**Ch2-Extra**

**Extra-Credit:** Chapter 2 Extra Credit (5 Points) Assignment - Due \_\_\_ \_\_\_ \_\_ Before Class

Apply the normalization process to the following relations. Show the following steps for each relation:

1. Show the candidate keys from the original relation.
2. Show the functional dependencies from the original relation.
3. Is any determinant not a candidate key? If so, show the following:
   1. The new normalized relations.
   2. The primary key in each new relation.
   3. The foreign keys in the new relations.
   4. The referential integrity constraints for the foreign keys.

**Relation 1:**

* BASEBALL (Player, Number, Position, Coach, Team, Manager)
* Write down your own assumptions:
  + Can two players have the same name or number? No.
  + How many positions can they play? 1.
  + How many coaches can a team have? 1.

Step 1: The candidate keys are: Number

Step 2: The function dependencies are:

Number 🡪 Player, Position, Coach, Team, Manager

Team 🡪 Manager, Coach

Step 3: Are there any determinants that are not candidate keys? Yes.

Team is a determinant, but not a candidate key.

Step 3a, b:

TEAM ( Team, Manager, Coach )

PLAYER ( Number, Player, Position, Coach, Team, Manager )

Step 3c:

BASEBALL ( Number, *Team* )

Step 3d:

Number in BASEBALL must exist in Number in PLAYER.

Team in BASEBALL must exisit in Team in TEAM.

**Relation 2:**

* GRADE (StudentID, StudentName, Class, ClassRoom, Instructor, InstructorOffice, Grade)
* Assumptions:
  + Each class meets in a certain room.
  + Each class has only one instructor.
  + Each student gets one grade from each class they take.
  + State any other assumptions you make.

Step 1: The candidate keys are: ( StudentID, Class )

Step 2: The function dependencies are:

Class 🡪 ClassRoom, Instructor

Instructor 🡪 InstructorOffice

( StudentID, Class ) 🡪 StudentName , ClassRoom, Instructor, Grade

Step 3: Are there any determinants that are not candidate keys? Yes.

Class and Instructor are determinants, but not candidate keys.

Step 3a, b:

CLASS ( Class, ClassRoom, Instructor )

INSTRUCTOR ( Instructor, InstructorOffice )

SCHEDULE ( StudentID, Class, StudentName, ClassRoom, Instructor, Grade )

Step 3c:

GRADE ( *StudentID*, *Class*, *Instructor* )

Step 3d:

Class in GRADE must exisit in Class in CLASS.

Instructor in GRADE must exisit in Instructor in INSTRUCTOR.

( StudentID, Class ) in GRADE must exisit in ( StudentID, Class ) in SCHEDULE.