

Gazi Hossain - 101305532 - COMP3005 - Final Project

Checking for 2NF and 3NF

For 2NF - every non-primal attribute must be **fully dependent** on the entire primary key, so no **partial keys**

Example - table **Employee Project** -

primary keys - {SSN, PRnumber}

Non-primal attribute - {PRhours, Empl_name, Pname, PRlocation}

Functional dependencies -

FD1: {SSN, Pnumber} → PRhours

FD2: SSN → Empl_name

FD3: PRnumber} → {PRname, PRlocation}

Here, FD2 and FD3 are partial dependencies, so we have to create a new table for those two dependencies, so there will be 3 new tables(one for each dependency)

For 3NF- the table must be in 2NF form, and there must be no **transitive dependency**.

Example - table **Student's Courses** -

primary keys - {StudentID}

Non-primal attribute - {s_name, CourseID, c_name}

Functional dependencies -

FD1: StudentID → s_name

FD2: StudentID → CourseID

FD3: CourseID → c_name

Here, StudentID → CourseID → c_name is a transitive dependency, so we created a new table with FD3(with CourseID as primary key), just remove C_name from the original table.

Now, let's check for 2NF and 3NF from our mapping by checking each table. We have a total of 12 tables.

1. Contact

- FD1:{memberID, contact} → {memberID, contact}

2. Member

- FD1: MemberID → {email, dob, gender, fname, lname}
- FD2: email →{MemberID, dob, gender, fname, lname}

3. Fitness Data Records

- FD1: {date_recorded, memberID} → {height, weight, heart_rate(avg), body_fat}

4. Personal Data records

- FD1: goalID → {MemberID, target_weight, target_body_fat}

5. Trainers

- FD1: trainerID → {fname, lname, gender, DOB}

6. Session

- FD1: sessionID → {date, start_time, end_time, trainerID, memberID, room_number}

7. Room

- FD1: room_number → room_name

8. Administrative staff

- FD1: adminID → {fname, lname}

9. Session-admin

- FD1: sessionID → adminID

10. Member subscription

- FD1: subscriptionID → {memberID, member_since, status, member_type}

11. Subs-admin

- FD1: subscriptionID → adminID

12. Payment records

- FD1: {payment_date, subscriptionID} → {amount, payment_method, status}

- All tables are in 2NF and 3NF.