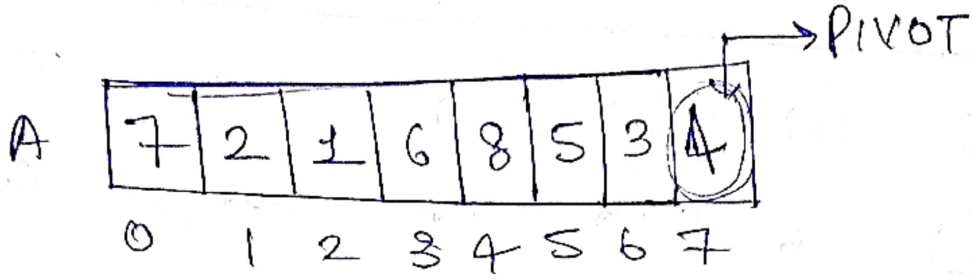
Sol-1




POS AROUND (4)

{2, 1, (3)} ← (4) → {7, 6, 8, (5)}

{2, (1)} {}

POS AROUND 3

POS AROUND (1)

{} {2}

{} {7, 6, (8)}

POS AROUND 5

{7, (6)} {}

POS AROUND 8

{} {7}

POS AROUND 6

{1, 2, 3, 4, 5, 6, 7, 8}

SORTED ARRAY

Sol-2 $h(x) = K \bmod 7$

50, 700, 76, 85, 92, 73, 101

$h(x)$. $50 \Rightarrow 50 \bmod 7 = 1$

$700 \Rightarrow 700 \bmod 7 = 0$

$76 \Rightarrow 76 \bmod 7 \Rightarrow 6$

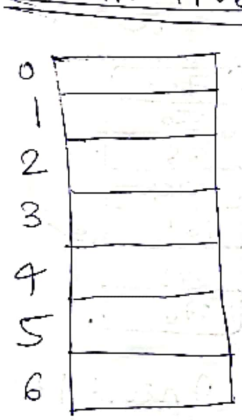
$85 \Rightarrow 85 \bmod 7 = 1$ collision

