

Agenda: Schema design

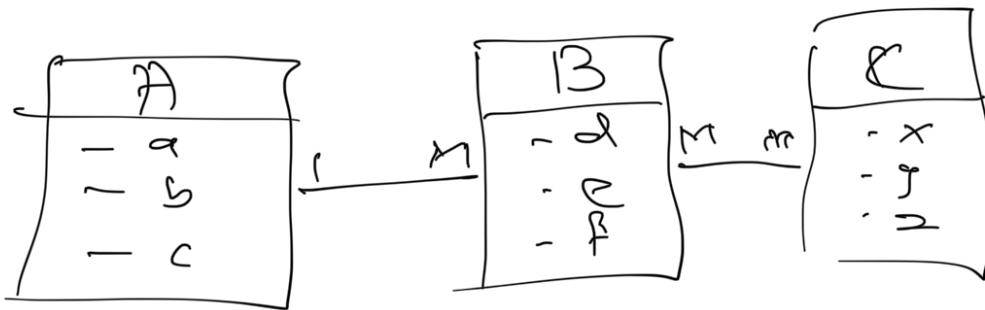
- ① How to create tables from entities?
- ② How do we model relationships?

what is Schema of a DB?

structure / layout

Schema: Pictorial representation of your DB

- ① What kind of tables you have?
- ② What is the relationship b/w tables



When do we create a schema of a DB?

① HLD

② LLD

- Class diagram
- Use case diagram
- API design
- DB / Schema design

"Design document"

... in schema design!

How to do entities :-

Case study: Scaler

- ① There are several batches at Scaler. Each batch has an ID, Name & current instructor.
- ② Every batch has multiple classes. Each class has an ID, name, instructor.
- ③ A student has name, ID, grad-year, university, email, etc., current batch.
- ④ A student may have changed batches in between course (by pausing). So we need to know entry & exit date for student in that batch
- ⑤ Every student has a mentor. Mentor has name, dob.
- ⑥ Every instructor has name & dob.

How do we model entities?

Anything which exists in your system & you store some info about it.

It can be living thing or non-living thing
(Instructor, student, mentor) (Batch, class)

✓ How do we identify an entity?

→ Identify all nouns in the requirement

② If you are storing some info about this noun, then create a table.

Naming conventions:

① Tables:

↳ Name can be singular, eg: batch

↳ Name can be plural. eg: batches (More prevalent)

Follow company convention

② Attributes:

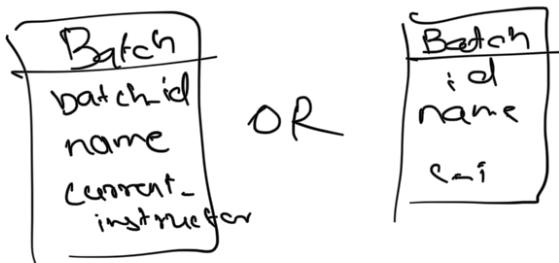
↳ Camel case: currentInstructor

↳ underscore based: current_instructor (More popular)

③ Id:

↳ Append table name: eg: batch_id

↳ Just id. (More popular)

