CS 351 DATA ORGANIZATION & MANAGEMENT

FALL 2011

QUIZ 4/ SECTION-1

(Date given: November 24, 2011)

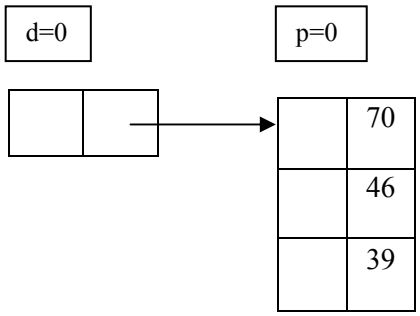
Consider extendible hashing with bkfr = 3

Key	Mod(key, 32)	Binary Pseudo key
70	6	00110
46	14	01110
39	7	00111
24	24	11000
34	2	00010

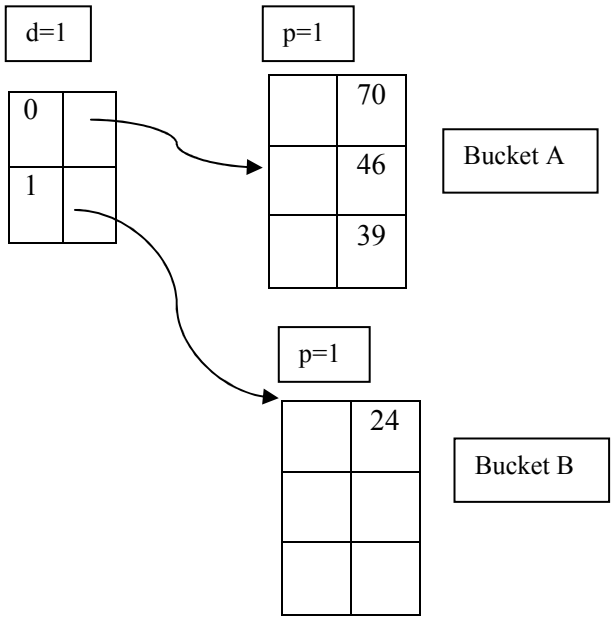
Rules:

- If a bucket whose local depth is equal to the global depth is split, the directory must be doubled.
- Whenever a bucket is split, increment the local depth of the split bucket and its split image by 1.

