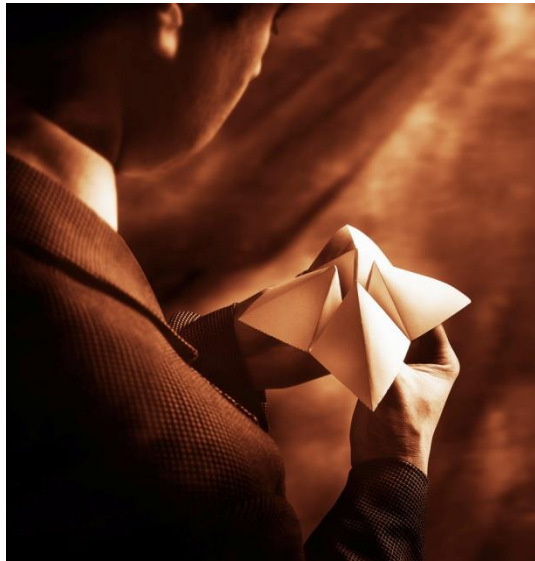# MRP

- MRP I -- Material Requirements Planning
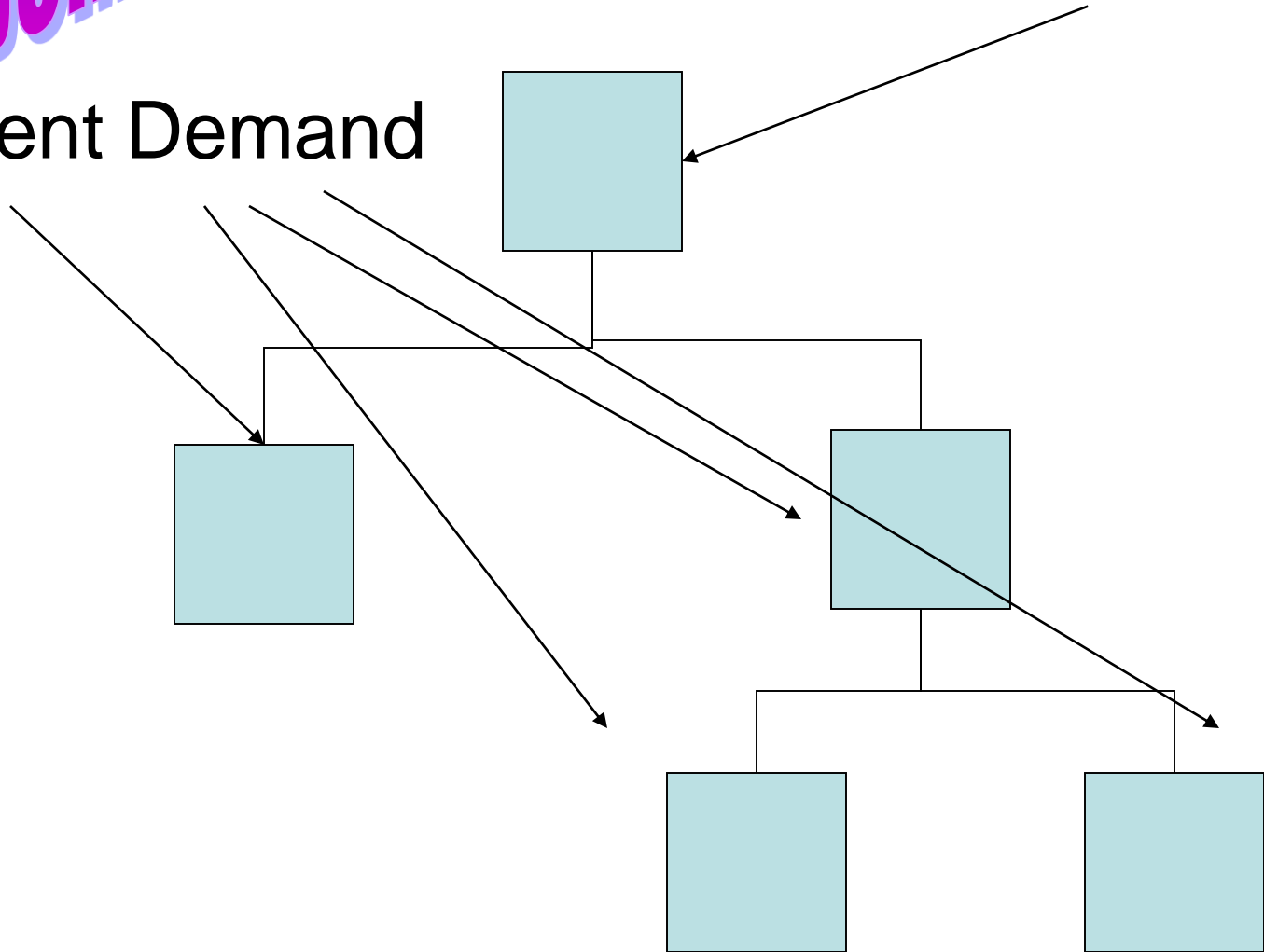- MRPII – Manufacturing Resource Planning

