

Operations Research, Spring 2015

Suggested Solution for Homework 0

Solution providers: Kiwi Liu and Amy Liu
 Department of Information Management
 National Taiwan University

1. (a) The maximum attainable profit $z^* = \$50070$.
 There may be many ways of assignments to obtain the optimal value. Here, we only list one of them. In this assignment, only order 2 will not be done. Below are each fab's productions (in machine hours).

Fab1

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	37.5	0	0	0	250	80	150	0	0	0
4	0	0	0	0	0	0	0	0	200	0	0	0
5	0	0	0	0	0	0	0	0	62.5	0	0	0
6	0	0	0	0	0	0	0	60	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>840</u>

Fab2

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	200	0	0	0	0	133.333	18.333	120	25	0
10	0	0	0	0	0	0	0	133.333	0	120	0	0
											sum	<u>750</u>

Fab3

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	37.5	0	0	0	0	0	0	0	0	66.667
4	0	200	0	0	0	0	0	0	0	0	0	100
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	17.083	116.667	0	0	0	0	0	0	0	0	0
7	0	50	16.667	0	0	0	0	0	0	0	0	5.417
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>610</u>

Fab4

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	200	0	0	0	60	62.5	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	125	0	0	0	0	0	22.5
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>470</u>

Fab5

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	100	133.333	0	0	0	0	33.333	0	0	50.833	0	0
9	75	0	0	0	0	66.667	100	0	0	0	0	0.833
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>560</u>

Fab6

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	40	60	0	0	0	0	111.111	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>211.111</u>

Fab7

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	333.333	0	0	0	0	0	133.333	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	50	66.667	0	0	0	0	247.5	200	100
9	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0
											sum	<u>1130.833</u>

Fab8

order/item	1	2	3	4	5	6	7	8	9	10	11	12
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	65.833	0	50	0	0	0	0	0	0	300	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	133.333	33.333	0	0	0	6.667	0	0	74.167
10	0	0	0	66.667	0	0	0	0	0	0	0	200
											sum	<u>930</u>

2. (a) As we talked about in videos, variables are those to be determined, and parameters are given with known values.

Q_{ij} : parameter

R_{ik} : parameter

C_k : parameter

- (b) We can find all values in MS Excel file "OR-Sp15_hw00_data".

Q_{18} : 2000

R_{52} : 0

C_3 : 610

- (c) The numbers are here:

j	$\max_{i \in I} \{Q_{ij}\}$
1	5000
2	3000
3	6000
4	8000
5	5000
6	3500
7	5000
8	3000
9	4000
10	4000

3. Omitted.