Set of FDs with normalization proofs.

Social Media Management System
Group 6

→ Minimal FD set and Proof that the Schema is in BCNF :

1. Admin Table :

FD: {Admin_ID} → {Name, Date_of_Birth, Email, Phone_number, Password, Join_date}

Proof: Admin_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

2. User Table :

FD: {User_ID} → {Name, Phone_number, Date_of_Birth, Email, Password, Signup_date, Bio}

Proof: User_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

3. Posts Table :

FD: {Post_ID} → {Content, Caption, Music, Location, User_ID, Created_at}

Proof: Post_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

4. Follow Table :

FD: {Follower_ID, Followee_ID} → {Followed_at}

Proof: {Follower_ID, Followee_ID} is the primary key, so it's a superkey. Hence, the table is in BCNF.

5. User_engages_with_posts Table :

FD: {User_ID, Post_ID} → {User_ID, Post_ID} (trivial FD)
Proof: The primary key is {User_ID, Post_ID}, which is a superkey. Hence, the table is in BCNF.

6. Like Table :

FD: {Like_ID} → {Liked_at, User_ID, Post_ID}
Proof: Like_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

7. Save Table :

FD: {Save_ID} → {Saved_at, User_ID, Post_ID}
Proof: Save_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

8. Share Table :

FD: {Share_ID} → {Shared_at, User_ID, Post_ID}
Proof: Share_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

9. Reports Table :

FD: {Report_ID} → {Reported_at, User_ID, Post_ID, Reason}
Proof: Report_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

10. Comment Table :

FD: {Comment_ID} → {Commented_at, User_ID, Post_ID, Content}
Proof: Comment_ID is the primary key, so it's a superkey. Hence, the table is in BCNF.

11. User_replies_on_comments Table :

FD: {Main_comment_ID, Reply_comment_ID} → {Main_comment_ID, Reply_comment_ID}
Proof: {Main_comment_ID, Reply_comment_ID} is the primary key, so it's a superkey. Hence, the table is in BCNF.

12. Admin_controls Table :

FD: {Admin_ID, User_ID, Post_ID} → {Admin_ID, User_ID, Post_ID}
Proof: {Admin_ID, User_ID, Post_ID} is the primary key, so it's a superkey. Hence, the table is in BCNF.

Conclusion:

In all tables, the left-hand side of the functional dependencies is a superkey. Therefore, the schema is in BCNF.