Q1

Normalize the following schema, with given constraints, to BCNF

books(accessionn, isbn, title, author, publisher)
users(userid, name, deptid, deptname)

accessionno → isbn
isbn → title
isbn → publisher
isbn → author
userid → name
userid → deptid
deptid → deptname

Answer

1NF :
Select primary key for each relation

books(accessionno, isbn, title, author, publisher)
users(userid, name, deptid, deptname)

2NF:
All relations are in 2NF because the primary key is single attribute

books(accessionno, isbn, title, author, publisher)
users(userid, name, deptid, deptname)

3NF
Prevent any transitively dependent in the 2NF relations

accession(accessionno, isbn)
book(isbn, title, publisher,author)
user(userid, name, deptid)
department(deptid,deptname)

Also all relations are in BCNF

Normalize the following relation up to 3NF.

Employee (emp_id, emp_name, phone, skill, salary, deptno, dept_name, jobno, job_title)

1NF:

To check for 1 NF, it has multiple values attribute phones, skills . So it must be in separate tables.

Employee_phone (emp_id, phone) and it is in BCNF

Employee_skill(emp_id,skill) it is in BCNF

2NF:

Employee_job(emp_id, jobno, job_title)

FD jobno -> job_title which is a partial dependency, decomposing further,

Employee_job(emp_id, jobno) and

Job (jobno, job_title)

3NF:

Employee(emp_id, emp_name, salary, deptno, dept_name) with FDs

emp_id -> emp_name, salary, deptno, dept_name

dept_no->dept_name

This relation is not in 3NF because of transitive dependency, so decomposing further:

Employee(emp_id, emp_name, salary, deptno)

Department(deptno, dept_name)