## **Exercise (extendable hashing)**

Let's suppose we have a dynamic hash function h that generates values over 32-bit binary integers:

$$h:K \to 2^{32}$$

Assume a block can contain only two records (blocking factor  $f_r = 2$ ).

Show how the following hash structure changes as the result of each of the following steps:

1) insert a record with search-key value k1 and h(k1) = 1100...

2) insert a record with search-key value k2 and h(k2) = 0110 .....

3) insert a record with search-key value k3 and  $h(k3) = 1101 \dots$ 



## Point 1

Insert h(k1) = 1100.....

The record goes in the block for hash prefix 1. The record is inserted in the block using the pointer in the address table.





Insert h(k2) = 0110 .....

The record goes in the block for hash prefix 01.

The insertion results in a block overflow leading to an increase of the number of bits and a doubling of the size of the address table.

Records with prefix 01 are redistributed into the two blocks (block for hash prefix 010 and block for hash prefix 011).



## Point 3

Insert h(k3) = 1101 .... The record goes in the block for hash prefix 1.

The insertion results in a block overflow leading to an increase of the number of bits. Records are redistributed into the two blocks (block for hash prefix 10 and block for hash prefix 11).

The size of the address table is unchanged.

