

Open Addressing

1) Linear Probing

size of hashtable
 $m = 10$

$$hf(value) = value \% m$$

$$hf(v) = v \% m$$

$$= 49 \% 10$$

value = 50, 75, 99, 20, 35, 88, 45, 23, 55, 67

$$m = 10 = 9$$

$$LP(value, i) = (hf(value) + i) \% m$$

Linear Probing

collision

collision

$$\Rightarrow 99 \% 10$$

$$= 9$$

$$50 \% 10 = 0$$

$$LP(50, 0) = (0 + 0) \% 10$$

$$= 0$$

$$75 \% 10 = 5$$

$$LP(75, 0) = (5 + 0) \% 10$$

$$= 5$$

collision

NOTE :

$i = 0$

$$hf(value) =$$

$$x$$

$$\%$$

$$m =$$

$$y$$

$$x = y$$

Hash Table

key	value	
0	50	20
1	20	55
2	55	55
3	23	
4	67	55
5	75	35
6	35	45
7	45	55
8	88	55
9	99	55

$$LP(99, 0) = 99 \% 10 = 9$$

$$(9 + 0) \% 10$$

$$= 9$$

$$LP(20, 0) = hf(20) = 20 \% 10 = 0$$

$$\boxed{hf(value) + i} \% m \quad \hookrightarrow \quad (0 + 0) \% 10 = 0$$

$$LP(20, 1) = (0 + 1) \% 10 \\ = 1$$

$$LP(35, 0) = hf(35) = 35 \% 10 = 5 \\ \underline{(5 + 0) \% 10 = 5}$$

$$LP(35, 1) = \underline{(5 + 1) \% 10 = 6}$$

$$LP(88, 0) = hf(88) = 88 \% 10 = 8 \\ \underline{(8 + 0) \% 10 = 8}$$

$$LP(45, 0) = hf(45) = 45 \% 10 = 5 \\ \underline{(5 + 0) \% 10 = 5}$$

$$LP(45, 1) = \underline{(5 + 1) \% 10 = 6}$$

$$LP(45, 2) = \underline{(5 + 2) \% 10 = 7}$$

$$LP(23, 0) = hf(23) = 23 \% 10 = 3 \\ \underline{(3 + 0) \% 10 = 3}$$

Collisions

$$\underline{LP(55, 0) = hf(55) = 55 \% 10 = 5}$$
$$\underline{(5 + 0) \% 10 = 5}$$

$$\underline{LP(55, 1) = (5 + 1) \% 10 = 6}$$

$$\underline{LP(55, 2) = (5 + 2) \% 10 = 7}$$

$$\underline{LP(55, 3) = (5 + 3) \% 10 = 8}$$

$$\underline{LP(55, 4) = (5 + 4) \% 10 = 9}$$

$$\underline{LP(55, 5) = (5 + 5) \% 10 = 0}$$

$$\underline{LP(55, 6) = (5 + 6) \% 10 = 1}$$

$$\underline{LP(55, 7) = (5 + 7) \% 10 = 2}$$

$$\textcircled{65} \rightarrow \underline{hf(65) = 65 \% 10 = 5}$$

Primary clustering \rightarrow Drawback of
Linear Probing

Worst case

search time $\rightarrow \underline{\underline{O(n)}}$

(Empty slot)