Spring 2013
W02 (40 points)
Due: April 17 @ 12 noon

Database Writing Activity

Learning objectives

- To review recursive relationships – their modeling and implementation.

Questions

1. Consider the following two relations, TREE and PROJECT.

   The table TREE is a recursive structure for representing hierarchies, with each row representing a node.

   (a) Draw a picture of the tree (2 points);
   (b) What is the primary key (1 point)?
   (c) Is there a foreign key in this table? Briefly discuss (1 point)?

TREE

id	pid	name
1	NULL	_root_
2	1	People
3	1	Projects
4	1	Institutions
5	3	1980
6	3	1985
7	3	1990
12	4	North American
13	4	Europe
14	12	Canada
15	12	U.S.A
16	12	Mexico
…	…	…

   Here, the table PROJECT represents projects of different kinds. The foreign key **tree_node** references an **id** in the table **TREE**.

PROJECT

id	name	title	tree_node
1	Philosophy	Interesting Research in Philosophy	1
…	…	…	…

   (d) Using the ER modeling notation in the textbook please draw an ER model of this database structure (4 points).
   (e) Write the SQL for creating these two tables and add some data to each table (4 points).
   (f) Write a query to find all the projects in the North American node of the tree (2 points).
   (g) Write a PLSQL procedure to compute number of sub-nodes for a given node (4 points).

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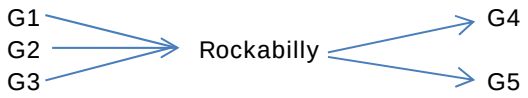
2. Consider the relationships between **musical genres**. Assume that we have a set of musical genres, {G1, G2,… Gn}, and assume that a genre X can be influenced by one or more other genres and, in turn, genre X will influence one or more genres. So, for example, three genres – G1, G2 and G3 – might influence "Rockabilly" and, in turn, "Rockabilly" might influence two other genres – G4 and G5.



Propose an ER model for this scenario, which can be used to model ancestors (for example, the ancestors of "Rockability" are G1, G2, and G3) and the descendants of a genre (for example, the descendants of "Rockability" are G4 and G5), as well as "siblings." Clearly explain how you define and model siblings.

(a) Using the ER modeling notation in the textbook, propose an ER model of this structure (4 points).
(b) Briefly discuss the strengths and weaknesses of your model (2 points).

3. Consider a **directory** of pages and a linking structure for browsing pages. Each page would consist of the following elements:

Page

(a) Page Title:	<string>
(b) Topic Path:	<Page Title of Grandparent> :: <Page Title of parent> :: <Page Title>
(c) Content:	<text>
(d) Subtopics:	<Child 1 of this page >, <Child 2 of this page>, … <Child n of this page>
(e) See also:	<Link 1/Title of page>, <Link 2/Title of page>, … <Link N/Title of page>

When you click on a link you move to a different page of the directory. As you can see, each page shows (a) A *Page Title*; (b) A *Topic Path* showing the location of the page in the directory; (c) A chunk of *Content*; (d) A list of *Subtopics*; and (e) A list of *See also* links which cut across the directory.

(c) Using the ER modeling notation in the textbook, propose an ER model of this structure (4 points).

a. Briefly discuss the similarities and differences between this problem (#3) and the previous problem (#2) (4 points).

b. Propose a single ER model that might work for problems #1, #2 and #3. Propose and API, that is, a list of functions which would allow a programmer to query and update the data model. (4 points)

c. Briefly discuss the strengths and weaknesses of your design. (4 points)

d. Is it a good idea to have a single model? In approximately 200-300 words, please discuss your answer. (4 points)