# DS HW13

Deadline: 2019/1/8

## 手寫題

4. Repeat Exercise 3 using a linked list method for collisions. Compare the results in this exercise with the results you obtained in Exercise 3.

6. Repeat Exercise 5 using a linked list method for collisions. Compare the results in this exercise with the results you obtained in Exercise 5.

8. Repeat Exercise 7 using a key-offset method for collisions. Compare the results in this exercise with the results you obtained in Exercise 7.

10. Repeat Exercise 9 using the fold boundary method.

12. Repeat Exercise 11 using a key-offset method for collisions. Compare the results in this exercise with the results you obtained in Exercise 11.

## 參考

3. Using the modulo-division method and linear probing, store the keys shown below in an array with 19 elements. How many collisions occurred? What is the density of the list after all keys have been inserted?

```
224562 137456 214562

140145 214576 162145

144467 199645 234534
```

5. Repeat Exercise 3 using the digit-extraction method (first, third, and fifth digits) and quadratic probing.

7. Repeat Exercise 3 using the midsquare method, with the center two digits, for hashing. Use a pseudorandom-number generator for rehashing if a collision occurs. Use $a = 3$ and $c = -1$ as the factors.

9. Repeat Exercise 3 using the fold shift method and folding two digits at a time and then use modulo-division on the folded sum.

11. Repeat Exercise 3 using the rotation method for hashing. First rotate the far-right digits two to the left and then use digit extraction (first, third, and fifth digits). Use the linear probe method to resolve collisions.

程式題

19. Write a program that uses a hashing algorithm to create a list of inventory parts and their quantities sold in the past month. After creating the hashed list, write a simple menu-driven user interface that allows the user to select from the following options:

   a. Search for an inventory item and report its quantity sold
   b. Print the inventory parts and their quantities sold
   c. Analyze the efficiency of the hashing algorithm

   The parts data are contained in a text file, as shown in Table 13-4. The key is the three-digit part number. The quantity represents the units sold during the past month.

| Part number | Quantity |
| --- | --- |
| 112 | 12 |
| 130 | 30 |
| 156 | 56 |
| 173 | 17 |
| 197 | 19 |
| 150 | 50 |
| 166 | 66 |
| 113 | 13 |
| 123 | 12 |
| 143 | 14 |
| 167 | 16 |
| 189 | 18 |
| 193 | 19 |
| 117 | 11 |
| 176 | 76 |

TABLE 13-4 Data for Hashing Problem

Three outputs are required from your program.

a. Test the following searches and return appropriate messages. You may test other part numbers if you desire, but the following tests must be completed first:

- Search for 112

- Search for 126

- Search for 173

b. When requested, analyze the efficiency of the hashing algorithm for this set of data. Your printout should follow the report format shown below.

```
Percentage of Prime Area Filled:xx%
Average nodes in linked lists:   nn
Longest linked list              nn
```

c. The printout of the entire contents of the list should use the following format:

```
    Home Addr   Prime Area     Overflow List
       0          130/30
       1
       2          112/12
       3          123/12      143/14, 173/17, 193/19
       .
       .
       .
```