

CSP 509/CSP 609 PG Software Lab
Lab Assignment 3
Submission Deadline: August 23 2018 11:55pm
Total Weightage of the Assignment: 3%

General Instructions:

- You must use only C, C++, or JAVA for this assignment.
- You would also have to use JDBC or ODBC connections.
- For databases, you can use any of the open source databases such as PostGRES, MySQL, etc.
- Prescribed specifications must be strictly followed. Failure to do so may lead to substantial loss of points.
- Make sure your code is well written (self explanatory variable names) and documented. You are likely to lose points if your TA cannot understand your code.

Question 1:

For this question, you are expected to develop a program to interface with a DBMS at the back-end. You would be expected to develop functions to insert and retrieve data. For evaluation, we would ask you to demonstrate the features of your code. No need to develop elaborate front-ends. A basic command line interface is sufficient for demonstrating the features. Following are the details of the database schema and retrieval queries that need to be supported.

Database Schema

Create the following schema in your database:

Classes (class, type, country, numGuns, bore, displacement)

Ships (name, class, yearlaunched)

Battles (name, year)

Outcomes (ship, battle, result)

Ships are built in “classes” from the same design. The relation Classes records the name of the class, the type (‘bb’ for battleship or ‘bc’ for battlecruiser), the country that built the ship, the number of main guns, the bore (diameter of the gun barrel, in inches) of the main guns, and the displacement (weight, in tons). Relation Ships records the name of the ship, the name of its class, and the year in which the ship was launched. Relation Battles gives the name and date of battles involving these ships, and relation Outcomes gives the result (sunk, damaged, or ok) for each ship in each battle.

1. The underlined attributes are the primary keys of the corresponding relation.
2. ‘Class’ attribute in the **Ships** relation refers to the ‘class’ attribute in the **Classes** relation.
3. ‘Ship’ attribute in the **Outcomes** relation refers the ‘name’ attribute in the **Ships** relation.
4. ‘Battle’ attribute in the **Outcomes** relation refers to the ‘name’ attribute in the **Battles** relation.

Following data may be useful in evaluating the correctness of the queries. This data is just a suggestion and by no means exhaustive. You may put more data in the tables.

Classes

Class	Type	Country	numGuns	bore	Displacement
Kongo	bc	USA	12	16	1000
Virat	bb	India	10	28	2000
Eagle	bb	USA	15	19	1700

Ships

Name	Class	Year
ABC123	Virat	2001
ABC149	Virat	2005
FGP123	Kongo	2000
KOP190	Kongo	1999
KOP122	Kongo	1990
EAG999	Eagle	1995
EAG111	Eagle	1993
EAG119	Eagle	1994

Battles

Name	Year
Gulf	2006
Yemen	2014
French	2011

Outcomes

Ship	Battle	Result
ABC123	Yemen	OK
ABC149	Gulf	Damaged
EAG999	Yemen	Sunk
KOP122	French	Sunk

Data Entry Queries:

Develop functions for inserting data into all the four tables, viz., Classes, Ships, Battles and Outcomes. Your functions must appropriate error handling procedures, for e.g., inserting a record into Ships table with an invalid “Class Name” should throw an error message.

Data Retrieval Queries:

1. For a given “class-name” (input from user), retrieve all the (battle names and their year) when ships of that class “Sunk”
2. For a given “class-name” (input from user), retrieve the year in which the first ship of that class was launched.
3. For a given “country-name” (input from user), retrieve the names of all ships which participated in a battle and are now either “OK” or “Damaged”

Things to submit:

1. Upload all the your code (written in a high level language). Note that there should not be any directory structure in the code, i.e., all the code files should be in just one directory. All your files should have your name and roll number.