CENTRE	: DDU KAUSHAL KENDRA
NAME OF THE PROGRAMME	: B.VOC(LOGISTICS AND SUPPLY CHAIN MANAGEMENT
PROGRAM CODE	: 3UABVOC(LSCM)
COURSE CODE	: LSCM17105
COURSE NAME	: OPERATIONS MANAGEMENT
SEMESTER	: I
FACULTY NAME	: MR.RAJKUMAR
DESIGNATION	: ASSISTANT PROFESSOR
TOPIC	: PROCESS SELECTION AND FACILITY LAYOUT

CENTRE	: DDU KAUSHAL KENDRA
NAME OF THE PROGRAMME	: B.VOC(LOGISTICS AND SUPPLY CHAIN MANAGEMENT
PROGRAM CODE	: 3UABVOC(LSCM)
COURSE CODE	: LSCM17105
TITLE OF THE PAPER	: OPERATIONS MANAGEMENT
SEMESTER	: I
FACULTY NAME	:MR.RAJKUMAR
DESIGNATION	: ASSISTANT PROFESSOR

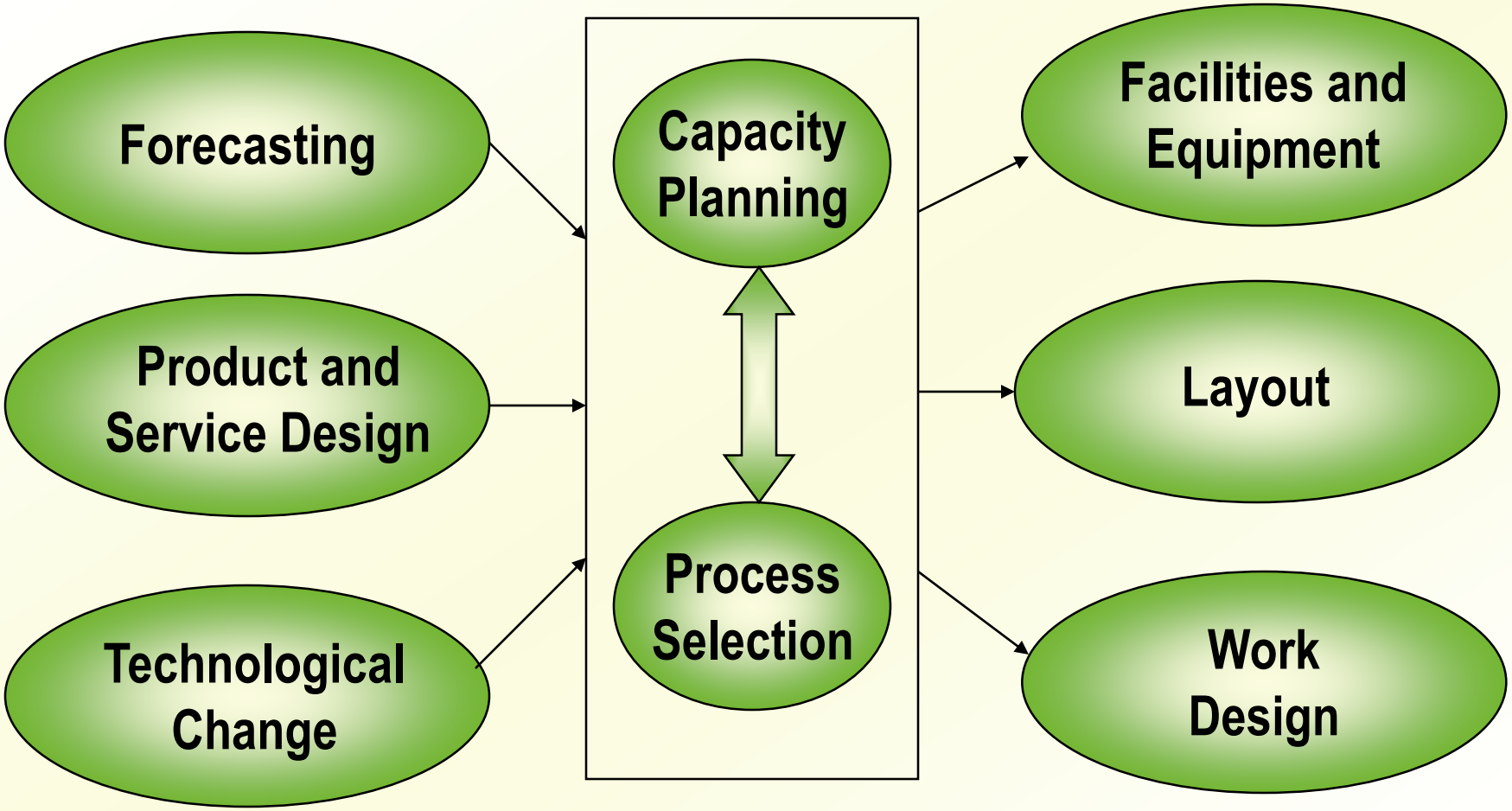
TOPIC: PROCESS SELECTION AND FACILITY LAYOUT

