Operations Management

MGT355

Theocharis Papadopoulos, London 2015

Lean synchronization

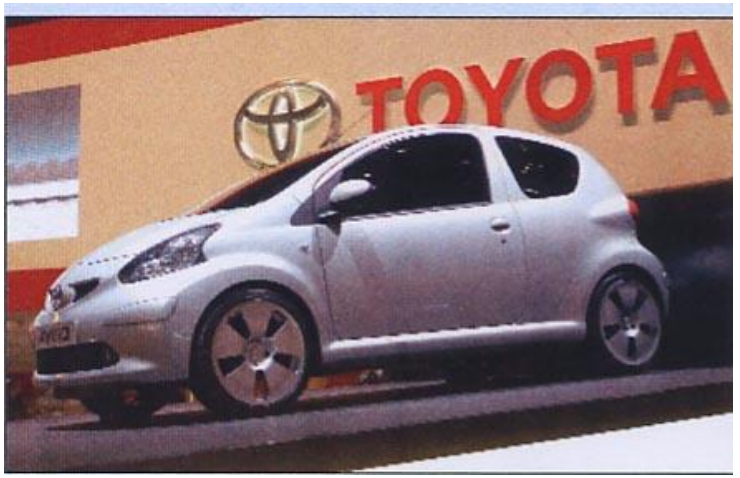
Lean operations

*'The key principle of **lean operations** is relatively straightforward to understand, it means moving towards the elimination of all waste in order to develop an operation that is faster, more dependable, produces higher quality products and services and, above all, operates at low cost'.*

Lean operations

Synonyms

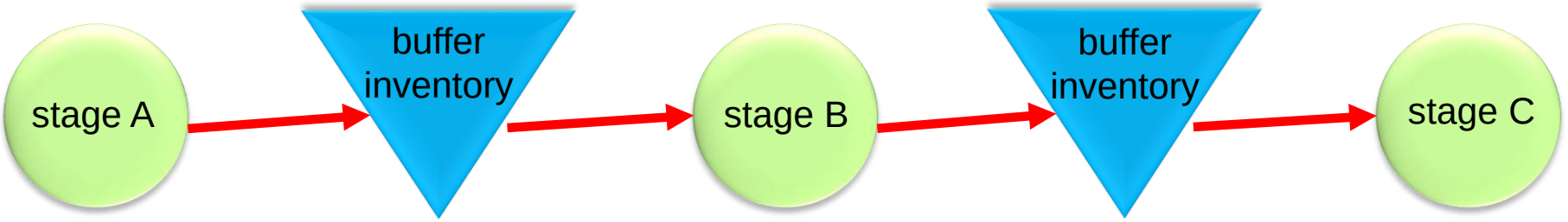
- continuous flow manufacture
- high value-added manufacture
- stockless production
- low-inventory production
- fast-throughput manufacturing
- lean manufacturing
- Toyota production system
- short cycle time manufacturing



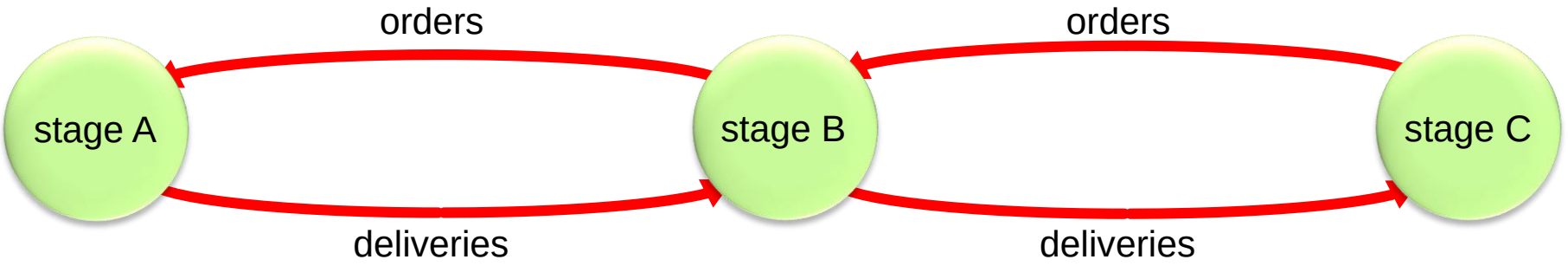
Lean operations

JIT material flow

Traditional approach:

