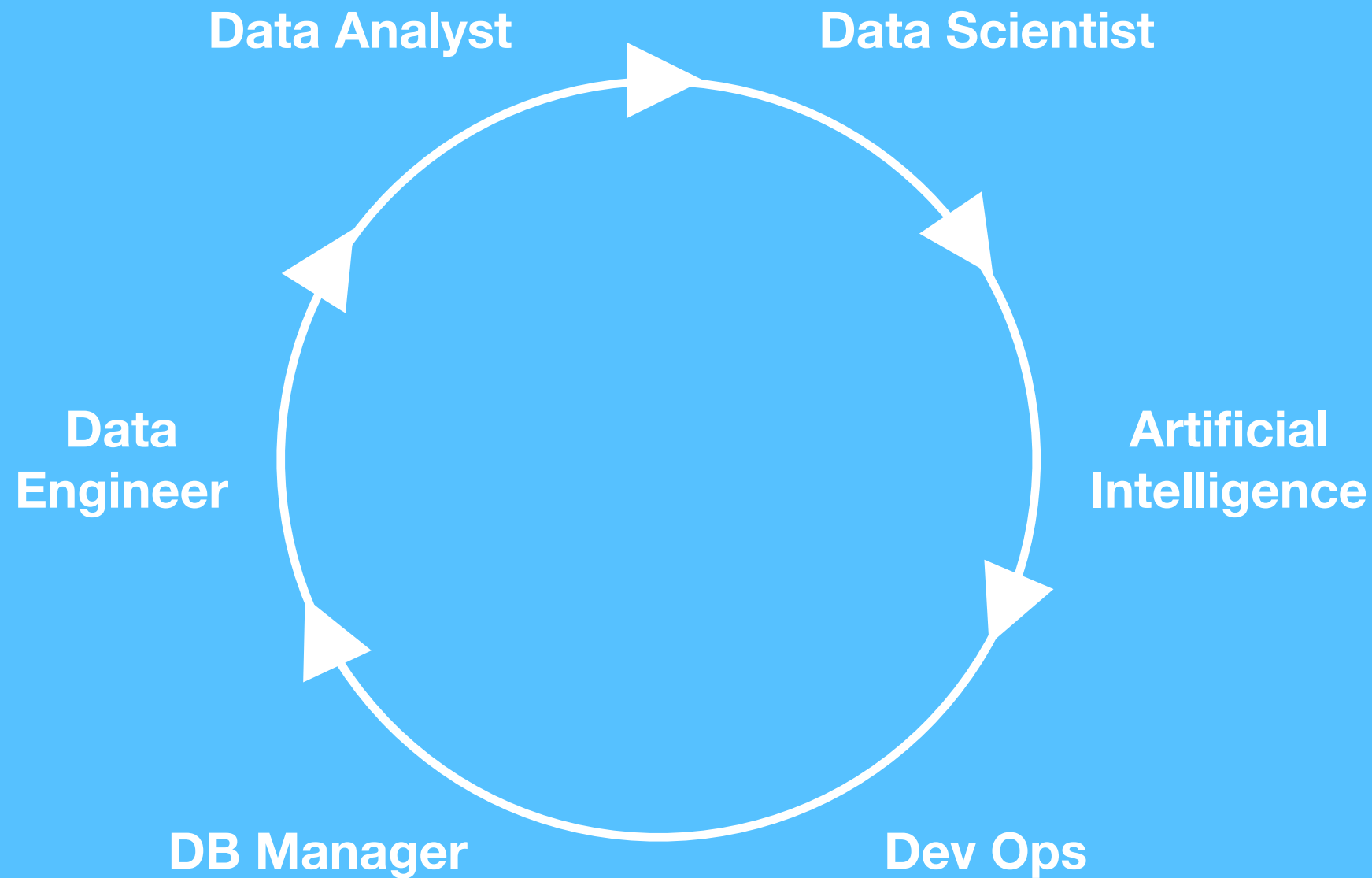
DB Taxonomy

Relational (RDDBMS)