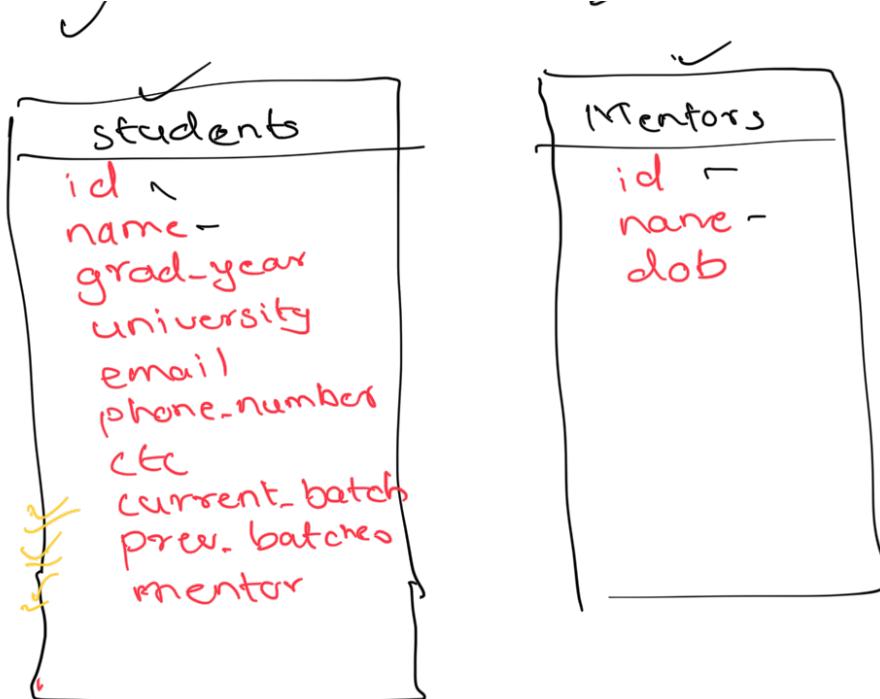


Scalar Schema

Batches
id
name
current-instructor

Classes
id
name
instructor
date
batch_id

Instructors
id
name
dob

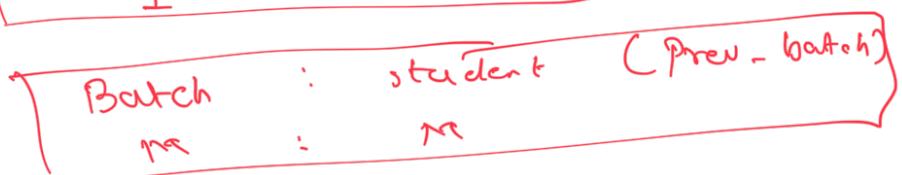
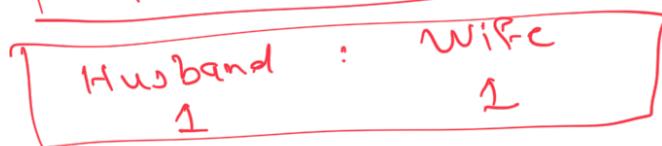
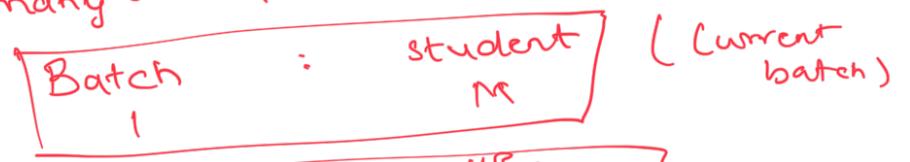


How do we model relationship b/w tables?

What is cardinality of a relationship?

If entity A is related to entity B via some relationship, then cardinality of the relationship is how many of A are related to how many of B

How many of A? : How many of B?



3 types:

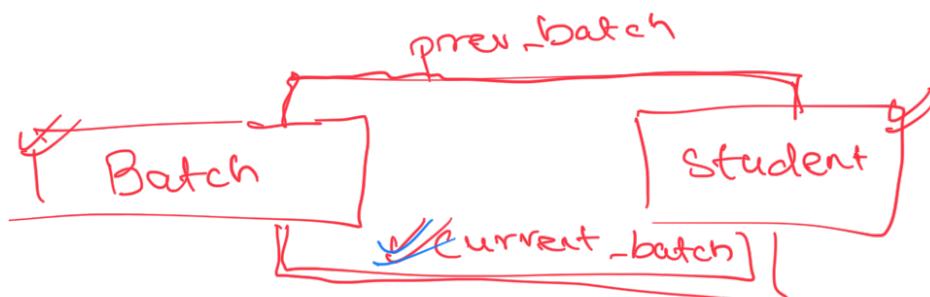
- ① 1:1
- ② 1:M or M:1

many or multiple

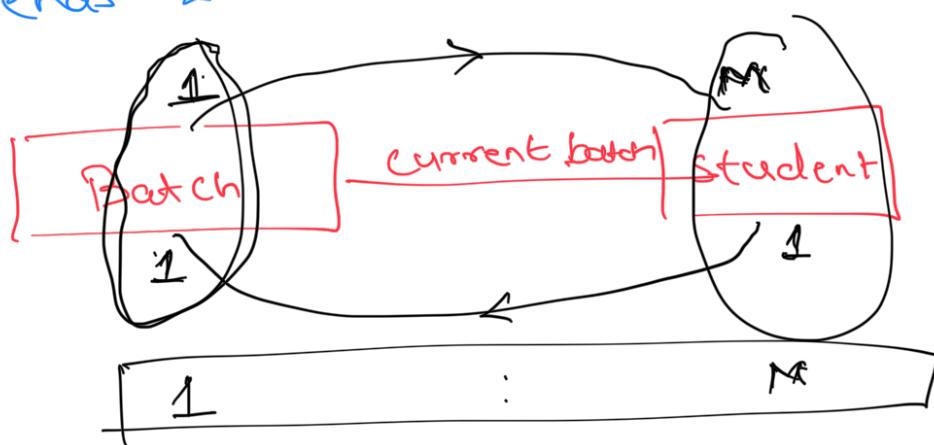
③ m:n

How to identify cardinality of a relationship?

