

# *Operations Management*

## *MGT355*

# Planning and control



# Planning and control

- Planning is a formalization of what is intended to happen at some time in the future
- A plan does not guarantee that an event will actually happen, it is a statement of intention
- Although plans are based on expectations, during their implementation things do not always happen as expected
- Control is the process of coping with any changes that affect the plan. It may also mean that an 'intervention' will need to be made in the operation to bring it back 'on track'



# Planning and control

## Planning is deciding

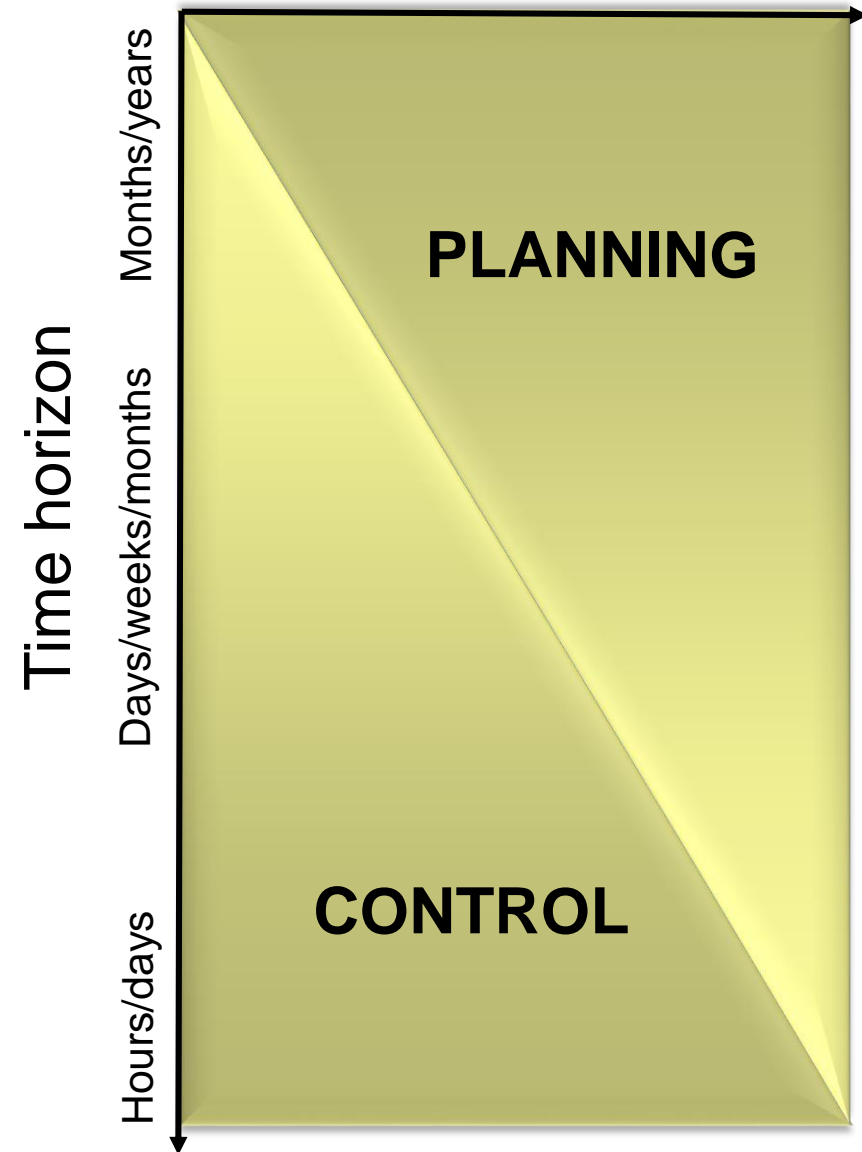
- what activities *should* take place in the operation
- when they should take place
- What resources should be allocated to them

## Control is

- understanding what is actually happening in the operation
- deciding whether there is a significant deviation from what *should* be happening
- (if there is deviation) changing resources in order to affect the operation's activities



# Significance of planning and control



## Long-term planning and control

- Uses aggregated demand forecasts
- Determines resources in aggregated form
- Objectives set in largely financial terms

## Medium-term planning and control

- Uses partially disaggregated demand forecasts
- Determines resources and contingencies
- Objectives set in both financial and operations terms

