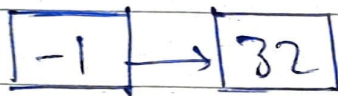# Skip List

Let no number of nodes $= 8$

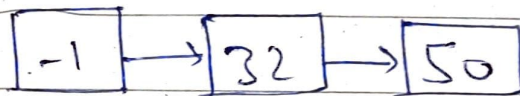number of levels $= \log_2 8 = 3$

Insertion → from Level 0

Insert (32),   Insert (50)
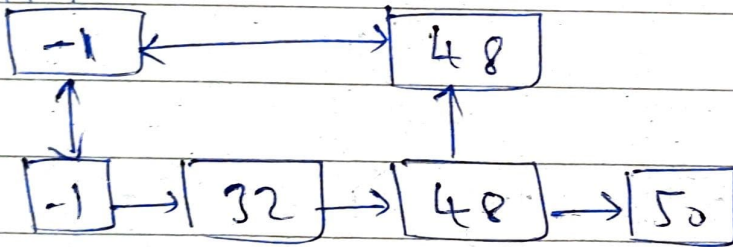
T   T

$$\boxed{-1} \rightarrow \boxed{32} \qquad\qquad \boxed{-1} \rightarrow \boxed{32} \rightarrow \boxed{50}$$

Insert (48)   Insert (20)

H T   T

Insert (12)

H H T

Insert(85)
HT

```
[-1] ←→ [12]
 ↑        ↑
[-1] ←→ [12] ←————————————→ [48] ←———————— [85]
 ↑        ↑                   ↑               ↑
[-1] → [12] → [20] → [32] → [48] → [50] → [85]
```

Insert(5)
T

```
[-1] ←——→ [12]
 ↑          ↑
[-1] ←→ [12] ←————————→ [48] ←————————→ [85]
 ↑        ↑               ↑                ↑
[-1] ←→ [5] ←→ [12] ←→ [20] ←→ [32] ←→ [48] ←→ [50] ←→ [85]
```

Insert(25)
HHT

```
[-1] ←→ [12] ←————————————→ [25] — NULL
 ↑        ↑                   ↑
[-1] ←→ [12] ←————————→ [25] ←————————→ [48]                [85]
 ↑        ↑               ↑               ↑                   ↑
[-1] ←→ [5] ←→ [12] → [20] ←→ [25] ←→ [32] ←→ [48] ←→ [50] ←→ [85]
```

8 elements inserted.
3 levels formed
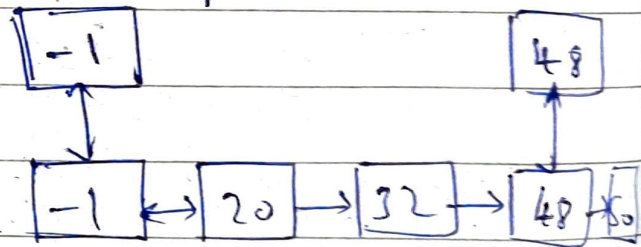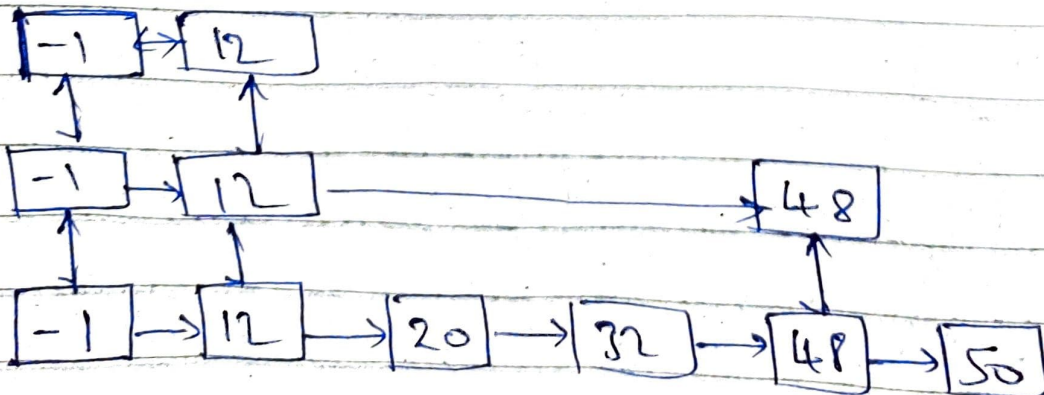
Final Skip List

Delete (25)

```
┌──────┐                ┌──────┐
│  -1  │ ◄──────────────►│  12  ├──── NULL
└──────┘                └──────┘
   ▲
   │
   ▼
┌──────┐      ┌──────┐           ┌──────┐              ┌──────┐        ┌──────┐
│  -1  │ ◄───►│  12  │ ◄─────────│  25  │ ◄───────────►│  48  │ ◄──────│  85  │
└──────┘      └──────┘           └──────┘              └──────┘        └──────┘
                                    ▲                     ▲               ▲
                                    │                     │               │
                                    ▼                     │               ▼
┌──────┐  ┌──────┐  ┌──────┐  ┌──────┐  ┌──────┐  ┌──────┐  ┌──────┐  ┌──────┐
│  -1  │◄►│   5  │◄►│  12  │◄►│  20  │◄►│  25  │◄►│  32  │◄►│  48  │◄►│  53  │◄► 85
└──────┘  └──────┘  └──────┘  └──────┘  └──────┘  └──────┘  └──────┘  └──────┘
```