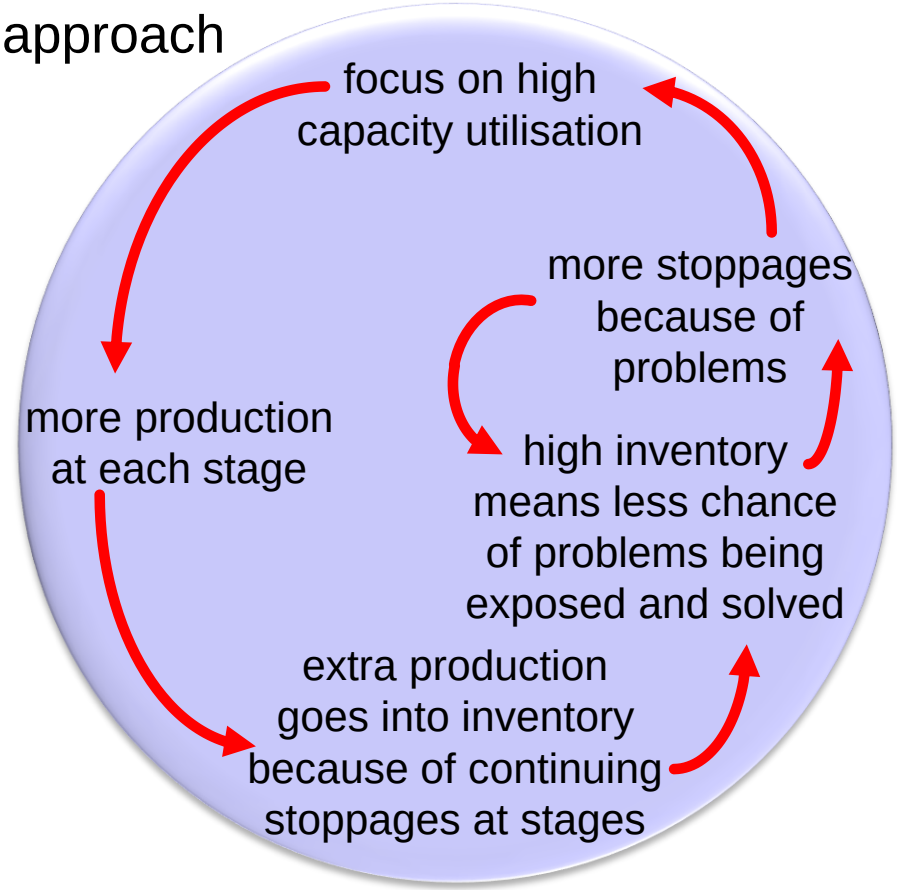


JIT approach:

