

Introduction to SQL

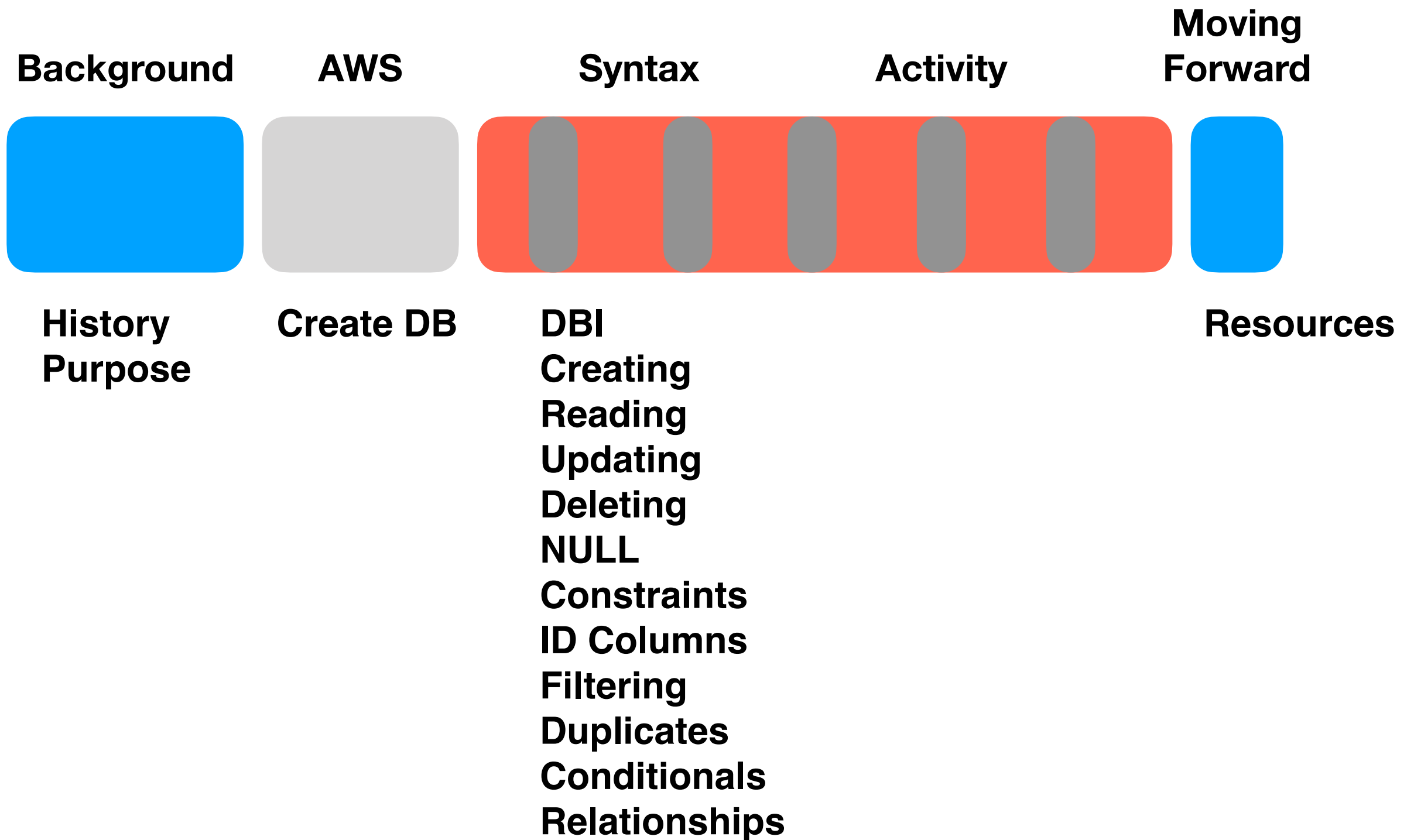
Charles Lang
Teachers College

[https://github.com/learning-
analytics-curriculum-teaching/sql-
workshop](https://github.com/learning-analytics-curriculum-teaching/sql-workshop)