Introduction

- Process selection
  - Deciding on the way production of goods or services will be organized
- Major implications
  - Capacity planning
  - Layout of facilities
  - Equipment
  - Design of work systems

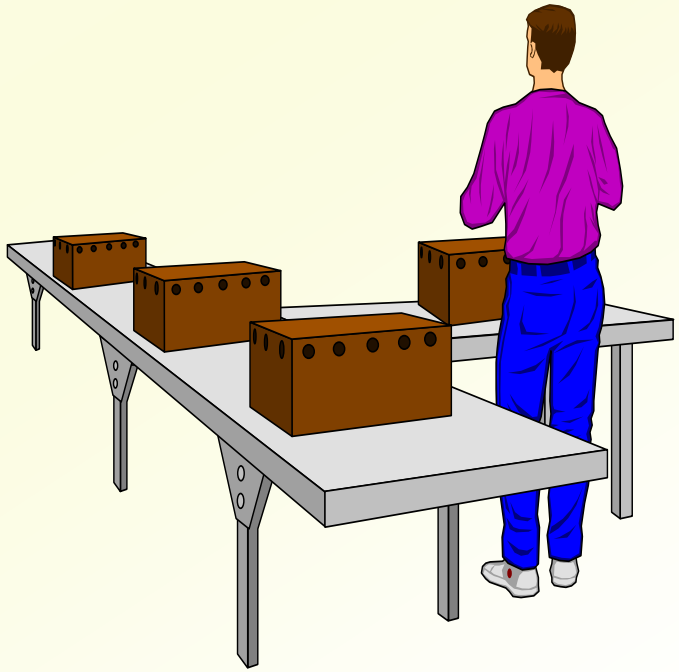
Process Selection and System Design

Figure 6.1



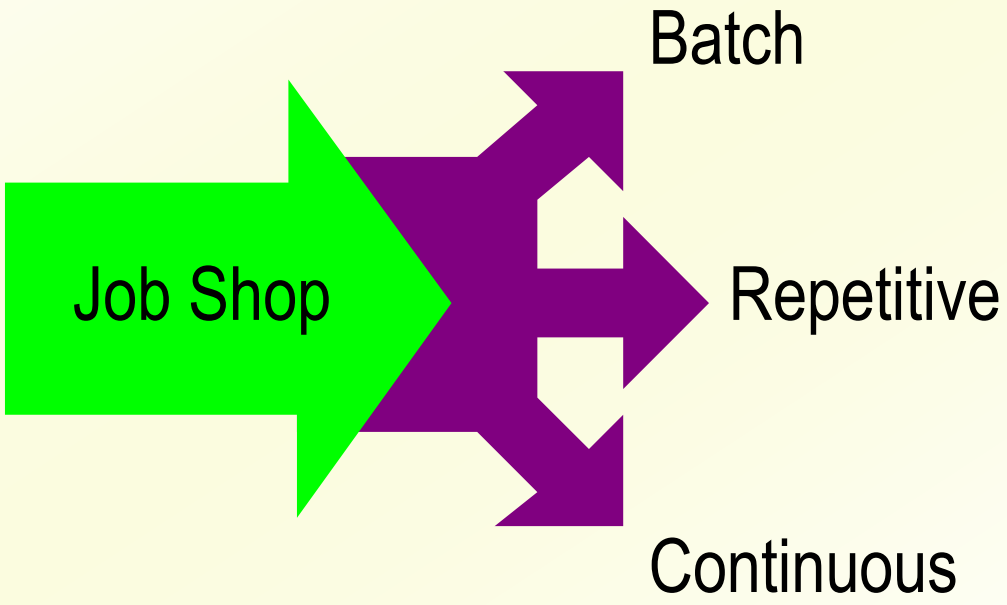
Process Strategy

- Key aspects of process strategy
  - Capital intensive – equipment/labor
  - Process flexibility
  - Adjust to changes
    - Design
    - Volume
    - technology



Process Selection

- Variety
  - How much
- Flexibility
  - What degree
- Volume
  - Expected output



Process Types

- Job shop
  - Small scale
- Batch
  - Moderate volume
- Repetitive/assembly line
  - High volumes of standardized goods or services
- Continuous
  - Very high volumes of non-discrete goods

Product – Process Matrix

Figure 6.2

Process Type				
Job Shop	Appliance repair Emergency room			Not feasible
Batch		Commercial bakery Classroom Lecture		
Repetitive			Automotive assembly Automatic carwash	
Continuous (flow)	Not feasible			Oil refinery Water purification

Product – Process Matrix

Figure 6.2 (cont'd)

Dimension				
Job variety	Very High	Moderate	Low	Very low
