Stevens Institute of Technology

Department of Computer Science

CS442: Database Management System

Fall 2016

**Handout 6. Midterm exam – sample questions (**October 24, 2016)

1. ER Design

Consider the following description of your local community library. Create the corresponding ER diagram.

1. The library has items such as books, CDs, tapes, which are lent to library patrons.
2. Each item has a unique ID, a type, a borrow date, and a return date.
3. Each patron has a unique ID.
4. Library patrons have accounts, and addresses.
5. If a loaned item is overdue, it accumulates penalty
6. Some patrons are minors, so they must have sponsoring patrons who are responsible for paying penalties (or replacing a library item in case of loss).
7. Relational algebra

Given two relations R1 and R2, where R1 contains N1 tuples, R2 contains N2 tuples, and N2 > N1 > 0, give the minimum and maximum possible sizes (in tuples) for the resulting relation produced by each of the following relational algebra expressions. In each case, state any assumptions about the schemas R1 and R2 needed to make the expression meaningful.

1. R1 ∪ R2
2. R1 ∩ R2
3. R1 – R2
4. R1 × R2
5. δA=5 (R1)
6. π A (R1)
7. R1/R2
8. SQL queries

Consider the following schema:

* Department (D-code, D-Name, Chair-SSn)
* Course (D-code, C-no, Title, Units)
* Prereq (D-code, C-no, P-code, P-no)
* Class (Class-no, D-code, C-no, Instructor-SSn)
* Faculty (Ssn, F-Name, D-Code, Rank)
* Student (Ssn, S-Name, Major, Status)
* Enrollment (Class-no, Student-Ssn)
* Transcript (Student-Ssn, D-code, C-no, Grade)

Write the SQL queries for the following questions:

1. List the courses (D-code and C-no), along with the names of the students who are currently taking them.
2. List the courses (D-Code and C-No) that do not require any pre-requisites.
3. Give the students (SSN) who are enrolled in CS442 (i.e., D-code=“CS” and C-no=“442”) and have satisﬁed all its prerequisites.