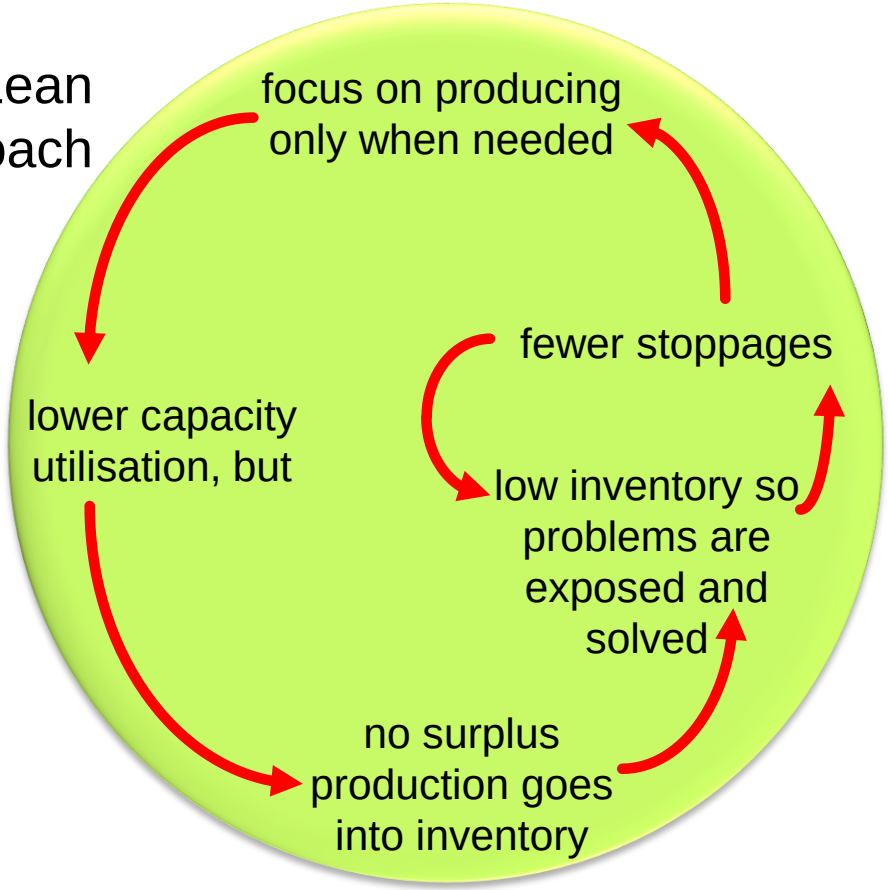


Lean operations

Traditional approach



Lean approach

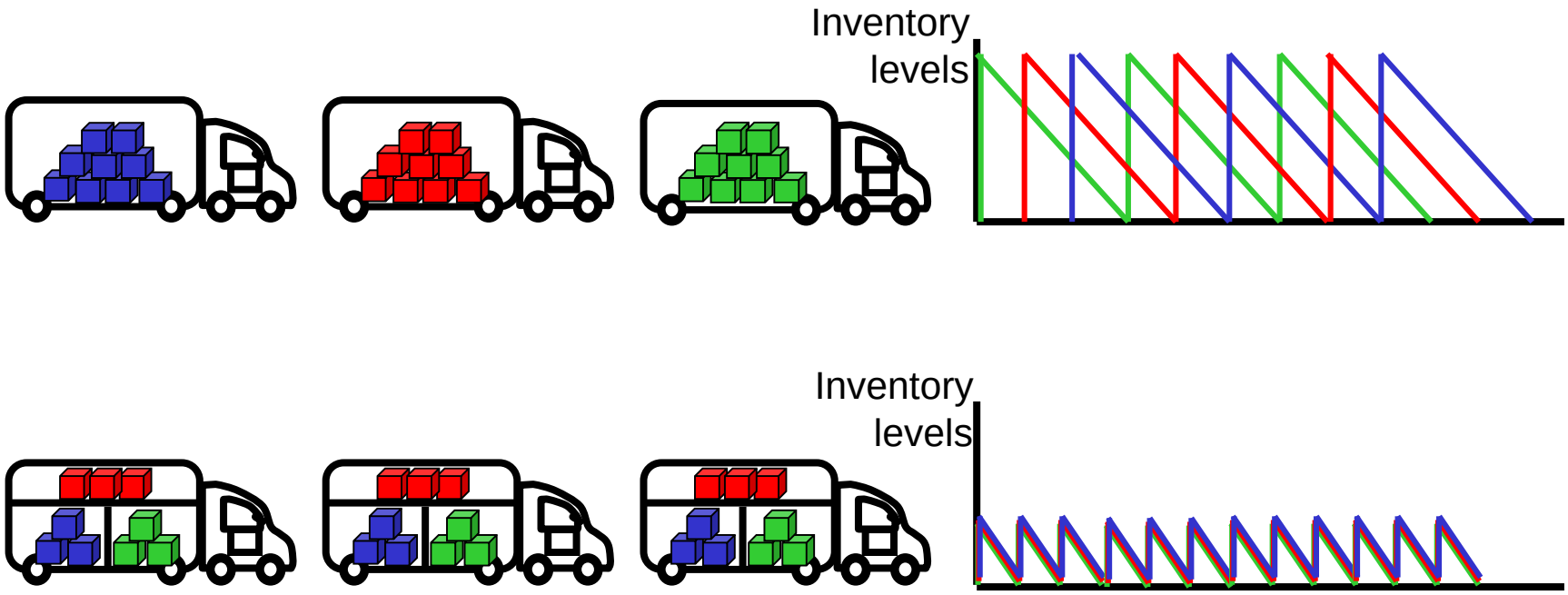


Inventories of materials. Information or customers have similar characteristics

	Inventory		
	Of material (Queue of material)	Of information (Queue of information)	Of customers (Queue of people)
Cost	Ties up working capital	Less current information and so worth less	Wastes customer's time
Space	Needs storage space	Needs memory capacity	Need waiting area
Quality	Defects hidden, possible damage	Defects hidden, possible data corruption	Gives negative perception
Decoupling	Makes stages independent	Makes stages independent	Promotes job specialization / fragmentation
Utilization	Stages kept busy by work in progress	Stages kept busy by work in data queues	Servers kept busy by waiting customers
Coordination	Avoids need for synchronisation	Avoids need for straight through processing	Avoids having to match supply and demand

