CPRG 307
Lab 7: Triggers

Student: _____

Mark: ___ / 2 (*one mark for each deliverable*)

Lab Objectives

Here is what you will be able to do when you complete each objective:

- Describe the types and structure of triggers.
- Create a DML trigger.
- Test a DML trigger.
- Use trigger predicates in the logging of database activity.
- Create a compound trigger.

Lab Instructions

To complete this lab, follow the steps below. This lab is due at the end of the lab class indicated by your instructor.

Steps:

☐ 1. ATTEND the lecture on the material that will be performed in the lab exercise.

☐ 2. COMPLETE the out-of-class learning activities as indicated by your instructor.

☐ 3. COMPLETE the prelab tasks identified in the lab document before the lab class, making sure to submit solutions to the appropriate forum and thread in the D2L discussion board.

☐ 4. COMPLETE the tasks identified in the lab document, making sure to submit solutions to the appropriate forum and thread in the D2L discussion board.

☐ 5. COMPLETE the post lab tasks identified in the lab document after the lab has been completed.

Deliverables

☐ 1. SUBMIT the complete and tested prelab code by the date and time indicated by your instructor to the appropriate forum and topic in the D2L discussion board.

☐ 2. SUBMIT the complete and tested lab code by the date and time indicated by your instructor to the appropriate forum and topic in the D2L discussion board.

For this lab, all code should be placed in the body of the discussion board posts – <u>not</u> as an attachment.

Unless stated otherwise, code from <u>all</u> tasks should be included in discussion board posts.

Prelab Tasks

The following questions use the Astra Talent Agency (ATA) table set.

☐ 1. Write the PL/SQL code for the following problem:

Create a DML trigger that places the current date as the date-of-hire for any new agents who are brought into the ATA family.

☐ 2. Write the PL/SQL code for the following problem:

Create a DML trigger so that every time an additional performance is added to a contract, the fee should increase by $25.

☐ 3. Write the PL/SQL code for the following problem:

Create a DML trigger that will prevent any changes to a contract number once it has been created.

Lab Tasks

The following questions use the Walnut Grove Library (WGL) table set.

Make sure to refresh the WGL database (the script files are located in the course resource area on D2L).

☐ 1. Create a trigger to prevent the insertion of the record into WGL_RESERVE_LIST when the title is available on the shelf (status *OS*) at the branch identified in the BRANCH_RESERVED_AT column of the triggering statement.

- Remember that the status of the book, and the location of the book, is indicated in the accession register.
- Your trigger should also populate the DATE_RESERVED value of the new row.
- Test with the following two insert statements:

```
INSERT INTO wgl_reserve_list
(patron_number, isbn, branch_reserved_at, pick_up_branch)
VALUES
(2, '0-566-03538-3', 1, 2);

INSERT INTO wgl_reserve_list
(patron_number, isbn, branch_reserved_at, pick_up_branch)
VALUES
(10, '0-88830-100-6', 1, 1);
```

☐ 2. Create a triggering INSERT statement with the minimum number of columns necessary for inserting a row into the table WGL_LOAN. Write the trigger to complete the loan row and update the appropriate tables (both WGL_PATRON and WGL_ACCESSION_REGISTER will need to be updated).

- Use sequence wgl_loan_seq for the loan number (already created).
- The date of the loan will be the current date.
- The due date of the book will be the loan date plus the number of days for the loan period of that book (will have to retrieve it from the accession register, do not hard code the value).
- The accession register will need to have the due date for the book updated (same as the due date set previously) and the status of the loan – should be *OL*.
- The patron table will need to be updated to reflect that the patron has taken another book out on loan – the books out on loan will increase by one.

- Test with the following two insert statements (your trigger should deal with the other columns not listed in the INSERTs below):

```
INSERT INTO wgl_loan
(patron_number, accession_number, loan_type)
VALUES
(13, 25, 'O');

INSERT INTO wgl_loan
(patron_number, accession_number, loan_type)
VALUES
(15, 2, 'O');
```

Make sure to refresh the ICCC database (the script files are located in the course resource area on D2L).

Before starting the next set of tasks, create a new table called ICCC_STATISTICS. This new table should have the following columns:

- Year – VARCHAR2(4)
- Student_count – NUMBER

☐ 3. CREATE a DML trigger on the COURSE_REGISTRATION table that is fired when a new registration is created (inserted). This trigger should ensure that for each new registration, the final grade is set to NULL.

☐ 4. CREATE a DML trigger on the COURSE_REGISTRATION table that is fired when a new registration is created (inserted), but the trigger code should execute after this new registration has been completed. This trigger should:

- Increase the enrolment number in the CLASS_SECTION table by one. This enrolment is based on the primary key of the table (COURSE_CODE, SECTION_CODE, SEMESTER, and YEAR combined).
- If the enrolment value is equal to the capacity value for that class, a new section should be created.
  - Use the following to identify the SECTION_CODE value for this new class:
    - SUBSTR(:NEW.section, 1, 2) || CHR(ASCII(SUBSTR(:NEW.section, 3, 1)) + 1)
  - If the row already exists, an error **may** occur on INSERT depending on how your code is structured, capture the error, but do nothing with it (do not let it stop the processing) – not an error in the application.
  - This new class section should have the same capacity and instructor as the original.
  - Enrolment should be set to zero. The student currently registering should still be registered in their class section of choice (do not place them in the newly created class section).

☐ 5. CREATE a DML trigger on the COURSE_REGISTRATION table that is fired when a new registration is created (inserted). This trigger should, based on the current year, add one student to the student count in the ICCC_STATITICS table. If the year does not exist, it should be added to this table and start with a count of 1.

☐ 6. Create a COMPOUND trigger that combines the trigger timing points and levels completed in *Tasks 3, 4,* and *5*.

☐ 7. Create two triggering statements for each of *Tasks 3, 4,* and *5* to test these three DML triggers. Can these same triggering statements be used to test the compound trigger or would there be changes required?

Post Lab Tasks

☐ 1. COMPARE your posted solutions to those posted by your instructor. If you are unsure why there are differences between the solutions, make sure to talk to your instructor.