

Practice 3

We highly encourage being environment friendly and trying all problems on your own.

我们强烈建议您保持环境友好并自行解决所有问题

1

Knapsack Problem . There are 5 items that have a value and weight list below, the knapsack can contain at most 100 Lbs. Solve the problem both as fractional knapsack and 0/1 knapsack.

背包问题。5个物品的价值和重量列表如下，背包最多可以装下100磅。请解决，部分背包问题和0-1背包问题。

	1	2	3	4	5
value (US \$)	20	30	65	40	60
weight (Lbs)	10	20	30	40	50
value / weight	2	1.5	2.1	1	1.2

2

A simple **scheduling problem** . We are given jobs j_1, j_2, \dots, j_n , all with known running times t_1, t_2, \dots, t_n , respectively. We have a single processor. What is the best way to schedule these jobs in order to minimize the average completion time. Assume that it is a nonpreemptive scheduling: once a job is started, it must run to completion. The following is an instance.

一个简单的 **调度问题**。我们给出作业 j_1, j_2, \dots, j_n ，他们分别具有已知的运行时间 t_1, t_2, \dots, t_n 。我们有单个处理器。为了最小的平均完成时间，调度这些作业的最好方法是什么。假设这是一个非抢占式的调度：一旦启动一个作业，他必须完成。以下是一个用例。

1. $(j_1, j_2, j_3, j_4): (15, 8, 3, 10)$

3

Single-source shortest paths . The following is the adjacency matrix, vertex A is the source.

单源最短路。以下是邻接矩阵，以顶点 A 为源。

	A	B	C	D	E
A		-1	3		
B			3	2	2
C					
D		1	5		
E				-3	

4

All-pairs shortest paths . The adjacency matrix is as same as that of problem 3. (Use Floyd or Johnsons's algorithm)

所有节点对最短路径。邻接矩阵同第3题。（请使用 Floyd 或 Johnsons 的算法）