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**CSC 352/452: DATABASE PROGRAMMING**  
**ASSIGNMENT # 4 (100 Points) Due Date 8/13 11:59pm**  
**Packages, Triggers, and Collections**

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1. **(35 Points)** Manually create the following database tables:

```
CREATE TABLE dept
( DEPTNO      NUMBER(3) PRIMARY KEY,
  DNAME       VARCHAR2(16),
  LOC         VARCHAR2(16)
);
```

```
CREATE TABLE dept_shadow
( DEPTNO      NUMBER(3) PRIMARY KEY,
  DNAME       VARCHAR2(16),
  LOC         VARCHAR2(16),
  USER        VARCHAR2(32),
  MODTIME     CHAR(17)
);
```

Create a trigger to track all inserts into a table. Specifically, for each record inserted into the **DEPT** table, the trigger should insert a duplicate record into the **DEPT\_SHADOW** table along with the information of the user who performs the insertion (the **USER** column) as well as the date/time of the insertion (the **MODTIME** column). The **MODTIME** column keeps track of the date/time in the following character string format:

MM/DD/YY hh:mm:ss.

Save your program in the script file **prog4a.sql**

2. **(35 Points)** For the **DEPT** table created in problem #1 above, insert the following records by using bulk binding

```
Dept = {(10, 'ACCOUNTING', 'NEW YORK'),
        (20, 'RESEARCH', 'DALLAS'),
        (30, 'SALES', 'CHICAGO'),
        (40, 'OPERATIONS', 'DALLAS'),
        (50, 'MARKETING', 'BOSTON')}
```

Save your program in the script file **prog4b.sql**

3. **(30 Points)** Create a PL/SQL block to retrieve all the information about each department from the **DEPT** table and print the information to the screen by using a PL/SQL table of records.

Save your program in the script file **prog4c.sql**

**Note:** Please note that this assignment consists of three parts, and each part may require you to submit a file. Therefore, please create a folder named "**LastName HW4**" to organize your solution files for each question/part. Place all the files in this folder and compress it into a zip file. Please ensure that the zip file is named "**LastName HW4.zip**". Finally, submit the zipped file to the Assignment 4 Submission page on your D2L course website.

**Again:** For instance, for assignment #4, you should create a folder named "**LastName HW4**" in your home directory (e.g., **c:\LastName HW4**) and save the script files **prog4a.sql**, **prog4b.sql**, and **prog4c.sql** in this folder. Once you have done that, compress the folder into a zip file named "**LastName HW4.zip**" and submit this zip file to the Assignment 4 Submission link on your D2L course website.

**SUBMIT YOUR HW4 FOLDER AS ZIP FILE TO YOUR D2L ASSIGNMENT 4 SUBMISSION LINK FOR GRADING.**  
**Make sure only one copy is submitted.**