- ① Decide which relationship are we talking about b/w the 2 entities

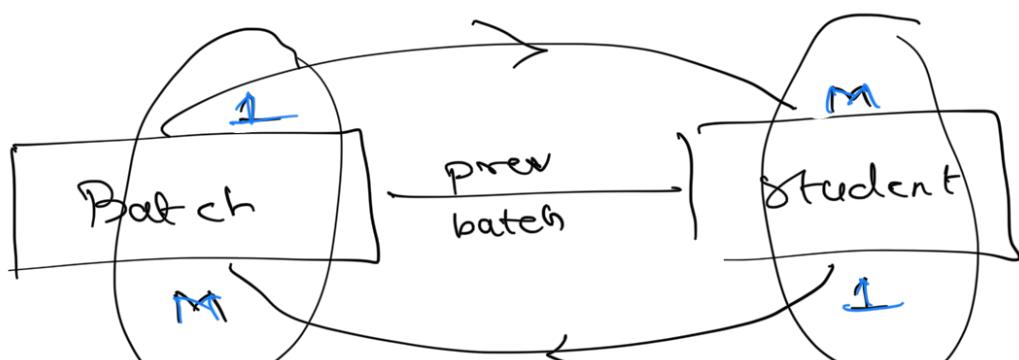


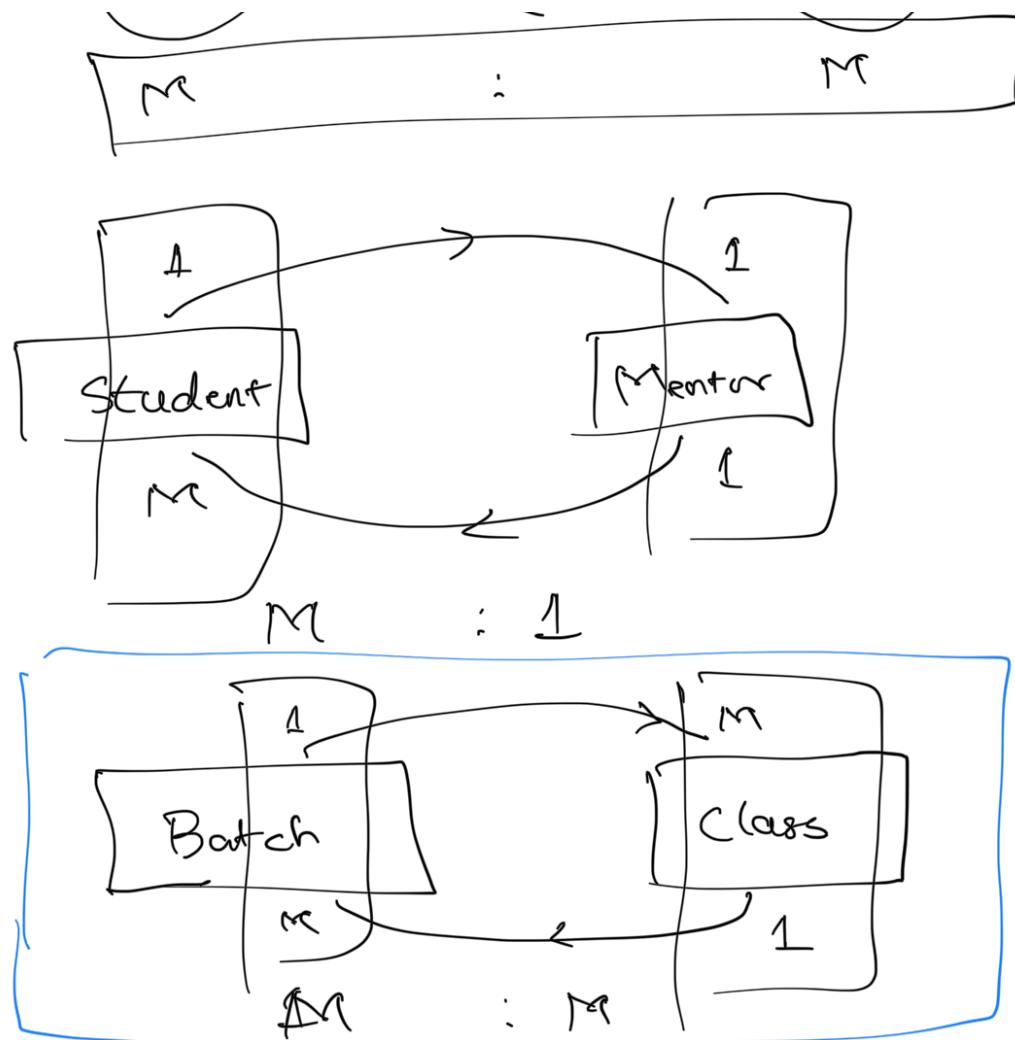
- ② Approach the relationship from both ends & note whether 1 or M



- ③ If even 1 M is present on either side, then write "M" else write "1"

Batch : student (Prev batch)

