**Université d'Ottawa**

**École de génie électrique et d'informatique**

**CSI3530 - Bases de données II**
**Devoir de programmation II (Lab No 3 et Lab No 4)** [**7.5** Points] (**Décembre 2**)

Nous utilisons toujours la BD SaloirsReservesBoats que vous avez déjà créée lors du précédent devoir de programmation.
L'objectif principal de ce devoir de programmation est de concevoir et d'implémenter en C de nouvelles fonctions d'agrégation telles que: *variance* (*variation)*, et *écart type* (*standard deviation)* qui ne sont pas disponibles en SQL et qui sont indispensables aux applications de statistiques de votre société de logiciels.

Répondre aux questions suivantes**:**

1. [0.25] Explain the term *impedance mismatch* in the context of embedding SQL commands in a host language such as C.
2. [0.25] How can the value of a host language variable be passed to an embedded SQL command?
3. [0.25] Explain the WHENEVER command's use in error and exception handling.
4. [0.25] Explain the need for *cursors*.
5. [0.25] Give an example of a situation that calls for the use of embedded SQL; that is, interactive use of SQL commands is not enough, and some host language capabilities are needed.
6. [1.5] Write a C program with embedded SQL commands a C function that computes and returns the *variance* of sailors' ages.
7. [1.5] Write a C program with embedded SQL commands a C function that computes and run *standard deviation* of sailors' ages.
8. [1.5] Extend the previous program to find all sailors whose age is within one standard deviation of the average age of all sailors.
9. [0.25] Explain how you would design and write a C program to compute the *transitive closure* of a graph, represented as an SQL relation Edges (from, to), using embedded SQL commands. (You need not write the program, just explain the main points to be dealt with.
10. [0.25] Explain the following terms with respect to cursors: *updatability*, *sensitivity*, and *scrollability*.
11. [1] Define a cursor on the Sailors relation that is updatable, scrollable, and returns answers sorted by age. Which fields of Sailors can such a cursor not update? Why?
12. [0.25] Give an example of a situation that calls for dynamic SQL; that is, even embedded SQL is not sufficient

**Hint:**
Assume we have a table of data describing the height of different trees with the following schema:

Tree(tid: integer, tname: string, theight: real)

**Important Notes and Submission Guidelines:**
For this programming assignment (Lab No3 and Lab No 4) that is a group-based work, only the group leader must submit a technical report to the virtual campus in term of a ZIP file that contains the answer for each question and the C source code and the executable on due date (December 2). In addition, you also have to book and pass a *demo*. with your teaching assistant (TA) in the lab and/or tutorial room. Your TA will lead you and conduct the tests of your programs and then evaluate your work. You are also allowed to do your *demo*. using your own laptop and your own favorite development environment as well as your favorite implementation of DBMS. This assignment is a group-based work, only a single submission by each group made by the leader is required.