Database Systems, CSCI 4380-01
Homework #1
Due Thursday February 3, 2011 at 2 pm

Please submit your answers as a text or PDF file via RPILMS assignment drop box function.

Question 1 (20 points). For the following relations, based on your understanding of the meanings of these attributes, describe the best keys for these relations. Write down a single sentence the justification for your choice of key.

(a) User(username, name, email, address)

(b) UserPhone(*keyForUser*, phoneNo, type)

Users can have multiple phones of any given type. People can share phone numbers.

(c) Posting(day, time, content, *keyForUser*)

Users post various type of content on this site.

(d) Link(date, time, link, *keyForPosting*)

Users can add multiple links to their postings.

Hint. After you decide on a key for users, you need to substitute all the attributes in the key for *keyForUser*. For example, a posting is made by a person, so you need to refer to the user that put that holding by substituting their key. The same holds for the key for the posting relation.

Question 2 (50 points). You are given the following simple relations (for simplicity, we are using unique integer ids as identifiers in this example):

Person(id, name, countryOfBirth, yearOfBirth)
Topics(id, title)
Books(id, title, publisher, isbn)
BookAuthorbook_id, person_id)
BookEditor(book_id, person_id)
BookTopic(book_id, topic_id)

Write the following queries using relational algebra.

(a) Find books published by 'Morgan Kaufman'. Return the id and title.

(b) Find people who were born in 'France' before 1900. Return id and name.

(c) Find the id of all people who are both book authors and editors.

(d) Find books on topic 'Open Source Software'. Return their id and title.

(e) Find people who are not book authors (i.e. who never appeared as a book author in the database.) Return their id.