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Normalization – Exam 2

1. TEACHER(TeacherID, SubjectID, TeacherName, TeacherEmail)

TeacherID 🡪 (TeacherName, TeacherEmail)

This does not violate 1st Normal form because it has no repeating fields, and has a primary key(s) but does violate 2nd Normal form because not all fields are dependent on the primary key.

This can be fixed and put in 3NF by creating a second table, like so:

TEACHER(TeacherID, TeacherName, TeacherEmail)

TeacherID 🡪 (TeacherName, TeacherEmail)

SUBJECT(SubjectID, *TeacherID*)

Foreign Key *TeacherID* references Teacher(TeacherID)

1. LENDING (BranchName, BranchCity, BranchManager, (CustNum, CustName, LoanNum, Amount))

BranchName 🡪 (BranchCity, BranchManager)

LoanNum 🡪 (CustNum, CustName, Amount)

CustNum 🡪 CustName

This violates 2nd Normal Form because there is a sub-entity/sub-fields in LENDING that does not directly depend on the primary key, BranchName. Also, because CustName is dependent on CustNum and LoanNum, we can separate CustNum and CustName into a separate entity to make the relations obey 3rd Normal Form, where each non-key field is dependent only on the primary key of the entity (not including foreign keys).

This can be fixed by changing to:

LENDING(BranchName, BranchCity, BranchManager)

BranchName 🡪 (BranchCity, BranchManager)

CUSTOMER(CustNum, CustName)

CustNum 🡪 CustName

LOAN (LoanNum, Amount, *CustNum*, *BranchName*)

LoanNum 🡪 (Amount)

FK *CustNum* references CUSTOMER(CustNum)

FK *BranchName* references LENDING(BranchName)