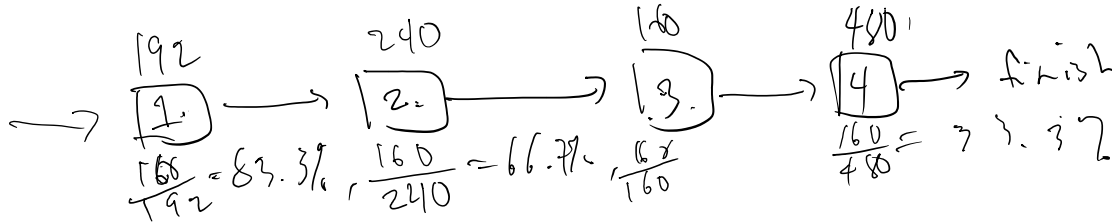


Table 1. Run times per step.

Step	Description	Run Time Minutes/Shirt
1	Cutting	12.5
2	Sewing (base)	10
3	Sewing (extras)	15
4	Pack/ship	5

Source: All tables created by author



Operation: 5 days/wk, 8hrs/day, 60 mins/hr

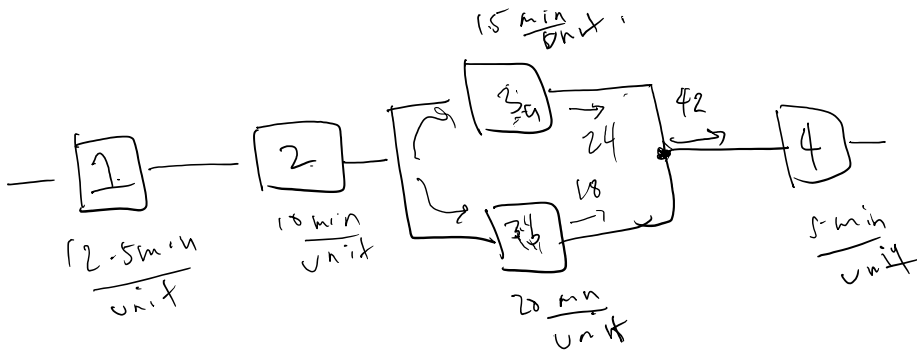
Step 1: Capacity (shirt / week) = 1shirt / 12.5 min \* 60 min/1hr \* 8hr/1day \* 5day/1wk = 192 shirt/wk. utilization = 160/192 = 0.8333

Step 2: Cap = 1shirt/10 min \* 60min/1hr \* 8hrs/1day \* 5day/1wk = 240 shirt/wk, utilization = 160/240 = 0.6667

Step 3 Cap = 1/15 \* 60\*8\*5 = 160 shirt/wk, utilization = 160/160 = 100%

Step 4 Cap = 1/5 \* 60 \* 8 \* 5 = 480 shirt/wk = utilization = 160/480 = 0.3333

Bottleneck is step 3 and the system capacity is 160 shirt/wk.



60 min in hr, 6hr /day  
Find Capacity (# units/day) of the system.

Station 1:  $1/12.5 * 60 * 6 = 28.8$  units/day

Station 2:  $1/10 * 60 * 6 = 36$  units/day

Station 3a:  $1/15 * 60 * 6 = 24$  unit/day

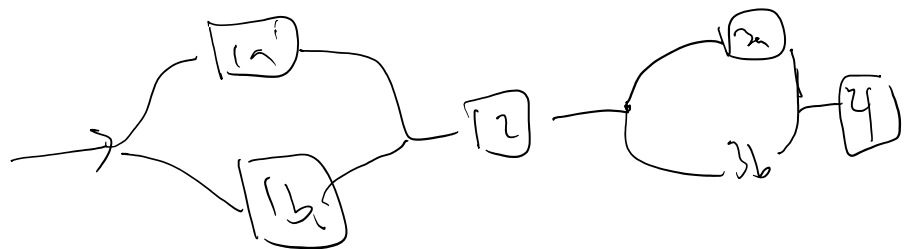
Station 3b:  $1/20 * 60 * 6 = 18$  unit/day

