**Normalization Exercise 3**

Assumption: Subject determines subject cost

Is this table in the first normal form?

Each cell has one value √

There are no subject 1, subject 2, and subject 3 columns √

There is no primary key X

**First Normal Form**

There are at least 2 entities here: Student and Subject. If you want you can consider house as a third entity.

(StudentID, Subject)->(StudentName, Address, HouseName, HouseColor, SubjectCost, Grade)

ORIGINALTABLE(StudentID, Subject, StudentName, Address, HouseName, HouseColor, SubjectCost, Grade)

**Second Normal Form**

Second normal form tells us to move repeating data to a separate table. We have repeating data in studentID, studentname, address, house, house color columns.

StudentID->(StudentName, Address, HouseName, HouseColor)

STUDENT(StudentID, StudentName, Address, HouseName, HouseColor)

ORIGINALTABLE(StudentID, Subject, SubjectCost, Grade)

**Third Normal Form**

There should be no transitive dependency. But, we have the following transitive dependencies here.

Transitive Dependency 1:

StudentID->HouseName,HouseColor (from the second normal form)

HouseName->HouseColor (from looking at the data)

HouseColor->HouseName

Transitive Dependency 2:

(StudentID, Subject)->SubjectCost (from the second normal form)

Subject->SubjectCost (from the assumption)

HOUSE(HouseName, HouseColor)

SUBJECT(Subject, SubjectCost)

STUDENT(StudentID, StudentName, Address)

GRADE(StudentID, Subject, Grade)

1 ∞ ∞ 1

Subject

Grade

Student

∞

1

House