

1.  $h(k) = k \% 7$

43 % 7 = 1 → list[1] = 43  
22 % 7 = 1 → COLLISION → list[2] = 22  
15 % 7 = 1 → COLLISION → list[3] = 15  
8 % 7 = 1 → COLLISION → list[4] = 8  
12 % 7 = 5 → list[5] = 12  
54 % 7 = 5 → COLLISION → list[6] = 54  
49 % 7 = 0 → list[0] = 49

list[0] = 49  
list[1] = 43  
list[2] = 22  
list[3] = 15  
list[4] = 8  
list[5] = 12  
list[6] = 54

2.  $h(k) = (k + i^2) \% 7$

43 % 7 = 1 → list[1] = 43  
22 % 7 = 1 → COLLISION → list[2] = 22  
15 % 7 = 1 → COLLISION → list[5] = 15  
8 % 7 = 1 → COLLISION → list[3] = 8  
12 % 7 = 5 → COLLISION → list[6] = 12  
54 % 7 = 5 → COLLISION → list[0] = 54  
49 % 7 = 0 → list[4] = 49

list[0] = 54  
list[1] = 43  
list[2] = 22  
list[3] = 8  
list[4] = 49  
list[5] = 15  
list[6] = 12

3.  $h(k) = ((h_1(k) + n * h_2(k)))$   
 $h_1(k) = k \% 7$   
 $h_2(k) = 5 - (k \% 5)$

43 % 7 = 1 → list[1] = 43  
22 % 7 = 1 → COLLISION → list[4] = 22  
15 % 7 = 1 → COLLISION → list[6] = 15  
8 % 7 = 1 → COLLISION → list[3] = 8  
12 % 7 = 5 → list[5] = 12  
54 % 7 = 5 → COLLISION → list[0] = 54  
49 % 7 = 0 → COLLISION → list[2] = 49

list[0] = 54  
list[1] = 43  
list[2] = 49  
list[3] = 8  
list[4] = 22  
list[5] = 12  
list[6] = 15

4. (2D Array)  
 $h(k) = k \% 7$

43 % 7 = 1 → list[1][0] = 43  
22 % 7 = 1 → COLLISION → list[1][1] = 22  
15 % 7 = 1 → COLLISION → list[1][2] = 15  
8 % 7 = 1 → COLLISION → list[1][3] = 8  
12 % 7 = 5 → COLLISION → list[5][0] = 12  
54 % 7 = 5 → COLLISION → list[5][1] = 54  
49 % 7 = 0 → list[0] = 49

list[0] = 49  
list[1][0] = 43  
list[1][1] = 22  
list[1][2] = 15  
list[1][3] = 8  
list[2] = (nil)  
list[3] = (nil)  
list[4] = (nil)  
list[5][0] = 12  
list[5][1] = 54  
list[6] = (nil)

5. (Linked List)

$$h(k) = k \% 7$$

$$43 \% 7 = 1 \rightarrow \text{list}[1] = 43$$

$$22 \% 7 = 1 \rightarrow \text{COLLISION} \rightarrow \text{list}[1] = 22 \rightarrow 43$$

$$15 \% 7 = 1 \rightarrow \text{COLLISION} \rightarrow \text{list}[1] = 15 \rightarrow 22 \rightarrow 43$$

$$8 \% 7 = 1 \rightarrow \text{COLLISION} \rightarrow \text{list}[1] = 8 \rightarrow 15 \rightarrow 22 \rightarrow 43$$

$$12 \% 7 = 5 \rightarrow \text{list}[5] = 12$$

$$54 \% 7 = 5 \rightarrow \text{COLLISION} \rightarrow \text{list}[5] = 54 \rightarrow 12$$

$$49 \% 7 = 0 \rightarrow \text{list}[0] = 49$$

$$\text{list}[0] = 49$$

$$\text{list}[1] = 8 \rightarrow 15 \rightarrow 22 \rightarrow 43$$

$$\text{list}[2] = (\text{nil})$$

$$\text{list}[3] = (\text{nil})$$

$$\text{list}[4] = (\text{nil})$$

$$\text{list}[5] = 54 \rightarrow 12$$

$$\text{list}[6] = (\text{nil})$$