

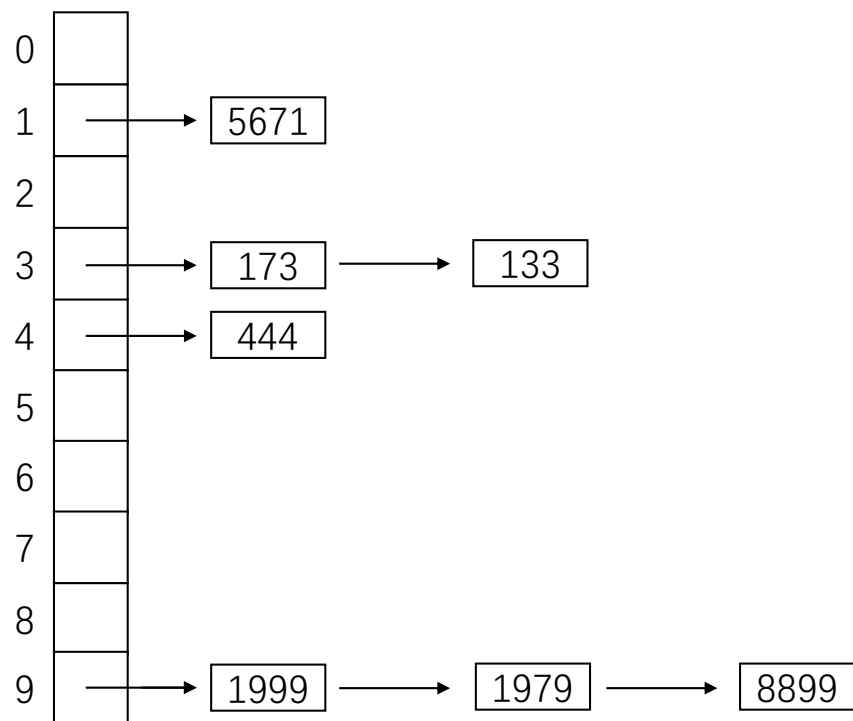
# —Assignment 7—

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# 1 Collision Resolution

## (a) Separate Chaining



**(b) Linear Probing**

0	1979
1	5671
2	1999
3	133
4	173
5	444
6	
7	
8	
9	8899

(c) Quadratic Probing

0	1979
1	5671
2	
3	133
4	173
5	444
6	
7	
8	1999
9	8899

(c) Double Hashing

0	
1	5671
2	1999
3	133
4	444
5	173
6	
7	1979
8	
9	8899

## 2 Hash Table Size

Define numbers of comparison in an unsuccessful case as  $U(L)$

Define numbers of comparison in an successful case as  $S(L)$

Define hash table size as  $n$

Define the number of elements as  $N$

We have that:

$$U(L) = \frac{1}{2} \left[ 1 + \frac{1}{1-L} \right] \leq 13 \Rightarrow L \leq \frac{4}{5}$$

$$S(L) = \frac{1}{2} \left[ 1 + \frac{1}{1-L} \right] \leq 10 \Rightarrow L \leq \frac{18}{19}$$

So:

$$L \leq \frac{4}{5}$$

Because  $N \leq 1000$ , we have:

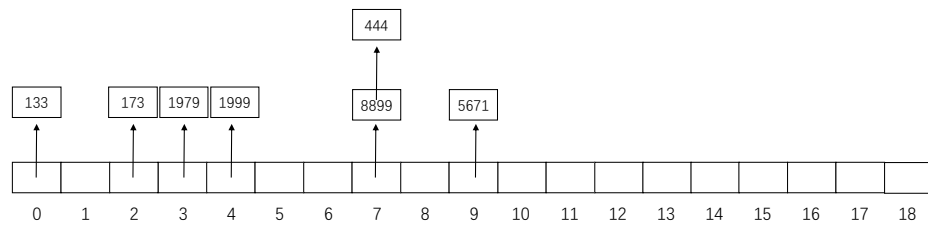
$$L = \frac{N}{n} \leq \frac{4}{5} \Rightarrow n \geq \frac{5}{4} \cdot 1000 = 1250$$

To avoid uneven distribution as much as possible,  $n$  should be a prime number:

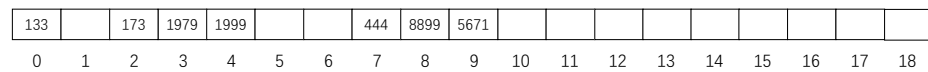
$$n = 1259$$

### 3 Rehashing

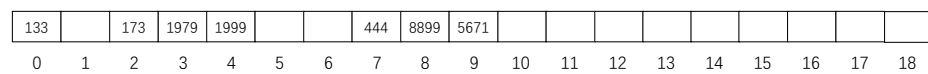
#### (a) Rehashing for Separate Chaining



#### (b) Rehashing for Linear Probing



#### (c) Rehashing for Quadratic Probing



#### (d) Rehashing for Double Hashing