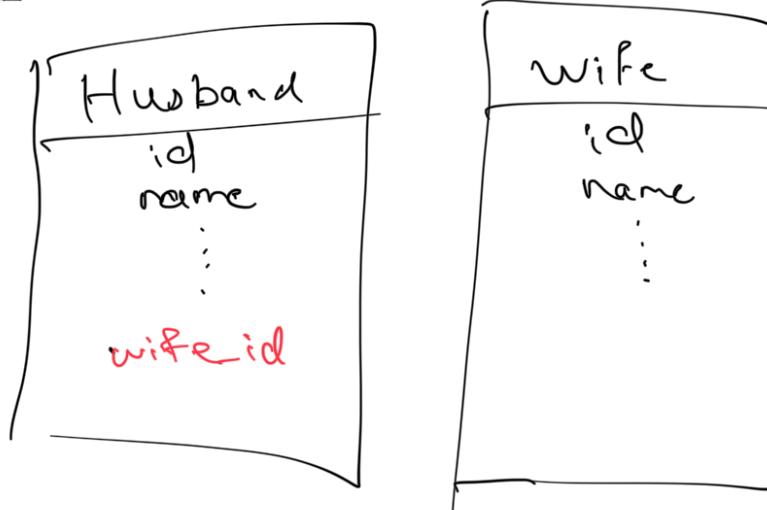




Lets have a break till : 8:45

How to store these cardinalities in Schema or DB?

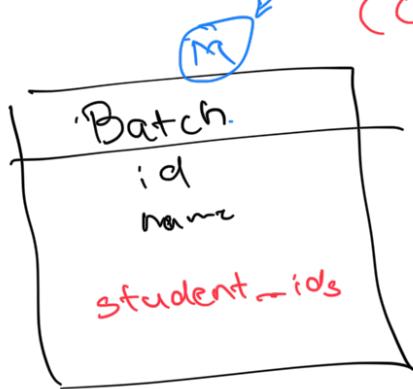
① 1:1



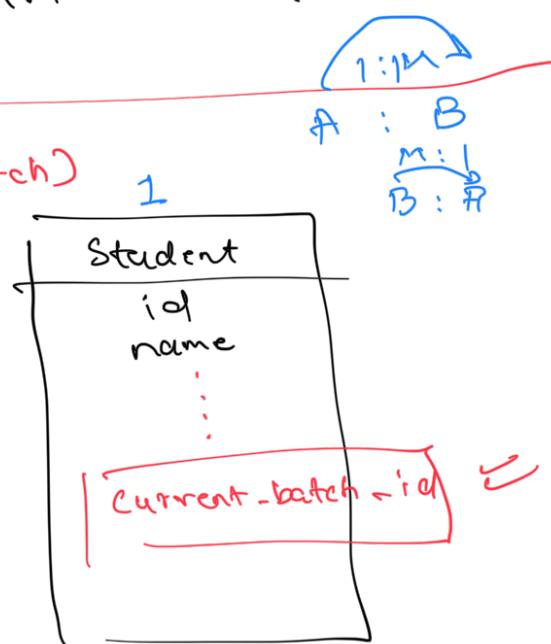
2 options

- ① Store husband_id in wife table
- ② Store wife_id in husband table

② 1:M or M:1



. OR.



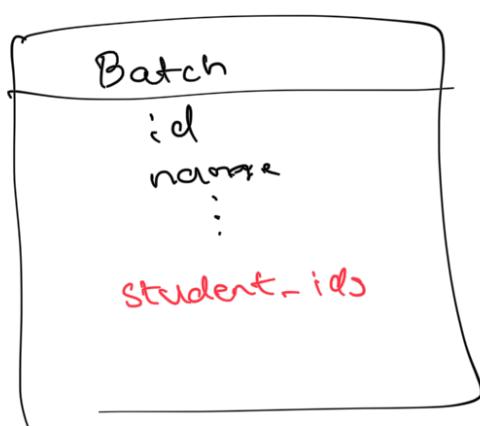
① Store student_id (i.e. an array) in batch table

Atomicity is violated

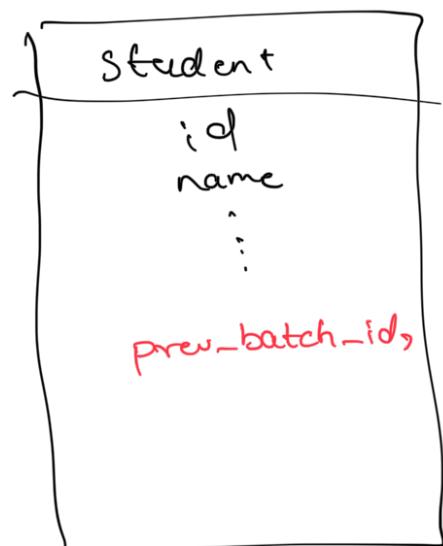
✓② Store batch_id in students table

In a 1:M relationship, store the primary key of M side on 1 side

③ M: M



. OR.



...

- ⓧ① Store student_id in batch
- ⓧ② Store prev-batch_ids in student

Mapping table

Batch id	batches students		Student .id	prev :
	b-id	s-id		
	1	1	293	204
	1	2	486	204
	2	1	786	203
	2	2	293	203
	3	1	486	203

Bhavik : 204
 Student id : 293, 486
 prev : 786
 Sushil : 203
 -

PK for mapping table?

