

Examples Chapter 7

- 7.7. Given the forecasts, customer orders, and on-hand inventory shown for a product in an ATO environment, derive the MPS for
- Lot-for-lot production
 - Batch production where batch size = 8000

Current inventory = 7500	Week					
	1	2	3	4	5	6
F_t	6000	6000	5600	5000	6000	5000
O_t	4600	4000	3500	500	0	0

- 7.8. Add the ATP values to the MPS plan in Problem 7.7.

- 7.10. Using the costs, requirements, and times as shown below for two products for a planning horizon of three weeks, with 1200 hours per week, formulate the MPS problem mathematically. This is an MTS environment.

Week	Demand (units)			Current inventory	Hours/unit	Cost (\$)	
	1	2	3			Set-up	Holding
P1	200	250	150	100	2.50	3.75	0.65
P2	560	590	700	50	1.20	5.50	0.32

- 7.11. Given the following data for an ATO environment, formulate the MPS problem mathematically. There are three modules that are assembled to produce two products. There are currently six orders to be filled over the next three time periods. There are 112 hours of production time available in each period.

Customer orders			
Order j	Product i	Quantity Q_i	Week due t
1	1	15	1
2	2	30	1
3	1	20	2
4	2	30	2
5	1	10	3
6	2	20	3

q_{ki}			
k			
i	1	2	3
1	3	2	1
2	1	1	1

q_{ki} = number of modules of type k required to assemble product i

g_{kj}							
j							
k	1	2	3	4	5	6	Total
1	45	30	60	30	30	20	215
2	30	30	40	30	20	20	170
3	15	60	20	60	10	40	205

g_{kj} = number of modules of type k required for order j

- 7.14. Pell Sons Boats manufactures three types of sailboats. Their final assembly operation consists of three workcenters: paint, mast fitting, and roping. Given the MPS and the bill of capacity for PSB, Inc., shown in the accompanying tables, create a capacity profile. If necessary, suggest an alternative MPS that would be feasible.

MPS (units)								
Week	1	2	3	4	5	6	7	8
Boat 1	94	93	42	33	73	87	71	98
Boat 2	65	20	48	57	77	37	74	40
Boat 3	71	53	56	22	91	79	93	66

Bill of capacity (minutes)			
	Paint	Mast	Rope
Boat 1	43	22	17
Boat 2	57	30	23
Boat 3	90	50	41

Approx. 225 130 100
hours

- 7.15. The following data represent the planned releases to an assembly workcenter that has a capacity of 475 hr per week. Use Karni's (1982) I/O-analysis method to analyze the lead times, assuming $U_o = 0$.

Week (t)						
	1	2	3	4	5	6
R_t	379	508	248	295	351	227

- 7.16. Using the data in Problem 7.15, determine the additional capacity that would be required to achieve a lead time of 0.5 weeks for this volume of work.

- 7.17. Rock Huggers, Inc., manufactures four types of contour sport sandals: the Chewy, the Tally, the Ammy, and the Grandy. Blick Carry, production planner for RHI received the following forecasts from the sales department:

Forecasts, in pairs \times 1000

	September				October			
	1	2	3	4	5	6	7	8
Chewy	98	94	93	87	73	71	42	33
Tally	74	71	57	33	28	18	12	9
Ammy	50	48	21	13	11	9	4	2
Grandy	24	24	21	18	17	16	16	8

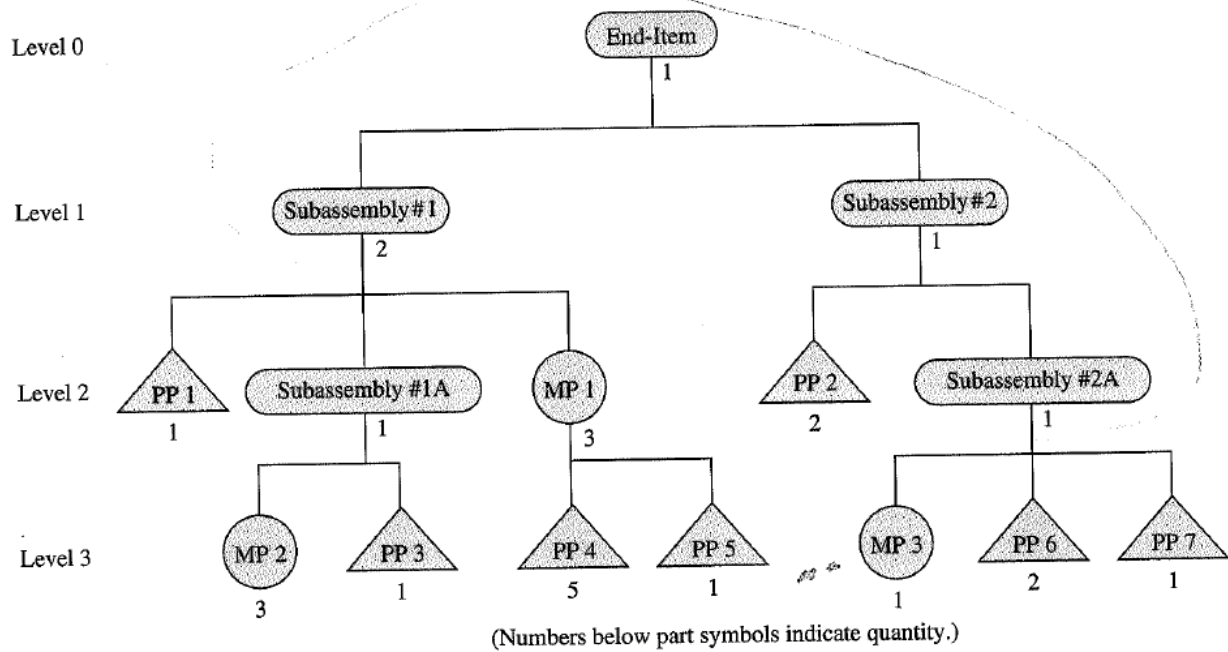
Blick also received the following quantities representing customer orders for those weeks:

Customer orders, in pairs \times 1000

	September				October			
	1	2	3	4	5	6	7	8
Chewy	93	93	78	71	61	27	11	3
Tally	63	61	59	37	24	15	11	10
Ammy	44	34	19	18	17	14	8	7
Grandy	30	29	24	14	7	5	4	1

Inventory quantities for the Chewy, the Tally, the Ammy, and the Grandy are 129,000, 108,000, 79,000, and 43,000, respectively. The production departments like Blick to schedule in batch sizes that are multiples of 100,000. What would Blick's MPS quantities look like for the four types of sandals?

7.31. For the generic product structure and the MPS shown below, perform the explosion part of the MRP process.



Level	Item	Weekly quantity					
		1	2	3	4	5	6
0	End-item	150	200	240	190	140	100

7.32. Given the scheduled receipts shown below for the subassembly #1 in the generic product structure of Problem 7.31, perform the netting procedure if the on-hand inventory at time 0 is 75.

Scheduled receipts per week						
1	2	3	4	5	6	
500	300	100	50	0	0	

7.33. Perform the offsetting procedure for the net requirements in Problem 7.32 assuming a lead time of three weeks and a lot size of 500 units.

7.34. Complete the MRP record shown in the following table for subassembly #2 in the product structure of Problem 7.31. Use the following assumptions:

- Lead time for subassembly #2 = two weeks.
- Lead time for all other parts = 1 week.
- Lot size for subassembly #2 = 300 units.
- Lot-for-lot method is used to determine lot sizes for all other parts.