

Homework Set #7

1. Exercise 8.2-1 (page 196) (20 points)

Ans:

	1	2	3	4	5	6	7	8	9	10	11
A	6	0	2	0	1	3	4	6	1	3	2

	0	1	2	3	4	5	6
C	2	2	2	2	1	0	2

	0	1	2	3	4	5	6
C	2	4	6	8	9	9	11

	1	2	3	4	5	6	7	8	9	10	11
B						2					

	0	1	2	3	4	5	6
C	2	4	5	8	9	9	11

Like shown like 8.2, we do not show more example step. Continue this process, finally we get

	1	2	3	4	5	6	7	8	9	10	11
B	0	0	1	1	2	2	3	3	4	6	6

2. Exercise 8.2-3 (page 196) (20 points)

Ans:

First we show that algorithm works properly.

	1	2	3	4	5	6	7	8	9	10	11
A	6	0	2	0	1	3	4	6	1	3	2

	0	1	2	3	4	5	6
C	2	2	2	2	1	0	2

	0	1	2	3	4	5	6
C	2	4	6	8	9	9	11

	1	2	3	4	5	6	7	8	9	10	11
B											6

	0	1	2	3	4	5	6
C	2	4	6	8	9	9	10

Like shown like 8.2, we do not show more example step. Continue this process, finally we get

	1	2	3	4	5	6	7	8	9	10	11
B	0	0	1	1	2	2	3	3	4	6	6

The modified algorithm is unstable, cause we change to j from 1 to length, and the line 12, $C[A[j]] = C[A[j]] - 1$, this statement will make the element with bigger j get prior position which decorates the stability.

3. Exercise 8.3-1 (page 199) (20 points)

Ans:

		I		I		I
COW		SEA		TAB		BAR
DOG		TEA		BAR		BIG
SEA		MOB		EAR		BOX
RUG		TAB		TAR		COW
ROW		DOG		SEA		DIG
MOB		RUG		TEA		DOG
BOX	→	DIG	→	DIG	→	EAR
TAB		BIG		BIG		FOX
BAR		BAR		MOB		MOB
EAR		EAR		DOG		NOW
TAR		TAR		COW		ROW
DIG		COW		ROW		RUG
BIG		ROW		NOW		SEA
TEA		NOW		BOX		TAR
NOW		BOX		FOX		TAR
FOX		FOX		RUG		TEA

4. Exercise 8.4-1 (page 204) (20 points)

Ans:

	A		B
1	.79	1 →	.13 → .16 /
2	.13	2 →	.20 /
3	.16	3 →	.39 /
4	.64	4 →	.42 /
5	.39	5 →	.53 /
6	.20	6 →	.64 /
7	.89	7 →	.71 → .79 /
8	.53	8 →	.89 /
9	.71		
10	.42		

5. Exercise 8.4-2 (page 204) (20 points)

Ans:

If all the element locate in one bucket, the algorithm run line 8 insertion sort for all element. So the worst case is $\Theta(n^2)$. Change the insertion sort to nlgn algorithm like Merge sort will make its worst-case running time $O(n \lg n)$.