Process flexibility	Very High	Moderate	Low	Very low
Unit cost	Very High	Moderate	Low	Very low
Volume of output	Very High	Low	High	Very low

Automation

- *Automation*: Machinery that has sensing and control devices that enables it to operate
  - Fixed automation
  - Programmable automation

Automation

- Computer-aided design and manufacturing systems (CAD/CAM)
- Numerically controlled (NC) machines
- Robot
- Manufacturing cell
- Flexible manufacturing systems(FMS)
- Computer-integrated manufacturing (CIM)

Facilities Layout

- *Layout*: the configuration of departments, work centers, and equipment, with particular emphasis on movement of work (customers or materials) through the system

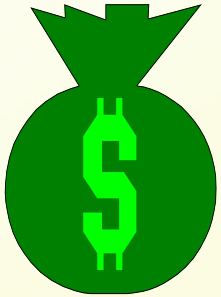
Importance of Layout Decisions

- Requires substantial investments of money and effort
- Involves long-term commitments
- Has significant impact on cost and efficiency of short-term operations

The Need for Layout Decisions

Inefficient operations

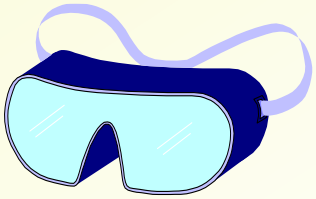
For Example:
High Cost
Bottlenecks



Changes in the design of products or services

The introduction of new products or services

Accidents



Safety hazards

The Need for Layout Design (Cont'd)

