

# CMPT 354: Database System I

About Midterm

# Midterm Coverage

1. Database History (10%)



2. Relational Model (10%)



3. SQL (45%)



4. Relational Algebra (25%)



5. Query Processing and Indexing (10%)



# Database History (10%)

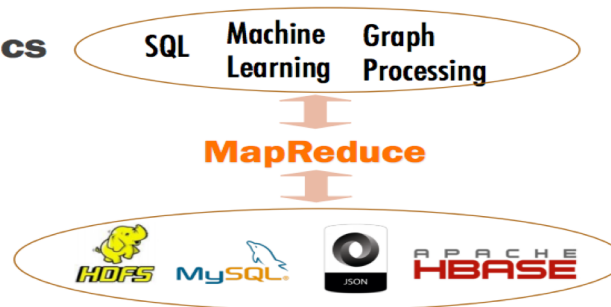
- You need to **understand**

- Why Relational Model
- Why MapReduce
- Why NoSQL

- Example

F ☒ T It is possible to implement SQL using MapReduce

## 2. Complex Analytics



# Relational Model (10%)

- You need to **understand**

- Basics of Data Models
- Terminologies
- Keys

- Example

☐ F ☐ T      A primary key is a single column that uniquely identifies a record in a relation

# SQL (45%)

- You need to be **familiar** with
  - SQL DDL
    - Create/Insert/Alter
    - Constraints
  - SQL DML
    - Selection, Projection
    - Set Operators (UNION, INTERSECT, EXCEPT)
    - Joins (INNER, OUTER)
    - Aggregation, Group By, Having
    - Order By, Distinct, NULL
    - Subqueries
- Example
  - Similar to A1 and A2

# Relational Algebra

- You need to **know**
  - How to write an RA query
  - How to optimize an RA query
  - How to convert an SQL query to an RA query
- Examples
  1. All students whose birth is larger than 1995
    - $\sigma_{birth > 1995}(\text{Student})$
  2. Optimize this query  $\sigma_{cNum=354} (R \bowtie S)$ 
    - $\sigma_{cNum=354} (R) \bowtie S$
  3. Convert “SELECT name FROM student” to an RA query
    - $\pi_{name}(\text{Student})$

# Query Processing and Indexing

- You need to know
  - Query Processing Steps
  - Which index is better/useful?
- Examples
  - What does SQL Parser do?
    - Convert the input SQL text to a logical plan
  - Can the following index speed up this SQL query:  
SELECT \* FROM Student WHERE id = ?
    - Index on Student(id)      YES NO

# Notes

- Midterm
  - Thursday 2:30 – 3:20 pm
  - AQ3149
  - Don't be late
- **Bring your Student IDs**
- Please **budget your time** so you get to all questions
- **Relax.** You are here to learn

