

Chapter 14 solutions

[Business](#), [Company](#)



Solutions for Review Problems of Chapter 14 1. a. Given the following diagram for a product, determine the quantity of each component required to assemble one unit of the finished product. b. Draw a tree diagram for the stapler:

a. F: 2 J: $2 \times 2 = 4$ D: $2 \times 4 = 8$ G: 1 L: $1 \times 2 = 2$ J: $1 \times 2 = 2$ H: 1 A: $1 \times 4 = 4$ D: $1 \times 2 = 2$ Totals: F = 2; G = 1; H = 1; J = 6; D = 10; L = 2; A = 4

b. Stapler Top Assembly Base Assembly Cover Spring Slide Assembly Base Strike Pad Rubber Pad 2 Slide Spring 2. The following table lists the components needed to assemble an end item, lead times, and quantities on hand.

. b. If 20 units of the end item are to be assembled, how many additional units of E are needed? (Hint: You don't need to develop an MRP plan to determine this.) An order for the end item is scheduled to be shipped at the start of week 11. What is the latest week that the order can be started and still be ready to ship on time? (Hint: You don't need to develop an MRP plan for this part either.) a. B: $20 \times 2 = 40 - 10 = 30$ E: $30 \times 2 = 60 - 12 = 48$ C: $20 \times 1 = 20 - 10 = 10$ E: $10 \times 2 = 20$ End Item D: $20 \times 3 = 60 - 25 = 35$ E: $35 \times 2 = 70$

Total: $48 + 20 + 70 = 138$ b. B(2) C D(3) E(2) F(3) G(2) E(2) H(4) E(2) Total LT 4 5 5 5 6 The longest sequence is 6 weeks. Week 11 - 6 weeks = Week 5.

5 3. End item P is composed of three subassemblies: K, L, and W. K is assembled using 3 Gs and 4 Hs; L is made of 2 Ms and 2 Ns; and W is made of 3 Zs. On-hand inventories are 20 Ls, 40 Gs, and 200 Hs. Scheduled receipts are 10 Ks at the start of week 3, 30 Ks at the start of week 6, and 200 Ws at the start of week 3. One hundred Ps will be shipped at the start of week 6, and another 100 at the start of week 7.

Lead times are two weeks for subassemblies and one week for components G, H, and M. Final assembly of P requires one week. Include an extra 10 percent scrap allowance in each planned order of G. The minimum order size for H is 200 units. Develop each of the following: a. b. c. d. A product structure tree. An assembly time chart. A master schedule for P. A material requirements plan for K, G, and H using lot-for-lot ordering. Solution: a. Product Structure Tree P K 3G c. Master Schedule d. Weeks Quantity LT = 1 wk. Beg. Inv. 1 2 3 4 5 Beg. Inv. 1 2 3 4 5 6 100 6 100 7 100 7 100

L 4H 2 2N W 3Z P Gross requirements Scheduled receipts Projected on hand Net requirements Planned-order receipts Planned-order releases K LT = 2 wk. Beg. Inv. 1 2 3 4 100 5 100 10 10 10 10 90 90 90 Beg. Inv. 1 2 3 270 40 40 40 40 230 253 253 231 210 231 70 4 210 5 100 100 100 6 100 30 70 70 100 100 7 Gross requirements Scheduled receipts Projected on hand Net requirements Planned-order receipts Planned-order releases G(3) LT = 1 wk. 6 7 Gross requirements Scheduled receipts Projected on hand Net requirements Planned-order receipts Planned-order releases H(4) LT = 1 wk. Beg.

Inv. 1 2 3 360 4 280 40 240 240 5 6 7 Gross requirements Scheduled receipts Projected on hand Net requirements Planned-order receipts Planned-order releases 200 200 200 200 200 160 200 240 4. Oh No! , Inc. , sells three models of radar detector units. It buys the three basic models (E, F, and G) from a Japanese manufacturer and adds one, two, or four lights (component D) to further differentiate the models. D is bought from a domestic producer. Lead times are one week for all items except C, which is two weeks. There are ample supplies of the basic units (E, F, and G) on hand.

There are also 10 units of B, 10 units of C, and 25 units of D on hand. Lot-sizing rules are lot-for-lot ordering for all items except D, which must be ordered in multiples of 100 units. There is a scheduled receipt of 100 units of D in week 1. The master schedule calls for 40 units of A to be produced in week 4, 60 units of B in week 5, and 30 units of C in week 6. Prepare a material requirements plan for D and its parents. Solution: Master Schedule

Week	Quantity	Beg. Inv.	1	2	3	4	40A	5	60B	6	30C
A LT = 1 wk.											
Beg. Inv. 1 2 3											
4	40	5	6								