Changes in environmental or other legal requirements

Changes in volume of output or mix of products

Changes in methods and equipment

Morale problems

Basic Layout Types

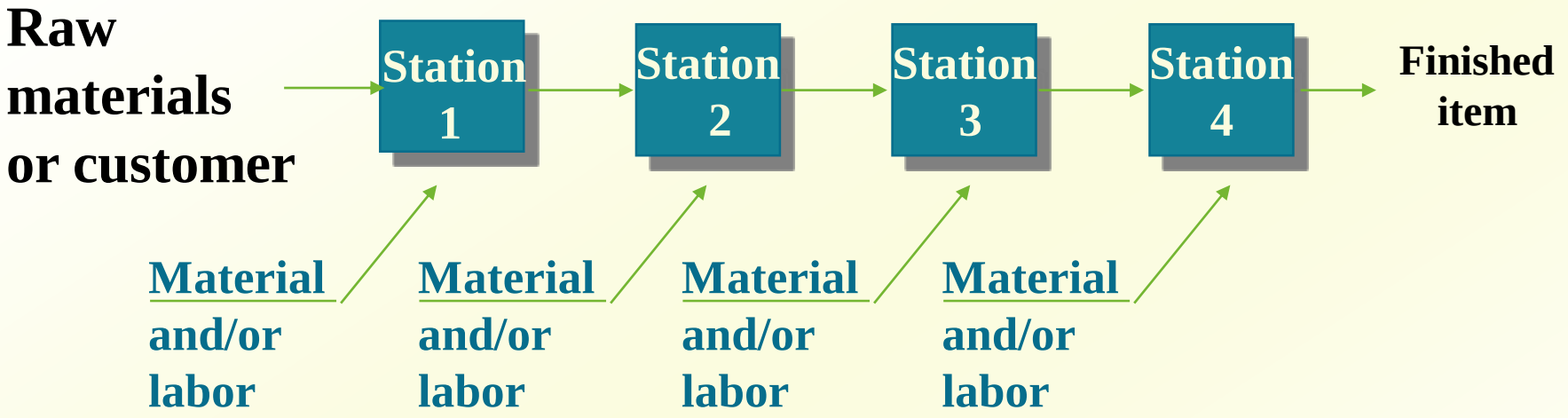
- Product layouts
- Process layouts
- Fixed-Position layout
- Combination layouts

Basic Layout Types

- Product layout
  - Layout that uses standardized processing operations to achieve smooth, rapid, high-volume flow
- Process layout
  - Layout that can handle varied processing requirements
- Fixed Position layout
  - Layout in which the product or project remains stationary, and workers, materials, and equipment are moved as needed

Product Layout

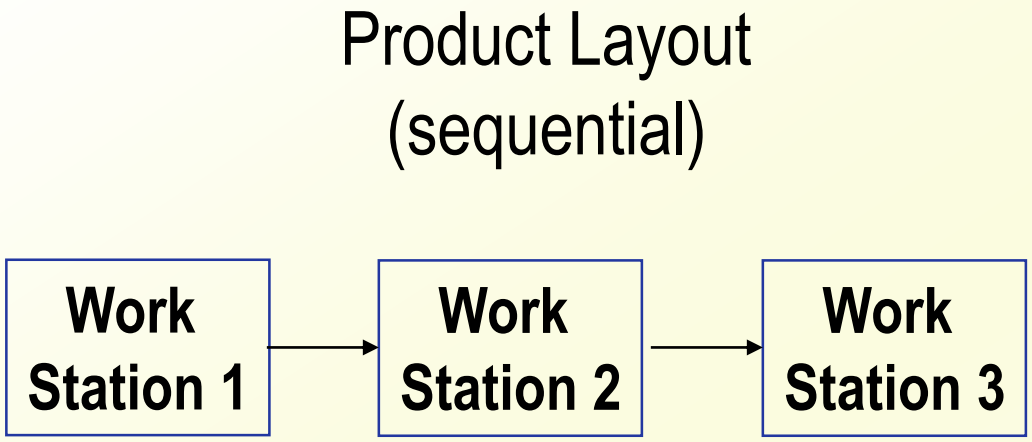
Figure 6.4



Used for Repetitive or Continuous Processing

Product Layout

Figure 6.7 (cont'd)



