SQL Summary

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- DDL (Data Definition Language)
- DML (Data Manipulation Language)
    - Select
    - Update
    - Delete
    - Insert
- DCL (Data Control Language)

- describe table
- describe database
- show grants

Null values and keys

- primary key
- foreign key
- not Null
- unique

Aggregate Functions

- count
- sum
- avg
- min/max

Aggregation

- GROUP BY
- HAVING

```sql
SELECT column1, SUM(column2)
FROM table_name
GROUP BY column1
HAVING SUM(column2) > 100;
```

Views

- Add indexes to make certain queries faster
- Provide visibility into data independent of table access
- Challenges:
  - Create a table with firstname, lastname, age but a view with only the name. Allow a user to see only the names.
  - Create an efficient query to find the 10 most populous cities using a view.

Stored Procedures

- parameters (IN, OUT, INOUT)
- result sets
- loops, if statements

- START TRANSACTION
- COMMIT
- ROLLBACK

Example: transfer money from account to account (full version)

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- Cursors
- Triggers
- recursive queries
- nested subqueries

Cursors

- Tracks location within a resultset
- Avoids repeating the same query

Cursors

```
DELIMITER //
CREATE PROCEDURE ExampleProc()
   BEGIN
      DECLARE done INT DEFAULT 0;
      DECLARE tutorialID INTEGER;
      DECLARE tutorialTitle, tutorialAuthor,
      tutorialDate VARCHAR(20);
      DECLARE cur CURSOR FOR SELECT * FROM tuto
      DECLARE CONTINUE HANDLER FOR NOT FOUND SET
      OPEN cur;
      label: LOOP
      FETCH cur INTO tutorialID, tutorialTitle,
      tutorialDate;
      INSERT INTO backup VALUES(tutorialID, tut
      tutorialAuthor, tutorialDate);
      IF done = 1 THEN LEAVE label;
      END IF;
```