**Database System Homework**

**提交时间：2022.11.23**

1. Consider the following relation schemas for the Retail Business Management System:

**Employees(eid, ename, address, telephone#)** /\* It is assumed that each telephone number is associated with exactly one address. \*/

**Clerks(eid, start\_date, hourly\_rate, hours)/\*** clerks who start to work on the same day have the same salary rate;\*/

**Managers(eid, start\_date, salary, prom\_date)/\*** managers who are promoted at the same time have the same salary rate;**\*/**

**Products(pid, pname, qoh, qoh\_threshold, original\_price, description, discnt\_category, discnt\_rate, discnt\_start\_date, length)** /\* Discount rate is determined by the discount category. \*/

**Suppliers(sid, sname, city, telephone#, email\_addr)/\*** sid is the primary key. A telephone number and email address are required. Different suppliers have different telephone numbers and different email addresses **\*/**

Do the following for each relation schema:

1. (30 points) Identify all non-trivial functional dependencies. Don’t make unrealistic assumptions about the data. Should use the union rule to combine the functional dependencies as much as possible. (You do not need to list redundant FDs. For example, if you already have A 🡪 BC, you don’t need to also list A 🡪 B and A 🡪 C. As another example, if you already have A 🡪 B and B 🡪 C, you don’t need to include A 🡪 C). List other constraints for each relation.

1. (30 points) Determine whether or not the schema is in 3NF or in BCNF. Need to provide justification.
2. (40) For each schema that is not in 3NF, decompose it into 3NF schemas using Algorithm LLJD-DPD-3NF. Show the result after each step of the algorithm. Are they decomposed schemas in BCNF? Justify your answer.