

# CHAPTER 11

## DISCUSSIONS 3

# Discussion 11-12

Why is a hash structure not the best choice for a search key on which range queries are likely?

## Discussion 11-13

Using the hash function  $h$  defined below, construct an *extendable hash index* on *ID* of the *instructor* table. (bucket size = 2 entries)

- For a decimal number  $x$ ,  $h(x)$  is the binary number obtained by converting each *odd digit* to 1, and each *even digit* to 0.

$$h(12345) = 10101$$

$$h(24680) = 00000$$

$$h(13579) = 11111$$

	<i>ID</i>	<i>name</i>	<i>dept_name</i>	<i>salary</i>
10101	10101	Srinivasan	Comp. Sci.	65000
10101	12121	Wu	Finance	90000
11111	15151	Mozart	Music	40000
00000	22222	Einstein	Physics	95000
10101	32343	El Said	History	60000
11010	33456	Gold	Physics	87000
01101	45565	Katz	Comp. Sci.	75000
10101	58583	Califieri	History	62000
10101	76543	Singh	Finance	80000
10100	76766	Crick	Biology	72000
01001	83821	Brandt	Comp. Sci.	92000
10101	98345	Kim	Elec. Eng.	80000

# Discussion 11-14

What is the height of a B+-tree index on *ID* of the following table? (degree 3; i.e., at most 3 pointers)

Compare this with the hash index of the previous problem.

<i>ID</i>	<i>name</i>	<i>dept_name</i>	<i>salary</i>
10101	Srinivasan	Comp. Sci.	65000
12121	Wu	Finance	90000
15151	Mozart	Music	40000
22222	Einstein	Physics	95000
32343	El Said	History	60000
33456	Gold	Physics	87000
45565	Katz	Comp. Sci.	75000
58583	Califieri	History	62000
76543	Singh	Finance	80000
76766	Crick	Biology	72000
83821	Brandt	Comp. Sci.	92000
98345	Kim	Elec. Eng.	80000

# Discussion 11-15

Does the order of record insertion affect the final state of a hash index ...

- A. ... based on static hashing?
- B. ... based on expandable hashing?

## Discussion 11-16

Consider the following table. Suppose there are many cases for searching with *lastname* and also with *lastname* and *firstname* combined. Can we use a single index to improve the performance of both types of search queries?

*student(ID, lastname, firstname, dept, year, address)*

10101	Srinivasan	Comp. Sci.	<b>1111</b>	
12121	Wu	Finance	<b>1010</b>	
15151	Mozart	Music	<b>0011</b>	
22222	Einstein	Physics	<b>1001</b>	
32343	El Said	History	<b>1100</b>	
33456	Gold	Physics	<b>1001</b>	
45565	Katz	Comp. Sci.	<b>1111</b>	
58583	Califieri	History	<b>1100</b>	
76543	Singh	Finance	<b>1010</b>	
76766	Crick	Biology	<b>0010</b>	
83821	Brandt	Comp. Sci.	<b>1111</b>	
98345	Kim	Elec. Eng.	<b>0100</b>	

*dept\_name*

Biology 0010 1101  
 Comp. Sci. 1111 0001  
 Elec. Eng. 0100 0011  
 Finance 1010 0011  
 History 1100 0111  
 Music 0011 0101  
 Physics 1001 1000



