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Assignment #3

Complete problems #5, #9 and #27 on pages 186, 187 and 192 respectively of the Text.

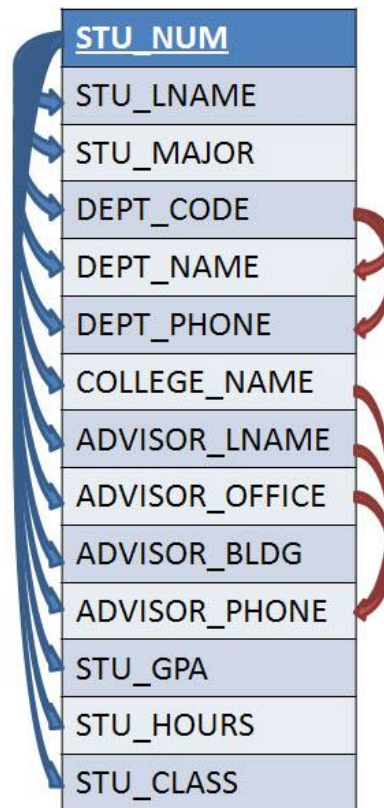
5. Using the STUDENT table structure shown in P5.5, write the relational schema and draw its dependency diagram. Identify all dependencies, including transitive dependencies.

1NF (STU_NUM, STU_MAJOR, DEPT_CODE, DEPT_NAME, DEPT_PHONE, COLLEGE_NAME, ADVISOR_LNAME, ADVISOR_OFFICE, ADVISOR_BLDG, ADVISOR_PHONE, STU_GPA, STU_HOURS, STU_CLASS)

Transitive Dependencies:

(DEPT_CODE \Rightarrow DEPT_NAME, DEPT_PHONE)

(ADVISOR_LNAME, ADVISOR_OFFICE, ADVISOR_BLDG \Rightarrow ADVISOR_PHONE)



Dependency Diagram

9. Using the answer to Problem 8, write the relational schema and create a set of dependency diagrams that meet 3NF requirements. Rename attributes to meet the naming conventions and create new entities and attributes as necessary.

ITEM (ITEM_ID, ITEM_LABEL, BLDG_ID)
 BUILDING (BLDG_ID, BLDG_ROOM_NUMBER, BLDG_CODE, BLDG_NAME, BLDG_MANAGER)



27. Suppose you have been given the table structure and data shown in Table P5.27, which was imported from an Excel spreadsheet. The data reflect that a professor can have multiple advisees, can serve on multiple committees, and can edit more than one journal.

Given the information in P5.27:
 a. Draw the dependency diagram.

Note: Because EMP_NUM can be empty, name must be included in the primary key.



b. Identify the multivalued dependencies

EMP_NUM, PROF_RANK, EMP_NAME, PROF_OFFICE, DEPT_CODE
 EMP_NUM, PROF_RANK, EMP_NAME, PROF_OFFICE, ADVISEE
 EMP_NUM, PROF_RANK, EMP_NAME, PROF_OFFICE, COMMITTEE_CODE
 EMP_NUM, PROF_RANK, EMP_NAME, PROF_OFFICE, JOURNAL_CODE

c. Create the dependency diagrams to yield a set of table structures in 3NF.

EMPLOYEE

<u>EMP_NUM</u>	<u>PROF_RANK</u>	<u>EMP_NAME</u>	<u>PROF_OFFICE</u>	DEPT_CODE
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DEPARTMENT

<u>DEPT_CODE</u>	DEPT_NAME
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EMPLOYEE_ADVISEE

<u>EMP_NUM</u>	<u>PROF_RANK</u>	<u>EMP_NAME</u>	<u>PROF_OFFICE</u>	ADVISEE
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EMPLOYEE_COMMITTEE

<u>EMP_NUM</u>	<u>PROF_RANK</u>	<u>EMP_NAME</u>	<u>PROF_OFFICE</u>	<u>COMMITTEE_CODE</u>
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EMPLOYEE_JOURNAL

<u>EMP_NUM</u>	<u>PROF_RANK</u>	<u>EMP_NAME</u>	<u>PROF_OFFICE</u>	<u>JOURNAL_CODE</u>
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d. Eliminate the multivalued dependencies by converting the affected table structures to 4NF.

EMPLOYEE

<u>EMP_ID</u>	EMP_NUM	PROF_RANK	EMP_NAME	PROF_OFFICE	DEPT_CODE
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DEPARTMENT

<u>DEPT_CODE</u>	DEPT_NAME
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EMPLOYEE_ADVISEE

<u>EMP_ID</u>	ADVISEE_CODE
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EMPLOYEE_COMMITTEE

<u>EMP_ID</u>	COMMITTEE_CODE
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EMPLOYEE_JOURNAL

<u>EMP_ID</u>	JOURNAL_CODE
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ADVISEE

<u>ADVISEE_CODE</u>	ADVISEE_NAME
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COMMITTEE

<u>COMMITTEE_CODE</u>	COMMITTEE_NAME
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JOURNAL

<u>JOURNAL_CODE</u>	JOURNAL_NAME
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- e. Draw the Crow's Foot ERD to reflect the dependency diagrams you drew in Part c. (Note: You might have to create additional attributes to define the proper PKs and FKs. Make sure that all of your attributes conform to the naming conventions.)