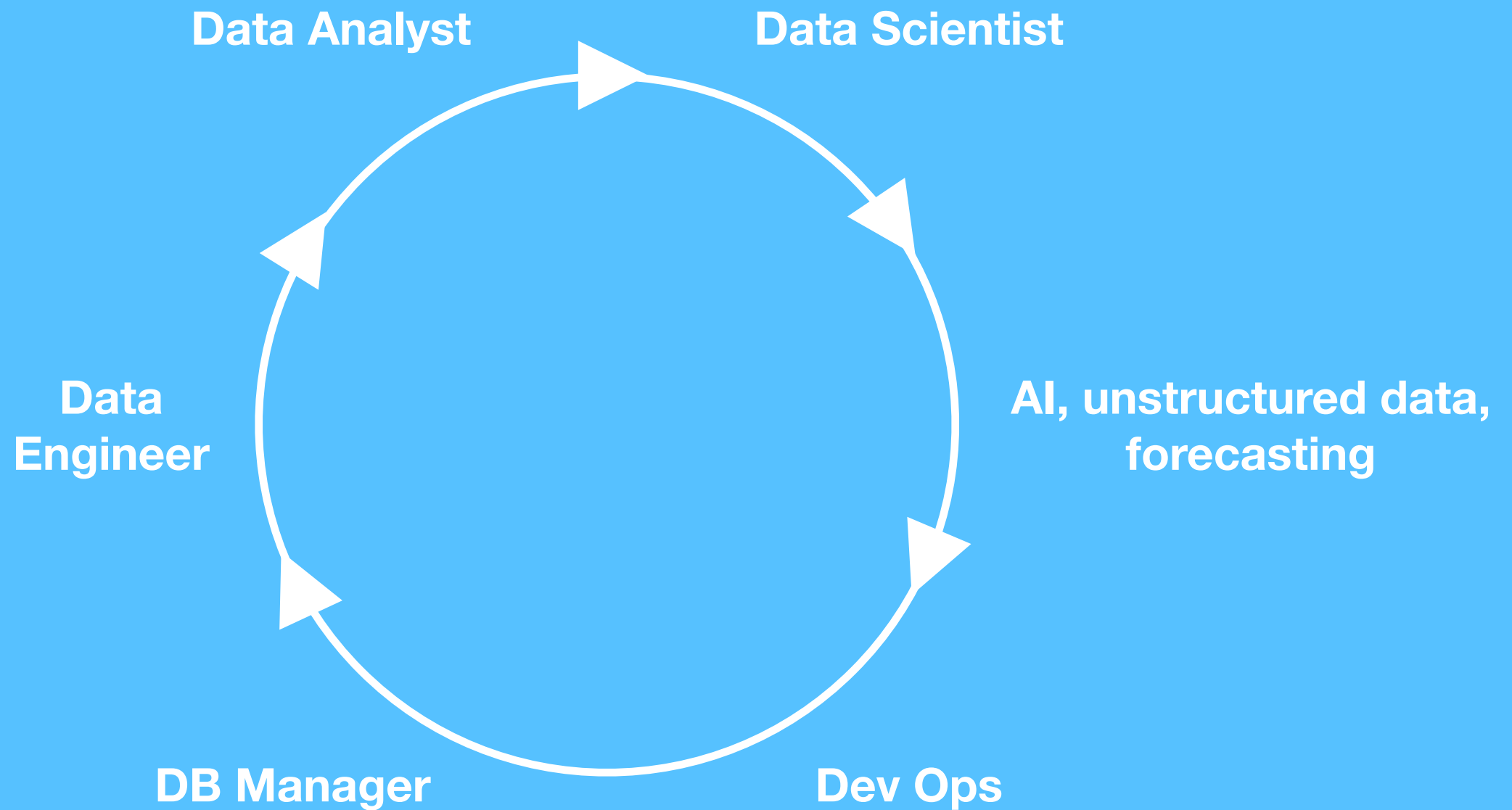
Learning SQL

1. Today = First pass at concepts + syntax
2. Rote practice (exercises, app, website)
3. Projects (post to Github)

Today



Data Science Workflow



DB Taxonomy

Relational (RDBMS)

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

Unique Key/
Primary key*

Column/
Field

Row/
Record

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

383 systems in ranking, February 2022

Rank			DBMS	Database Model	Score		
Feb 2022	Jan 2022	Feb 2021			Feb 2022	Jan 2022	Feb 2021
1.	1.	1.	Oracle +	Relational, Multi-model i	1256.83	-10.05	-59.84
2.	2.	2.	MySQL +	Relational, Multi-model i	1214.68	+8.63	-28.69
3.	3.	3.	Microsoft SQL Server +	Relational, Multi-model i	949.05	+4.24	-73.88
4.	4.	4.	PostgreSQL +	Relational, Multi-model i	609.38	+2.83	+58.42
5.	5.	5.	MongoDB +	Document, Multi-model i	488.64	+0.07	+29.69
6.	6.	↑ 7.	Redis +	Key-value, Multi-model i	175.80	-2.18	+23.23
7.	7.	↓ 6.	IBM Db2	Relational, Multi-model i	162.88	-1.32	+5.26
8.	8.	8.	Elasticsearch	Search engine, Multi-model i	162.29	+1.54	+11.29
9.	9.	↑ 11.	Microsoft Access	Relational	131.26	+2.31	+17.09
10.	10.	↓ 9.	SQLite +	Relational	128.37	+0.94	+5.20