## Short-term planning and control

- Uses totally disaggregated forecasts or actual demand
- Makes interventions to resources to correct deviations from plans
- Ad hoc consideration of operations objectives

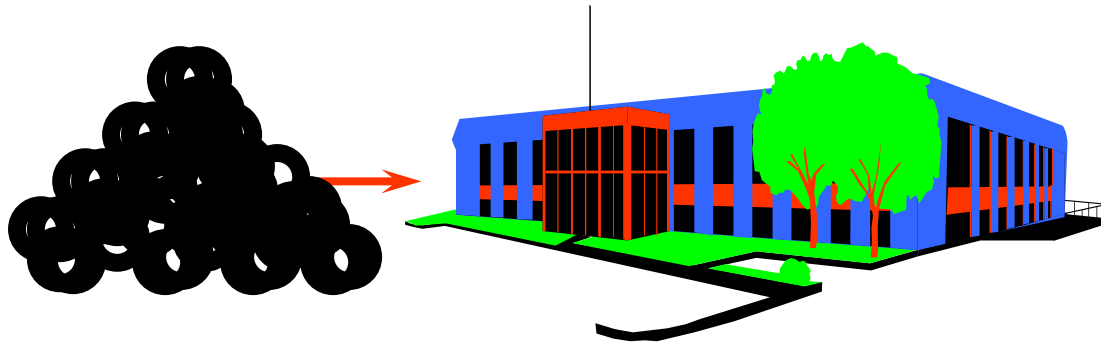


# How do supply and demand affect planning and control?

- The degree of uncertainty in demand affects the balance between planning and control. The greater the uncertainty, the more difficult it is to plan, and greater emphasis must be placed on control.
- This idea of uncertainty is linked with the concepts of dependent and independent demand.
  - **Dependent demand** is relatively predictable because it is dependent on some known factor
  - **Independent demand** is less predictable because it depends on the chances of the market or customer behaviour

