# The University of British Columbia 

Computer Science 304
Midterm Examination
October 3, 2013

Time: 75 minutes
Total marks: 44

Instructor: Rachel Pottinger

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

Signature $\qquad$

## This examination has $\mathbf{3}$ double-sided 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 |  | 10 |
| 2 |  | 15 |
| 3 |  | 9 |
| 4 |  | 10 |
| Total |  | 44 |

1. $\{10$ marks $\}$

| a. | In ER diagrams, a relationship set can exist between an entity set and itself. | TRUE |
| :--- | :--- | :--- |
| b. | In relational algebra, two tuples for the relation R(a, b) can have the same value <br> for a. | FRULSE |
| c. | We use ER diagrams to logically model our data. | FALSE |
| d. | It is possible for a table in a relational schema to have more than one key. | TRUE |
| $e$. | We can check a database instance to verify that an integrity constraint holds. | FALSE |

2. $\{15$ marks $\}$

Consider the schema that we have used in class:

Movie(MovieID, Title, Year)
StarsIn(MovieID, StarID, Character)
MovieStar(StarID, Name, Gender)
Write relational algebra queries to answer the following. For each query, return EXACTLY (and only) what is asked for. State any assumptions that you need to make.
a. Find the titles of all the movies that have only male movie stars
b. Find the titles of all movies where an actor plays him/herself (e.g., in "Being John Malkovich", John Malkovich plays John Malkovich).
c. Find the titles of all movies that have all the female actors from the movie titled "The Thing" in them.
3. $\{9$ marks $\}$

For each part below, annotate the related diagram so that it provides the additional requested functionality- do not add any additional items or constraints beyond what is required. If nothing needs to be done to the diagram or it is impossible to add that constraint in our version of ER diagram, state why. State any assumptions.
a. The entity player depends on Team for its existence. The key of Player is the team's city and the Player's Jersey \#

b. a 2 is another key of A

c. E is in a many to many relationship with R

4. \{10 marks $\}$

Suppose that we have a ternary relationship T between entity sets D, E, and F such that D has a key constraint and E has a key constraint and total participation; these are the only constraints. D has attributes d 1 and d2, with d 1 being the key; E has attributes e1 and e2, with e1 being the key; and F has attributes f1 and f2, with f1 being the key. T has no descriptive attributes. All attributes are integers. Write SQL statements that create tables corresponding to this information so as to capture as many of the constraints as possible. If you cannot capture some constraint, explain why.