① Use the composite Key out of existing

(Go for
this
until you
cannot)

FKs

Adv:

1] Queries will be faster as the data will be stored in sorted format on the basis of b-id & s-id

② Create a new id column

→ Reasons not to use Composite PK

① Your mapping table is linked to another entity

②

Your mapping table has its own set of attributes, i.e. M:M behaves like an entity

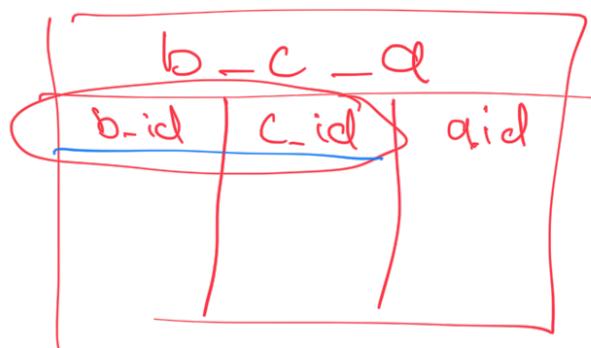
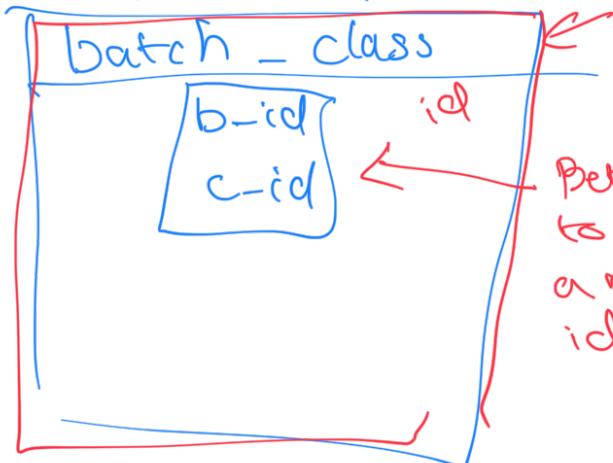


