Database Management System

Course Project

Project No: 1F

MockClassroom Database
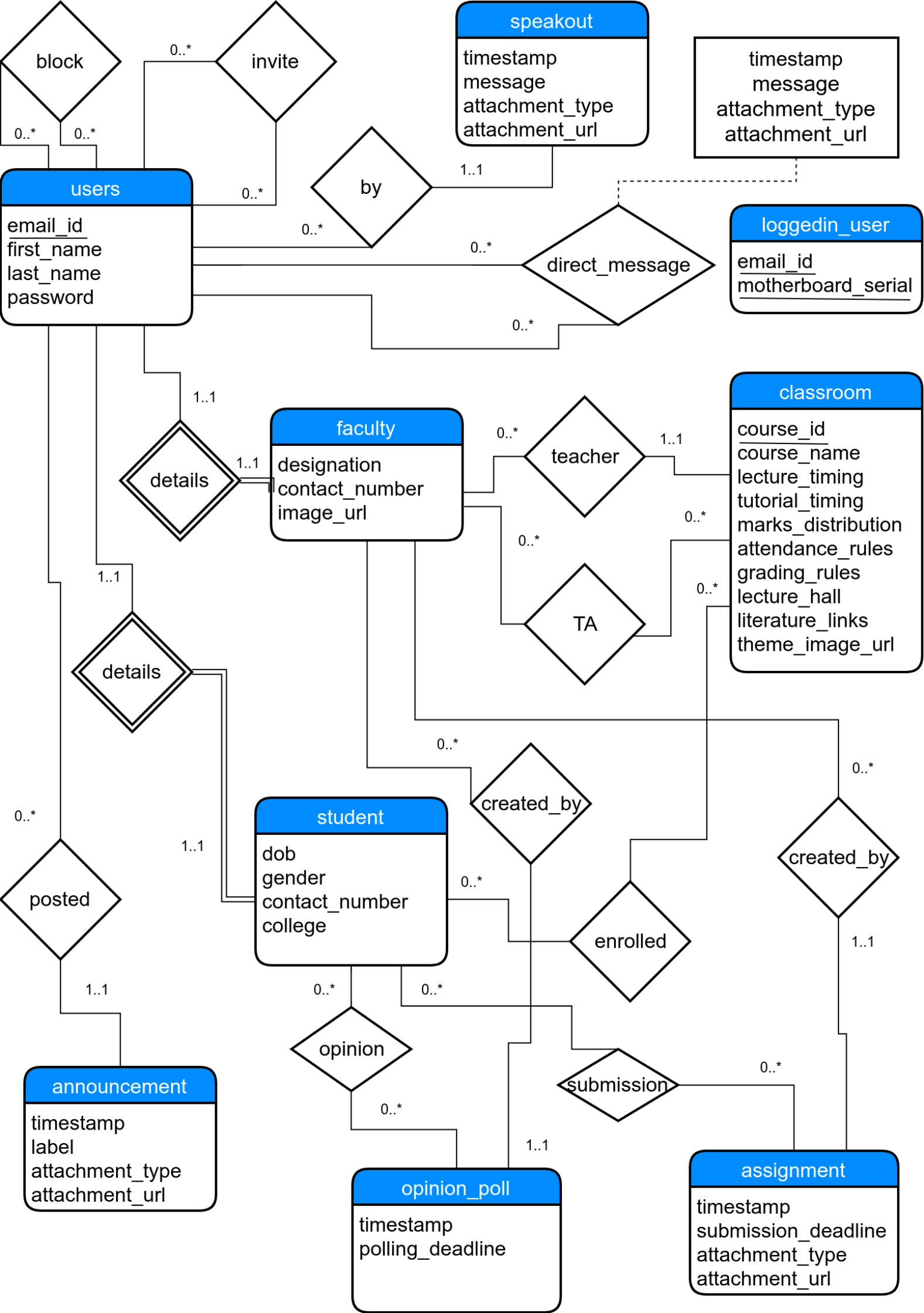