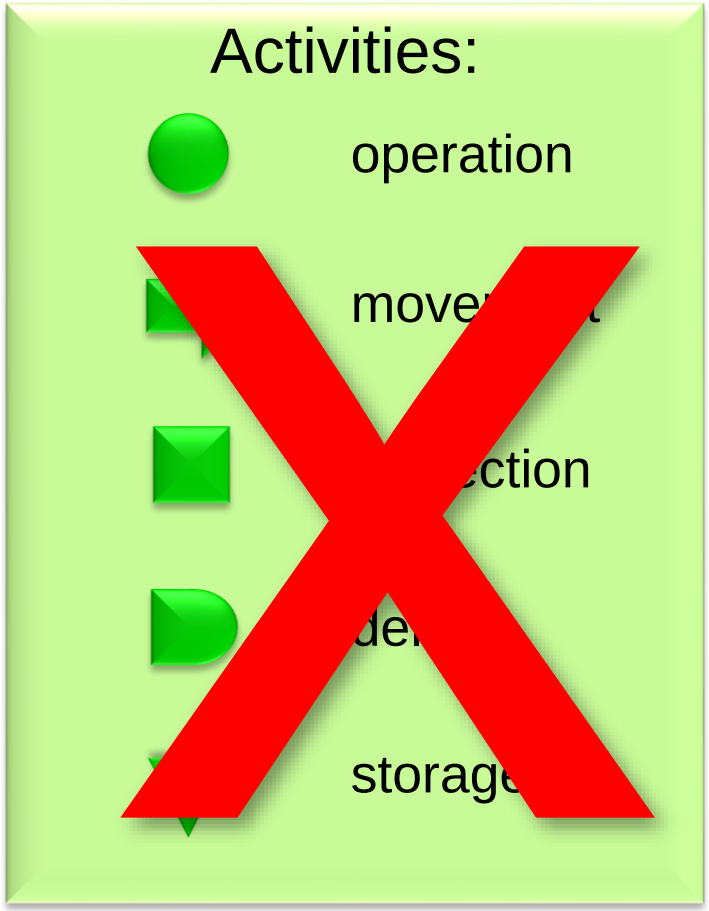
Source: Adapted from Fitzsimmons, J.A.

Delivering smaller quantities more often can reduce inventory levels



Waste (muda)

Which of these symbols signify non-value adding activities?

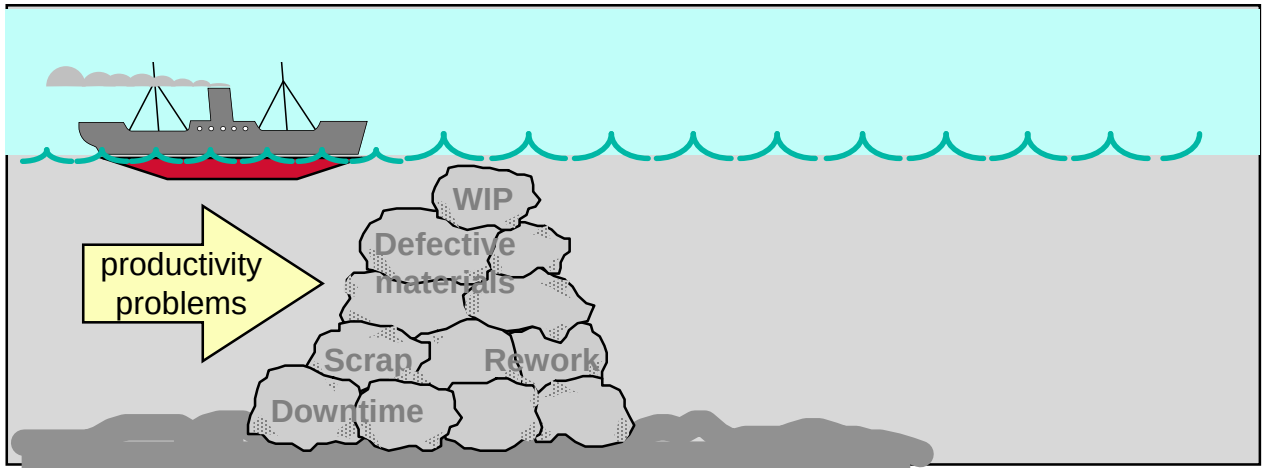


Types of waste:

