CSC134 Spring 2019 Name: _____
Quiz 3
100 points

Part 1

1. (10 pts) What two things must hold for relations to be union compatible?

   A. Both relations must have the same degree (ie same number of attributes)
   Each corresponding attribute A_i must have the same domain.

2. (10 pts) Relational algebra operations always return relations, which are sets of tuples. What are two major properties of sets?

   A. Sets have no duplicate members.
   Sets are unordered.

Part 2

Using the supplied relational model, write relational algebra expressions that find the following data:

1. (40 pts) The first and last name of all employees who work more than 10 hours on a project located in 'Folsom'

WORKS_PROJ ← PROJECT ⋈ $_{\text{PNUMBER = PNO}}$ WORKS_ON

FOLSOM_10 ← $\sigma_{\text{HOURS > 10 AND PLOCATION = 'FOLSOM'}}$ (WORKS_PROJ)

RESULT ← $\pi_{\text{FNAME, LNAME}}$ (EMPLOYEE ⋈ $_{\text{SSN = ESSN}}$ FOLSOM_10)

2. (40 pts) The first and last name of all employees who manage a department but who do not work on the project named 'Unicorn'.

MGRS ← EMPLOYEE ⋈ $_{\text{SSN = MGRSSN}}$ DEPARTMENT

UNION_COMPAT_MGRS ← $\pi_{\text{FNAME, LNAME, SSN}}$ (MGRS)

WORKS_ON_UNICORN ← WORKS_ON ⋈ $_{\text{PNO = PNUMBER}}$ ($\sigma_{\text{PNAME = 'UNICORN'}}$ (PROJECT))

UNICORN_EMPS ← $\pi_{\text{FNAME, LNAME, SSN}}$ (EMPLOYEES ⋈ $_{\text{SSN = ESSN}}$ WORKS_ON_UNICORN)

RESULT ← $\pi_{\text{FNAME, LNAME}}$ (UNION_COMPAT_MGRS - UNICORN_EMPS)

Many students tried to do a join of the data and then do a select where project was not equal to 'Unicorn'. However, the fact that the WORKS_ON relation has a combined primary key means it's possible people work on more than one project. When we do a select for project not equal to unicorn, we aren't eliminating any managers who also work on another project.