Old School

MySQL
Oracle
PostgreSQL

New School
Amazon Aurora
MySQL Cluster

Maria

Object-Oriented
Smalltalk

Non-Relational

NoSQL

Key-Value
Membrane
Document
MongoDB
Graph

InfiniteGraph

Distributed
Blockchain

Relational DBs

student   **Table**

student_id	username	email
1	AAA	emailA
2	BBB	emailB
3	CCC	emailC
4	DDD	emailD

Row/ Record

Unique Key/ Primary key*

Column/ Field

lesson

id	student_id
Z	1
Z	2
Z	3
Z	4

Foreign key

game

id	lesson_id	level
1A	Z	1
1A	Z	2
1A	Z	1
1B	Z	1

* Can be hidden

DB Popularity

Rank			DBMS	Database Model	Score		
Oct 2019	Sep 2019	Oct 2018			Oct 2019	Sep 2019	Oct 2018
1.	1.	1.	Oracle ➕	Relational, Multi-model ℹ️	1355.88	+9.22	+36.61
2.	2.	2.	MySQL ➕	Relational, Multi-model ℹ️	1283.06	+3.99	+104.94
3.	3.	3.	Microsoft SQL Server ➕	Relational, Multi-model ℹ️	1094.72	+9.66	+36.39
4.	4.	4.	PostgreSQL ➕	Relational, Multi-model ℹ️	483.91	+1.66	+64.52
5.	5.	5.	MongoDB ➕	Document, Multi-model ℹ️	412.09	+2.03	+48.90
6.	6.	6.	IBM Db2 ➕	Relational, Multi-model ℹ️	170.77	-0.79	-8.91
7.	7.	⬆ 8.	Elasticsearch ➕	Search engine, Multi-model ℹ️	150.17	+0.90	+7.85
8.	8.	⬇ 7.	Redis ➕	Key-value, Multi-model ℹ️	142.91	+1.01	-2.38
9.	9.	9.	Microsoft Access	Relational	131.18	-1.53	-5.62
10.	10.	10.	Cassandra ➕	Wide column	123.22	-0.18	-0.17

https://db-engines.com/en/ranking

Create a MySQL DB

- Log into your [AWS Management Console](#)

- Locate `RDS` under the `Databases` heading

- Within Amazon RDS click `Create database`

- Under `Choose a database creation method` click `Standard Create`

- Under `Engine options` choose `MySQL`

- Under `Templates` choose `Free tier`

- Under `Settings` name your `DB instance identifier` as `sqltest`

- Under `Credential settings` create a username and password combination and write it down (you will need it later)

- Under `Connectivity` expand `Additional connectivity configuration` to show additional menu items and make sure that `Publicly accessible` is checked `Yes`

- Expand the `Additional configuration` menu

- Under `Initial database name` write `testdb`

- Uncheck `Automatic backups`

- Click `Create database`

Structured Query Language (SQL)

- Developed SEQUEL at IBM ~1970

- Domain-specific language for querying relational DBs

- Based on relational algebra

- Works with structured data

- <u>Main benefit</u>: don't need to specify how to reach a given record (no file path, index number)

