CSCI 585 - Database Systems
Spring 2008
Homework Assignment 1: Part1
Due: 02/15/2008 5:00PM

Project Description
The goal of this assignment is to 1) design a conceptual schema using the **(E)ER** Data model, 2) incorporate this schema into an **OR-DBMS**, and 3) run queries on this database.

Part 1: Extended ER data model (50 points)
Design a schema that incorporates the specification described below as efficiently as possible. You should submit a written diagram of your schema design using the notation given in the class. In this diagram, indicate all the classes, subclasses, relationships (weak & strong), relationship cardinalities and degrees, total participations, attributes, and primary keys. In addition, specify whether each attribute is single-valued or multi-valued, stored or derived, and atomic or composite. In your design, you can make and state reasonable assumptions if they are not specified in the specification.

Design Specification
The following is a description of the information required for a database system that maintains information about a texture[1] mapping system. CS585 class is given the task to generate the texture-map of buildings in USC health science and main campus. In order to make the job easier and as efficient as possible, each student in the class is given a cell phone and asked to take the pictures of buildings. The geo-tagged pictures are sent to the server by the cell phones automatically and the server is responsible of generating the texture for buildings. When generating the model, the server may find the missing parts of the model and assigns tasks (i.e.: which building and when) to the students to take the picture of missing parts based on the students' locations. Students can only take pictures from stations which are around the building. Students travel in/between the campuses by walking, riding a cycle or driving. The cars and bicycles are provided by USC transportation office. Your job is to design a database schema to store the data and provide specific queries on the database.

The database must represent the following information:

[1] *Texture* is a bitmap image applied to a surface.

Vehicle information
A vehicle has a plate number, a maker, year of manufactured, maximum speed. Each vehicle can be either a car or a bicycle (assume bicycles have plate number like cars). In the case of car, its type - sedan or sport- and capacity is also specified.

Student Information
A student has an SSN, name, date of birth, gender, age calculated from his/her date of birth, one or more phone numbers, and a mailing address. The mailing address contains street number, street name, city, state, and zip code. The entire mailing address can also be retrieved as a unit. A student can be a master student, a PhD student, or both. In case of PhD student, his/her advisor and program are also stored. Each student can drive both cars and bicycles (but just one vehicle at a date) and his/her driving schedule in terms of date, start time, and end time is also known.

Building information
Each building has a building code, name, height, surface area and at least one or more station (see below) information. In addition each building has geographical region information which includes coordinates of two opposite diagonal corners.

Station Information
A station is a point location where the students stand and take the pictures of buildings. Each station has a station code, color code and latitude and longitude. Each station can be assigned to as many paths (see below) as required however each station can belong to only one building

Path Information
A path is the route that a student would follow based on a given task. Each path has path name, station information consisting of a number of stations, which are in the order of appearing along the path.

Task Information
A task is assigned to at least one or more students based on their location and destination. A task tells student which path to follow and also the direction of the path (0 is for forward direction and 1 is for reverse direction). Each task has task id, student information, type (photo or video), path information, one or more time schedule which consists of day of the week, start time, end time, starting station, ending station. A particular task assigned to multiple students is done separately by them on separate time schedules, In other words, no multiple students do the same task at the same time. Certain types (ie: video shots) of tasks can only be assigned to PhD students.

Submission Guideline

On-campus students, you are required to submit a HARDCOPY of your EER diagram. Off-campus/Remote students, you should submit your homework through DEN as usual. Include your reasonable assumptions in a separate page. This hardcopy should be handed in to the TA at SAL-103 between 9AM – 5PM. If you can't hand in your hard-copy during the specified interval in person, send a scanned copy to csci585s@usc.edu BEFORE the deadline. Make sure that your attachment is less than 2MB in size.