Name:

CS 33007 Introduction to Database System Design, Fall 2018

Midterm

Instructions:

- *This examination is closed book (no access to book, lecture notes, phone, laptop, tablet etc.).*
- *Please write your answer in the given blank space for each question. If your answer doesn't fit in the given space, you can use back side of the papers but write question number.*
- ***A separate sheet will be provided for university database relational schema.***

Total Points:100 **Time:** 11AM – 12:10PM

1.

a. Given the following relation schema in a bank database, [**10 points**]

account (account_number, branch_name, balance)

identify all possible **super keys** and **candidate keys** for the account table considering real world practice.

b. Write the following queries in relational algebra, using the university database schema. [***10 points]***

i. Find the titles of courses in the Comp. Sci. department that have 3 credits.

ii. Find the courses that have prerequisite CS12401.

2.

a. (HW2) You need to create a movie database. For that, create three tables, one for actors(AID, name), one for movies(MID, title) and one for actor_role(MID, AID, rolename). Use appropriate data types for each of the attributes and add appropriate primary/foreign key constraints. ***[15 points]***
b. In university database, Update the budget of Music department by 5% of the total salary of it's instructors. ***[10 points]***

3.

a. Assume you are given two relations, *student(name, rollno) and marks(rollno, exam, mark)* Show names of all students who have got marks in at least two exams. ***[10 points]***
b. In university database, create a view *MSBinstructors*, showing all information about instructors from the Comp. Sci. and Math department. ***[8 points]***
c. Grant permission to one of your friends to view all data in your student relation of university database. Also make sure that you are granting your friend to pass the permission to others. [***7 points]***

4.

a. Write a SQL function that takes department name as input and increase the salary 10% only for the instructors whose salary is less than the average salary of the instructors of the department. ***[12 points]***

b. Prepare a partial ER diagram for a relational database that will allow Facebook to store information about the users and their posted text. The diagram must list all the necessary attributes of the entity sets and specify their primary keys based on real word practice. **[15 points]**

c. Covert the ER diagram in (b) to a non-redundant set of relation schemas. **[8 points]**