# Dependent and independent demand

Dependent demand  
e.g. input tyre store in automobile plant

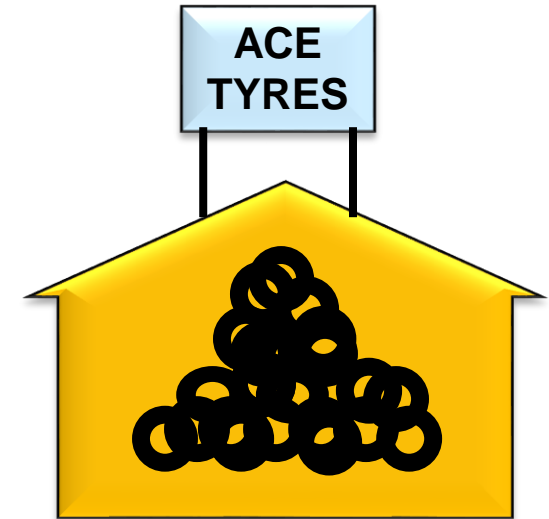


Demand for tyres is governed by the number of automobiles planned to be made

For every automobile that are planned to be made, five tyres will be needed

# Dependent and independent demand

Independent demand  
e.g. tyre fitting service

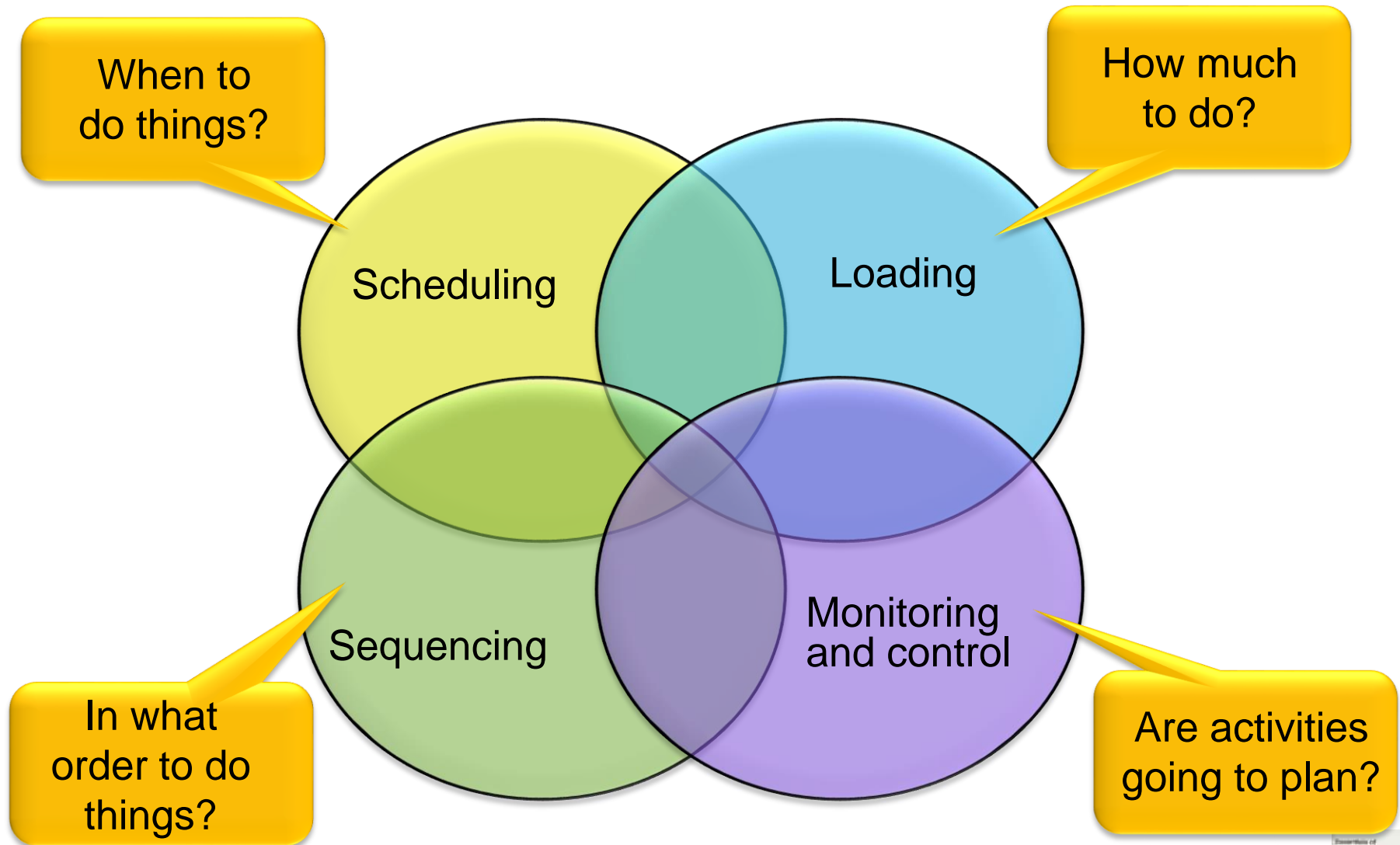


Demand for tyres is governed by the type of car arriving, the fluctuations in the number of cars arriving and how many tyres need replacing