M

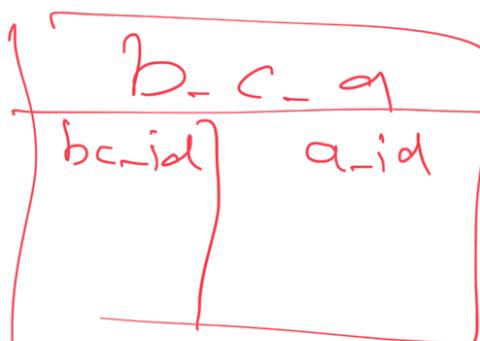
M



Assignments
aid



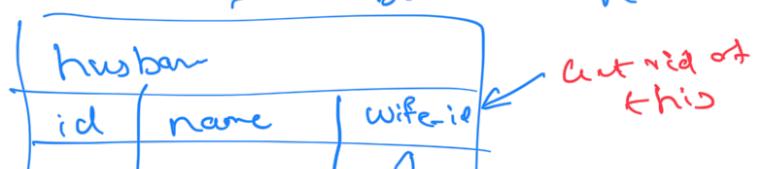
O R



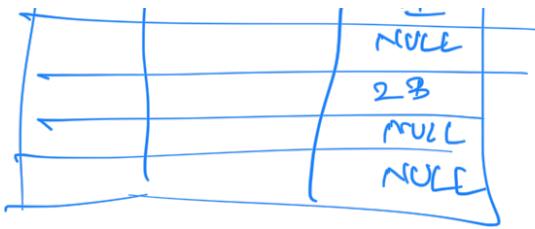
Caveats

① Husband : Wife

→ 5M rows in husband but 3M of them don't have wives



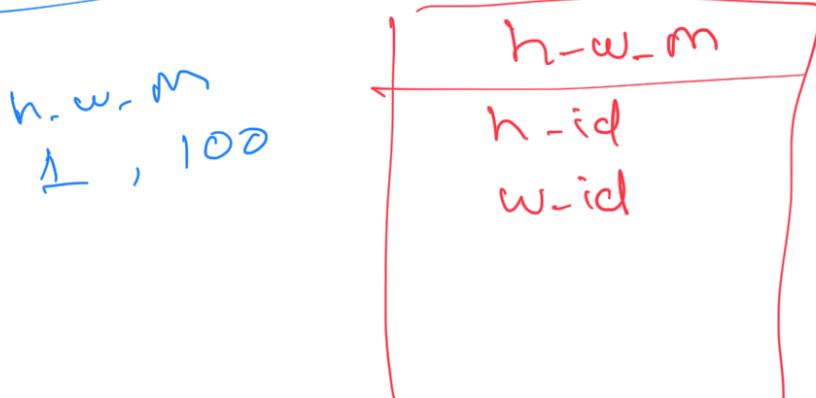
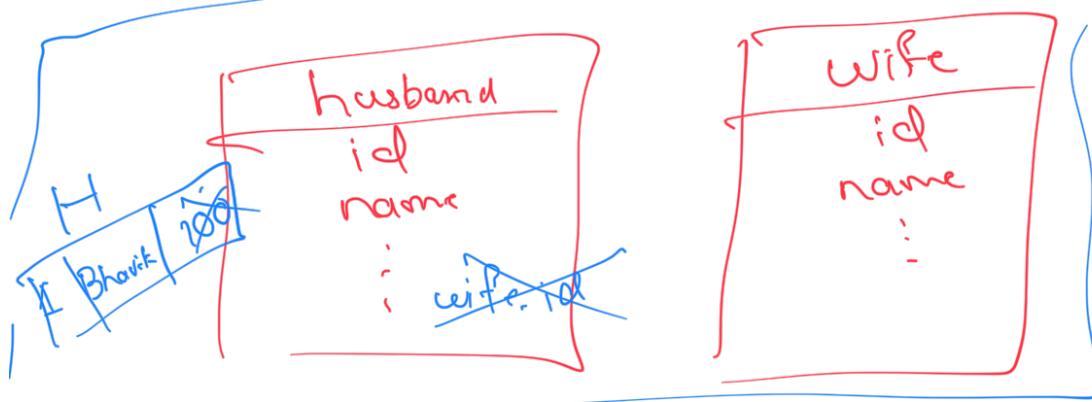
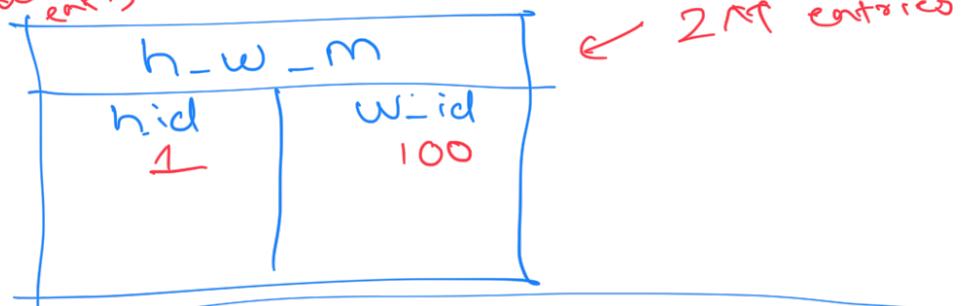
This is an example of a sparse table