- Is *loosely standardized* across products

Todd
Codd

Donald
Chamberlin
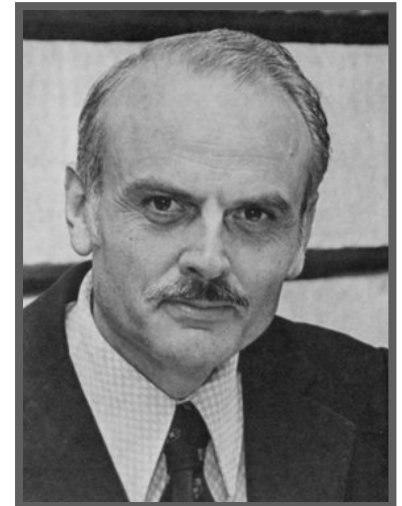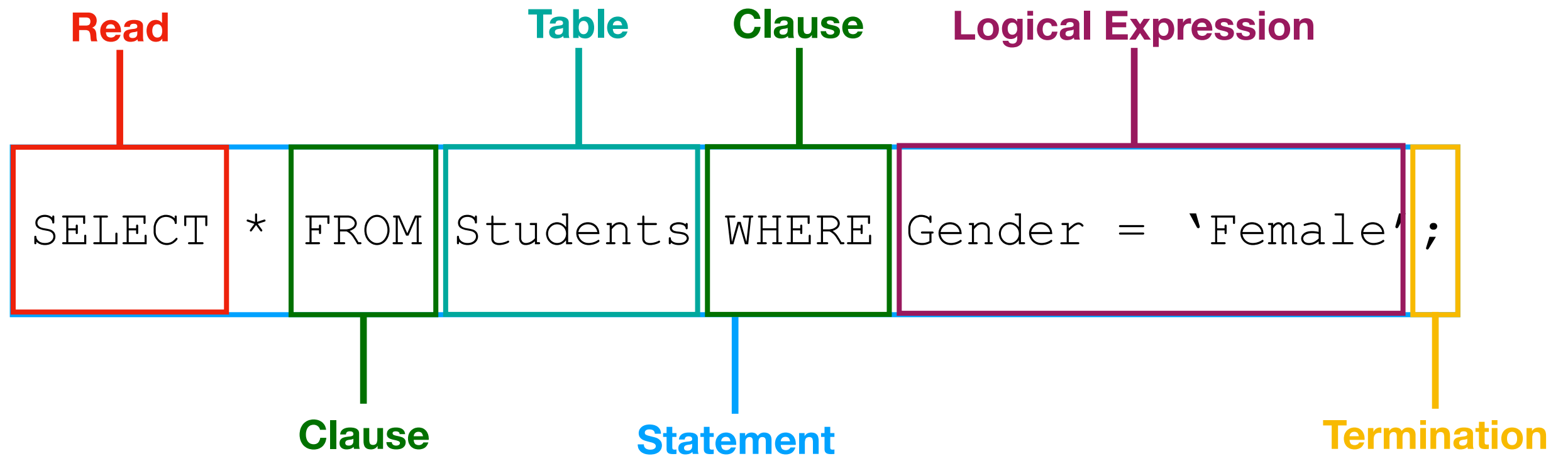
Ray
Boyce

DB Fundamental Functions

- **C**reate

- **R**ead

- **U**pdate

- **D**elete

Basic Statement

Read → `SELECT`

Clause → `FROM`

Table → `Students`

Clause → `WHERE`

Statement

Logical Expression → `Gender = 'Female'`

Termination → `;`

`SELECT * FROM Students WHERE Gender = 'Female';`

*Capitalization of SQL keywords is not required but is useful

DB Fundamental Functions

- **C**reate: `INSERT` - Add rows

- **R**ead: `SELECT` - Get data

- **U**pdate: `UPDATE` - Change data
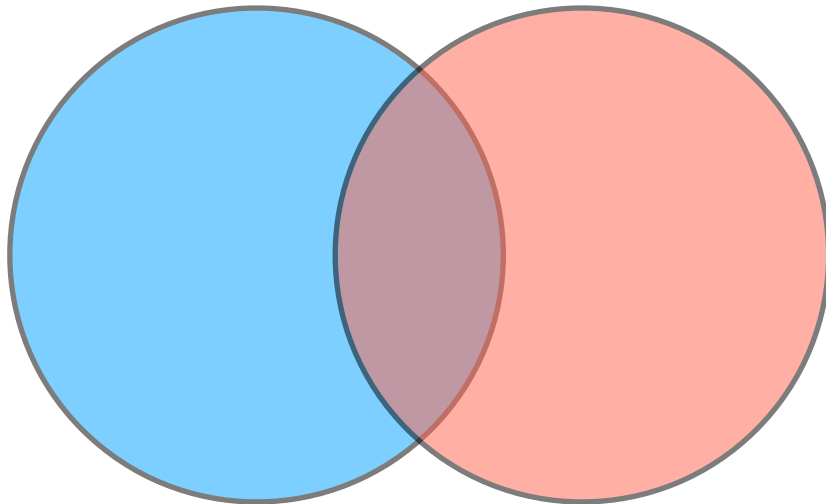
- **D**elete: `DELETE` - Remove rows

