Database Management Systems II (DBMS-2004)
Mid-term Project Part C – Stored Procedures

This is the third part of the Mid-term Project. In this part you will add to the PL/SQL code you wrote in parts A & B to automatically extract information about a schema into which you are logged (in this case, your schema in DBMSDBII). The remaining part of this assignment will build on the first parts. The final version will be a useful tool to explore Oracle databases in the future.

This third stage will add the following to the code you developed in Part A and Part B.

- The stored procedure Extract_PK_Constraint
- The stored procedure Extract_Unique_Constraint
- The stored procedure Extract_Check_Constraint
- The stored function Get_Constraint_Columns

Specifications:]

1. **Before beginning, run the SQL Script 'Run_SetUp.bat'. This batch file will run a SQL script to prepare your schema for this part of the project.**

2. Stored Procedure Extract_Columns.
   - Change the procedure so instead of displaying the message '*** Unknown data type *type* ***' it throws an application error with a number of -20100 and that message.

3. Stored Procedure Extract_Tables
   - Change the procedure to capture the error -20100 thrown by procedure EXTRACT_COLUMNS.
     - The exception must be caught using the exception name INVALID_COLUMN_TYPE
     - Display the message as shown in lines 20-23 of the sample output
     - Processing of the remainder of this table is immediately terminated when an exception occurs (no further columns or constraints are produced for this table)
     - This procedure must finish producing output for all remaining unprocessed tables
     - Any other error that occurs will propagate to the executing environment causing the stored procedure to terminate

4. Add 3 stored procedures to process the Primary Key, Unique and Check constraints as defined below.
   - These new procedures are called from Extract_Tables.
   - These constraints must be added in the proper location in the CREATE TABLE statement.
   - Primary key constraint must be processed first, followed by Unique constraints and Check constraints last.

5. Stored Procedure Extract_PK_Constraint:
   - Will process the 'Primary Key' constraint defined on the current table being processed.
   - It is possible a table may not have a Primary Key constraint defined.
   - If found, this constraint must appear after the last table column.
   - Lines 34-35 and 52-53 of the sample output demonstrate what this stored procedure creates.

6. Stored Procedure Extract_Unique_Constraints:
   - Will process the 'Unique' constraints defined on the current table being processed.

- A table may not have any Unique constraints, or it might have many.
- Since it is possible a table might have more than one UNIQUE constraint, the procedure must process them all when called.
- These constraints must be coded with the CREATE TABLE statement.
- Unique constraints must be listed immediately after the Primary Key constraint (if there is one), or after the last column defined in the table (if no primary key is defined).
- Lines 36-37 of the sample output demonstrate what this stored procedure creates.

7. Stored Procedure Extract_Check_Constraints:
   - Will process the 'Check' constraints defined on the current table being processed.
   - A table may not have any Check constraints, or it might have many.
   - Since it is possible a table might have more than one Check constraint, the procedure must process them all when called.
   - These constraints must be coded with the CREATE TABLE statement.
   - Check constraints (if there are any) are the last constraints listed on the CREATE TABLE.
   - Lines 38-39 and 54-55 of the sample output demonstrate what this stored procedure creates.
   - **NOTE:** Oracle stores NOT NULL constraints as CHECK constraints. These NOT NULL types of constraints must not appear on your CREATE TABLE. They can be omitted by checking the condition for the string not being like (%" IS NOT NULL%) – excluding the parenthesis.

8. Function Get_Constraint_Columns:
   - Will return the columns associated with Primary Key or Unique constraints.
   - A constraint may contain one or several columns.
   - Columns must be listed in the same order as they were when the constraint was created.
   - A single call to this function will return all the columns in the constraint.

9. The code of the procedures/functions must contain comments that describe what the procedure does (at the top of the procedure code) as well as comments for major sections of code within the procedure.

10. Objects, variables must all be named using a consistent naming convention.

11. All output must go to a file called Create_Tables_YourLastName.SQL.

12. The format of the SQL CREATE TABLE Statements must match exactly the sample shown in Figure 1.

13. Make sure that your SERVEROUTPUT is set to a SIZE of at least 10,000.

14. Please ask your instructor for assistance. Don't get stuck!

IMPORTANT:

- Code that does not compile or run on the instructor laptop will not be marked.
- Code that does not output to the proper file when run on the instructor laptop will not be marked.