MRP Assumptions

- Infinite Capacity

- Fixed Lead Times
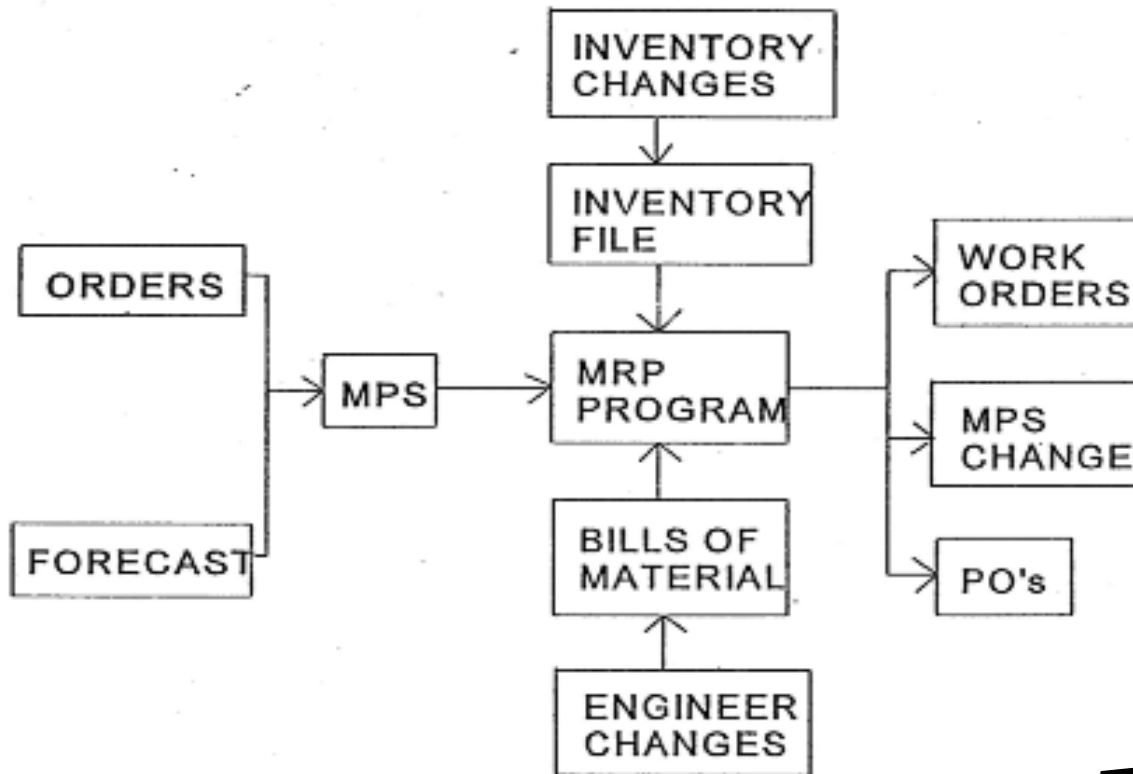
- Parts Move in Full Batches

BOM

Independent Demand

Dependent Demand

3

Material Requirements Planning
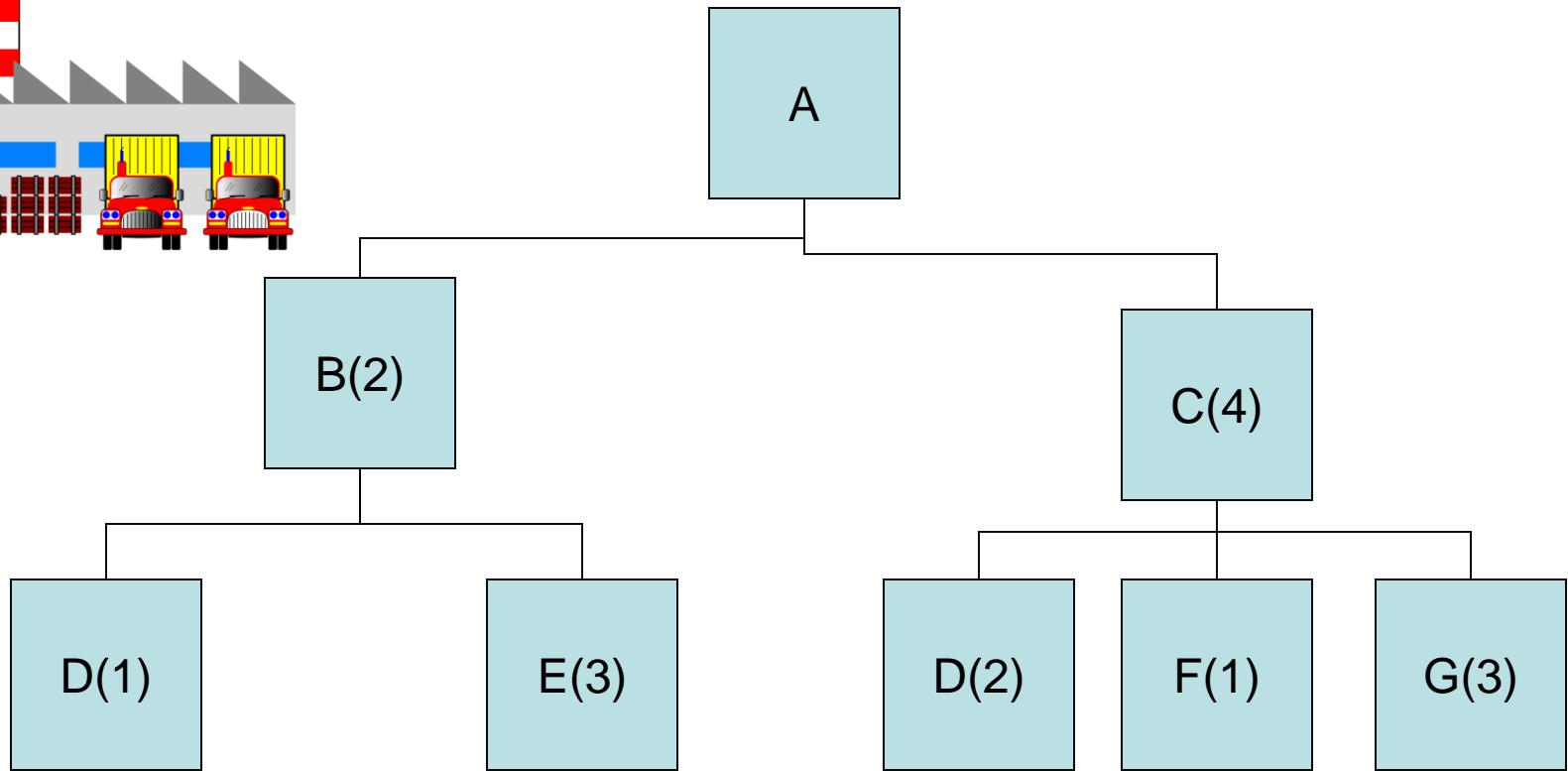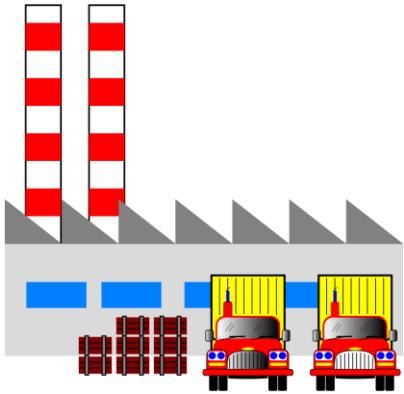
Single Level Bill of Material