$92 \Rightarrow 92 \bmod 7 = 1$

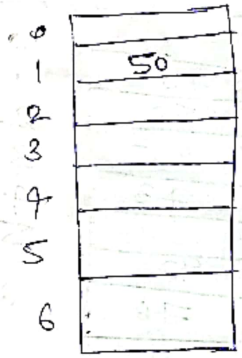
$73 \Rightarrow 73 \bmod 7 = 3$

$101 \Rightarrow 101 \bmod 7 = 3$

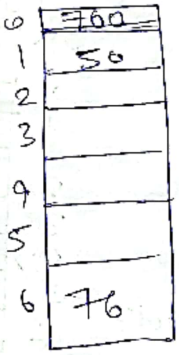
LINEAR PROBING



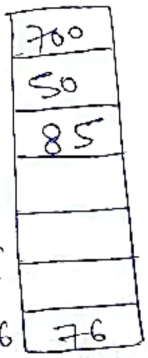

Initial Empty Table




Insert 50



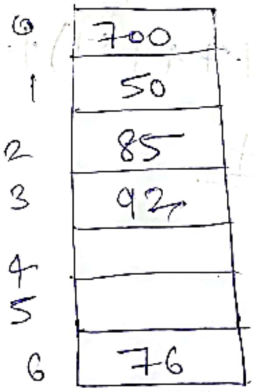

Insert 700 and 76




Insert 85, collision so move to next free slot

$h(x) = 85 \bmod 7 = 1$ collision

$(1+1) \% 7 = 2$

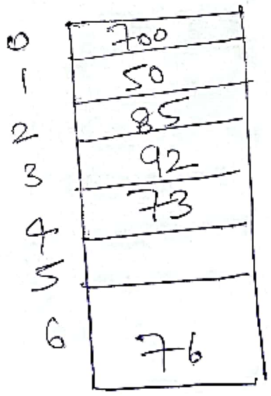



Insert 92 collision as 50 already present so move to next free slot

$92 \bmod 7 = 1$

$(1+1) \% 7 = 2$ collision

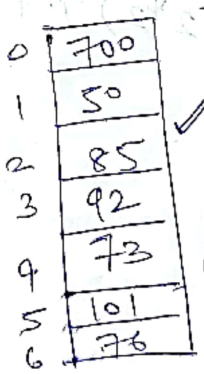
$(1+2) \% 7 = 3$




Insert 73 92 at 3 so insert at next free slot

$73 \bmod 7 = 3$

$(3+1) \% 7 = 4$




Insert 101 92 at 3 so move to next free slot

$101 \% 7 = 3$

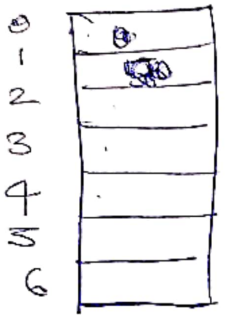
$(3+1) \% 7 = 4$

$(3+2) \% 7 = 5$

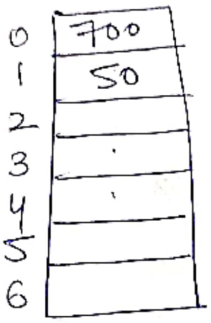
# QUADRATIC PROBING

hash(x) % S full then try (hash(x) + 1*1) % S

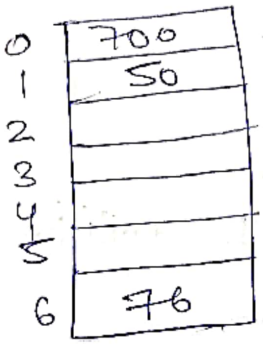
then (hash(x) + 2*2) % S and so on..