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

Create a MySQL DB

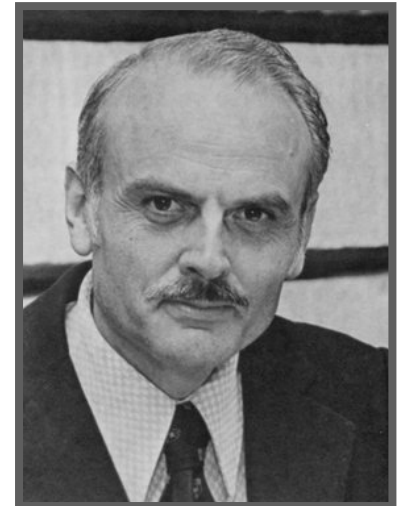
- Log into your [AWS Management Console](#)
- Locate RDS under the Services -> Databases heading
- Within Amazon RDS click Create database
- Under Choose a database creation method click Standard Create
- Under Engine options choose MySQL
- Under Templates choose Free tier
- Under Settings name your DB instance identifier as sqltest
- Under Credential settings create a username and password combination and write it down (you will need it later): username: admin, password: sql022723
- Under Connectivity make sure that Publicly accessible is checked Yes
- Expand Additional connectivity configuration to check port is 3306
- Database Authentication should be Password authentication
- 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
- Main benefit: don't need to specify how to reach a given record (no file path, index number)
- Is *loosely standardized* across products



**Donald
Chamberlin**



**Todd
Codd**



**Ray
Boyce**

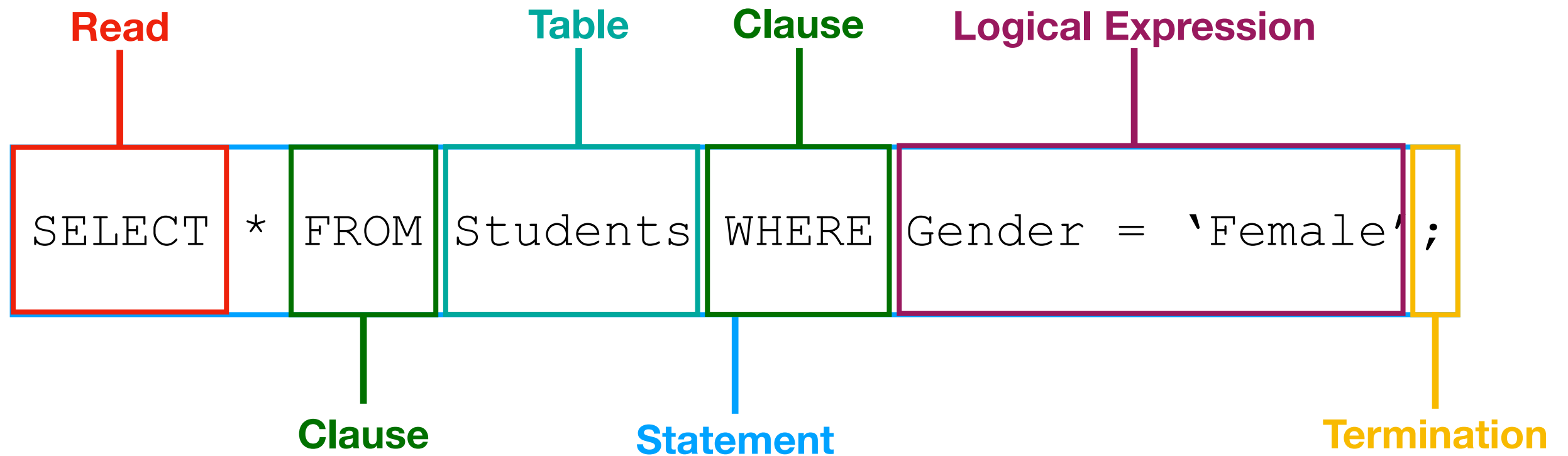
DB Fundamental Functions

- Create
- Read
- Update
- Delete

DB Fundamental Functions

- Create: INSERT - Add rows
- Read: SELECT - Get data
- Update: UPDATE - Change data
- Delete: DELETE - Remove rows