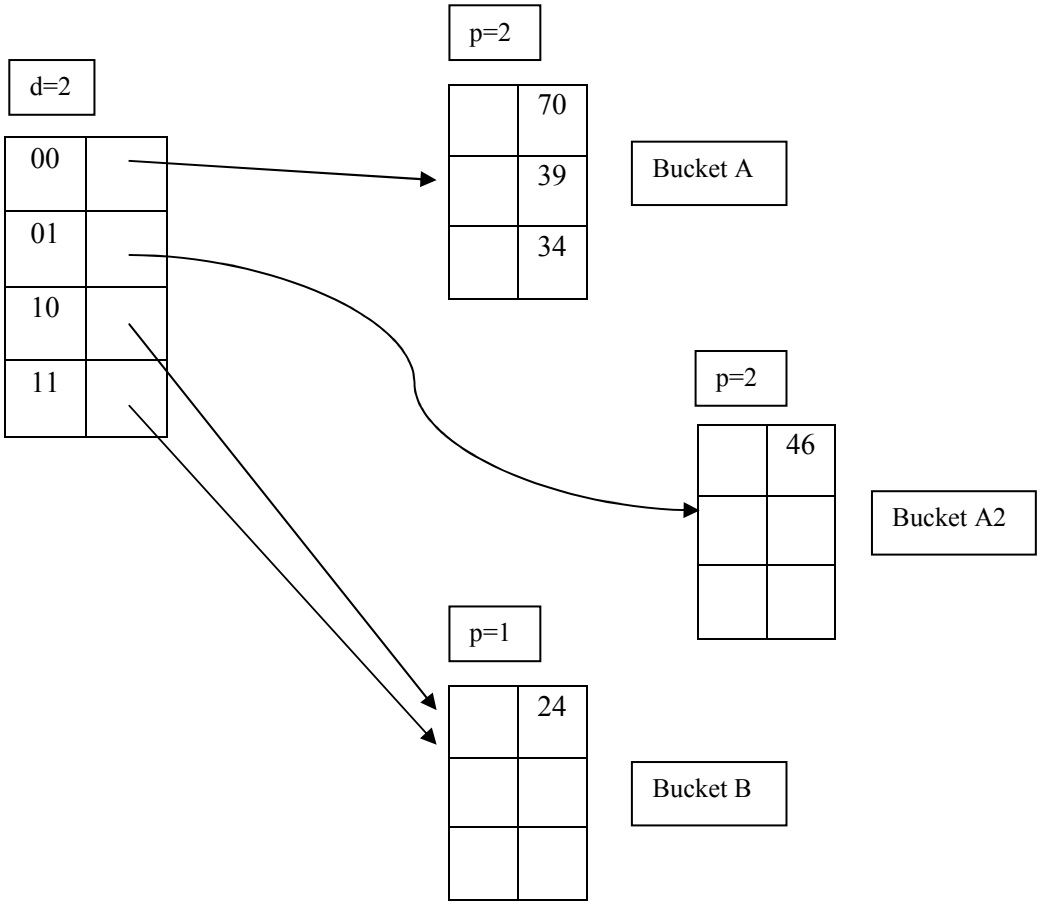
Add 70, 46, 39



Add 24



Add 34



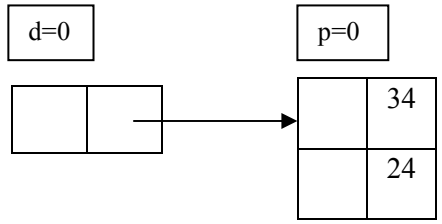
QUIZ 4/ SECTION-2

(Date given: November 30, 2011)

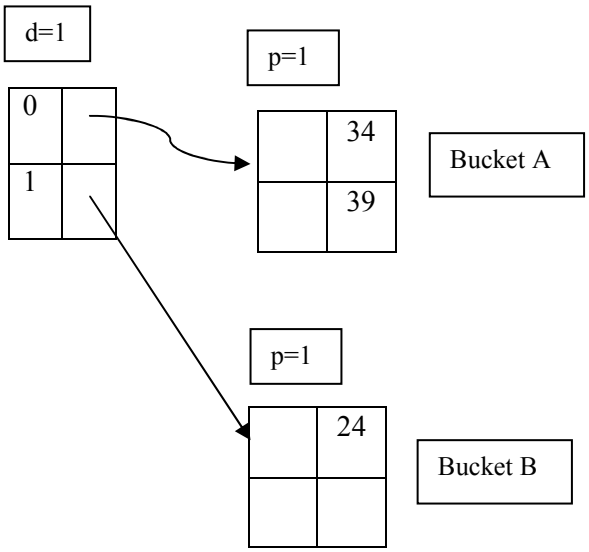
Consider extendible hashing with bkfr = 2

Key	Mod(key, 32)	Binary Pseudo key
34	**2**	**00010**
24	**24**	**11000**
39	**7**	**00111**
46	**14**	**01110**
70	**6**	**00110**