Used for Repetitive Processing
Repetitive or Continuous

Advantages of Product Layout

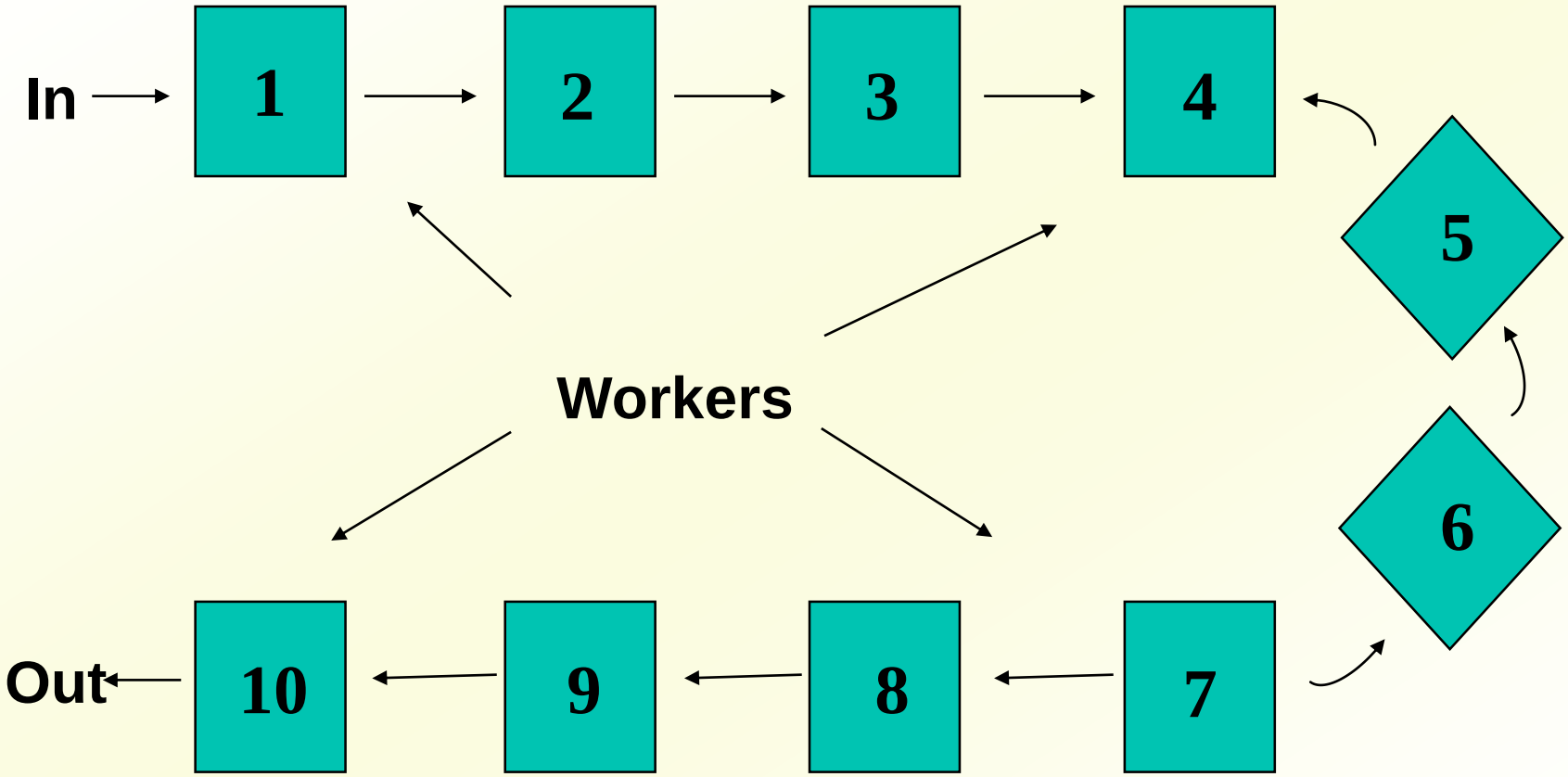
- High rate of output
- Low unit cost
- Labor specialization
- Low material handling cost
- High utilization of labor and equipment
- Established routing and scheduling
- Routing accounting and purchasing