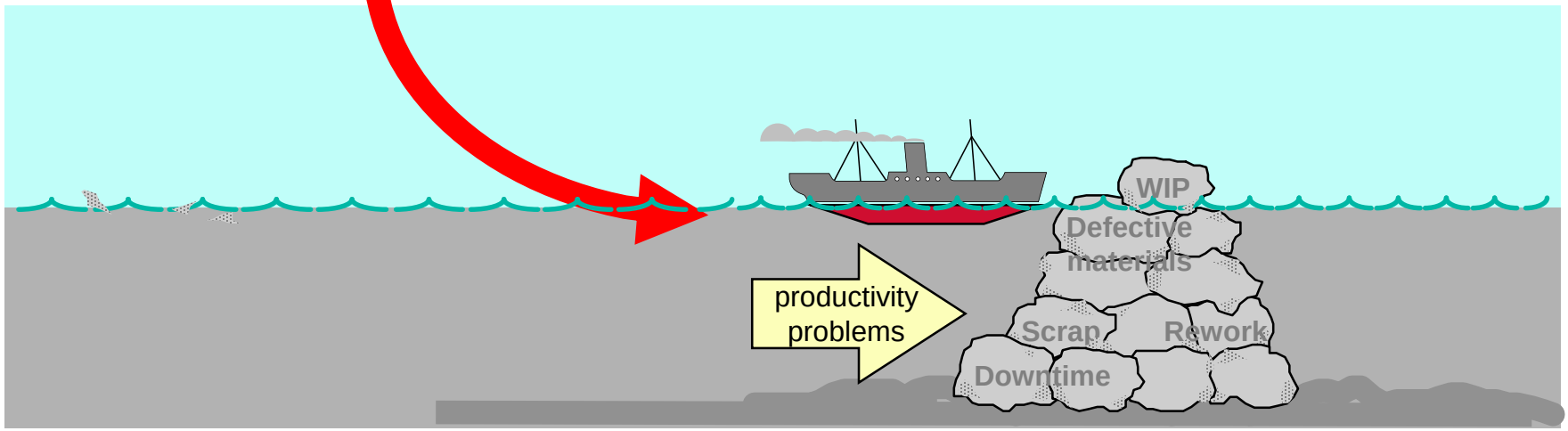
- over production
- waiting time
- transport
- process
- inventory
- motion
- defective goods

➔ influencing the throughput efficiency

The problem with inventory



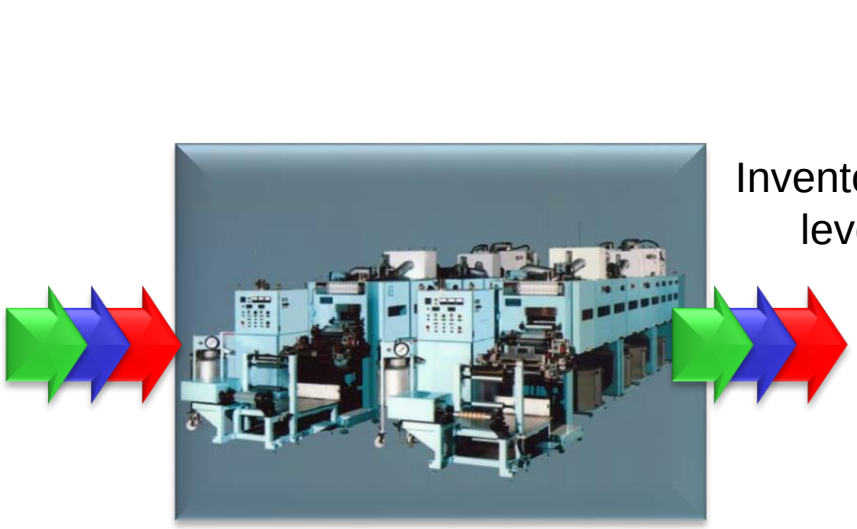
Reduce the level of inventory (water) to reveal the operations' problems