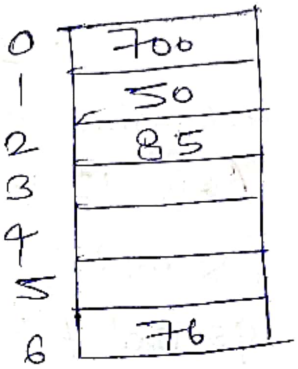
Initial empty




Insert 50, 700




Insert 76

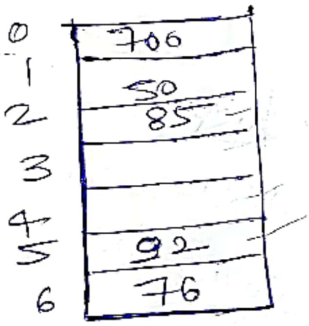



Insert 85

h(x) = 85 mod 7 = 1

Collision so,

(1 + 1*1) % 7 = 2



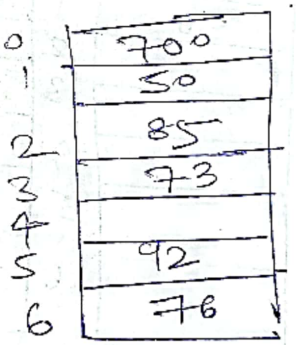

Insert 92 h(x) = 92 mod 7 = 1

Collision so,

(1 + 1*1) % 7 = 2 collision

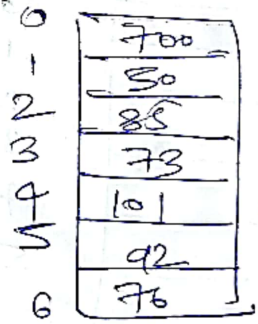
so,

(1 + 2*2) % 7 = 5




Insert 73

73 % 7 = 3




Insert 101

101 % 7 = 3

Collision so

(101 % 7 + 1*1) % 7

= 4

Sol-2

(b) $h(14) = 14 \% 11 = 3$

$h(17) = 17 \% 11 = 6$

$h(25) = 25 \% 11 = 3$ after using

Second hash func = 8

$h(37) = 37 \% 11 = 4$

$h(34) = 34 \% 11 = 1$

$h(16) = 16 \% 11 = 5$

$h(26) = 26 \% 11 = 4$

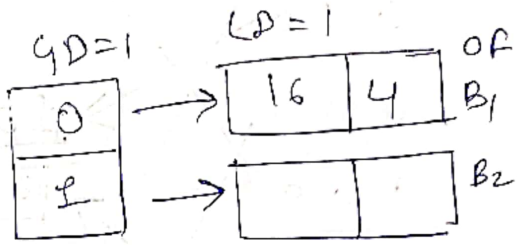
$\Rightarrow 4 + 6 = 10$

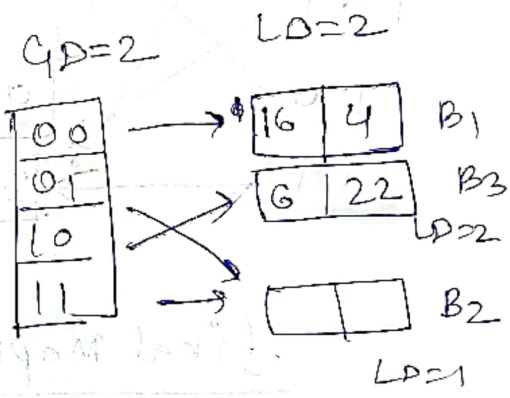
| | |
|---|---|
| 0 | 6 |
| 1 | 34 |
| 2 | |
| 3 | 14 |
| 4 | 37 |
| 5 | 10 |
| 6 | 17 |
| 7 | |
| 8 | 25 |
| 9 | |
| 10 | 26 |