	Qty	Description
A	1	xxxxxxxxxxxx
– B	2	xxxxxxxxxxxx
– C	4	xxxxxxxxxxxx
B	1	xxxxxxxxxxxx
– D	1	xxxxxxxxxxxx
– E	3	xxxxxxxxxxxx
C	1	xxxxxxxxxxxx
– D	2	xxxxxxxxxxxx
– F	1	xxxxxxxxxxxx
– G	3	xxxxxxxxxxxx

Indented Bill of Material
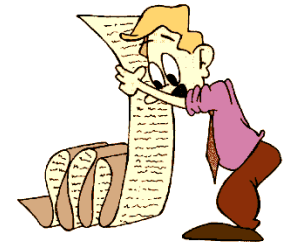
- **A   end item description**
- **Part   level   qty   description**
- **B   1   2   xxxxxxxxxxxx**
  - **D   2   1   xxxxxxxxxxx**
  - **E   2   3   xxxxxxxxxxx**
- **C   1   4   xxxxxxxxxxxx**
  - **D   2   2   xxxxxxxxxxx**
  - **F   2   1   xxxxxxxxxxx**
  - **G   2   3   xxxxxxxxxxx**

Summarized Bill of Material

- A

  - Qty required   Description

  B   2   **xxxxxxxxxxxx**

  C   4   **xxxxxxxxxxxx**

  D   10   **xxxxxxxxxxxx**

  E   6   **xxxxxxxxxxxx**

  F   4   **xxxxxxxxxxxx**

  G   12   **xxxxxxxxxxxx**

Where-Used Bill of Material

- Item   Where Used   Qty Required
- B   A   2
- C   A   4
- E   B   3
- D   B   1
              »   C   2

MRP Schedule

- Part   Lead Time (Weeks)
- A   1
- B   2
- C   3
- D   3
- E   2
- F   3
- G   4

Time Phased MRP Record

	»	Week			
Item	1	2	3	4	5
A rec					10
ord				10	
B rec				20	
ord		20			
C rec				40	
ord	40				

Item	1	2	3	4	5	6	7	8	9
A record									10
								10	
B record								20	
						20			
C record								40	
					40				
D record					100				
		100 (Note 100 = (80 For C, 20 For B)							
E record						60			
				60					
F record					40				
		40							
G record					120				
	120								