Demand for tyres is largely governed by random factors



# The activities of planning and control

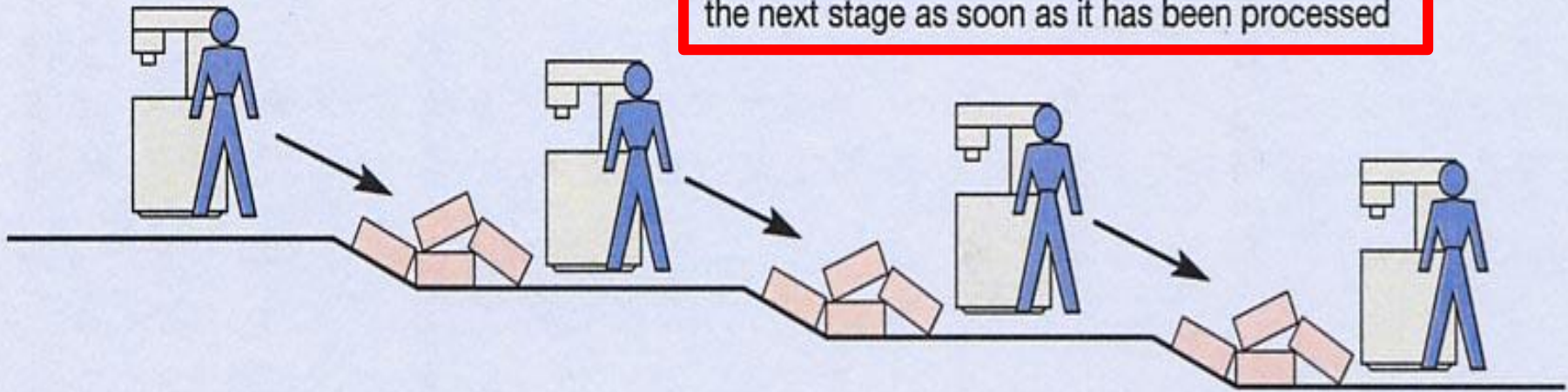


# The activities of planning and control

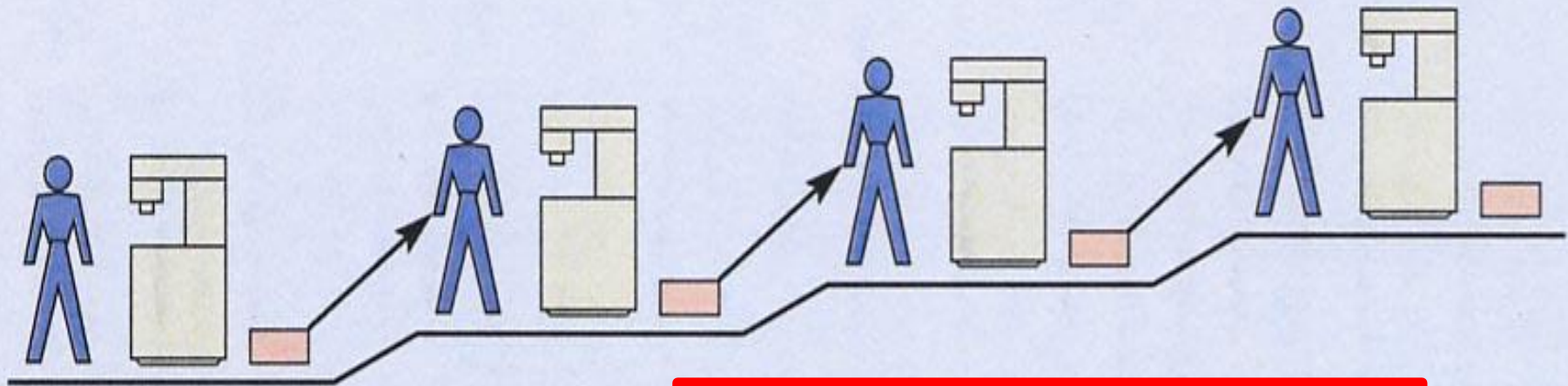
- **Loading**
  - Dictates the amount of work that is allocated to each part of the operation
- **Sequencing**
  - Decides the order in which work is tackled within the operation
- **Scheduling**
  - Determines the detailed timetable of activities and when activities are started and finished
- **Monitoring and control**
  - Involve detecting what is happening in the operation, re-planning if necessary, and intervening in order to impose new plans
  - Two important types of are “*pull*” and “*push*” control
  - Pull control: demand is triggered by requests from a work centre’s (internal) customer
  - Push control: centralized system, where decisions are issued to work centres which are required to perform the task and supply the next workstation

# Pull and push philosophies of planning and control

A **push system** where material is moved on to the next stage as soon as it has been processed



A **pull system** where material is moved only when the next stage wants it



# Different approaches to sequencing

- Customer Priority: allows an important or aggrieved customer (or item) to be “processed” prior to others, irrespective of the order of arrival
- Physical constraints: physical constraints may determine the priority of work eg. Lighter shades of paint will be sequenced before darker ones
- Due date (DD): work is sequenced according to when it is “due” for delivery, irrespective of the size of each job or the importance of each customer
- Last-in-first-out (LIFO): Usually selected for practical reasons (eg. Unloading an elevator)
- First-in-first-out (FIFO): Serving customers in exactly the sequence they arrive in
- Longest operation time (LOT): Sequencing the longest jobs first in the system (better utilization of resources)
- Shortest operation time (SOT): Sequencing the shortest jobs first (useful when there are cash-flow problems)