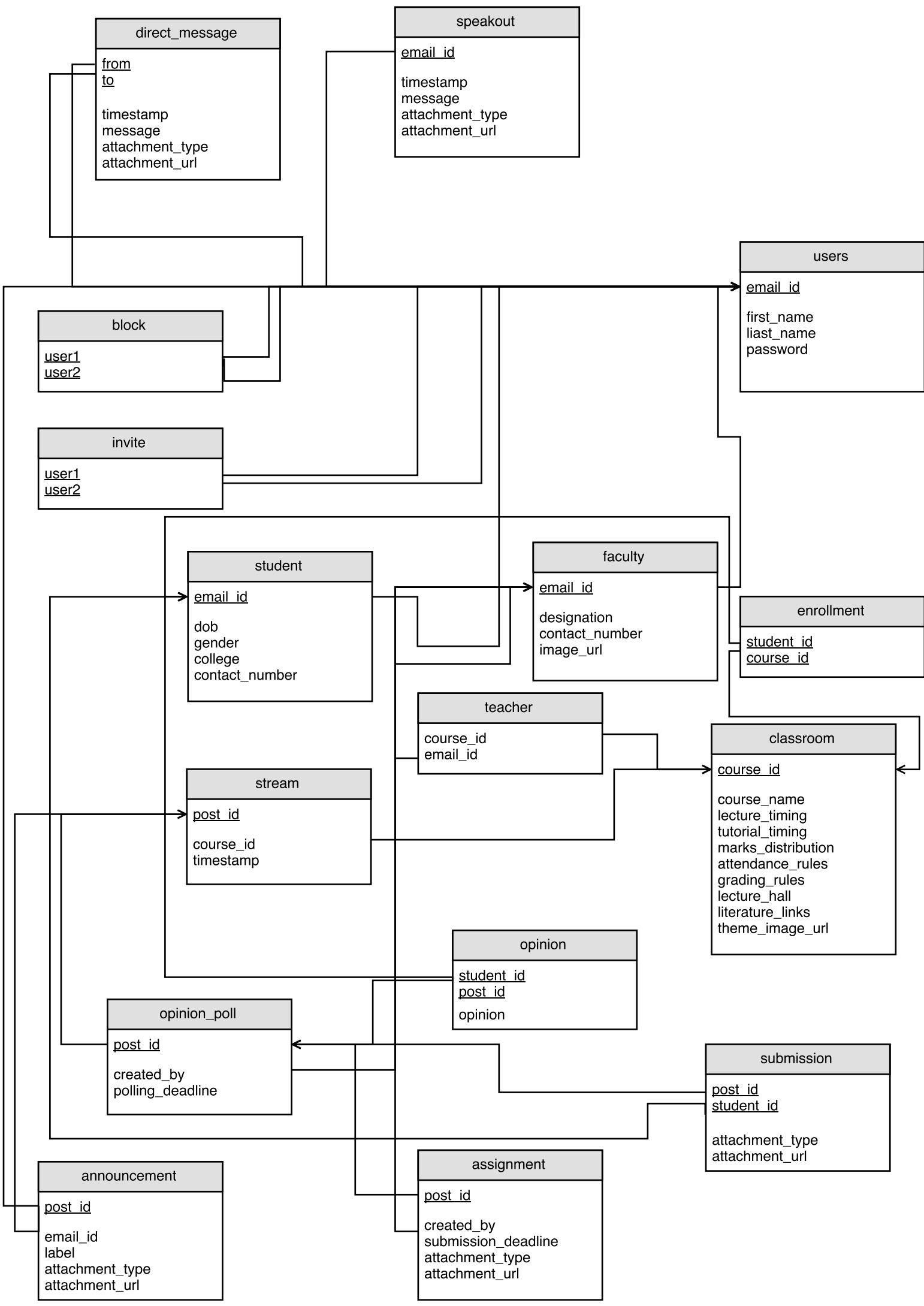Github Link: https://github.com/hareshkh/ClassroomDBMS