12

13
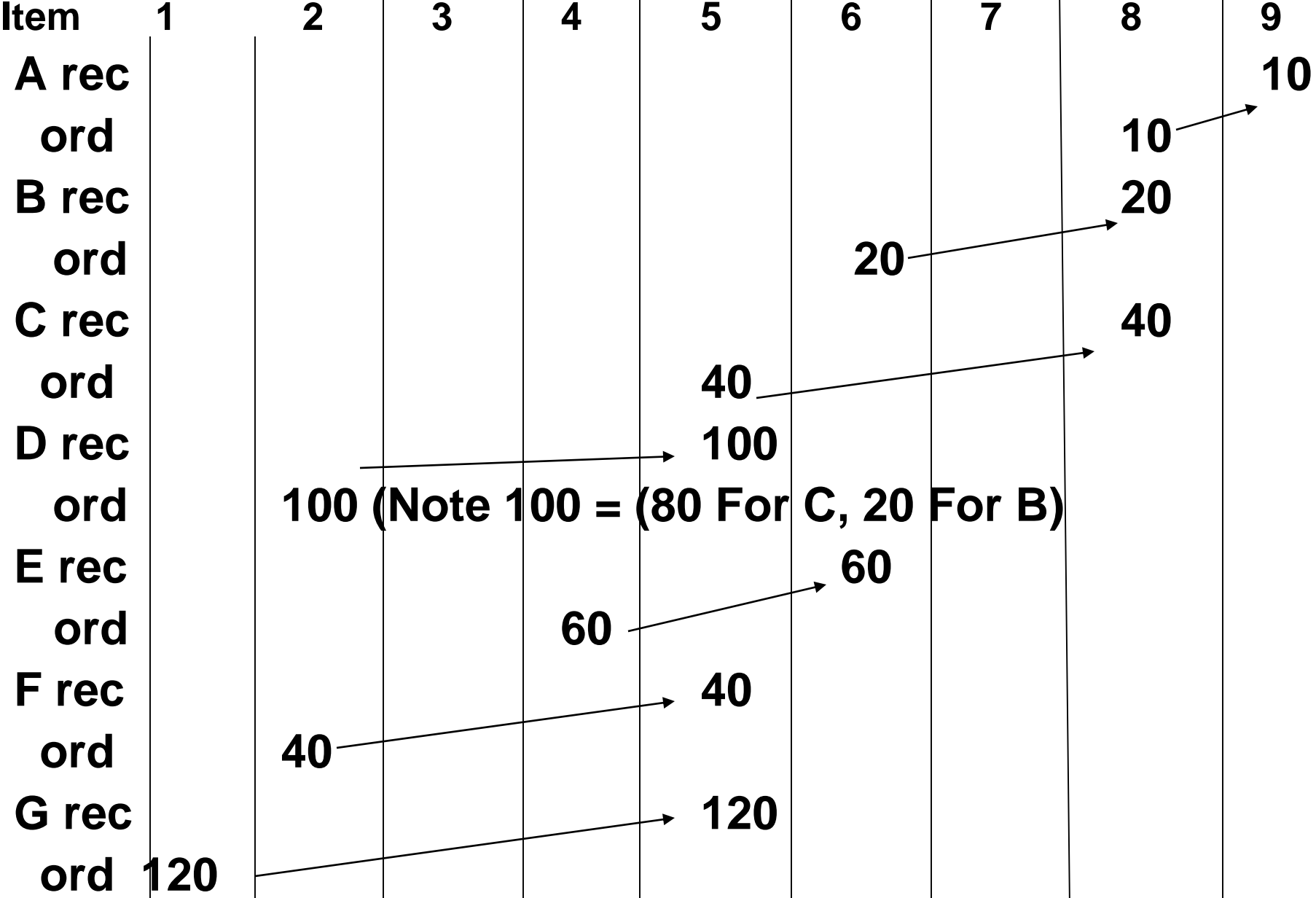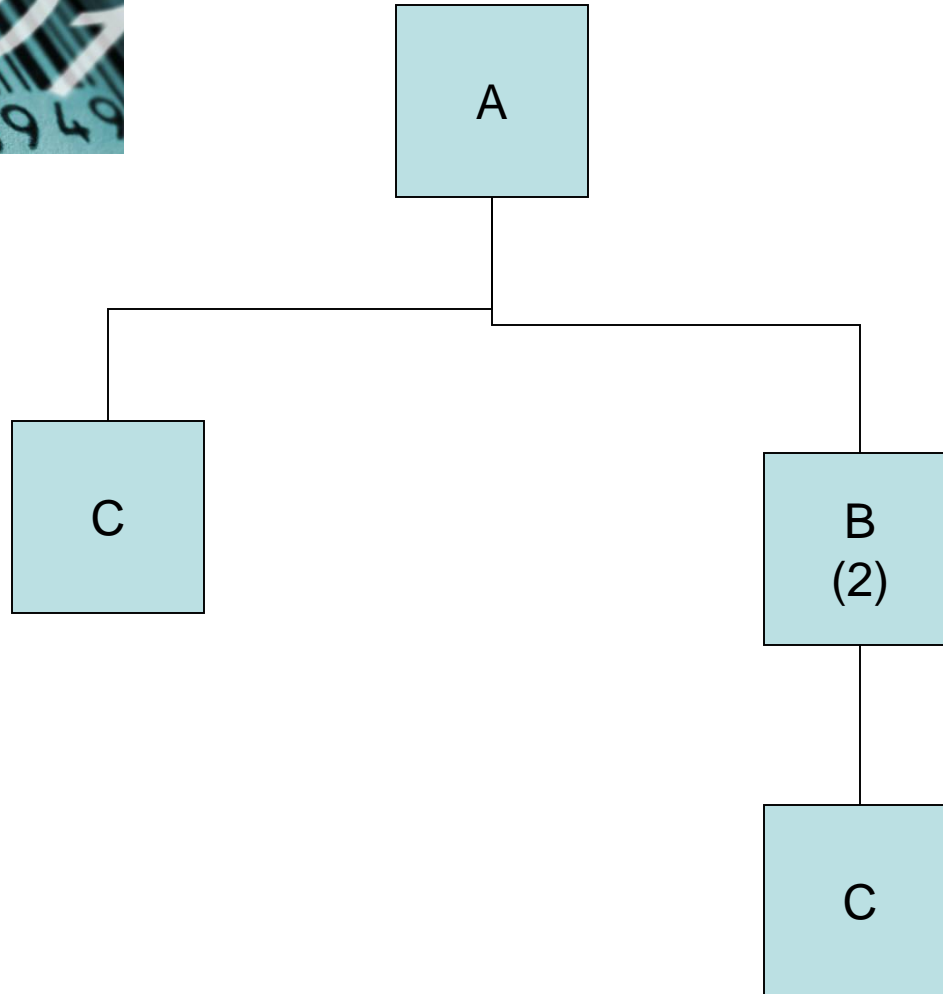
Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec						
Pro Avail Bal(21)						
Pln Ord Rel						
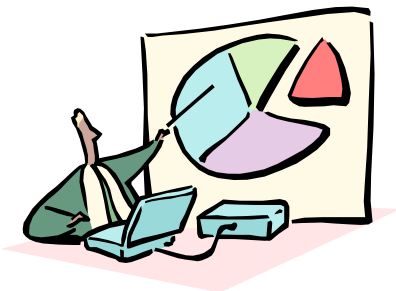
Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec						
Pro Avail Bal	16					
Pln Ord Rel						

Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec			20			
Pro Avail Bal	16	1				
Pln Ord Rel		20				

Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec			20	20		
Pro Avail Bal	16	1	3			
Pln Ord Rel		20	20			

Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec			20	20		
Pro Avail Bal	16	1	3	15		
Pln Ord Rel		20	20			

Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec			20	20		20
Pro Avail Bal	16	1	3	15	3	
Pln Ord Rel		20	20		20	
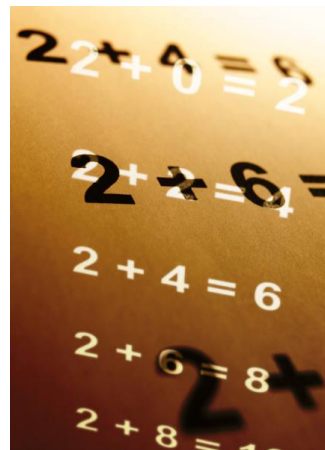
Q=20, LT=1, SS=0

Part A	1	2	3	4	5	6
Gross Req	5	15	18	8	12	22
Sch Rec			20	20		20
Pro Avail Bal	16	1	3	15	3	1
Pln Ord Rel		20	20		20	
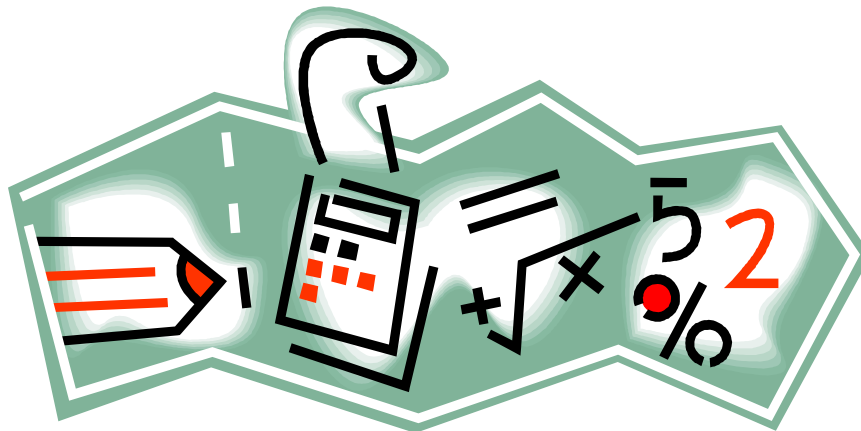
Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req						
Sch Rec	32					
Pro Avail Bal(20)						
Pln Ord Rel						

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32					
Pro Avail Bal(20)						
Pln Ord Rel						

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32					
Pro Avail Bal(20)	52					
Pln Ord Rel						

4-2=2
5-3=2
4-2=2
6-4=2
7-5=2
8-6=2
9-7=2

Subtraction

23

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40			
Pro Avail Bal(20)	52					
Pln Ord Rel	40					

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40			
Pro Avail Bal(20)	52	12				
Pln Ord Rel	40					

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40			
Pro Avail Bal(20)	52	12				
Pln Ord Rel	40					

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40			
Pro Avail Bal(20)	52	12	12			
Pln Ord Rel	40					

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40		40	
Pro Avail Bal(20)	52	12	12			
Pln Ord Rel	40		40			

Q=40, LT=2, SS=0

Part B	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40		40	
Pro Avail Bal(20)	52	12	12	12		
Pln Ord Rel	40		40			
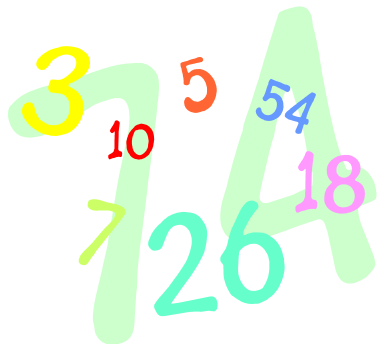
Q=40, LT=2, SS=0

PartB	1	2	3	4	5	6
Gross Req		40	40		40	
Sch Rec	32		40		40	
Pro Avail Bal(20)	52	12	12	12	12	12
Pln Ord Rel	40		40			

Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec						
Pro Avail Bal(50)						
Pln Ord Rel						
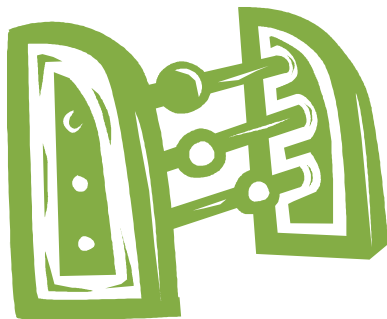
Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec		20				
Pro Avail Bal(50)	10					
Pln Ord Rel	20					
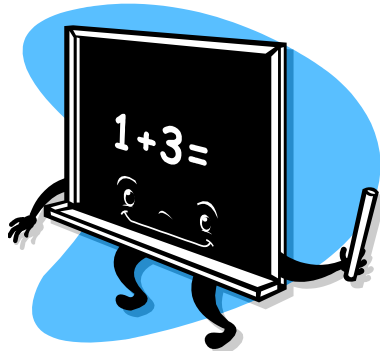
Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec		20	60			
Pro Avail Bal(50)	10	10				
Pln Ord Rel	20	60				

Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec		20	60			
Pro Avail Bal(50)	10	10	10			
Pln Ord Rel	20	60				
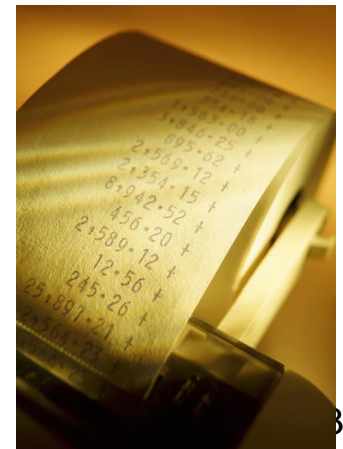
Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec		20	60		20	
Pro Avail Bal(50)	10	10	10	10		
Pln Ord Rel	20	60		20		
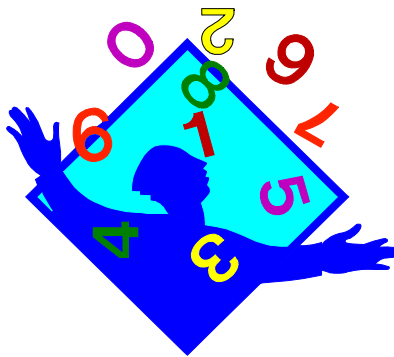
Q=LOT FOR LOT, LT=1, SS=10

