Homework #1
due Thursday September 16, 2010 at 2 pm

Database Systems, CSCI-4380-01

Each student must work on this homework alone.

Homework Description

Question 1. Suppose you are given the following relations. Write down tables that correspond to these relations in SQL with CREATE TABLE statements by listing each attribute with an appropriate data type, listing all keys by primary key constraints and giving the appropriate rationale (you can assume names are unique for this homework to simplify the question). The length of character strings is not important, use varchar(255) for all.

Example: `movies(title, year, studio)`

```
CREATE TABLE movies (
   title varchar(255)
   , year  int
   , studio varchar(255)
   , primary key (title, year)
)

; There can be multiple movies in a year and multiple movies with the same
; title, but no two movies released in the same year should have the
; same title.
```

person	
name	dateOfBirth
'joe'	'01-01-1985'
'jane'	'01-01-1985'
'jack'	'03-04-1986'

club	
name	dateFounded
'skiing'	'02-01-1980'
'board games'	'09-01-2010'
'facebook support'	'09-01-2008'

clubMember	
personName	clubName
'joe'	'board games'
'joe'	'facebook support'
'jane'	'facebook support'

clubActivity			
clubname	title	date	time
'board games'	'carcassone'	'08-01-2010'	'08:00 PM'
'board games'	'carcassone'	'09-10-2010'	'08:00 PM'
'board games'	'settlers of catan'	'10-01-2010'	'06:00 PM'
'facebook support'	'just been defriended'	'01-01-2009'	'09:00 PM'

Question 2. Assuming the above data model and instance, for each query below, write down (1) what is a good English sentence that describes what the query is returning, (2) what is the result of the query (i.e. which attributes and tuples are in the result)?

a. $(\Pi_{name}\ Club) - (\Pi_{name}(Club \bowtie_{name=ClubName \text{ and } date>dateFounded}\ ClubActivity))$

b. $Person \bowtie_{name<>n1 \text{ and } dateOfBirth=d1}\ (\rho_{P1(n1,d1)}(Person))$

Question 3. Write the following queries using relational algebra assuming the above data model:

a. Find the name of all people who are part of a club founded after 2010.

b. Find people who are born after 1980 and are member of a club. Return all the attributes of the people table.

c. Find all clubs that have no members and have no activities. Return their name.