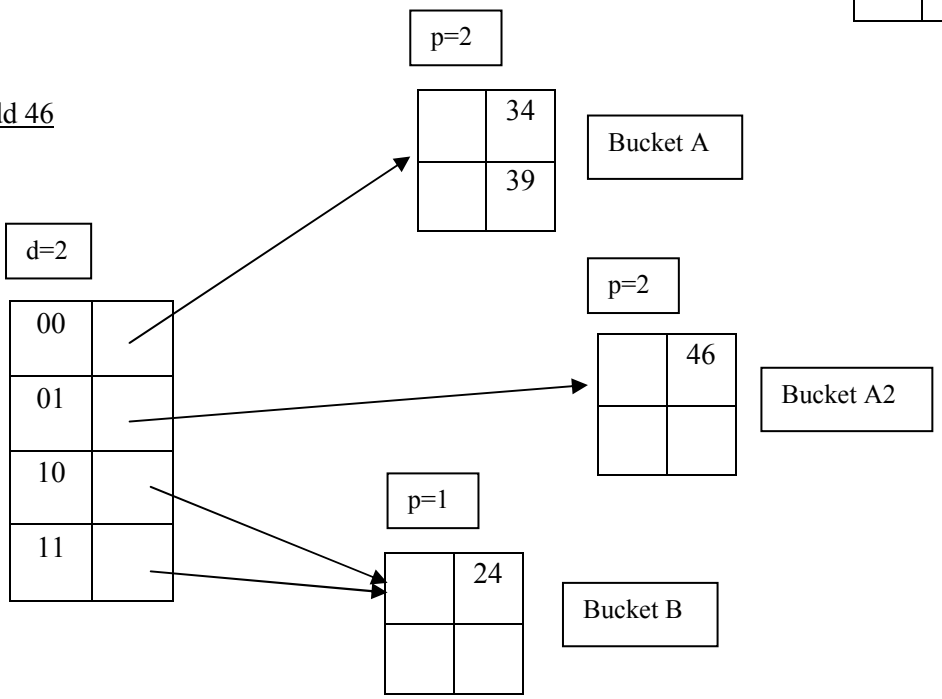
Add 34, 24



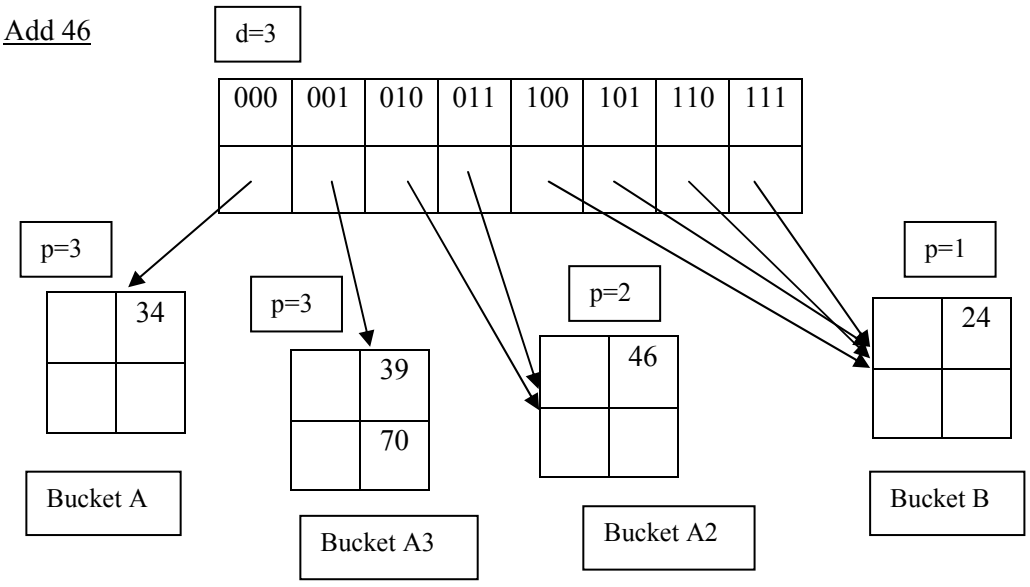
Add 39



Add 46



Add 46



QUIZ 4/ SECTION-3

(Date given: November 23, 2011)

1- Linear Hashing

n = 8

- What is bv and h?
- What is the number of pages at level h? Also give the page numbers.
- What is the number of pages at level h + 1? Also give the page numbers.

