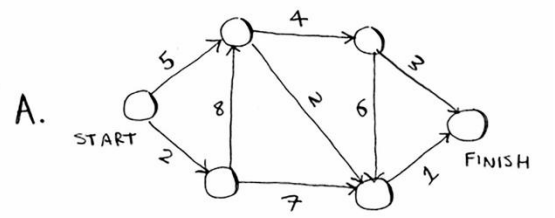
Task3

ch.7

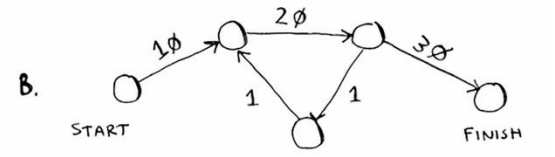
EXERCISE

7.1 In each of these graphs, what is the weight of the shortest path from start to finish?

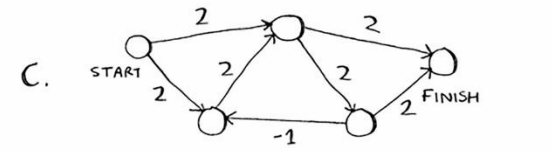
7.1.A (start->5->2->1->finish)=8



7.1.B (start->10->20->30->finish)=60



7.1.B (start->2->2->finish)=4



ch.8

EXERCISES

8.1 You work for a furniture company, and you have to ship furniture all over the country. You need to pack your truck with boxes. All the boxes are of different sizes, and you're trying to maximize the space you use in each truck. How would you pick boxes to maximize space? Come up with a greedy strategy. Will that give you the optimal solution?

Greedy strategy

1. Pick the largest box that will fit in the truck.

2. Pick the next largest box that will fit in the truck. And so on ,Until the truck can't pack more boxes.

Greedy strategy will not give optimal solution.

8.2 You're going to Europe, and you have seven days to see everything you can. You assign a point value to each item (how much you want to see it) and estimate how long it takes. How can you maximize the point total (seeing all the things you really want to see) during your stay? Come up with a greedy strategy. Will that give you the optimal solution?

1. Pick the activity that have max points .

2. And so on ,Until the time run out .

Greedy strategy will not give optimal solution.

For each of these algorithms, say whether it's a greedy algorithm or not.

8.3 Quicksort ->no

8.4 Breadth-first search ->yes

8.5 Dijkstra's algorithm->yes

8.6 A postman needs to deliver to 20 homes. He needs to find the shortest route that goes to all 20 homes. Is this an NP-complete problem? yes

8.7 Finding the largest clique in a set of people (a clique is a set of people who all know each other). Is this an NP-complete problem? yes

8.8 You're making a map of the USA, and you need to color adjacent states with different colors. You have to find the minimum number of colors you need so that no two adjacent states are the same color. Is this an NP-complete problem? yes

ch.9

9.1 Suppose you can steal another item: an MP3 player. It weighs 1 lb and is worth $1,000. Should you steal it?

item	1	2	3	4
guitar	1500 (g)	1500 (g)	1500 (g)	1500 (g)
Stereo	1500 (g)	1500(g)	1500 (g)	3000 (S)
Laptop	1500 (g)	1500(g)	2000 (L)	3000 (S)
Iphone	2000 (I)	3500(I,g)	3500 (I,g)	4000 (I,L)
MP3	2000 (I)	3500 (I,g)	4500 (M,I,g)	4500 (M,I,g)

9.2 Suppose you're going camping. You have a knapsack that will hold 6 lb, and you can take the following items. Each has a value, and the higher the value, the more important the item is:

- Water, 3 lb, 10
- Book, 1 lb, 3
- Food, 2 lb, 9
- Jacket, 2 lb, 5
- Camera, 1 lb, 6

What's the optimal set of items to take on your camping trip?

item	1	2	3	4	5	6
Book	3 (b)	3 (b)	3 (b)	3 (b)	3 (b)	3 (b)
Camera	6(C)	9(b,C)	9(b,C)	9(b,C)	9(b,C)	9(b,C)
Food	6(C)	9(b,C)	15(C,F)	18(C,F,b)	18(C,F,b)	18(C,F,b)
Jacket	6(C)	9(b,C)	15(C,F)	20(C,F,j)	20(C,F,j)	21(C,F,j,b)
water	6(C)	9(b,C)	15(C,F)	20(C,F,j)	20(C,F,j)	25(C,F,W)

9.3 Draw and fill in the grid to calculate the longest common substring between blue and clues

	C	L	U	E	S
B	0	0	0	0	0
L	0	1	0	0	0
U	0	0	2	0	0
E	0	0	0	3	0

longest common substring between blue and clues is 3