Part C	1	2	3	4	5	6
Gross Req	40	20	60		20	
Sch Rec		20	60		20	
Pro Avail Bal(50)	10	10	10	10	10	10
Pln Ord Rel	20	60		20		

```
                 ┌─────────┐                                      ┌─────────┐
                 │         │                                      │         │
                 │    D    │                                      │    E    │
                 │         │                                      │         │
                 └────┬────┘                                      └────┬────┘
        ┌─────────────┼─────────────┐              ┌──────────────────┼──────────────────┐
   ┌────┴────┐   ┌────┴────┐   ┌────┴────┐     ┌────┴────┐       ┌────┴────┐        ┌────┴────┐
   │    A    │   │         │   │    R    │     │    A    │       │    B    │        │    F    │
   │   (2)   │   │    F    │   │   (2)   │     │   (2)   │       │   (3)   │        │   (2)   │
   └─────────┘   └────┬────┘   └─────────┘     └─────────┘       └─────────┘        └────┬────┘
              ┌───────┴───────┐                                               ┌──────────┴──────────┐
         ┌────┴────┐     ┌────┴────┐                                     ┌────┴────┐           ┌────┴────┐
         │    L    │     │    M    │                                     │    L    │           │    M    │
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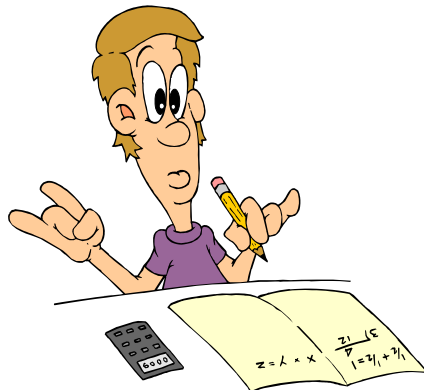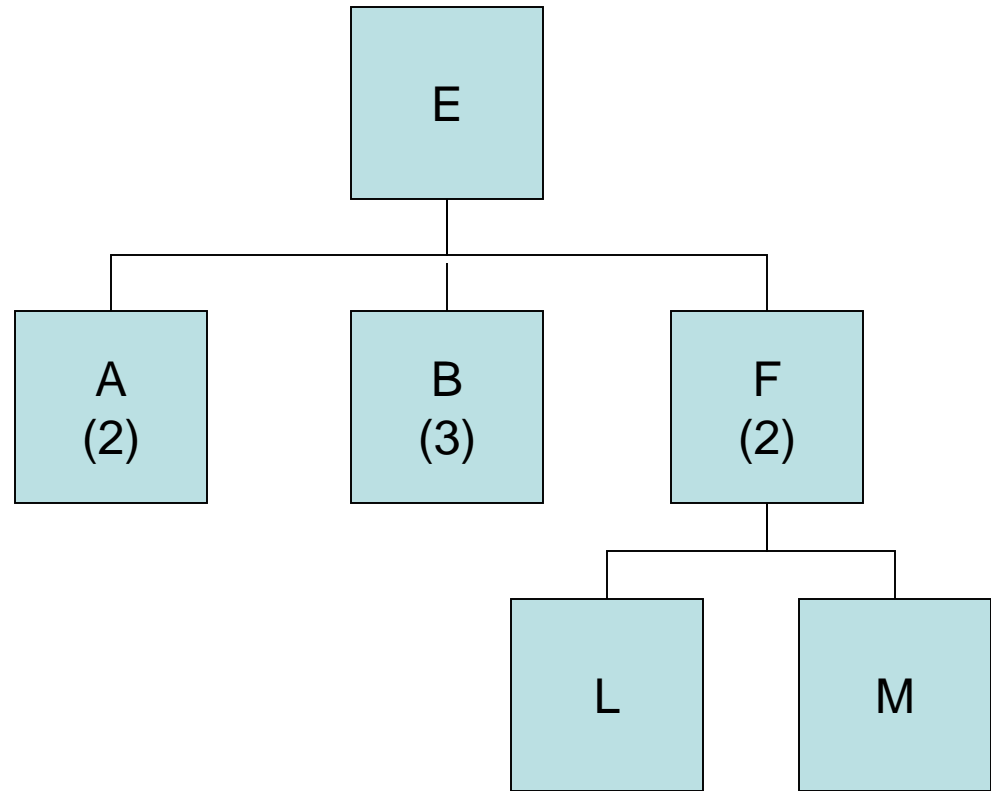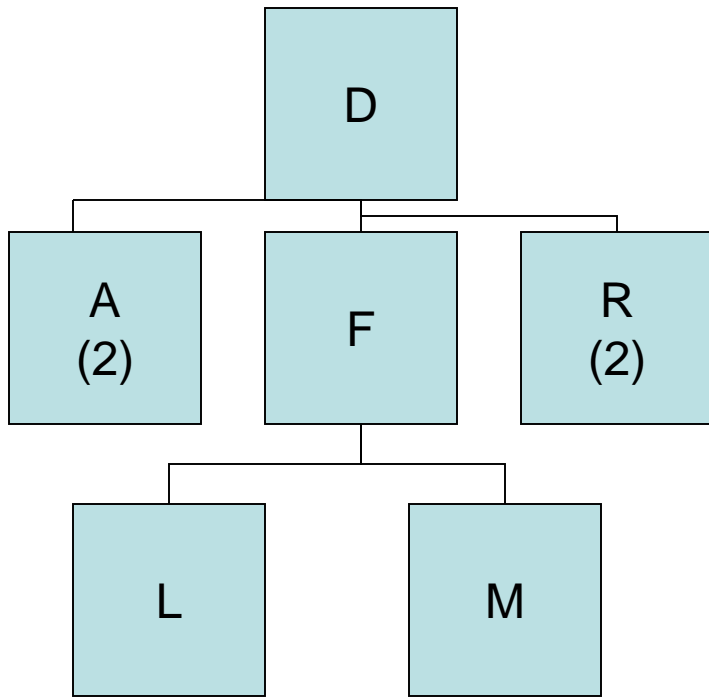
MRP

Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec						
Pro Avail Bal(10)	3					
Pln Ord Rel						

Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec		30				
Pro Avail Bal(10)	3	22				
Pln Ord Rel	30					
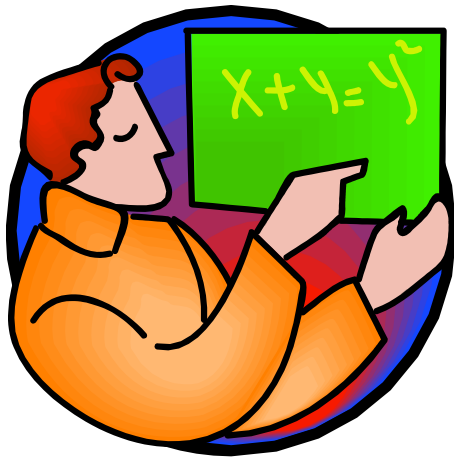
Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec		30				
Pro Avail Bal(10)	3	22	13			
Pln Ord Rel	30					
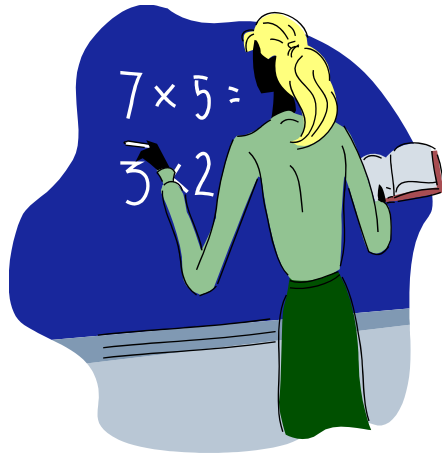
Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec		30				
Pro Avail Bal(10)	3	22	13	8		
Pln Ord Rel	30					

41
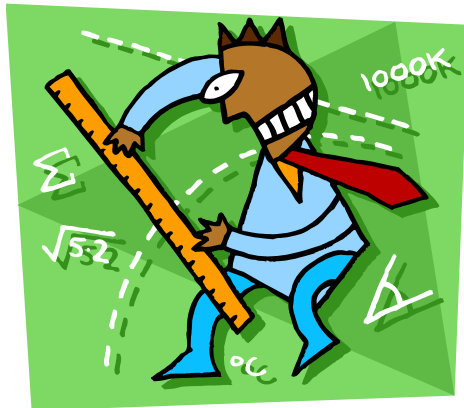
Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec		30				
Pro Avail Bal(10)	3	22	13	8	0	
Pln Ord Rel	30					
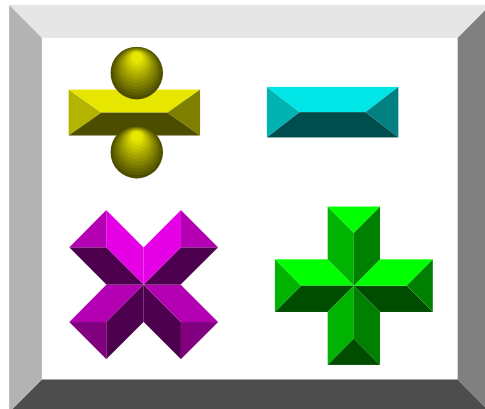
Q=30, LT=1, SS=0

Part D	1	2	3	4	5	6
Gross Req	7	11	9	5	8	6
Sch Rec		30				30
Pro Avail Bal(10)	3	22	13	8	0	24
