—---------- PRE-READS —----------

MySQL 8 Installation (Follow any 1 as per the OS):

Windows: https://dev.mysql.com/doc/refman/8.0/en/windows-installation.html
MacOS: https://dev.mysql.com/doc/refman/8.0/en/macos-installation.html
Linux: https://dev.mysql.com/doc/mysql-apt-repo-quick-guide/en/

MySQL Workbench Installation (Follow any 1 as per the OS):

Windows: https://dev.mysql.com/doc/workbench/en/wb-windows.html
MacOS: https://dev.mysql.com/doc/workbench/en/wb-mac.html
Linux: https://dev.mysql.com/doc/workbench/en/wb-linux.html

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1. What will we cover in DBMS Module
    a. Intro to DBMS and SQL
    b. Schema Design
    c. CRUD, Joins, Subqueries
    d. Aggregates, BuiltIn Functions
    e. Indexing
    f. Transaction
2. WhatsApp group for this cohort: https://chat.whatsapp.com/DIz6xrmindf8dArnQvovik
3. What is a Database
    a. Organized collection of inter-related data
4. What is a Database Management System
    a. Software system that allows to store, manage and query a database.
5. Why Database Management System?
    a. Storing DB in Files
        i. Scaler Students File
        ii. Scaler Batches File
    b. File parsing code to access, store data
    c. Problems:
        i. Integrity (delete something that has reference, anomalies in values at different places, invalid value)
        ii. Lot of code to write. Repetition of code if multiple apps need to access same data. Also, slow, inefficient.
        iii. Security
        iv. Concurrency
6. Types of DBMS
    a. Relational (SQL) - Follow the relational model. Will learn today.
        i. MySQL
        ii. PostgreSQL
    b. Non Relational (NoSQL)
        i. Document DB
        ii. Columnar DB

        iii. Graph DB
    c. Will learn diff b/w them in HLD. Each have different benefits, like some have fast writes, other have fast reads.
7. Relational Model
    a. Data Model is a collection of concepts that are used to describe the data in a database
    b. In relational model data is represented as a collection of multiple relations. Can consider each relation to be like a table, or info about something. We will learn more on how to represent data as tables in Schema Design class.
    c. Eg Scaler will have a relation for Students. Another for batches.
    d. Properties of a relation/ table:
        i. A relation is a SET of rows (called tuples). Order of rows doesn't matter.
        ii. Order of columns doesn;t matter.
        iii. Value  in each cell is atomic (No lists/ jsons allowed) - Will learn in Schema Design how to represent data that has lists.
        iv. Each row is unique (has atleast one value different).

8. Keys
    a. Super Key: A set of attrs that can uniquely identify a tuple
    b. Candidate Key: Super Key of minimum size st if I remove any of the attribute, it is no longer a super key.
    c. Primary Key: One of the candidate keys.
        i. If we don't have a key in our data, we create our own key, an id column, which is different.
        ii. Databases have options of auto-incrementing keys etc.
    d. Foreign Key: A column in one relation that refers to a primary key of another relation
        i. on update restrict and cascade

—---------- BREAK —----------

1. Intro to SQL
2. Create Database

```create database scaler_class;```
```create database if not exists scaler_class;```

3. Delete Database

```drop database scaler_class;```
```drop database if exists scaler_class;```

4. Use Database

```use scaler_class```

5. Create a Table
```

```create table if not exists batches(
batch_id int primary key auto_increment,
batch_name varchar(20) NOT NULL,
instructor_name varchar(20) default ‘abc’,
primary key(batch_id),
foreign key (instructor_id)
references instructors(id)
    on update restrict
    on delete cascade
);
```

6. Describe a Table

```describe batches;```

7. Alter Table

```alter table students add column batch_id int```
```Alter table students
add foreign key fk_students_batches (batch_id)
references batches (batch_id);
```

8. SQL Data Types
    a. Integer

**Table 11.1 Required Storage and Range for Integer Types Supported by MySQL**

| Type | Storage (Bytes) | Minimum Value Signed | Minimum Value Unsigned | Maximum Value Signed | Maximum Value Unsigned |
|---|---|---|---|---|---|
| TINYINT | 1 | -128 | 0 | 127 | 255 |
| SMALLINT | 2 | -32768 | 0 | 32767 | 65535 |
| MEDIUMINT | 3 | -8388608 | 0 | 8388607 | 16777215 |
| INT | 4 | -2147483648 | 0 | 2147483647 | 4294967295 |
| BIGINT | 8 | $-2^{63}$ | 0 | $2^{63}-1$ | $2^{64}-1$ |

        - Signed and Unsigned Variants
        - Small, Big, Medium variant
    b. Floating Points
        i. DECIMAL(P, S)
        ii. Float - 4B
        iii. Double - 8B
    c. Boolean
        i. TRUE/ FALSE
        ii. 1/0
        iii. Is a TINYINT
    d. Blobs
        i. Binary Large Objects
        ii. Storing files etc in DB
        iii. Don’t use them unless a reason.
    e. ENUM(‘a’, ‘b’, ‘c’, ‘d’)

    i. Avoid using them
    ii. Will learn in Schema Design how to represent enums
f. Date and Time we will learn in a separate class.

—---------- POST - READS —----------

1. https://dev.mysql.com/doc/refman/8.0/en/database-use.html
2. https://dev.mysql.com/doc/refman/8.0/en/creating-database.html
3. https://dev.mysql.com/doc/refman/8.0/en/creating-tables.html
4. https://dev.mysql.com/doc/refman/8.0/en/alter-table.html
5. https://dev.mysql.com/doc/refman/8.0/en/numeric-types.html
6. https://dev.mysql.com/doc/refman/8.0/en/date-and-time-types.html
7. https://dev.mysql.com/doc/refman/8.0/en/string-types.html
8. https://stackoverflow.com/a/6720458
9. https://www.youtube.com/watch?v=uikbtpVZS2s&list=PLSE8ODhjZXjaKScG3l0nuOiDTTqpfnWFf&index=1

—----------NOTES—----------

1. https://gist.github.com/Naman-Bhalla/0d6b0c78828fb872727cf5e41897ae40