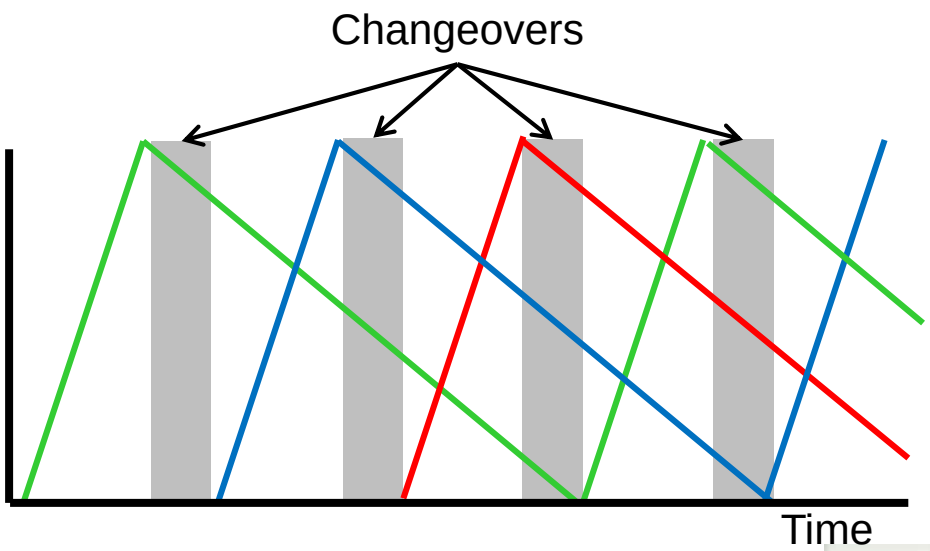


Small machines

- Conventional Western approach is to purchase large machines to get “economies of scale”.

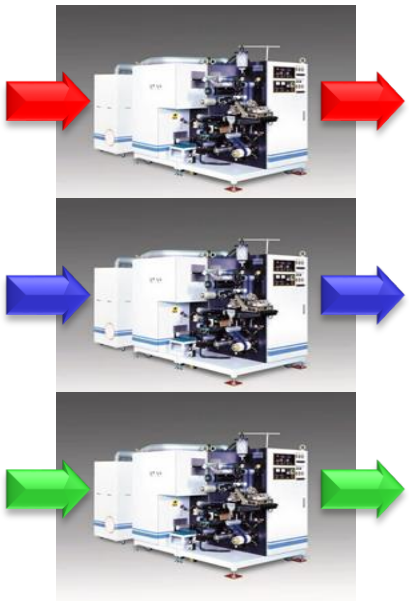
- These often have long, complex set-ups, and make big batches quickly creating “waste”.

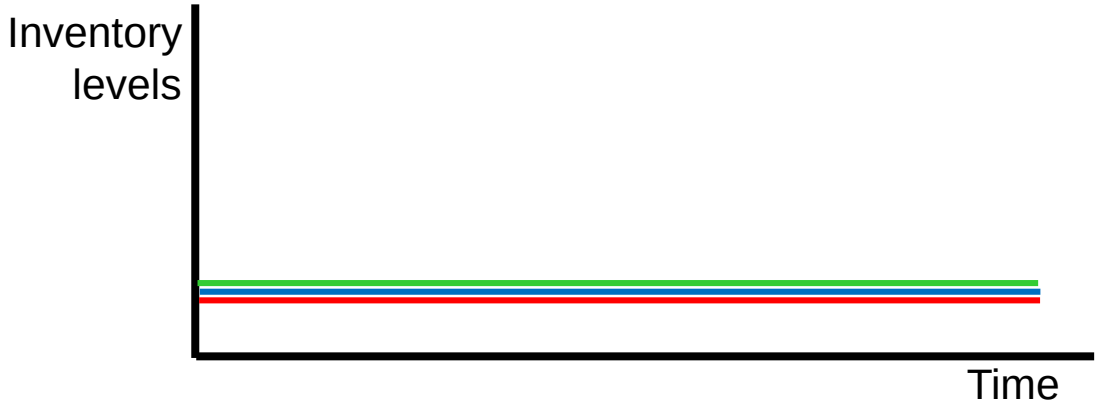




Small machines

Using several small machines rather than one large one allows simultaneous processing, is more robust and is more flexible.....