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block

invite

speakout
- timestamp
- message
- attachment_type
- attachment_url

- timestamp
- message
- attachment_type
- attachment_url

by

users
- email_id
- first_name
- last_name
- password

direct_message

loggedin_user
- email_id
- motherboard_serial

details

faculty
- designation
- contact_number
- image_url

teacher

TA

classroom
- course_id
- course_name
- lecture_timing
- tutorial_timing
- marks_distribution
- attendance_rules
- grading_rules
- lecture_hall
- literature_links
- theme_image_url

details

posted

created_by

student
- dob
- gender
- contact_number
- college

enrolled

created_by

announcement
- timestamp
- label
- attachment_type
- attachment_url

opinion

submission

opinion_poll
- timestamp
- polling_deadline

assignment
- timestamp
- submission_deadline
- attachment_type
- attachment_url

Cardinalities:
- block 0..* — 0..* users, 0..*
- invite 0..* — 0..*
- by 1..1 speakout, 0..*
- direct_message 0..* — 0..*
- details 1..1 — 1..1 faculty
- teacher 0..* — 1..1 classroom
- TA 0..* — 0..*
- details 1..1 — 1..1 student
- posted 0..* — 1..1 announcement
- created_by 0..*
- enrolled 0..* — 1..1
- created_by 0..* — 1..1 assignment
- opinion 0..* — 0..* opinion_poll
- submission 0..*

direct_message

<u>from</u>
<u>to</u>

timestamp
message
attachment_type
attachment_url

speakout

<u>email_id</u>

timestamp
message
attachment_type
attachment_url

users

<u>email_id</u>

first_name
liast_name
password

block

<u>user1</u>
<u>user2</u>

invite

<u>user1</u>
<u>user2</u>

student

<u>email_id</u>

dob
gender
college
contact_number

faculty

<u>email_id</u>

designation
contact_number
image_url

enrollment

<u>student_id</u>
<u>course_id</u>

teacher

course_id
email_id

classroom

<u>course_id</u>

course_name
lecture_timing
tutorial_timing
marks_distribution
attendance_rules
grading_rules
lecture_hall
literature_links
theme_image_url

stream

<u>post_id</u>

course_id
timestamp

opinion

<u>student_id</u>
<u>post_id</u>

opinion

opinion_poll

<u>post_id</u>

created_by
polling_deadline

submission

<u>post_id</u>
<u>student_id</u>

attachment_type
attachment_url

announcement

<u>post_id</u>

email_id
label
attachment_type
attachment_url

assignment

<u>post_id</u>

created_by
submission_deadline
attachment_type
attachment_url

Observation: In all our tables, we have FDs of type X -> A, X ∈ Candidate Key.

1. **1NF:**
   a. Since all our columns are atomic, the tables are in 1NF.

2. **2NF:**

   a. Since X ∈ Candidate Key, no non-prime attribute can be dependent on a subset of candidate key.

3. **3NF:**

   a. Since X ∈ Candidate Key, there cannot be a functional dependency from non-prime attribute to non-prime attribute

4. **BCNF:**

   a. Since X ∈ Candidate Key ∈ Super Key, this means all our tables are in **BCNF.**

Since there are no multi-valued dependencies or Join Dependencies, the schema is in **5NF**

Functional Dependency

Direct_message

(from,to) → (timestamp, message, attachment_type, attachment_url)

Speakout

(email_id) → (timestamp, message, attachment_type, attachment_url)

Users

(email_id) → (first_name, last_name, password)

Student

(email_id) → (dob, gender, college, contact_number)

Faculty

(email_id) → (designation, contact_number, image_url)

Stream

(post_id) → (course_id, timestamp)

Classroom

(course_id) → (course_name, lecture_timing, tutorial_timing, marks_distribution, attendance_rules, grading_rules, lecture_hall, literature_links, theme_image_url)

Opinion_poll

(post_id) → (created_by, polling_deadline)

Opinion

(student_id, post_id) → (opinion)

Announcement

(post_id) → (email_id, label, attachment_type, attachment_url)

Assignment

(post_id) → (created_by, submission_deadline, attachment_type, attachment_url)

Submission

(post_id, student_id) → (attachment_type, attachment_url)

The above FDs are also the **minimal cover** of the schema.