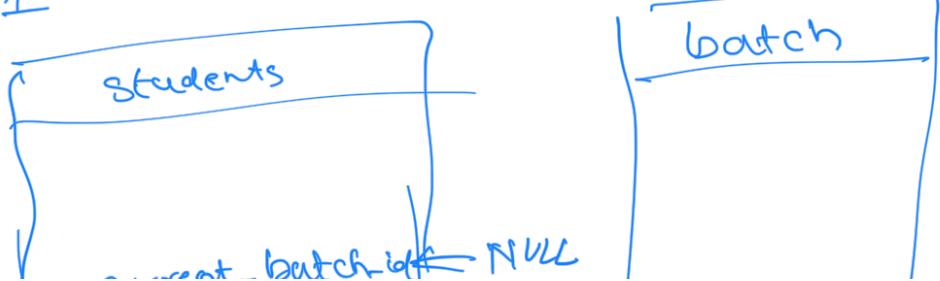
4 Bytes
 $3M \times 4B$

→ space is wasted
 - as we are storing null's

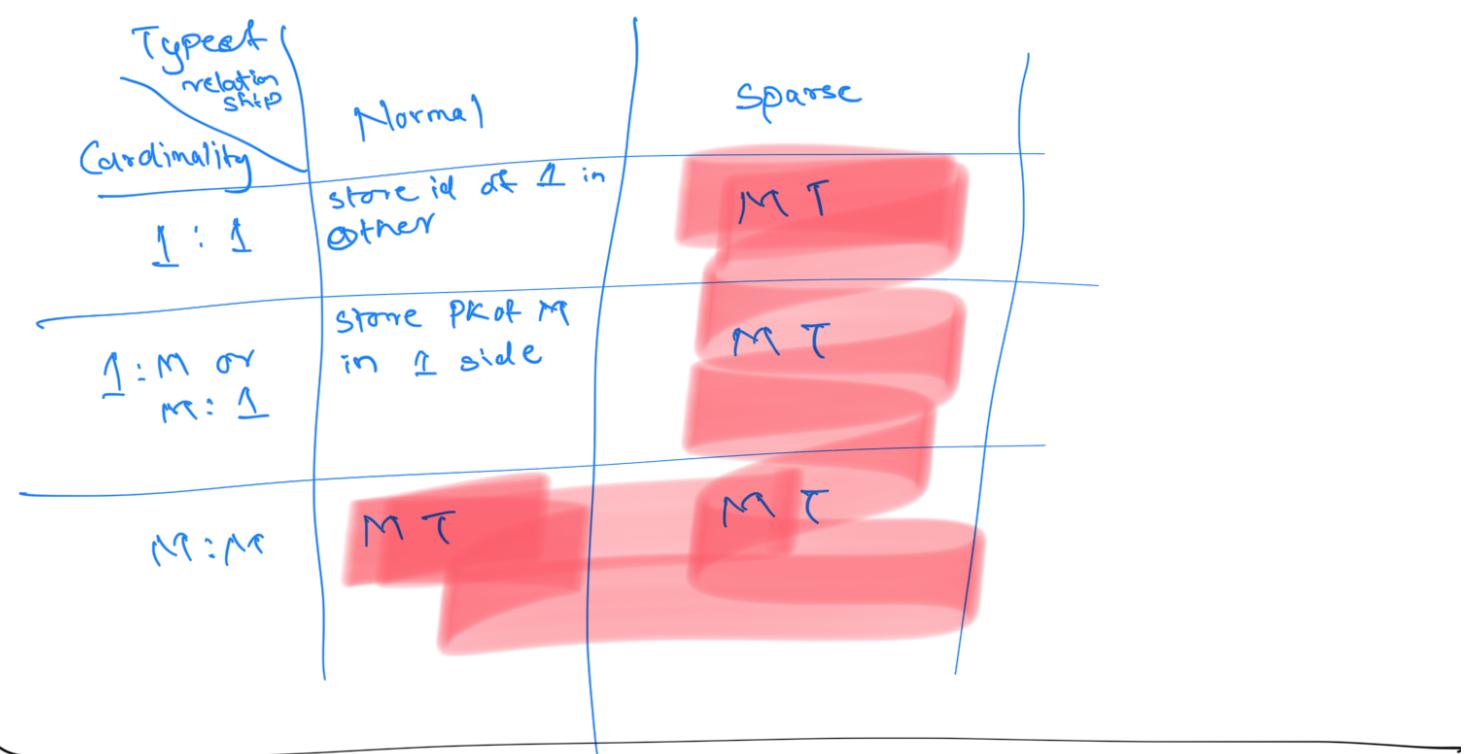
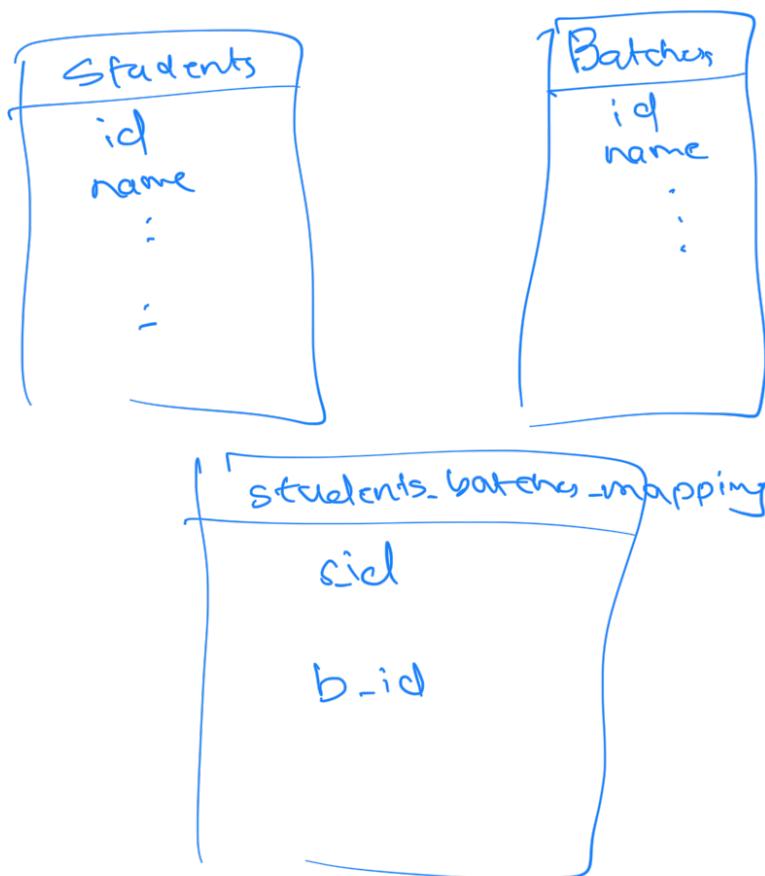
2 don't have
 a wife, his M T
 entry will not be here

