

Worksheet Four: Materials Requirement Planning

Please attempt the questions before the session and be prepared to share your solutions.

Question One

Company OLDCO manufactures product Y. The demand for Y is stationary over time, but with a seasonal effect. The weekly demand for product Y is shown in Table 4.

Table 4: Weekly demands for product Y

Week	5	6	7	8	9	10	11	12
Demand	30	55	80	30	65	90	25	70

Product Y is made of two units of X and one unit of U. Component X consists of one unit of V and one unit of W. Component U is made of one unit of X and one unit of T. Production and assembly of Y and X each take one week; assembly of U takes two weeks. All other assembly times or lead times may be assumed to be negligible.

At the end of period 4, 15 units of Y are expected to be in stock, and 10 units of X will be available in period 2. The inventory holding costs for X and W are £1 per unit per week and £0.01 per unit per week, respectively. The machine producing X appears to be critical in the entire process. The setup cost to start producing X is therefore high – estimated at £300 per setup.

- (a) Draw the product structure diagram for product Y
- (b) Using the demand for product Y given in the table above, determine the planned order release (lot-for-lot) for X using an MRP approach. Organise your calculations in an appropriate table and explain your approach.

Question Two

A manufacturing company produces two products, A and B, which have a common component Y (see Figure 1). Table 3 shows the MPS for A and B for the next eight weeks. The projected inventory levels for A and B at the end of week 3 are 30 and 25 units, respectively. In addition, 5 units of component X will be available in week 4, while 50 units of components Y are expected to arrive in week 5.

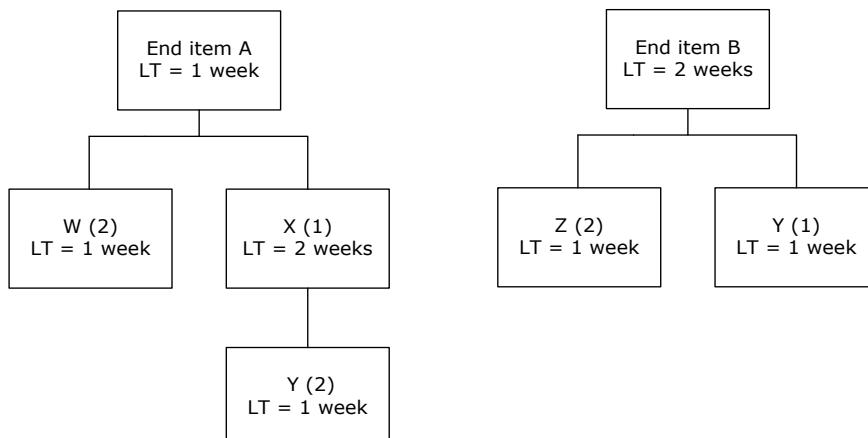


Figure 1: Product structure diagram for A and B

Table 3: MPS: weekly demand for A and B

Week	4	5	6	7	8	9	10	11
Demand A	65	55	30	95	40	25	30	35
Demand B	55	75	40	55	85	80	85	95

- (a) Determine the planned order release (lot-for-lot) for Y. Describe briefly your approach and arrange your calculations in an appropriate table.
- (b) Suppose that the capacity to produce Y is 120 units per week. The production setup cost for Y is £150 and the holding cost is £0.50 per unit per week. Is the Planned Order Release for Y from part (a) capacity feasible. If not, try to obtain your best possible capacity feasible plan for Y

Question Three

Office Supplies Ltd. produces office equipment. Their most popular item is the Soft Chair. The demand for the chair over an eight-week period is shown below:

Week	3	4	5	6	7	8	9	10
Demand	150	70	190	80	60	100	85	120

The lead times are given as follows: two weeks for the chairs, seat and back and one week for the legs. The company is expecting a receipt of 50 seat units in week two and 20 back units in week 5.

At the end of week 2 the company expects to have 260 chair units in inventory. In week one, the company expects to have 70 seat units, 35 back units and 60 leg units in inventory.

- (a) Draw the product structure diagram (bill of materials) for the chair
- (b) Using the demand for the chairs given in the table above, determine the planned order release (lot-for-lot) for the chair and component parts using an MRP approach. Find the cost associated with this plan
- (c) Compare the cost of the lot for lot lotsizing POR for the seat with EOQ lotsizing. Assume the setup cost is £275 and the holding cost is £1.50 per unit per week.