# The University of British Columbia 

Computer Science 304

## Midterm Examination

March 2, 2012

Time: 50 minutes
Total marks: 60
Instructor: Rachel Pottinger

Name $\qquad$ Student No $\qquad$ (PRINT) (Last) (First)

Signature $\qquad$

This examination has $\mathbf{3}$ doublesided pages.

## Check that you have a complete paper.

This is a closed book, closed notes exam. No books or other material may be used.

Answer all the questions on this paper.
Give very short but precise answers.
State any assumptions you make
Work fast and do the easy questions first. Leave some time to review your exam at the end.

Good Luck

| Question | Mark | Out of |
| :---: | :---: | :---: |
| 1.a |  | 10 |
| $1 . b$ |  | 10 |
| $2 . \mathrm{a}$ |  | 10 |
| $2 . \mathrm{b}$ |  | 10 |
| $2 . c$ |  | 10 |
| 2.d |  | 10 |
| TOTAL |  | Out of <br> 60 |

All queries for this exam use the same schema as in class and in the SQL exercises in the book:
Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)
The schema will be repeated on following pages for easy reference. The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class.

1. $\{20$ marks $\}$ Relational Algebra. For each query return EXACTLY the following:
a. Find the names of all students who have taken at least two classes taught by "Elizabeth Taylor"
b. Find the student numbers of the students who have taken classes from teachers with the same name (e.g., you'd return the student ID of the student "John Williams" if he took a class from "John Williams")

The schema again:
Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)
2. \{40 marks\} SQL Queries. For each query return EXACTLY the following (i.e., remove duplicates from your final answers where they are not explicitly requested, and include no extra columns):
a. Find the name of the faculty member(s) who taught the most number of unique students and how many students they taught

The schema again:
Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)
b. Find an alphabetical list of the names of all students who have not taken a class taught by the faculty member with ID 489456522

The schema again:
Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)
c. List each major majored in by at least 2 students whose student IDs begin with " 3 "

The schema again:
Student(snum: integer, sname: string, major: string, level: string, age: integer)
Class(name: string, meets_at: string, room: string, fid: integer)
Enrolled(snum: integer, cname: string)
Faculty(fid: integer, fname: string, deptid: integer)
d. Find the names of all students who are enrolled in two classes that meet at the same time

