p.172 5.1

Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function h(X) = X (mod 10), show the resulting:

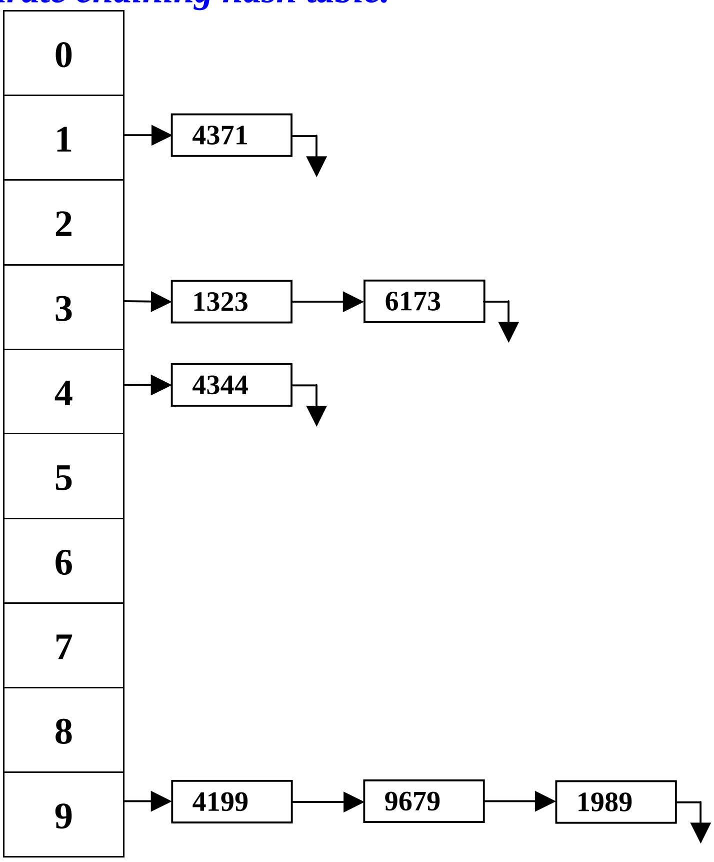
a. Separate chaining hash table.
b. Open addressing hash table using linear probing.
c. Open addressing hash table using quadratic probing.
d. Open addressing hash table with second hash function $h_2(X) = 7 - (X \bmod 7)$.

Answer

$h_f(4371)=1$ $h_f(1323)=3$ $h_f(6173)=3$ $h_f(4199)=9$ $h_f(4344)=4$ $h_f(9679)=9$ $h_f(1989)=9$

TableSize = 10

a. Separate chaining hash table.



b. Open addressing hash table using linear probing.

0	**9679**
1	**4371**
2	**1989**
3	**1323**
4	**6173**
5	**4344**
6	
7	
8	
9	**4199**

c. Open addressing hash table using quadratic probing.

0	**9679**
1	**4371**
2	
3	**1323**
4	**6173**
5	**4344**
6	
7	
8	**1989**
9	**4199**

d. Open addressing hash table with second hash function $h_2(X) = 7 - (X \bmod 7)$.

0	
1	**4371**
2	
3	**1323**
4	**6173**
5	**9679**
6	
7	**4344**
8	
9	**4199**

No place for 1989

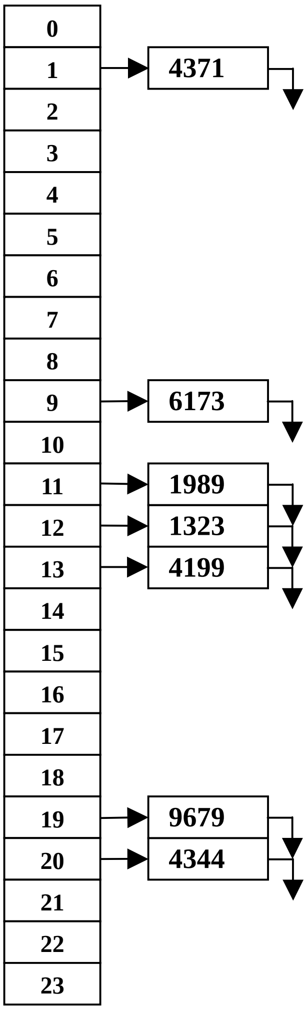
p.172 5.2

Show the result of rehashing the hash tables in Exercise 5.1.

Answer

The size of new table is 23, the first prime that is about twice as large as the original table size. The new hash function is then *h(X) = X mod 23*.

a. Separate chaining hash table.



b. *Open addressing hash table using linear probing.*

0	
1	**4371**
2	
3	
4	
5	
6	
7	
8	
9	**6173**
10	
11	**1989**
12	**1323**
13	**4199**
14	
15	
16	
17	
18	
19	**9679**
20	**4344**
21	
22	
23	

c. *Open addressing hash table using quadratic probing.*

d. *Open addressing hash table with second hash function* $h_2(X) = 7 - (X \bmod 7)$.

Same table obtained as in part *a* since there is no collision to be resolved.