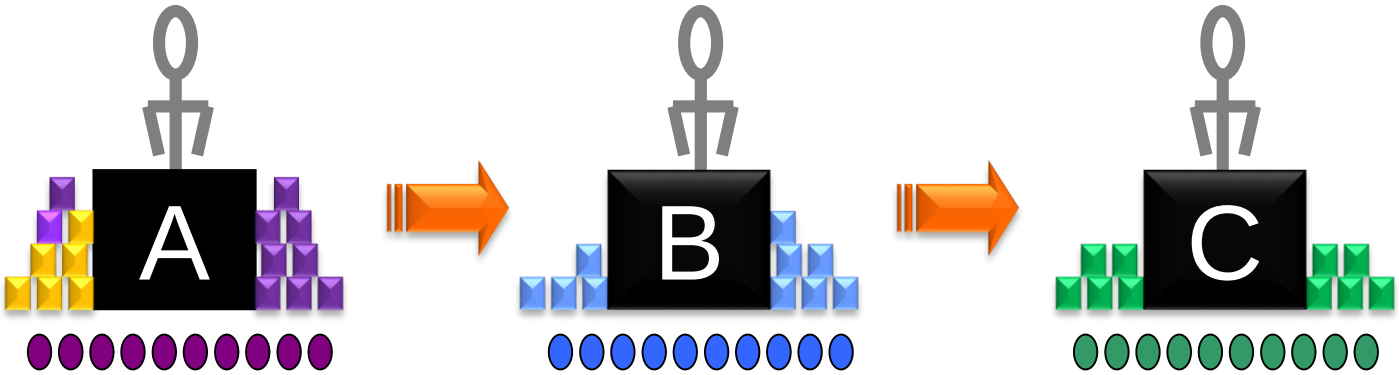
Flow Principle

A process consists of 3 steps - A , B and C.

It takes one minute to finish each step of the process. (A, B and C)

Batch Flow (units processed in batches of 10)

How much time will it take for 10 units to move through the process?



10 Minutes + 10 Minutes + 10 Minutes

= 30 Minutes

Flow Principle

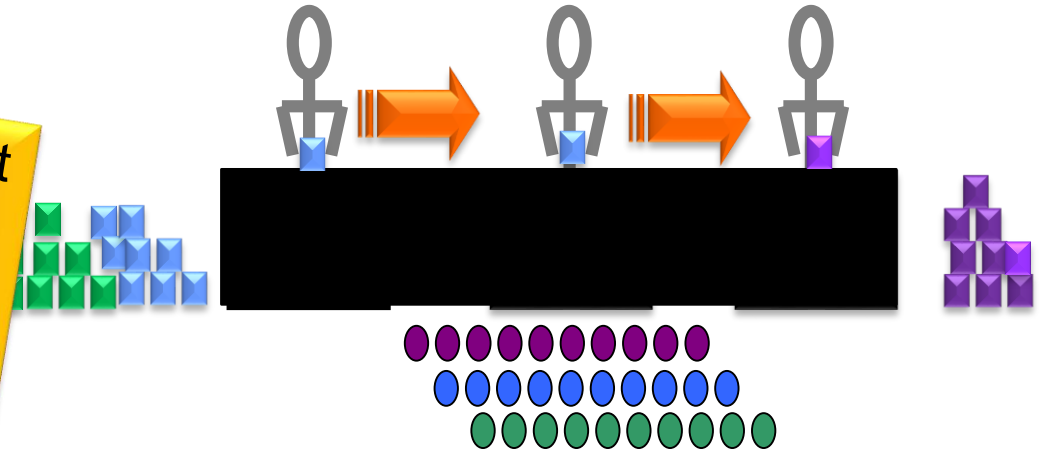
A process consists of 3 steps - A , B and C.

It takes one minute to finish each step of the process. (A, B and C)

Continuous Flow (unit processed individually, that is, process one, move one)

How much time will it take for 10 units to move through the process?

Note – The total amount of work required to complete each batch has not changed, but the throughput time of each batch is reduced from 30 to 12 minutes



