# COMP 5120/6120 Database Systems I

# Fall 2016
# Homework #2
# Due: 9/30/2016

1. What is a foreign key constraint? Why are such constraints important? What is referential integrity? (10 pts)

2. Explain the difference between external, internal, and conceptual schemas. How are these different schema layers related to the concepts of logical and physical data independence? (10 pts)

3. Consider the following schema:

   Employee (<u>person-name</u>, street, city)
   Works (<u>person-name</u>, company-name, salary)
   Company (<u>company-name</u>, city)
   Manages (<u>person-name</u>, manager-name)

   Write the following queries in **relational algebra** (40 pts):

   a.) Find the names of all employees who work for Auburn Bank.

   b.) Find the names and cities of residence of all employees who work for Auburn Bank.

   c.) Find the names, street address, and cities of residence of all employees who work for Auburn Bank and earn more than $50,000 per year.

   d.) Find the names of all employees in this database who live in the same city as the company for which they work.

4. Consider the following schema:

   Suppliers (<u>sid: integer</u>, sname: string, address: string)
   Parts (<u>pid: integer</u>, pname: string, color: string)
   Catalog (<u>sid: integer, pid: integer</u>, cost: real)

   The Catalog relation lists the prices charged for parts by suppliers. Write the following queries in **SQL** (40 pts):

a.) Find the pnames of parts for which there is some supplier.

b.) For each part, find the sname of the supplier who charges the most for that part.

c.) Find the sids of suppliers who supply only red parts.

d.) Find the snames of suppliers who supply every part.