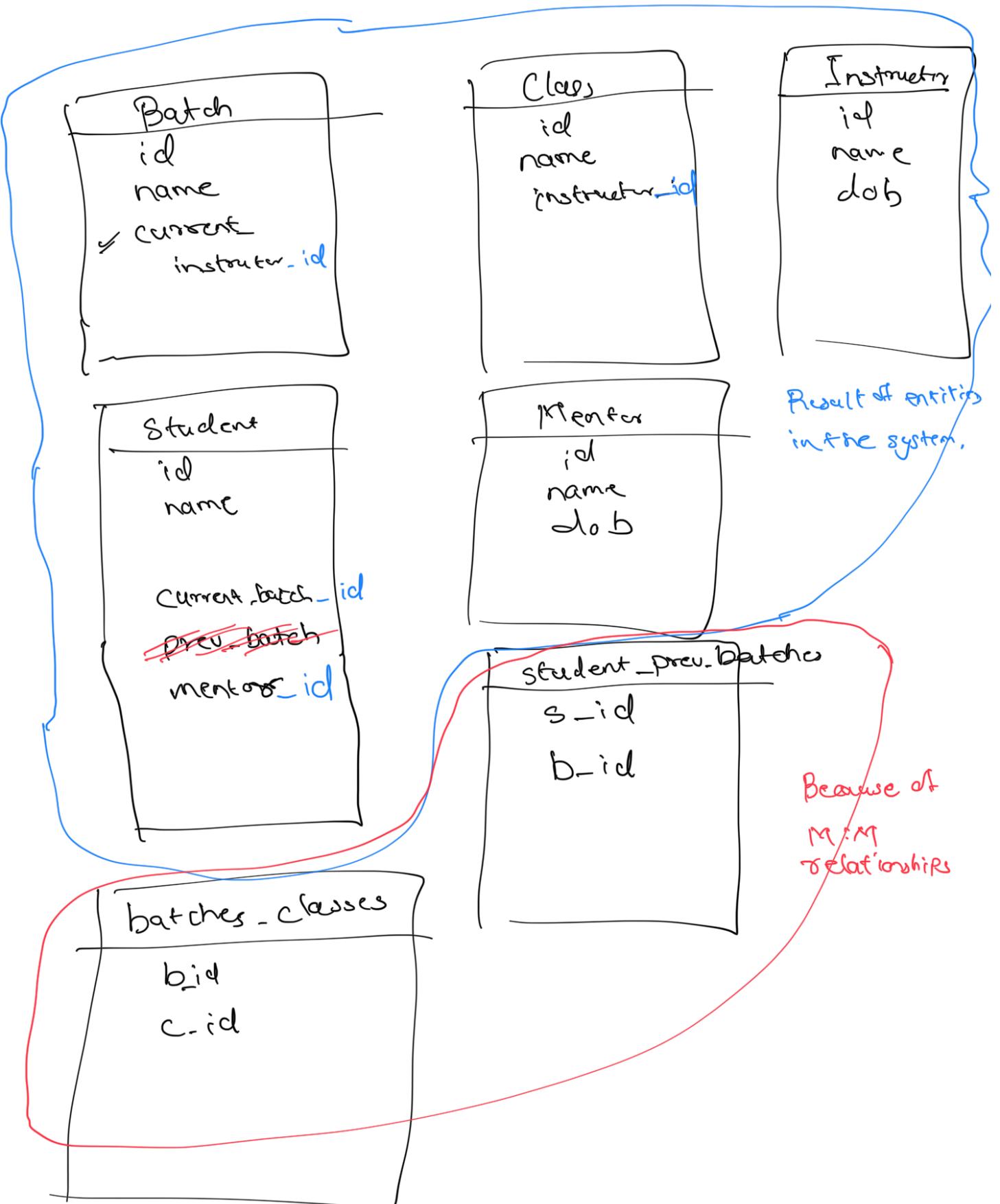


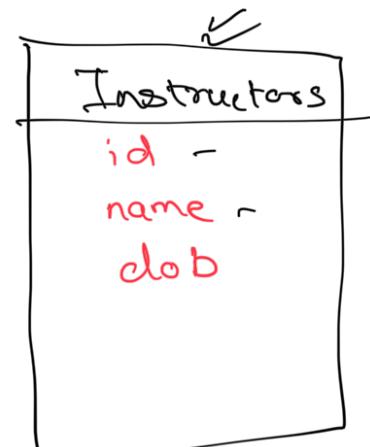
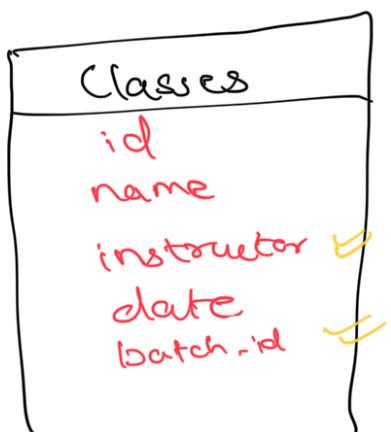
② M: 1



Current
 25k students have registered for Master class
 0.5k students enrol & get a batch.







✓ t

✓ e

✓ r