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Figure 1: Sample result from PL/SQL code run (your tables will differ).

```
---- Oracle Catalog Extract Utility V3.0 ----
----
---- Run on Nov 3, 2015 at 12:50
----
---- S T A R T I N G   T A B L E   D R O P S
----
DROP TABLE AD_MATERIALS;
DROP TABLE CLIENTS;
DROP TABLE CUSTOMERS;
----
---- T A B L E   D R O P S   C O M P L E T E D
----
----
---- S T A R T I N G   T A B L E   C R E A T E
----
--   Start extracting table BIN_ADS
CREATE TABLE BIN_ADS (
  PRODNO                         VARCHAR2(15)                      NOT NULL
, IMAGE                          BLOB
================================================================================
=== EXCEPTION -20100 Raised - ORA-20100: *** Unknown data type BLOB ***
=== Unable to complete table generation for BIN_ADS
================================================================================
                     ); -- END of Table ADS creation
--
--
--   Start extracting table COURSES
CREATE TABLE CLIENTS (
  CLIENT                         NUMBER(6)                         NOT NULL
, FIRSTNAME                      VARCHAR2(35)
, LASTNAME                       VARCHAR2(35)
, CLIENTSINCE                    DATE            DEFAULT SYSDATE   NOT NULL
, CREDITCARD                     NUMBER(12)                        NOT NULL
, CONSTRAINT ORDERLINESPK
     PRIMARY KEY(CLIENT )
, CONSTRAINT VALIDCREDITCARD
     UNIQUE (CREDITCARD)
, CONSTRAINT VALIDDATECHECK
     CHECK (CLIENTSINCE <= CURRENT_DATE)
                      ); -- END of Table COURSES creation
--
--
--   Start extracting table ORDERLINES
CREATE TABLE ORDERLINES (
  ORDERLINE                       NUMBER(6)                        NOT NULL
, ORDER                           NUMBER(6)                        NOT NULL
, PRODNO                          VARCHAR2(15)                     NOT NULL
, SUPPLIER                        NUMBER(6)                        NOT NULL
, UNITPRICEPAID                   NUMBER(8,2)
, QUANTITY                        NUMBER(4)     DEFAULT 0.00
, STATUS                          CHAR(1)       DEFAULT 'P'        NOT NULL
, CONSTRAINT ORDERLINESPK
     PRIMARY KEY(ORDER , ORDERLINE )
, CONSTRAINT VALIDSTATUS
     CHECK (STATUS IN ('P', 'L', 'F'))
                        ); -- END of Table CUSTOMERS creation
--
--
---- T A B L E   C R E A T E   C O M P L E T E D
----
---- Oracle Catalog Extract Utility V3.0 ----
---- Run Completed on Nov 3, 2015 at 12:52
```

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Submit the following:

1. One text file called **YourLastName_C_Compile.SQL**. This file will contain your stored procedure creation code:
    - One stored procedure named Extract_Tables.
    - One stored procedure named Extract_Columns.
    - One stored procedure named Extract_PK_Constraints
    - One stored procedure named Extract_Unique_Constraints
    - One stored procedure named Extract_Check_Constraints
    - One stored function named Get_Constraint_Columns

2. One text file called **YourLastName_C_Run.SQL**.
    - This file will contain the SQL code necessary to run your stored procedures and spool output to the file specified in '3' below.

3. One text file called **Create_Tables_YourLastName.SQL**.
    - This file will contain the code generated by running 'Extract_Tables'. Your code will produce this file each time 'Extract_Tables' runs.
    - Note: the line numbers to the left of the sample output on Page 2 are only for reference within this document. Do not produce line numbers!

4. One text file named **YourLastName_C.BAT**.
    - This file prompts to compile or run your stored procedures.
    - DOS commands cannot display on the screen when this batch file runs.
    - Prompt the user to 'C'ompile, 'Run'.
        - If they choose 'C'ompile, run the SQL script **YourLastName_C_Compile.SQL.** Make sure to pause so you can see the output to determine if the procedures compiled correctly. After the user hits enter terminate the batch file.
        - If they choose 'R'un, then run the SQL script **YourLastName_C_Run.SQL**. Do not pause - the batch file must terminate immediately when the SQL script completes.

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The following standards are to be used when coding:

- Keywords are in Uppercase
- Names are coded in camel case (First letter capitalized)
- Each clause is placed on a line by itself

Submission Instructions

- Compress all files into a zip archive named *lastname,firstname_PartC* and submit the archive to the appropriate LEARN dropbox.

- ***Have your instructor review your submission immediately after submitting it.*** You will not be able to start the next part of the assignment until your instructor provides feedback on this part.
    - Submission reviews will only take place during lab periods or the instructor's office hours (or by appointment).
    - Do not come to see the instructor until you have made a drop box submission
    - Do not email the instructor asking for the next component to be released. It won't be.

Marking Guidelines

This part contributes 10% to the final mark for the mid-term project. The assignment component does have a due date (drop box submission) as well as a requirement to have the assignment reviewed by your instructor. If a submission to the drop box is not made before the due date or an in-person review with the instructor is not completed before the next parts due date the mark for the component will be zero.

A rubric is used to allocate marks on this component. See the Learn dropbox.