Create a MySQL DB

- Once your DB has been created

- Under `Security groups rules` click the hyperlink

- Click `Inbound` and then `Edit`

- Do not delete any rules!

- Add the rule `SQL/Aurora` on `Port 3306` with the `Connection` of `MyIP`

OU LA Data Set
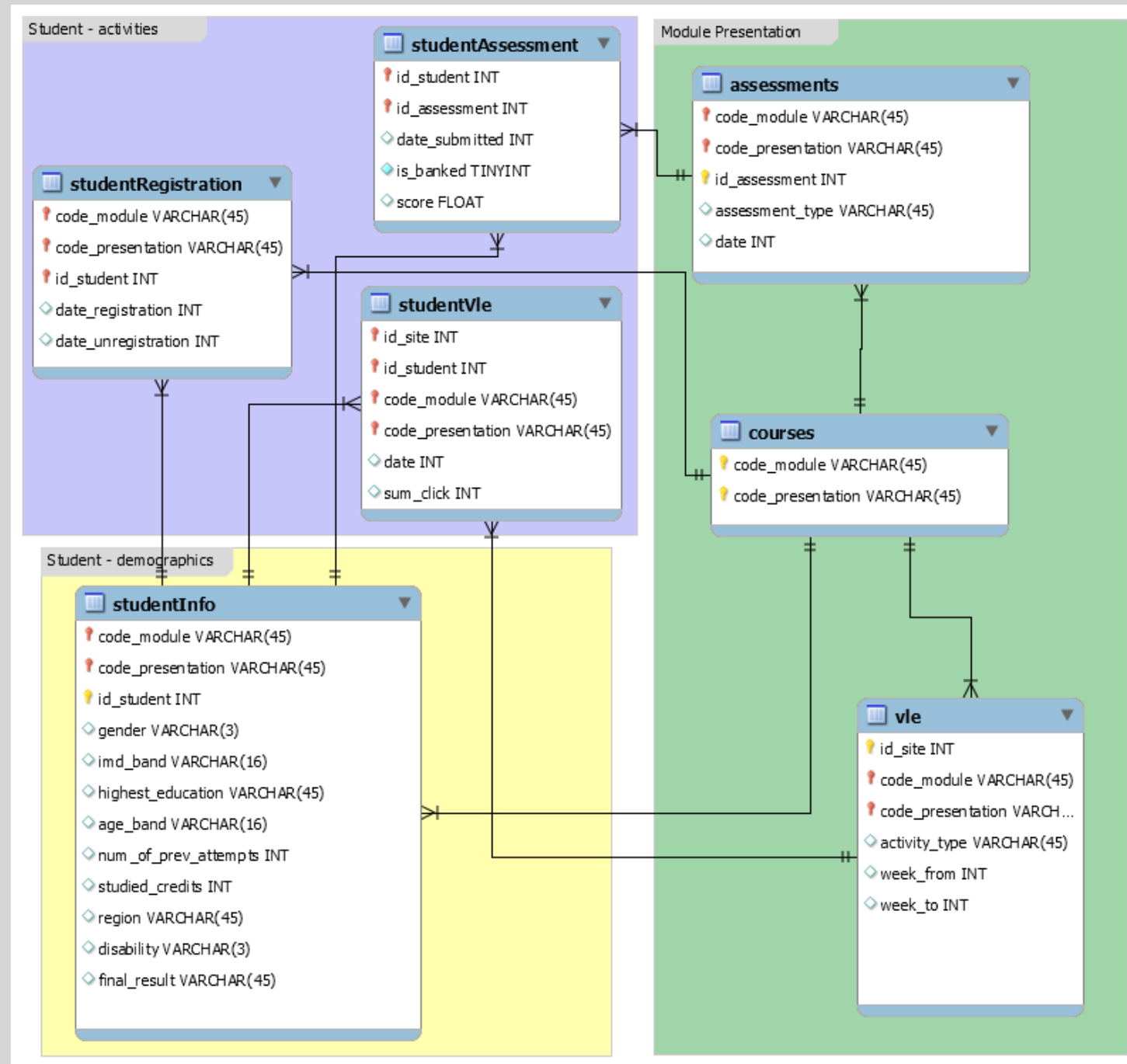
Joins

Inner Join

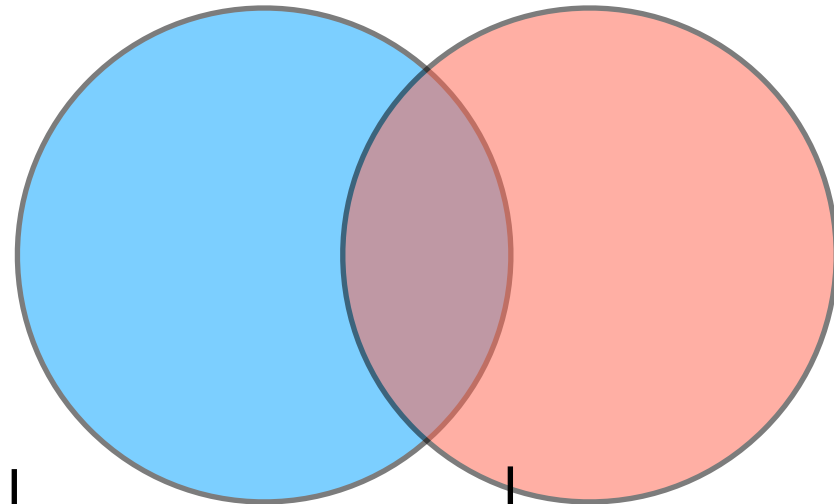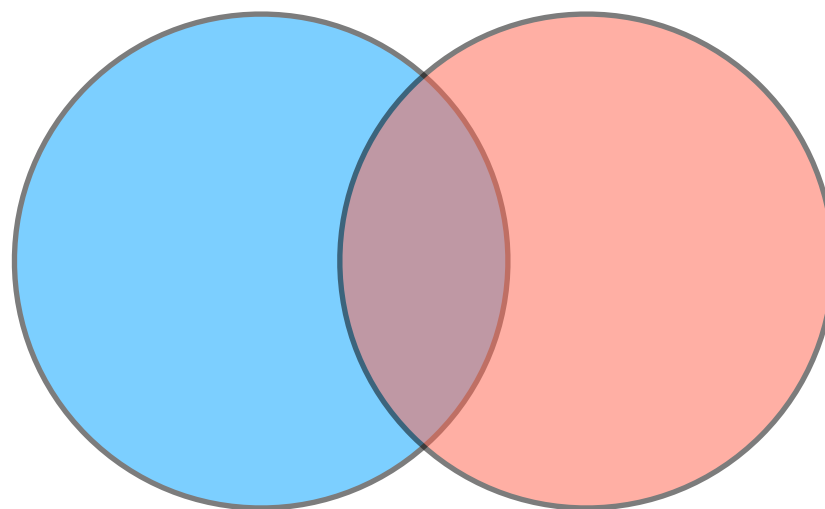**Left Outer Join**

Full Join

Moving Forward

- SoloLearn

- Test

- Projects