Gross requirements		Scheduled receipts		Projected on hand		Net requirements	
Planned order receipt		Planned order release		Beg. Inv.		B LT = 1 wk.	
1	2	3	4	5	60	6	
Gross requirements Scheduled receipts Projected on hand Net requirements Planned order receipt Planned order release Beg. Inv. 50 10 10							
10	10	10	10	50	50	C	LT = 2 wks.
1	2	3	4	5	6	30	
Gross requirements Scheduled receipts Projected on hand Net requirements Planned order receipt Planned order release D LT = 1 wk. Beg. Inv. 1 2 3 40 100 25 125							
125	125	85	95	100	100	5	20 4 180 5 10 10 10 10 10 10 20 20 6

Gross requirements Scheduled receipts Projected on hand Net requirements Planned order receipt Planned order release 5. Using the diagram below, do the following: a. Draw a tree diagram for the scissors. b. Prepare an MRP for scissors. Lead times are one day for each component and final scissor assembly, but two days for the plastic grips. Six hundred pairs of scissors are needed on Day 6. Note: There are 200 straight blades and 350 bent blades on hand, and 40 top blade assemblies on hand. Solution: a. Scissors Bottom Blade Assembly Screw Top Blade Assembly Straight Blade b. Master Schedule for:

Straight Plastic Grip Bent Blade Bent Plastic Grip Week Quantity Beg. Inv. 1 2
 3 4 5 6 600 7 8 Week Scissors (LT = 1 week) Gross requirements Scheduled
 receipts On hand Net requirements Planned order receipts Planned order
 releases 600 600 600 Beg. Inv. 1 2 3 4 5 6 600 7 8 Week Bottom Blade
 Assembly (LT = 1 week) Gross requirements Scheduled receipts On hand Net
 requirements Planned order receipts Planned order releases 600 600 600
 Beg. Inv. 1 2 3 4 5 600 6 7 8 Week Top Blade Assembly (LT = 1 week) Gross
 requirements Scheduled receipts On hand Net requirements Planned order
 receipts Planned order releases Beg.

Inv. 560 Week Screw (LT = 1 week) Gross requirements Scheduled receipts
 On hand Net requirements Planned order receipts Planned order releases
 Week Straight Blade (LT = 1 week) Gross requirements Scheduled receipts
 On hand Net requirements Planned order receipts 200 200 200 200 200 400
 400 Beg. Inv. 1 2 3 4 600 5 6 7 8 600 600 600 1 2 3 4 5 6 600 7 8 40 40 40
 40 40 40 560 560 Beg. Inv. 1 2 3 4 5 600 6 7 8 Planned order releases 400
 Week Straight Plastic Grip (LT = 2 weeks) Gross requirements Scheduled
 receipts On hand Net requirements Planned order receipts Planned order
 releases Beg. Inv. 00 Week Bent Blade (LT = 1 week) Gross requirements
 Scheduled receipts On hand Net requirements Planned order receipts
 Planned order releases Bent Plastic Grip (LT = 2 weeks) Gross requirements
 Scheduled receipts On hand Net requirements Planned order receipts
 Planned order releases 560 560 560 Beg. Inv. 210 Week 1 2 3 4 560 5 6 7 8
 350 350 350 350 350 210 210 1 2 3 4 560 5 6 7 8 600 600 Beg. Inv. 1 2 3 4
 600 5 6 7 8 6. Develop a material requirements plan for component H. Lead

times for the end item and each component except B are one week. The lead time for B is three weeks. Sixty units of A are needed at the start of week 8.

There are currently 15 units of B on hand and 130 of E on hand, and 50 units of H are in production and will be completed by the start of week 2. Solution:

Master Schedule Week Quantity Beginning inventory 1 2 3 4 5 6 7 1 2 3 4 5
 6 7 8 60 8 A LT = 1 Gross requirements Scheduled receipts Projected on
 hand Net requirements Planned-order receipts Planned-order releases
 Beginning inventory 1 2 3 4 5 6 60 7 60 60 60 B(2) LT = 3 8 Gross
 requirements Scheduled receipts Projected on hand Net requirements
 Planned-order receipts Planned-order releases 105 15 15 15 15 15 15 15 120
 15 105 105 C LT = 1

Beginning inventory 1 2 3 4 5 6 7 8 Gross requirements Scheduled receipts
 Projected on hand Net requirements Planned-order receipts Planned-order
 releases 60 60 60 60 E(2) E(4) LT = 1 Beginning inventory 1 2 3 4 5 6 7 8
 Gross requirements Scheduled receipts Projected on hand Net requirements
 Planned-order receipts Planned-order releases 80 130 130 130 130 210 240
 130 80 80 240 240 240 H(E3) H(E3) LT = 1 Beginning inventory 1 2 3 4 5 6
 7 8 Gross requirements Scheduled receipts Projected on hand Net
 requirements Planned-order receipts Planned-order releases 190 50 50 240
 720 50 190 190 240 720 720