EKE GABRIEL

T00665716

HMW 10

1. Assume that you have a seven-slot hash table (the slots are numbered 0 through 6). Show final hash table that would result if you used the hash function h(k)=k mod(7) and linear probing on this list of numbers: 3, 12, 9, 2. After inserting the key with value 2, list for each empty slot the probability that it will be next one filled.

**Probe sequence:**

For key 2

H(k) = 2 mod (7) = 2

For key 3

H(k) = k mod (7)

H(k) = 3 mod (7) = 3

For key 12

H(k) = k mod (7)

H(k) = 12 mod (7)= 5

For key 9

H(k) = k mod (7)

H(k) = k + f( i ) mod (7) // for reason of collusion to generate probe sequence

H(k) = 9 + 0 mod (7)= 2 // collusion//

H(k) = 9 + 1 mod(7) = 3 // collusion

H(k) = 9 + 2 mod(7) = 4\* // available

H(k) = 9 + 3 mod (7) = 5\*

H(k) = 9 + 4 mod (7) = 0\*

H(k) = 9 + 5 mod (7) = 1\*

H(k) = 9 + 5 mod (7 = 6\*

Slot 0 and 1 are on a probability of 1/7 and slot 6 is 5/7

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| --- | --- | --- | --- | --- | --- | --- | --- |
| SLOT | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| KEY |  |  | 2 | 3 | 9 | 12 |  |

Using closed hashing, with double hashing to resolve collisions, insert the following keys into a hash table of thirteen slots (the slots are numbered 0 through 12). The hash functions to be used are h and h2, defined below. You should show the hash table after all eight keys have been inserted. Be sure to indicate how you are using h and h2 to do the hashing. Function Rev(k) reverses the decimal digits of k, for example, Rev(37)=73; Rev(7)=7.

1. h(k) = k mod(13); and b) h2(k) = Rev(k+1 ) mod(11).

Keys: 2, 8, 31, 20, 19, 18, 53, 27.

H(k) = k mod(13) = 2 mod 13= 2

H(k) = k mod (13) = 8 mod 13 = 8

H(k) = k mod (13) = 31 mod 13 = 5

H(k) = k mod (13) = 20 mod 13 = 7

H(k) = k mod (13) = 19 mod 13 = 6

H(k) = k mod (13) = 18 mod 13 = 5 // collusion, ergo double hashing policy.

H2(k) =Rev (k+1) mod (11)

= Rev(19) mod (11)

Rev (91) mod (11) = 3

5 + 3 mod 13 =8

5 + (2\*3) mod 13 =11

H(k) = k mod (13) = 53 mod (13) = 1

H(k) = k mod (13) = 27 mod (13) = 3

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| SLOT | 0` | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| KEY |  | 53 | 2 | 27 |  | 31 | 19 | 20 | 8 |  |  | 18 |  |