Basic Statement

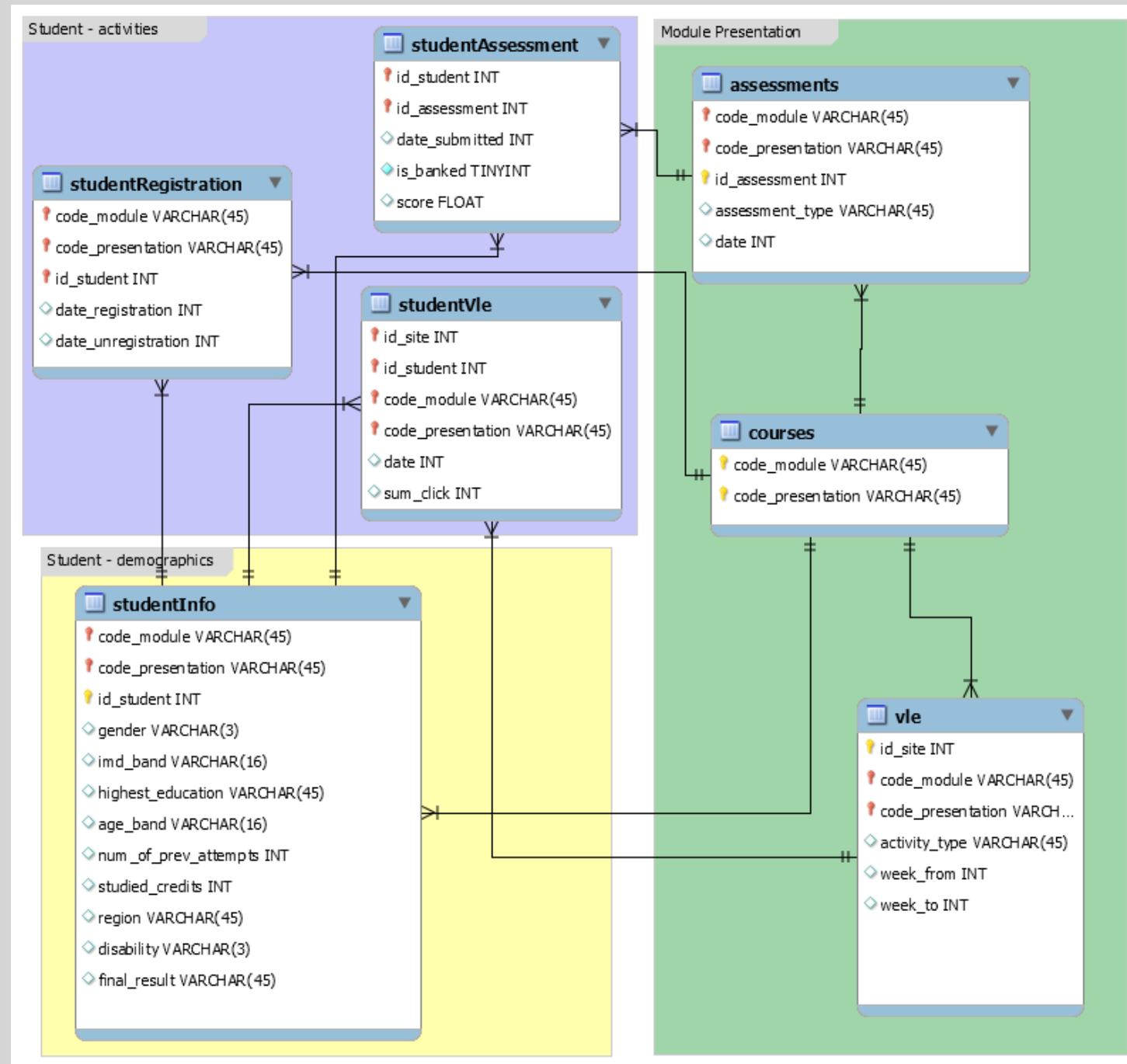


***Capitalization of SQL keywords is not required but is useful**

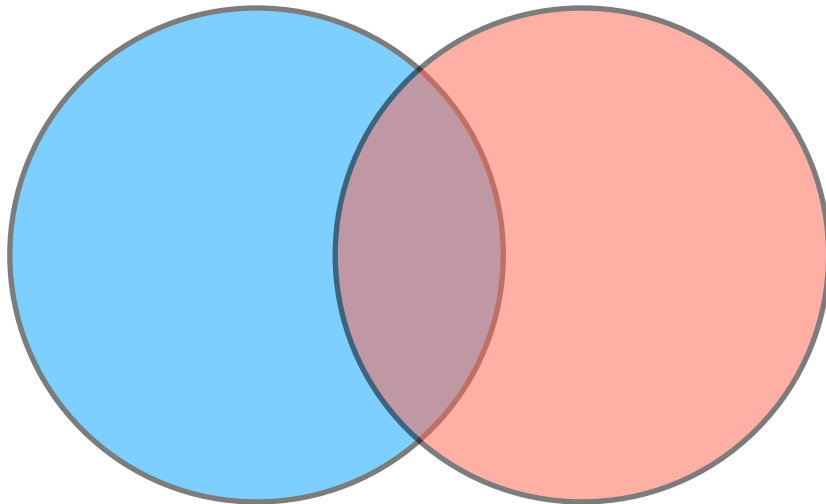
Create a MySQL DB

- Once your DB has been created
- Under Connectivity & security and Security group rules click the hyperlink
 - something like: default(sg-sgbfftf)
- Click on Security group ID link
- Click Edit inbound rules
- Do not delete any rules!
- Add the rule MySQL/Aurora on Port 3306 with the Connection of MyIP

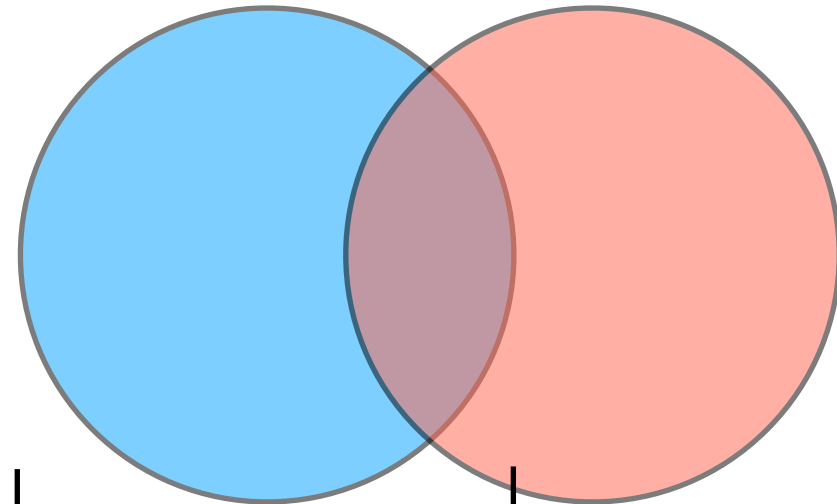
OU LA Data Set



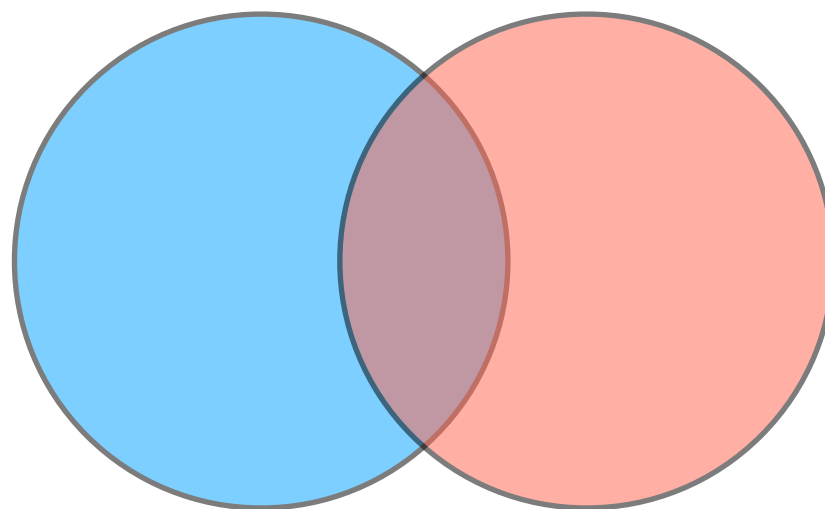
Joins



Inner Join



Left Outer Join



Full Join

***tidyverse:: join**

Union



***tidyvesre:: bind_rows**

Delete Your Amazon Instance

- Under RDS -> Databases
- Click radio button next to `sqltest`
- Actions -> Stop -> Create snapshot = no
- Actions -> Delete
 - Uncheck Create final snapshot
 - Check “I acknowledge that upon instance deletion, automated backups, including system snapshots and point-in-time recovery, will no longer be available.”
 - Type “delete me” in text box
 - Delete

Moving Forward

- SoloLearn, DataCamp, W3Schools, etc
- [LeetCode.com](https://leetcode.com)
- Test
- Projects
- ChatGPT