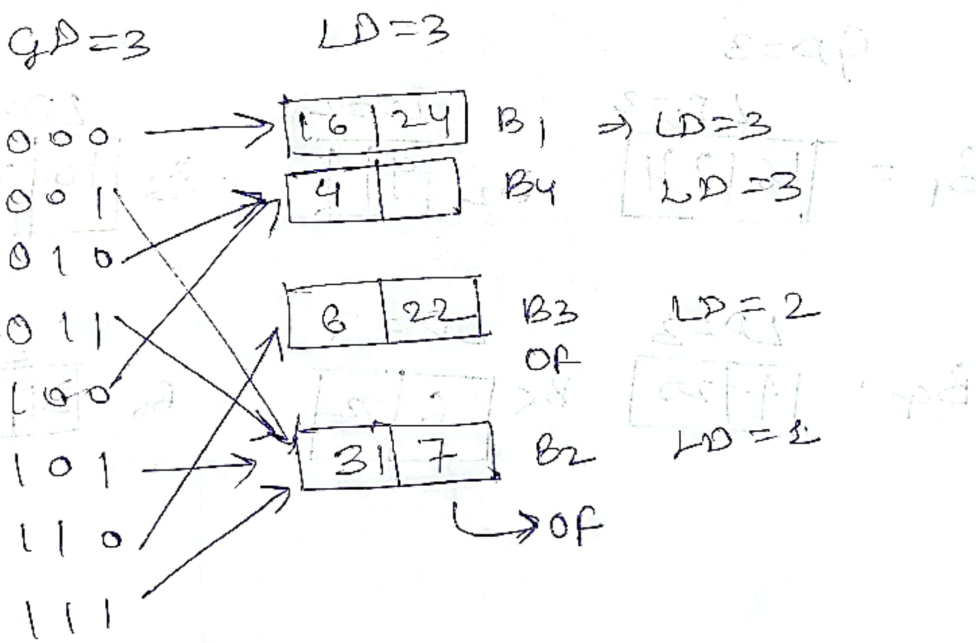
Sol-3

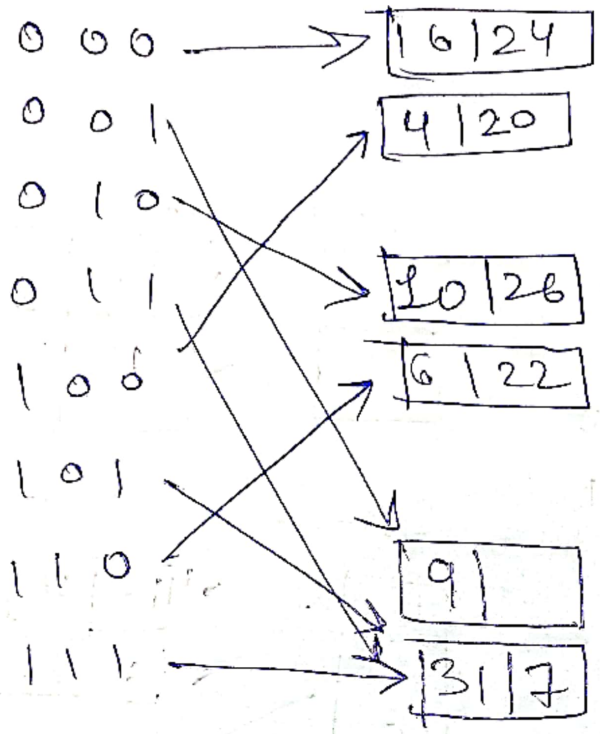
| Key Element |
|---|
| 16 |
| 4 |
| 6 |
| 22 |
| 24 |
| 10 |
| 31 |
| 7 |
| 9 |
| 20 |
| 26 |

0 1 0 0 0 0
0 0 0 1 0 0
0 0 0 1 1 0
0 1 0 1 1 0
0 1 1 0 0 0
0 0 1 0 1 0
0 1 1 1 1 1
0 0 0 1 1 1
0 0 1 0 0 1
0 1 0 1 0 0
0 1 1 0 1 0






## final Maping

GD=3

$B_1$ = LD=3 | 16 | 24 |

$B_2$ LD=2 | 9 | |

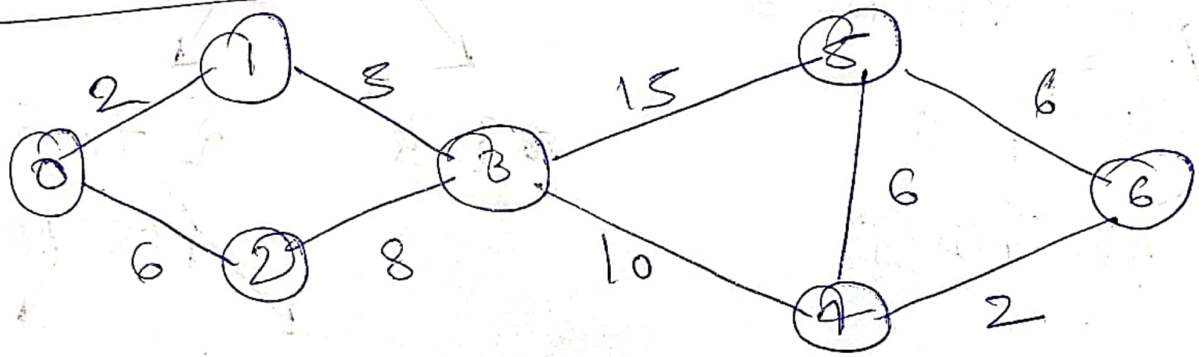
$B_3$ LD=3 | 10 | 26 |

$B_4$ LD=3 | 4 | 20 |

$B_5$ LD=3 | 6 | 22 |

$B_6$ LD=2 | 31 | 7 |

Sol-4




Initially

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|
| | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ | ∞ |
| Start from | (0) | 2 | 6 | ∞ | ∞ | ∞ | ∞ |
| | 0 | (2) | 6 | 7 | ∞ | ∞ | ∞ |
| | 0 | 2 | (6) | 7 | ∞ | ∞ | ∞ |
| | 0 | 2 | 6 | (7) | 17 | 22 | ∞ |
| | 0 | 2 | 6 | 7 | (17) | 22 | 19 |
| | 0 | 2 | 6 | 7 | 17 | 22 | (19) |
| | 0 | 2 | 6 | 7 | 17 | (22) | 19 |

| NODE | COST | PATH |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 2 | 0→1 |
| 2 | 6 | 0→2 |
| 3 | 7 | 0→1→3 |
| 4 | 17 | 0→1→3→4 |
| 6 | 19 | 0→1→3→4→6 |
| 5 | 22 | 0→1→3→5 |