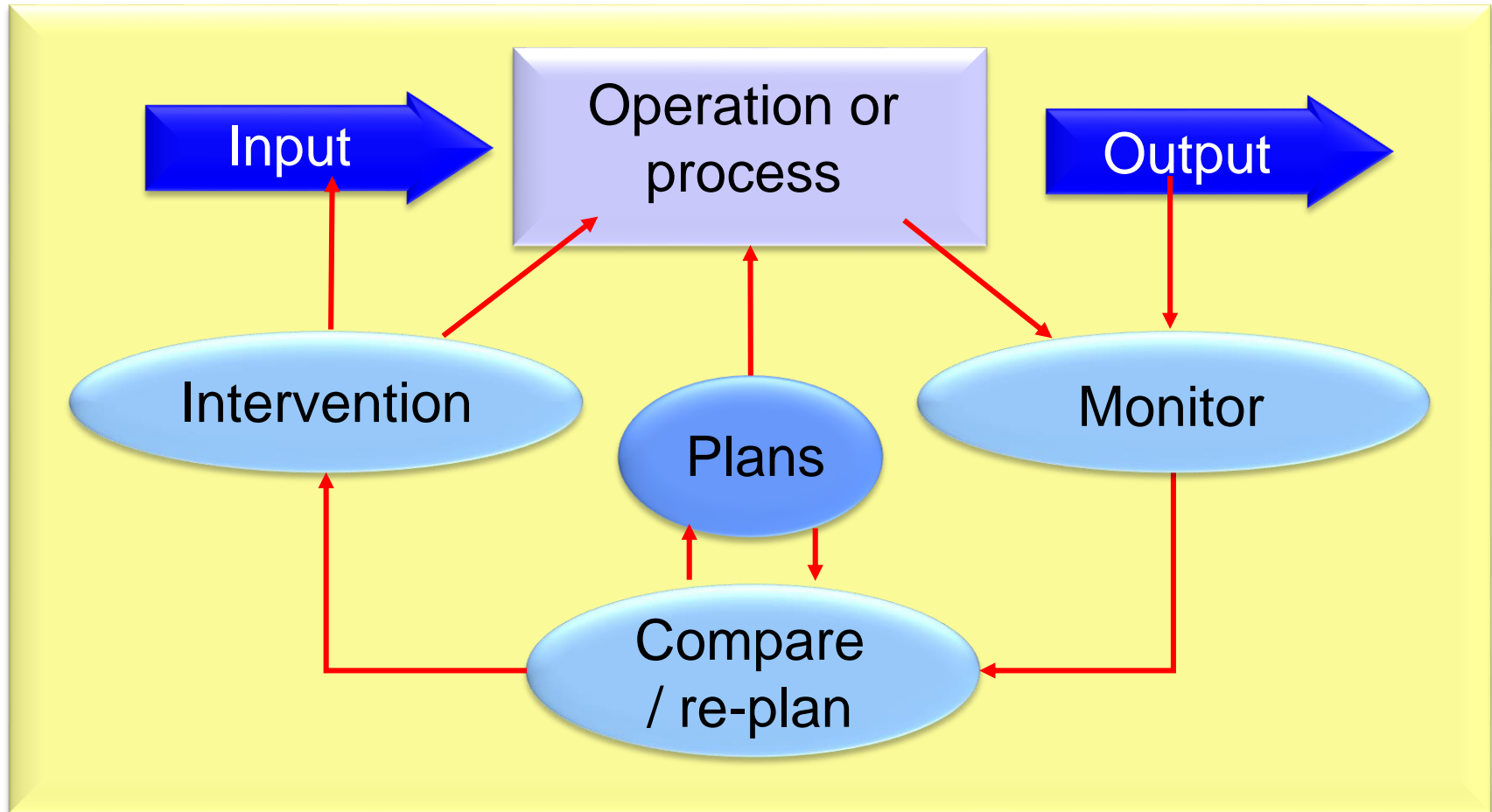
# Main objectives of sequencing

- Meeting “due date” promised to customer (dependability)
- Minimizing the time the job spends in the process (speed)
- Minimizing work-in-progress inventory (element of cost)
- Minimizing idle time of work centres (another element of cost)

# Forward and backward scheduling

- Forward scheduling involves starting work as soon as it arrives
  - High labour utilization, flexible
- Backward scheduling involves starting jobs at the last possible moment to prevent from being late
  - Lower material costs
  - Less exposed to risk in case of schedule change by customer

# A simple model of control



# Operating equipment effectiveness (OEE)