Solution:

$h = \lfloor \lg n \rfloor = \lfloor \lg 8 \rfloor = \lfloor \lg 2^3 \rfloor = 3$

$bv = n - 2^h = 8 - 2^3 = 0$

The last page at level h is 7 ($2^3 - 1 = 7$)

$\Rightarrow$ Therefore, there are 8 pages at level h (i.e., pages between 000 and 111)

The number of pages at level h + 1 is calculated as follows:
f(bv) = 2 * bv = 2 * 0 = 0
(or, 8 (total num.pages) – 8 (num.pages at level h) = 0 (num.pages at level h+1))
The number of pages at level h+1 is 0.

2- Linear Hashing

n = 21

- What is bv and h?
- What is the number of pages at level h? Also give the page numbers.
- What is the number of pages at level h + 1? Also give the page numbers.

Solution:

$h = \lfloor \lg n \rfloor = \lfloor \lg 21 \rfloor = \lfloor \lg 2^{4,\cdots} \rfloor = 4$

$bv = n - 2^h = 21 - 2^4 = 5$

The last page at level h $\Rightarrow 2^4 - 1 = 15$

$\Rightarrow$ Therefore, there are 11 pages at level h (i.e., pages between page 5 and page 15)

The number of pages at level h + 1 is calculated as follows:
f(bv) = 2 * bv = 2 * 5 = 10 (or as an another way, you can calculate as 21 – 11 = 10).
Page numbers at level h+1 are between 00000-00100, and 10000-10100.

3- Consider linear hashing with bkfr = 2 and lf = 1/2

Initially, we have 2 buckets and h = 1

Add the following records: 25, 28, 5, 17, 34

25 011001

28 011100

5 000101

17 010001

34 100010

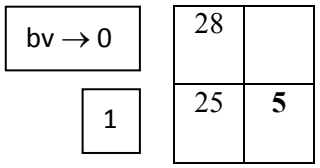
Solution:

At each time after reaching the target load factor, insert (Lf*Bkfr) record(s) and update the file.

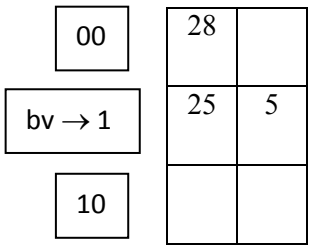
Target Load Factor = 1/2
Bkfr = 2

} Lf*Bkfr = 1/2 * 2 = 1
Add 1 record and update the file

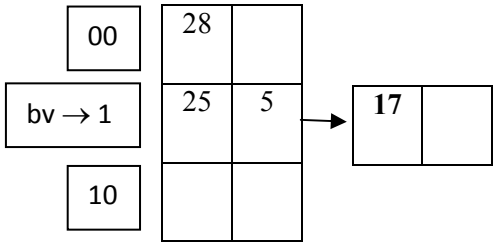
Add 5



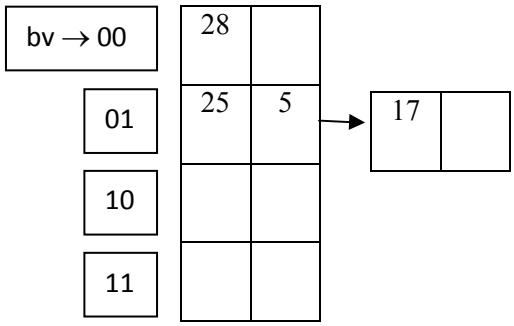
Update:



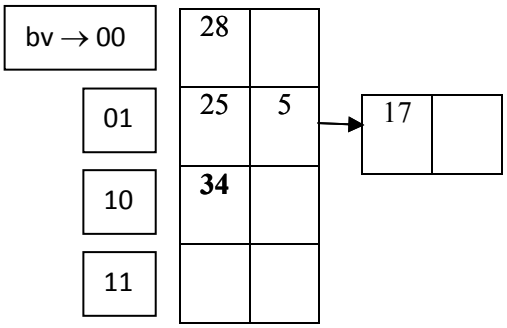
Add 17



Update:



Add 34



Update: