Problem 1

Keys = {14, 28, 37, 19, 48, 6, 26, 56, 45, 50}

Chaining method: -

 h(14) = 14 % 11 = 3
 h(20) = 28 % 11 = 6
 h(37) = 37 % 11 = 4
 h(19) = 19 % 11 = 8
 h(48) = 48 % 11 = 4
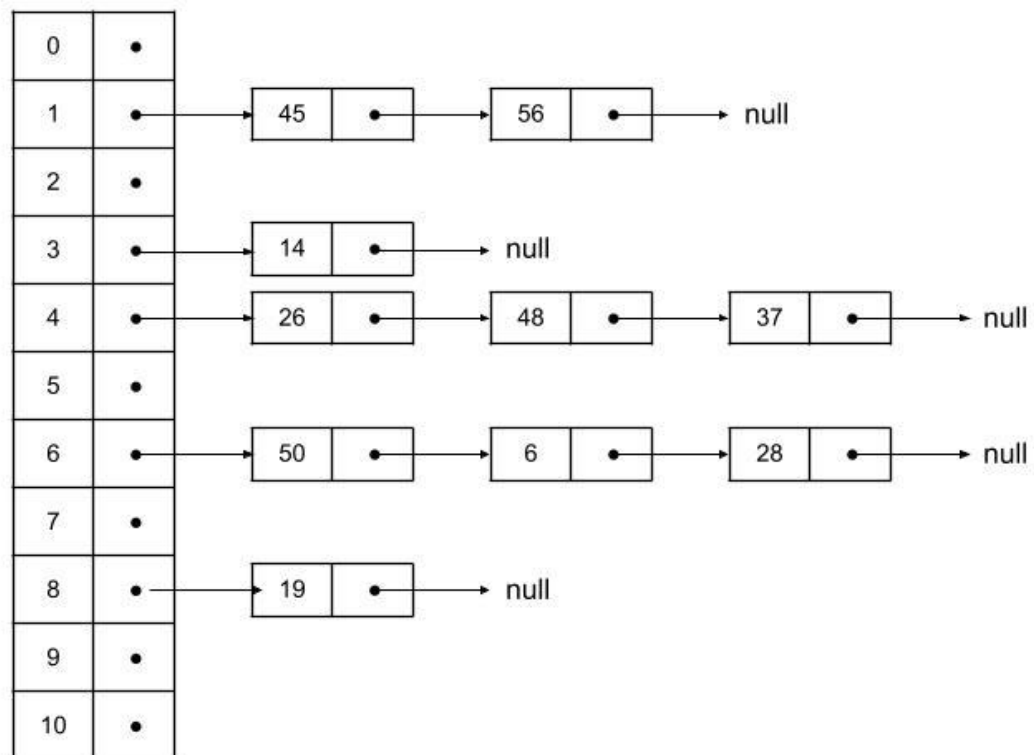 h(6)   = 6 % 11 = 6
 h(26) = 26 % 11 = 4
 h(56) = 56 % 11 = 1
 h(45) = 45 % 11 = 1
 h(50) = 50 % 11=   6

Problem 2

Keys = {14, 28, 37, 20, 24, 36, 49, 33, 43, 64}

Linear Probing method: -

h(14) = 14 % 11 = 3

h(28) = 28 % 11 = 6

h(37) = 37 % 11 = 4

h(20) = 20 % 11 = 9

h(24) = 24 % 11 = 2

h(36) = 36 % 11 = 3 (occupied)
(h(36) + 1) % 11 = 4 (occupied)
(h(36) + 2) % 11 = 5

h(49) = 49 % 11 = 5 (occupied)
(h(49) + 1) % 11 = 6 (occupied)
(h(49) + 2) % 11 = 7

h(33) = 33 % 11 = 0

h(43) = 43 % 11 = 10

h(64) = 64 % 11=   9 (occupied)
(h(64) + 1) % 11 = 10 (occupied)
(h(64) + 2) % 11 =   0 (occupied)
(h(64) + 3) % 11 =   1

0	33
1	64
2	24
3	14
4	37
5	36
6	28
7	49
8	
9	20
10	43

Problem 3

Double Hashing method: -

$h(k) = k \% 13$
$h(49) = 49 \% 13 = 10$

$h'(k) = 1 + (k \% 11)$
$h'(49) = 1 + (49 \% 11) = 5$

$h(k,i) = (h(k) + i * h'(k)) \% N$
$h(5, 1) = (10 + 1*5) \% 11 = 4$ (occupied)
$h(5, 2) = (10 + 2*5) \% 11 = 9$ (occupied)
$h(5, 3) = (10 + 3*5) \% 11 = 3$ (occupied)
$h(5, 4) = (10 + 4*5) \% 11 = 8$

0	
1	53
2	
3	3
4	30
5	18
6	
7	
8	49
9	22
10	36
11	
12	38