Database Management Systems

Lab 6 Exercise: Oracle PL/SQL and Stored Procedures

WHAT TO DO

1. 下载 **Lab6** 课程材料，**Lab6Exercise** 文件夹中包含 2 个 SQL 脚本文件， **Lab6DB.sql** 和 **Lab6Queries.sql**， 以及一个文本文件 **Lab6CgaCalculations.txt**.

2. 将你 **Lab5** 完成的 **InsertMyself.sql** 文件放置在 **Lab6Exercise** 中，修改该文件使得其插入纪录的 CGA 属性值为 null。← <mark>IMPORTANT!</mark>

3. **Execute** the **Lab6DB.sql** script file in **SQL Developer**.

4. 在你当前数据库连接的面板下，新建一个 **Procedures**（过程），并将其命名为 **Lab6CgaCalculations**（新建"过程"参考 ppt 20-22 页）。

5. 将 **Lab6CgaCalculations.txt** 中的代码全部复制，然后粘贴覆盖掉 **Lab6CgaCalculations** 过程中的代码。

6. **Complete** the **TODOs** in the **Lab6CgaCalculations** procedure to do the following.

    a. 在第一个 TODO 处声明（定义）计算 CGA 所需要的其他变量；在第二个 TODO 处把不正确的 cursor 定义替换为正确的，正确定义的 cursor 指向了 studentId 为 currentStudentId（这是已经定义好的变量）的 EnrollsIn 纪录。

    b. 对于 **studentCursor** 获取的每个 student 纪录，完成：
       i. 获取该学生关联的 EnrollsIn 纪录，以及对于每个 EnrollsIn 纪录，获取该课程的 credit（学分），以便于后续计算 CGA。
       ii. 计算该学生的 CGA（课程成绩的加权平均，公式在本页末尾），将计算结果用于更新 Student 表格里该学生的 CGA。
       iii. 如果该学生的 CGA 小于 studentLowCga（定义好的变量，值为 2），则将该学生纪录插入到 Lowcga 表中。

    <mark>解释 1</mark>： The command **dbms_output.put_line**(*<string>*) outputs *<string>* to the Script Output tab.

7. ***After your Lab6CgaCalculations procedure executes correctly,*** **execute** the **Lab6Queries.sql** script file in **SQL Developer**. <mark>解释 2</mark>： The **Lab6Queries.sql** script file contains the following code.

```
clear screen
set serveroutput on
set pagesize 30
set termout off
@Lab6DB
set termout on
set feedback off

exec Lab6CgaCalculations;
select studentId, firstName, lastName, cga from Student order by cga desc;
select studentId, firstName, lastName, cga from LowCga order by cga desc;
```

The **set** commands do the following:
- **set serveroutput on** - enables display of the **dbms_output.put_line** command argument;
- **set pagesize 30** - sets the output page size to 30 lines;
- **set termout off** - disables display to the Script Output tab;
- **set termout on** - enables display to the Script Output tab.

The third last line executes your **Lab6CgaCalculations** procedure. The final two lines display the result of calculating each student's CGA as well as those students whose CGA is less than or equal to 2.

CGA CALCULATION

A student's cga is calculated according to the following formula:

$$cga = \frac{\sum(\text{course credit} \times \text{course grade point})}{\sum \text{course credit}}$$

For each course in which the student is enrolled, multiply the course credit by the course grade point and sum these values for all courses. Then, divide the previous sum by the sum of the course credit of all the courses in which the student is enrolled.

To obtain the grade point for a course, convert the course grade to a grade point according to the following formula:

$$\text{course grade point} = \text{maximum}((\text{grade} / 20) - 1, 0)$$

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The above grade point conversion has been already done in the file **Lab6CgaCalculations**.

WHAT TO SUBMIT

1. Your completed **Lab6CgaCalculations** procedure code as a text file. You can copy and paste your code from **SQL Developer** into a text (txt) file.
2. A <u>screenshot 截图</u> of the **SQL Developer** window or a text file that shows the result of running the **Lab6Queries.sql** script file in the Script Output tab as shown in Figure 1.

```
>>> Alan Turing (28918856) with cga=3.56 is an honours Student.
>>> Typical Student (11111111) with cga=3.64 is an honours Student.

STUDENTI FIRSTNAME            LASTNAME                   CGA
-------- -------------------- -------------------------- ----------
11111111 Typical              Student                    3.64
28918856 Alan                 Turing                     3.56
15000655 Steve                Jobs                       3.45
26186666 Warren               Buffet                     3.42
15085942 Bill                 Gates                       3.4
29873381 Nikola               Tesla                      3.37
13556789 Legolas              Greenleaf                  3.36
18792018 Elon                 Musk                       3.25
13782973 Edith                Clarke                     3.15
28834512 Issac                Newton                     2.98
13456789 Ariana               Grande                     2.82
13455789 Harry                Potter                     2.76
15678989 Maria                Callas                     2.73
15456789 Leonardo             Da Vinci                   2.72
16789012 Robert               Redford                    2.57
15678901 Albert               Einstein                   2.56
26184624 Bruce                Wayne                      2.47
14567890 Julius               Caesar                      1.9
99987654 Lazzy                Lazy                       1.67
66666666 Ferris               Bueller                    1.64
26184444 Donald               Trump                      1.49

STUDENTI FIRSTNAME            LASTNAME                   CGA
-------- -------------------- -------------------------- ----------
14567890 Julius               Caesar                      1.9
99987654 Lazzy                Lazy                       1.67
66666666 Ferris               Bueller                    1.64
26184444 Donald               Trump                      1.49
```

Your record should be shown in the top message and in the result of the first query.

Figure 1: Example **SQL Developer** Script Output tab showing
the result of executing the **Lab6Queries.sql** script file.

HOW TO SUBMIT

在下次实验课之前（周二下午 10 点前），将上述文件打包（以为名字+学号命名）发给学委，学委再打包邮件发给我（zhenglb6@mail.sysu.edu.cn）。