

Assignment 2

CSIS 3300-001

Deadline: 8:59 PM Mar 21, 2019

(20 marks in total, 5% toward your final grade)

Q1. Write the following queries in relational algebra, respectively, using the university schema discussed in class.

- a. Find the names of all instructors who have taught at least one Comp. Sci. course in Spring 2009. Make sure there are no duplicate names in the result.
- b. Across all departments, find the department with the lowest average salary of instructors. You may assume that every department has at least one instructor.

Q2. Normalize the following relations, with given constraints, to BCNF and 4NF ($\rightarrow\rightarrow$ is for multivalued dependency).

Relations:

books(accessionno, isbn, title, author, publisher)
users(userid, name, deptid, deptname)

Constraints:

accessionno \rightarrow isbn
isbn \rightarrow title
isbn \rightarrow publisher
isbn $\rightarrow\rightarrow$ author
userid \rightarrow name
userid \rightarrow deptid
deptid \rightarrow deptname

Q3. Consider the MongoDB inventory collection populated with the following command

```
db.inventory.insertMany([
  { item: "canvas", qty: 100, size: { h: 28, w: 35.5, uom: "cm" }, status: "A" },
  { item: "journal", qty: 25, size: { h: 14, w: 21, uom: "cm" }, status: "A" },
  { item: "mat", qty: 85, size: { h: 27.9, w: 35.5, uom: "cm" }, status: "A" },
  { item: "mousepad", qty: 25, size: { h: 19, w: 22.85, uom: "cm" }, status: "P" },
  { item: "notebook", qty: 50, size: { h: 8.5, w: 11, uom: "in" }, status: "P" },
  { item: "paper", qty: 100, size: { h: 8.5, w: 11, uom: "in" }, status: "D" },
  { item: "planner", qty: 75, size: { h: 22.85, w: 30, uom: "cm" }, status: "D" },
  { item: "postcard", qty: 45, size: { h: 10, w: 15.25, uom: "cm" }, status: "A" },
  { item: "sketchbook", qty: 80, size: { h: 14, w: 21, uom: "cm" }, status: "A" },
  { item: "sketch pad", qty: 95, size: { h: 22.85, w: 30.5, uom: "cm" }, status: "A" }
]);
```

Give Mongo commands for the following queries and attach the results.

- a. Find all the documents with h less than 25 and uom equal to "in". The results should only return the item and the qty fields and are sorted by the qty value in the descending order.

b. Obtain the total qty of each status for the documents with qty greater than 50 and sort the results by the status in ascending order.

Q4. Consider the MongoDB inventory collection populated with the following command

```
db.inventory.insertMany( [
  { item: "journal", instock: [ { warehouse: "A", qty: 5 }, { warehouse: "C", qty: 15 } ] },
  { item: "notebook", instock: [ { warehouse: "C", qty: 5 } ] },
  { item: "paper", instock: [ { warehouse: "A", qty: 60 }, { warehouse: "B", qty: 15 } ] },
  { item: "planner", instock: [ { warehouse: "A", qty: 40 }, { warehouse: "B", qty: 5 } ] },
  { item: "postcard", instock: [ { warehouse: "B", qty: 15 }, { warehouse: "C", qty: 35 } ] }
]);
```

Give Mongo commands for the following queries and attach the results.

- Find the documents where the instock array has at least one element with warehouse equal to "A" and qty greater than 30.
- Find the documents where the first element in the instock array has qty greater than 30.
- Find the documents where the instock array has only one element.

Submission

You need to submit your assignment through Blackboard community by the due date.

NO LATE SUBMISSION will be allowed.

You should do the assignment individually.

Your submission should be a single **PDF** file named assignment2-yourstudentID.pdf that has a cover page with student name and student number.

You may submit your work multiple times, but only the last submission will be graded.

Q1 for 4 marks

Q2 for 5 marks

Q3 for 4 marks

Q4 for 6 marks

Cover page and submission in PDF format for 1 mark.