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1. (i) ~~58~~ ~~and~~ 56 students and 56 − 2 = 54 are giving the test where table size = 60. Linear probing being used here.

$h(K) = K \% m.$

$h'(K) = \{K+i\} \% m$ if slot is not found.

∴ In unsuccessful searching running time complexity

$= O(1+\alpha) = O(1+n/m) = O(1+54/60) = O(1.9)$

which is a constant and upper bound.

(ii) i slots will be required to find an empty slot in linear probing;

$\cancel{E(T(m,n)) = i} = \frac{m}{m-n} = \frac{60}{60-54} = \frac{60}{6}$

$= 10$

$\cancel{R(i) = \frac{54}{60} = .9}$

We need to go through $54/60 = .9$ ~~select~~

~~Successful search for probing~~ $= \cancel{O(1+\alpha)} = O(1+\frac{54}{60})$

$\cancel{= P(1.9)} = P(1.9).$

P (probability) $= .9$.

② a) ~~#~~ $h(k,0)$ will be unsuccessful: it's probability $= \frac{5}{11}$

(ii) $h(k) = k \% \text{mod}.$

$h'(k) = \{k+i\} \% 10.$

if not found an empty slot.

$\therefore$ p (The element will be inserted within the first 6 probes) $= 1$ as $\lceil 11/2 \rceil = \lceil 5.5 \rceil = 6$ and 5 is inserted in the table. $\lceil m/2 \rceil$ will be distinct.

(3) 10, 22, 31, 4, 15, 28, 16, 17, 59.

$m = 11.$

$h(k) = k \bmod m.$

Linear probing :

$h'(k) = (k+i) \% m.$

0	22
1	59.
2	
3	
4	4.
5	15
6	28
7	16
8.	17.
9	31.
10	10

nubers

15 ; probe 2.

16, probe 3.

17; probes 3.

59 probes 9.

These are 4 ~~the~~ primary clusters.

Quadrating probing.

$h'(k) = (k+i^2) \% m.$

0	22
1	
2	
3	16.
4	4.
5	15
6	28.
7	17.
8	59.
9	31.
10	10.

$(16+0) \% 11.$

$(16+1) \% 11 = 6.$

$(16+4) \% 11 = 9.$

$(16+9) \% 11 = 3.$

probes → 4. for 16.

17's probe = 2.

59.

$(59+0) \% 11 = 4.$

$(59+1) \% 11 = 5.$

$(59+4) \% 11 = 8.$