CS 32

Exam 4 - Answer Key

May 15, 2015

General Instructions

- Answer the items completely.
- Write as legibly as possible. Illegible or unreadable answers may not merit any points.
- Refrain from making unnecessary motions and sounds during the exam. Any suspicious behavior will be dealt with accordingly.
- Direct all questions to the proctor.
- If you need to go to the CR, hand your questionnaire and scratch paper to the proctor before heading out. Only one person at any given time is allowed to go out.
- Once the exam period is over, wait for the proctor's dismissal before leaving the exam site.

Questions

Consider the following table of keys and the outputs from 2 hash functions, h and h':

k	$h(k)$	$h'(k)$
AL	7	9
$Arch$	9	0
BA	9	2
$Engg$	6	1
FA	5	14
HK	6	2
Mu	0	8
Sci	7	5
SSP	0	10
$Stat$	0	9

1. Rearrange the keys inside the following sequential table *in preparation for multiplicative binary search. (1 pt.)*
   ANSWER:

1	Mu
2	$Engg$
3	SSP
4	$Arch$
5	HK
6	Sci
7	$Stat$
8	AL
'9	BA
10	FA

2. Assume that the keys were placed inside an ordered sequential table of size 10. Using *Fibonnacian search*, how many times will the execution enter the loop when the following are used as search keys: *(0.25 pt. each)*

   (a) Sci
   ANSWER: 1

   (b) Arch
   ANSWER: 4

   (c) MassComm
   ANSWER: 4

   (d) SURP
   ANSWER: 3

3. Show the final result of inserting the keys (in top-to-bottom order as they appear in the table shown in the first part of the questionnaire) into a *hash table of size 11* (with h(k) as the primary hash function) when the following collision resolution techniques are used:

   (a) Linear Probing *(1 pt.)*
   ANSWER:

0	Mu
1	
2	$Stat$
3	Sci
4	HK
5	FA
6	$Engg$
7	AL
8	BA
9	$Arch$
10	SSP

   (b) Double Hashing *(1 pt.)*
   ANSWER:

0	Mu
1	SSP
2	FA
3	
4	HK
5	BA
6	$Engg$
7	AL
8	Sci
9	$Arch$
10	$Stat$

4. Assume that the keys were inserted in a hash table of size 11 with *linear probing* as collision resolution, as in item 3.(a). Show the adjusted table when Engg is deleted from the table by *rehashing affected entries* in the table.*(1 pt.)*
ANSWER:

0	Mu
1	
2	
3	$Stat$
4	Sci
5	FA
6	HK
7	AL
8	BA
9	$Arch$
10	SSP

Scoring Mechanics

1. For Items 1, 3.(a), 3.(b), and 4: **0.1 point *deduction*** is given for each key not in its proper index.
2. For Item 2: all sub-items are subject to **all-or-nothing** scoring