

University of Waterloo
School of Computer Science

CS348

Fall 2015

Assignment 5

Due: Nov. 23, 2015

1. Consider the following relational schema.

Student(SNO, SNAME)

Course(CNO, CNAME)

Prerequisite(CNO, PREREQ)

Professor(EID, PNAME, OFFICE, DEPT)

Enrollment(SNO, CNO, TERM, SECTION, MARK)

Schedule(CNO, TERM, SECTION, DAY, TIME, ROOM)

Class(CNO, TERM, SECTION, INSTRUCTOR)

A DB2 database on the above schema called **enrollment** has already been created on *linux.student.cs.uwaterloo.ca* which can be accessed from your Java program via the Internet. The url to access the server is

"jdbc:db2://linux.student.cs.uwaterloo.ca:50002/cs348".

To load the correct jdbc driver in your Java program, use the following command: `Class.forName("com.ibm.db2.jcc.DB2Driver")`. You should place the following files in your library or classpath: *db2jcc4.jar* and *db2jcc_license_cu.jar*. These jars files are available under your LEARN account. The DB2 account you should use to access the database is *db2guest* with the password *upKellynoisylair*.

IBM DB2 ISQL statements may have a different syntax from those presented in the lectures. Please refer to DB2 document for more information on the ISQL statement syntax. The current version of DB2 running on *linux.student.cs.uwaterloo* is version 9.

Write an efficient Java program (with JDBC) that generates the required result for the following application. Your work will be evaluated based on the design, correctness, generality, efficiency, documentation (both external and internal), readability, testing (verification) and ease-of-use. In your external documentation, you should explain the strategy in generating the following required report.

A *course average* is the average mark of all students enrolled in sections of the course in the same year. A *class average* is the average mark of students enrolled in a class. A section is offered by a department if it is taught by a professor from the department. A course is said to be offered by a department *D* in a year *yr* if there is a section of the course offered by the department *D* in *yr*.

Given a department name *D*, and years *begin* and *end*, for each course offered by *D* between *begin* and *end*, print out, for each year in the range *begin* and *end*, the course number, course name, number of classes and total enrollment for the course, maximum and minimum class averages as well as the course average for the year. The output should be sorted in an ascending order on years, then within the same year, on course number. Any output format that allows a reader to visualize the information easily is acceptable. A suggested format is as follows.

Course and Class Information for Department *D* between Years *begin* and *end*

Year *begin*

C#	Name	Enrollment	#Section	Course Ave	Max Class Ave	Min Class Ave
CS120	Introduction to ..	122	3	72	78	72
CS134	Introduction to ..	56	2	66	78	60
:						

Year *end*

:

The program should interactively prompt the user for a department name *D*, year *begin* and year *end*. To exit the program, the user inputs 'exit.' Your output should contain at least the following 3 sets of test data: (CS, 1989, 1992), (CS, 1990, 1993), (CS, 1991, 1995).

What to submit

You need to submit both a **soft-copy** and a **hard-copy** of your assignment. The soft-copy includes your complete source code (.java files) and executable (.class files). Softcopy is needed in case the TA needs to run your program for verification. Your hard-copy should include a description of your program design (include overall design and its justification, individual class description and data structures employed), how to execute your executable, the complete source code and the test output. In your hard-copy submission, you should convince the reader that your design is efficient and correct by outlining your strategy and overall design, as well as validating the correctness of the test results.

How to submit your assignment

For **softcopy** submission, put it into A5 dropbox under you LEARN account. Follow the instructions given in course outline for softcopy submission. You need to submit a **hard-copy** of your assignment as well. The hardcopy is used by TAs for indicating your errors and giving you feedback. Drop the hard-copy into boxes on the 4th floor in MC labelled CS348. Please make sure that you place the assignments into the right boxes. Both copies must be submitted on or before the deadline.