Station 3 : 42 units/day

Station 4:  $1/5 * 60 * 6 = 72$  units/day

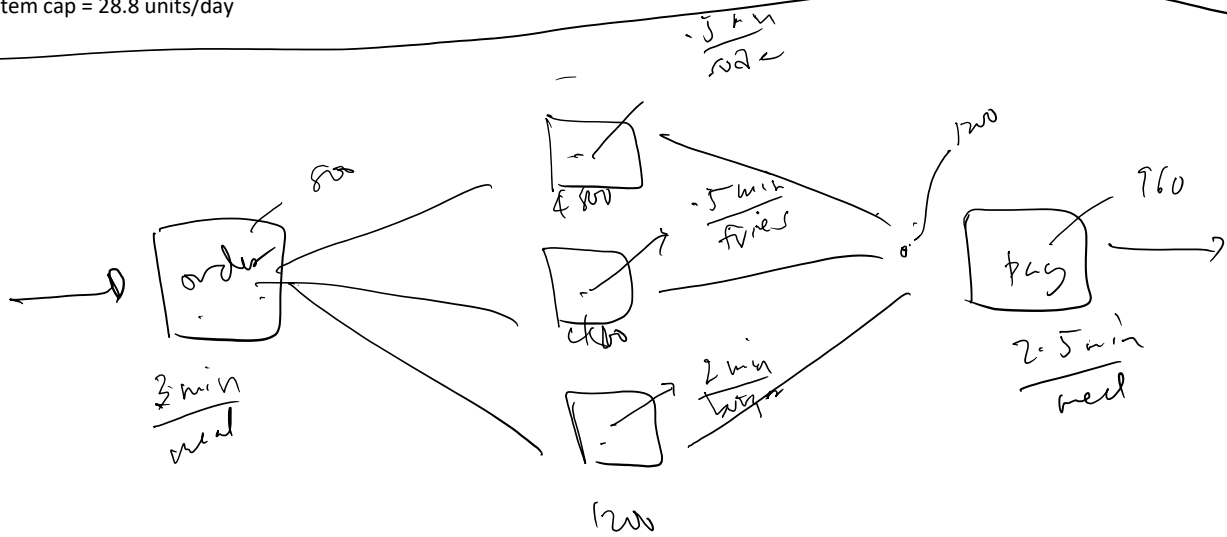
Bottleneck station 1

System cap = 28.8 units/day



Jan 22

System cap = 28.8 units/day



Capacity (meals/day)

Order:  $1/3 * 60/1 * 8/1 * 5/1 = 800$  meals/wk

Fries & Soda:  $1/5 * 60/1 * 8/1 * 5/1 = 4,800$  meal/wk

Burger:  $1/2 * 60/1 * 8/1 * 5/1 = 1,200$  meals/wk

Pay:  $1/2.5 * 60/1 * 8/1 * 5/1 = 960$  meals/wk

Process capacity : 800 meals/wk

Table 1. Run times per step.

Step	Description	Run Time Minutes/Shirt
1	Cutting	12.5
2	Sewing (base)	10
3	Sewing (extras)	15
4	Pack/ship	5

Source: All tables created by author

Order: 180 shirts/wk, 60 min/hr, 8 hr/day, 5 days/wk

Capacity 1: 192 shirt /wk

Capacity 2: 240 shirt/wk

Capacity 3: 160 shirt/wk

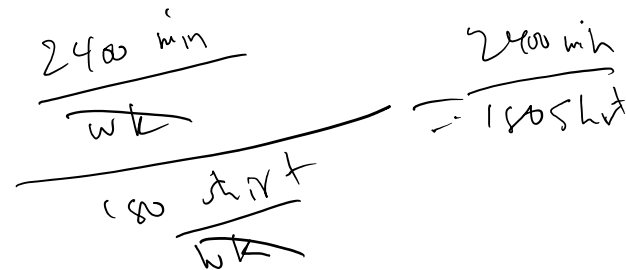
Capacity 4: 480 shirt/wk

Process capacity = 160/wk

Total time available (mins) = 60min/hr \* 8 hr/day \* 5 day/wk

Time available = 2,400 mins / week

Takt time = total time available / demand = 2400 shirt/wk / 180 shirt/wk = 2400/180 = 13.3333 min/shirt





2 ways to see problem:

1.) I need  $\frac{180 \text{ shirt}}{\text{wk}}$  but cap is only  $\frac{160 \text{ shirt}}{\text{wk}}$ .

2.) One of the station takes longer than 13.33 min. to produce 1 shirt and takt time is 13.33.

Figure 3. Detailed operator-loading chart.

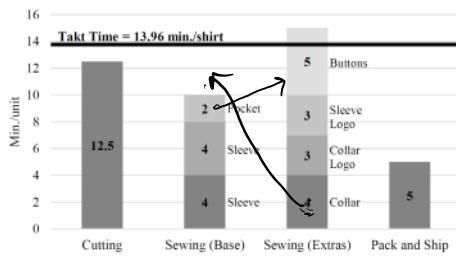
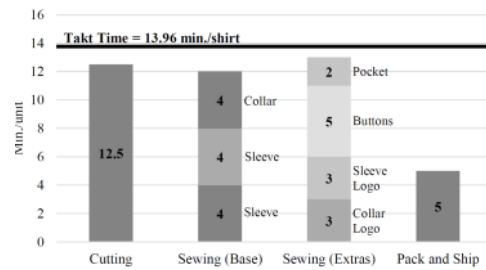


Figure 4. Balanced operator-loading chart.



$$\frac{12 \text{ min}}{\text{sh}} \quad \frac{13 \text{ min}}{\text{sh}}$$