1 Minute + 1 Minute + 10 Minutes = 12 Minutes

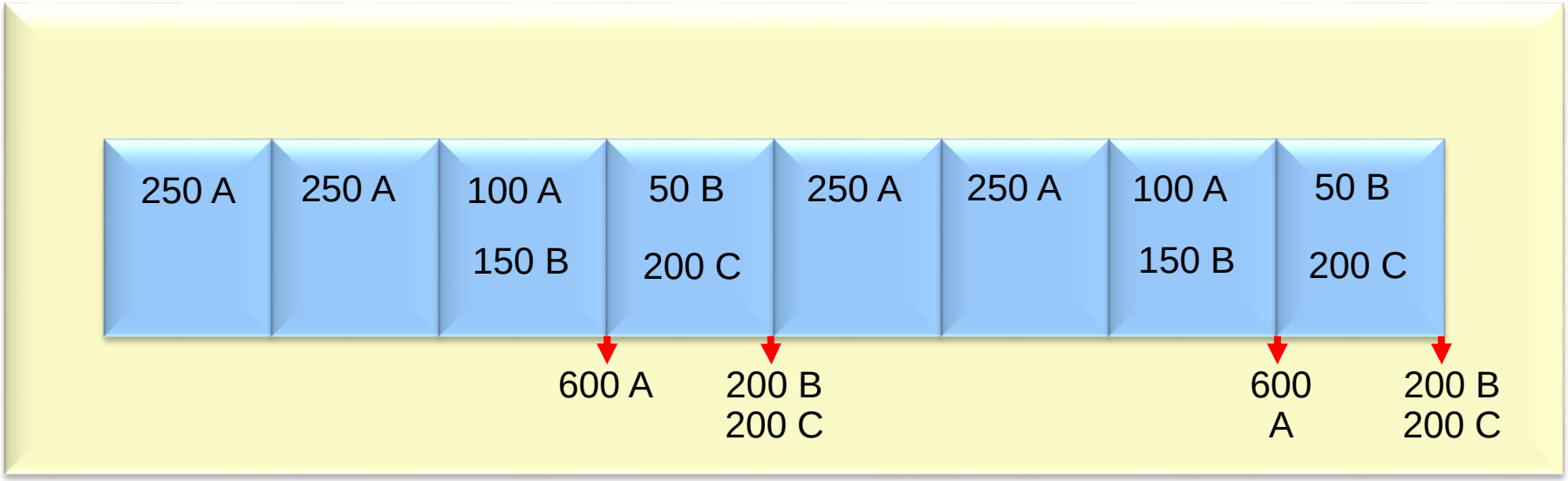
Levelled scheduling equalizes the mix of products made each day

Over an eight day period, need to make.....1200 of A

400 of B

400 of C

Scheduling in *large batches*, where *batch size A = 600, B = 200, C = 200*



Every day, the schedule needs to be calculated. Each day can be different

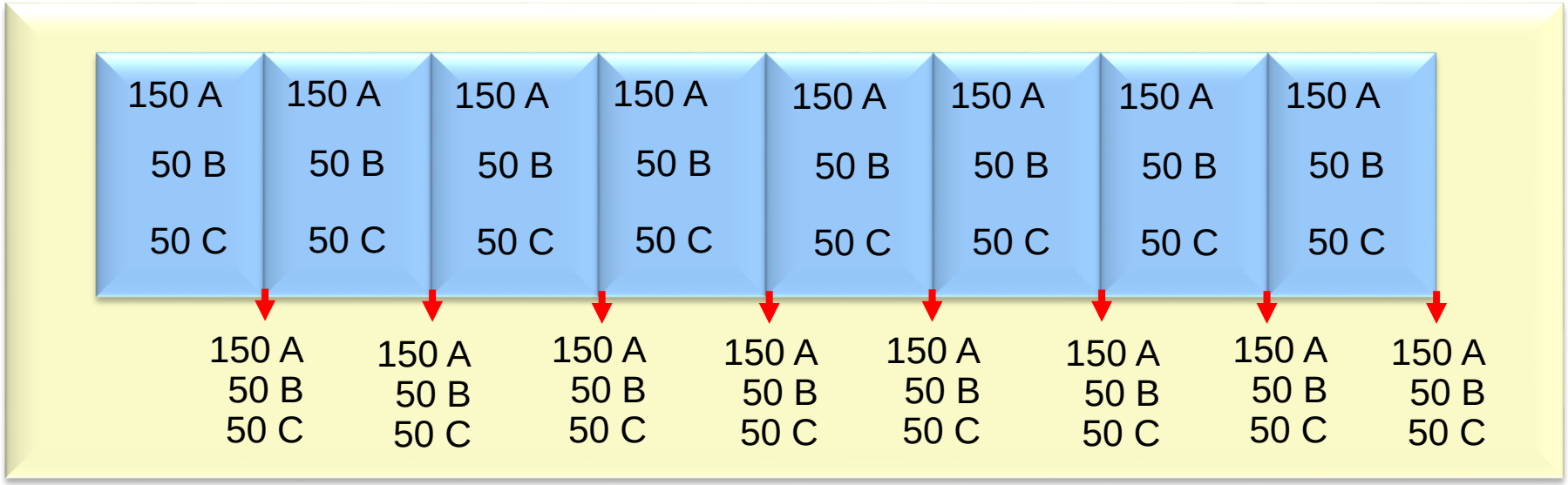
Levelled scheduling equalizes the mix of products made each day

Over an eight day period, need to make.....1200 of A

400 of B

400 of C

With *levelled scheduling*, where *batch size A = 150, B = 50, C = 50*



Every day is the same. Easy to notice if falling behind schedule