Pln Ord Rel	30				30	
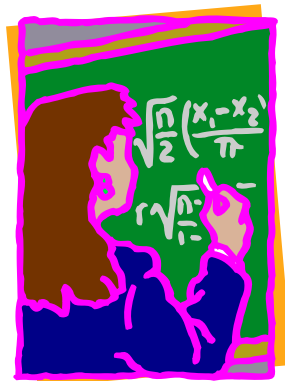
Q=lot for lot, LT=2, SS=3

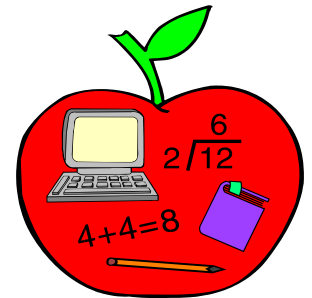| Part E	1	2	3	4	5	6
Gross Req	10	12	15	11	6	8
Sch Rec		11				
Pro Avail Bal(15)	5					
Pln Ord Rel						
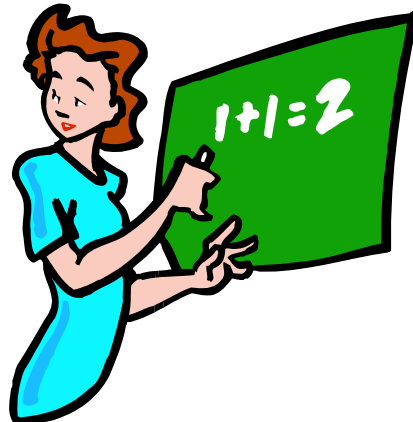
- Week 1 Required=12+15 =27
  - Minus available=5+11 =16
    - » Needed =11
    - »Plus Safety Stock =3
    - »Order = 14

50+100+250+100+500=1000

50+100+250+100+500=1000

50+100+250+100+500=1000

Q=lot for lot, LT=2, SS=3

Part E	1	2	3	4	5	6
Gross Req	10	12	15	11	6	8
Sch Rec		11	14			
Pro Avail Bal(15)	5	4				
Pln Ord Rel		14				

- Week 2
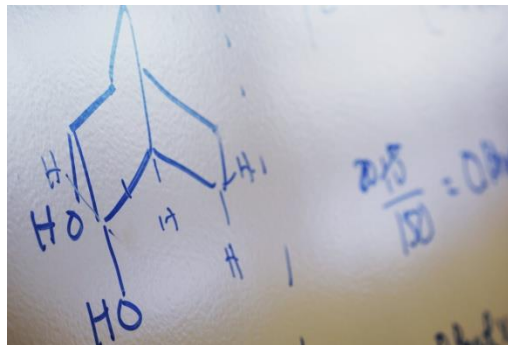-   Required=15+11   =26
  -          Minus available=4+14   =18
    - » Needed   =8
    - »Plus Safety Stock   =3
    - »Order   = 11

Q=lot for lot, LT=2, SS=3

Part E	1	2	3	4	5	6
Gross Req	10	12	15	11	6	8
Sch Rec		11	14	11		
Pro Avail Bal(15)	5	4				
Pln Ord Rel	14	11				

Q=lot for lot, LT=2, SS=3

Part E	1	2	3	4	5	6
Gross Req	10	12	15	11	6	8
Sch Rec		11	14	11		
Pro Avail Bal(15)	5	4	3			
Pln Ord Rel	14	11				
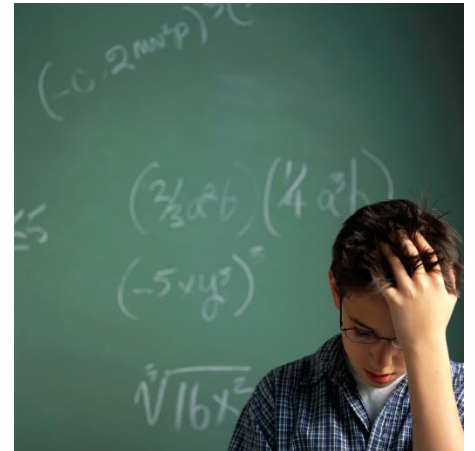
Q=lot for lot, LT=2, SS=3

Part E	1	2	3	4	5	6
Gross Req	10	12	15	11	6	8
Sch Rec		11	14	11	6	8
Pro Avail Bal(15)	5	4	3	3	3	3
Pln Ord Rel	14	11	6	8		
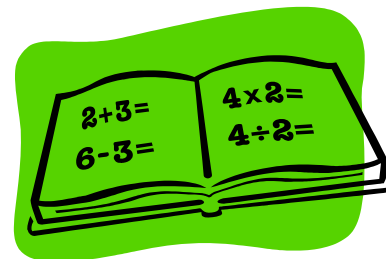
Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req						
Sch Rec	60					
Pro Avail Bal(20)						
Pln Ord Rel						
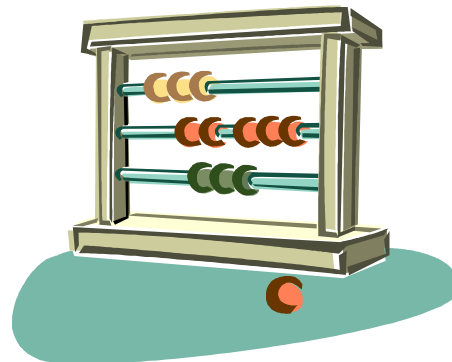
Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60					
Pro Avail Bal(20)						
Pln Ord Rel						

Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60					
Pro Avail Bal(20)	22					
Pln Ord Rel						
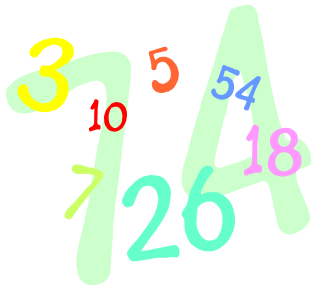
Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60		60			
Pro Avail Bal(20)	22	0				
Pln Ord Rel		60				

Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60		60			
Pro Avail Bal(20)	22	0	48			
Pln Ord Rel		60				

Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60		60			
Pro Avail Bal(20)	22	0	48	32		
Pln Ord Rel		60				

Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60		60			
Pro Avail Bal(20)	22	0	48	32	2	
Pln Ord Rel		60				

57

Q=60, LT=1, SS=0

Part F	1	2	3	4	5	6
Gross Req	58	22	12	16	30	
Sch Rec	60		60			
Pro Avail Bal(20)	22	0	48	32	2	2
Pln Ord Rel		60				