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Tutorial - 4

Q1. Student table:

Aadhar_id → CK / PK
Aadhar_id → Phone No, DOB, Address, fname, Lname, Email
Prime = {Aadhar id}
Non prime = {DOB, Phone no, Address, L-name, F-name, Email}
Not in First NF as multivalued attribute is present, hence no other normals forms is possible further.

Course / Branch table:

Student unique_id → course id, date of enrolment, Course name
Course id → course span, Course name
CK = {student unique id, no. of enrolments} → together CK
Prime = {student id, no. of enrolments}
Non prime = {course id, course span, course name}
It is in 1st Normal form as partial dependency exist as student unique-id (part of CK) is

Determining non prime attributes

Subjects:
Subject id → PK
Subject id → total credits, lecture id
CK = subject_id
Prime attributes = { subject-id }
Non prime attributes = { total-cred, lecture-id }
It is in BCNF as in FD's all attributes on LHS is CK.

Exam:
Student unique-id → PK
student unique-id → Grades, CGPA, SGPA
CK = student unique_id
Prime = { student unique-id }.
Non prime = { Grades, CGPA, SGPA }.
It is in BCNF as in FD's LHS is CK.

Q2. Student table

Aadhar_id → PK
Aadhar-id → DOB, Email-id, F-name, L-name, Address.
Hence CK = { Aadhar-id }.
Prime Att. = { Aadhar-id }
Non prime Att. = { DOB, Email-id, F-name, L-name, Address }
Hence it is in BCNF as in FD's LHS is CK.

Date: / /

Trip table:

Training id → PK
Training-id → Training type, training span
Training type → Training-id.

Hence CK = { Training type, Training id }.
Prime = { Training-id, Training type }.
Non prime = { Training span }

It satisfies BCNF as in FD's LHS is CK.

Company table:

Company-id → type, comp-name.
Comp-name → type
CK = { comp-description, comp-id }
Prime = { comp-description, comp-id }.
Non prime = { comp-name, type }.

It is in 2nd NF and it is not in 3rd NF as a non prime attribute is determing another non-prime attribute.

Single offer:

offer id → salary, location
position → salary → together
CK = { offer-id, position }
Prime attribute = { offer-id, position }
Non prime = { Location, salary }.

It is 1st NF and not in 2nd NF as a part of CK is defining a non-prime attribute (partial dependency). Hence not in 2nd NF.

Multi offer

offer_id, company → Location, salary
CK = offer_id
It is in BCNF as in FD's LHS is CK.

Academic details:

Student unique_id → CGPA, SGPA, credits
CK = Student unique_id
Prime attributes = {student unique_id}
Non prime attributes = {CGPA, SGPA, credits}
It is in BCNF as in FDs LHS is CK.

Q3. Staff:

Staff_id → name.
CK = {staff_id}
Prime Attr. = {staff_id}.
Non. prime Attr. = {name}
It is in BCNF as in FD's LHS is CK.

Student_table:

Aadhar_id → PK
Aadhar_id → DOB. Email_id, F_name, L_name, Address

Hence CK = {Aadhar-id}.
Prime = {Aadhar-id}
Non prime = {DoB, Email-id, F-name, L-name, Address}.
Hence it is in BCNF as in FD's LHS is CK.

Books

ISBN → PK
ISBN → Author, Category, Price, no. of pages
Author → category.
CK = {ISBN}.
It is in 2nd Normal Form and not in 3rd NF as transitive dependency exist.
Prime = {ISBN}
Non prime = {Author, Category, price, no. of pages}.

Publisher:

Publisher_id → name.
CK = {Publisher_id}.
Prime = {Publisher_id}.
Non prime = {name}.
In BCNF as LHS of FD's is CK.