

**CSCI 585 - Database Systems**  
**Spring 2008**  
**Homework Assignment 1: Part 2 & 3**  
**Due: Tuesday, March 4 @5:00PM**

**Part 2: Map the (E)ER diagram into the Oracle OR data model, and then implement the resulting database schema in Oracle (30 points)**

Convert the sample EER conceptual schema (i.e., the solution of Part 1 posted on the class website) into an OR data schema. Thereafter, implement the resulting database schema in the Oracle database on shams.usc.edu.

**Note:** You are required to populate sufficient data to test your database schemas and the queries in Part 3. Use the data files provided along with the sample EER solution for this. Also, go through the queries in Part 3, and make reasonable assumptions regarding the attributes that are not available in the files provided and fill them out yourself.

**IMPORTANT Notes:**

- **The following procedure must be followed to access the Oracle database server:**  
//\$ is the system prompt  
\$ sqlplus //Use sqlplus to issue sql statements
- **Reduction Guidelines for Oracle OR-DBMS:**
  - Must use Oracle Object-Relational features.
  - Must use **user-defined subtypes** for specializations if any of the sub-object has different attributes (e.g., do not differentiate between PhD student and Master Student by using an attribute).
  - Must use **user-defined object types** for composite attributes.
  - **Do not use triggers.**
  - Use reference for foreign keys and specify what action should be taken in case of update and/or deletion of the referenced tuple/row (i.e., cascade, reject, or setdefault/null).
- **Reference:** Refer to Oracle manual for information on how to create tables, indexes, insert data, etc. (a link is provided on the class website).

### **Part 3: Queries on the database (70 points)**

Write the following queries in Oracle SQL and run them on your database developed as mentioned in Part 2 of this assignment.

- Q1. Find the street name where maximum number of students lives. Display the street name and number of students who live on that street. (5 Points)
- Q2. Find the youngest students who live on the same street. Display the ssn, student name, age for each street name. (5 Points)
- Q3. In one query, display the maximum, minimum, and average age of the PhD students who are assigned to at least 2 tasks. (5 Points)
- Q4. Find the percentage of PhD students among all PhD students who drives bicycle and assigned to video shooting task. Number of PhD students = PhD+Both in status field of student table in the dataset. (5 Points)
- Q5. Find the percentage of (only) master's students among all students who drive sports cars and assigned to picture shooting task. Number of Masters students = Master in status field of student table in the dataset. (10 Points)
- Q6. Find the largest surface-area building which owns at least 3 stations. List all the paths which include alt least one station of this building. (Your answer should include Building\_Code, Surface\_Area, Path\_Name, Station) (10 Points)
- Q7. Display the number of hops for each task and order your result by number of hops in descending order (ie: task-1 starts at "s6" and ends in "s1"; along the path between start and end there is "s7" so the total number of hops needed to be visited is 3 for task-1) (10 Points)
- Q8. Display the number of hops and student ssn for each student in order to complete all the assigned tasks. Order your results by ascending hop number. (ie: total number of hops that 111-11-3333 will visit is 2 in order to complete all the tasks assigned to him) (10 Points)
- Q9. Find the student ssn, address, name who has to cover maximum distance (in terms of the number of station hops) in order to complete all the assigned tasks. List the number of hops and the license plate of his vehicle too. (10 Points)

## Submission Guidelines

1. Your submission of Part 2 and Part 3 should include one `createdb.sql` file, one `dropdb.sql` file, nine `.sql` files for queries described in Part 3 (named `q1.sql` to `q9.sql`), and one `readme.txt` file.
  2. **`createdb.sql`** file should create required types, tables, indexes if required, generate primary keys, ... , and populate sufficient data based on the skeleton data provided. “Sufficient data” means enough data such that your queries return something, but not everything. There is 60 points penalty if this file is missing since it is not possible for us to check your queries without any data.
  3. The **`dropdb.sql`** file should drop all types and tables that are created by `createdb.sql`. There is 10 points penalty if this file is missing from your submission or if it does not drop all of your database objects.
  4. **`q1.sql` ~ `q9.sql`** query files should contain SQL statements for queries Q1 to Q9 described in part 3 respectively.
  5. The **`readme.txt`** file must have your name, SSN/USC-ID, the name of the database and tables that your `createdb.sql` file generates, and your user name on **`aludra.usc.edu`** (**NOT** `shams.usc.edu`). There is 25 points penalty if this file or some of the required information is missing from your submission.
  6. You must make a `.tar` file to include all of your files in one file (`<your_username>_hw1.tar`) using the following command:  
  
**`> tar cvf <your_username>_hw1.tar createdb.sql dropdb.sql readme.txt q1.sql q2.sql q3.sql q4.sql q5.sql q6.sql q7.sql q8.sql q9.sql`**
- For example, if your username on aludra server is John, then your tar file should be `John_hw1.tar`.
7. You need to submit the 2nd and 3rd Parts of your assignment electronically using the following command from your account on **`aludra.usc.edu`** (**do not submit from your Oracle server**). Do NOT try to submit any other file than `<your_username>_hw1.tar` :  
  
**`> submit -user csci585s -tag hw1 <your_username>_hw1.tar`**  
(e.g., `submit -user csci585s -tag hw1 john_hw1.tar`)

The submit command will immediately respond with a SUCCEEDED if your submission of file "<your\_username>\_hw1.tar" was successful. That will be your means to know that your homework has reached the right place. Your submissions will be time stamped, so we will know the exact time when you made the submission. If you do not have an account on aludra, you could email your file to [csci585s@usc.edu](mailto:csci585s@usc.edu). Submit your assignment before the deadline.

8. We run your sql files in the following order (where \$ represents your Unix prompt on shams.usc.edu):

```
$ sqlplus your_oracle_username/your_password @createdb.sql
$ sqlplus your_oracle_username/your_password @q1.sql
$ sqlplus your_oracle_username/your_password @q2.sql
$ sqlplus your_oracle_username/your_password @q3.sql
$ sqlplus your_oracle_username/your_password @q4.sql
$ sqlplus your_oracle_username/your_password @q5.sql
$ sqlplus your_oracle_username/your_password @q6.sql
$ sqlplus your_oracle_username/your_password @q7.sql
$ sqlplus your_oracle_username/your_password @q8.sql
$ sqlplus your_oracle_username/your_password @q9.sql
$ sqlplus your_oracle_username/your_password @dropdb.sql
```

Note that you should run your own “dropdb.sql” file or delete your database in sqlplus right before submitting your assignment otherwise Oracle will return an error when we try to create your database and publish your data again by running your “createdb.sql” file. This is because your database already exists.

You need to make sure that Oracle does not return ANY error while running these files. If Oracle returns ANY error during execution of any of the above files, we make no attempt to fix the problem, and you will lose the points associated with those steps.

9. You need to develop your databases and SQLs on shams.usc.edu using Oracle. More information about how to use Oracle is provided on the course's web page.

10. Start working on your assignment early.