

CSCI 443: Database Management Systems
Quiz III -- open book section
 29 April, 1993

The entire exam is to be turned in at 8:30PM. Work the closed book section first and turn it in before you consult your books and notes to work on the open book section.

There are two pages to this exam!!!

Name: _____

Problem 1. (20 points)

Consider the following table, which is rather like the university purchase order system:

PO-NUM	DEPT	AUTHORIZED-BY	A-OFFICE	ITEM	QUANT	COST-EACH	ACCNT-NUM
P93444	CSCI	NATION, CARY	RBH221A	DESK	3	300.00	205555
P93444	CSCI	NATION, CARY	RBH221A	COIN	14	1.00	205555
P83777	CSCI	ANTHONY, SUSAN	RBH035	COIN	133	1.00	205556
P45456	PHYS	EINSTEIN, AL	RBH100	MASS	10	13335.67	307777
P45457	PHYS	EINSTEIN, AL	RBH100	ENERGY	1	3.67	307777
P67321	MUSC	PRESLEY, ELVIS	HIP175	STAMP	1356	.29	406777

After interviewing the appropriate university officials you find out the following facts:

- (1), All items on a single PO must be paid from the same account number.
- (2), Only certain people within a department are allowed to authorize PO's.
- (3), All items are purchased under a state contract that specifies one price for that item.

Subproblem 1A. (4 points)

Write down two more questions you'd like to ask about the PO system.

Subproblem 1B. (4 points)

Draw functional dependencies (pp. 220-222) for the university PO system. Explain!

Subproblem 1C. (4 points)

Draw multivalued dependencies (pp. 223) for the university PO system.

Base your answers to the remaining subproblems on the dependencies you gave in subproblems 1B and 1C.

Subproblem 1D. (4 points)

Give examples of how deletion anomalies could result using a relation of the form given at the start of the problem.

Subproblem 1E. (4 points)

Show how to transform this relation into a set of third normal form relations.

Problem 2. (10 points)

Suppose you are storing numbers into a hash file of 10 records using the hash function

$$H(\text{key}) = \text{key} \bmod 5.$$

Show how you would store the 6 numbers

2516446
4796382
2516442
2519046
5551212
7486789

in the hash file.

Problem 3. (10 points)

You have a choice in this question. Answer one of the following two questions.

Problem choice 3A. (10 points)

Assume the following five keys (we're ignoring the rest of the record)

``slash",
``muffin",
``lucy",
``garfield",
``spots"

are inserted into a B-tree or order one (each node can hold up to two records). Draw a picture of the B-tree after each insertion.

Problem choice 3B. (10 points)

Redraw the VSAM file in Figure 7-15b (p. 290) to show the result of adding records with the following four primary key values

121,
250,
333,
155.