Disadvantages of Product Layout

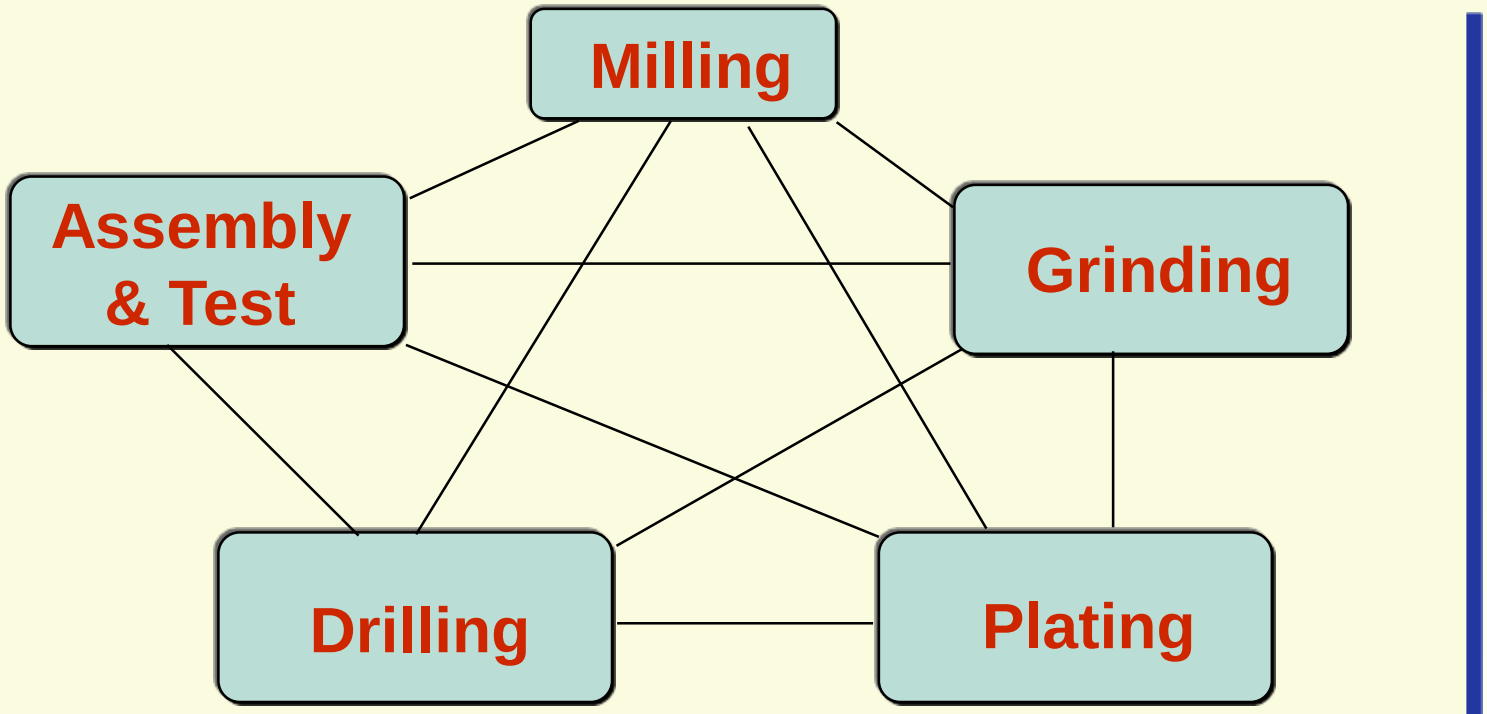
- Creates dull, repetitive jobs
- Poorly skilled workers may not maintain equipment or quality of output
- Fairly inflexible to changes in volume
- Highly susceptible to shutdowns
- Needs preventive maintenance
- Individual incentive plans are impractical

A U-Shaped Production Line

Figure 6.6



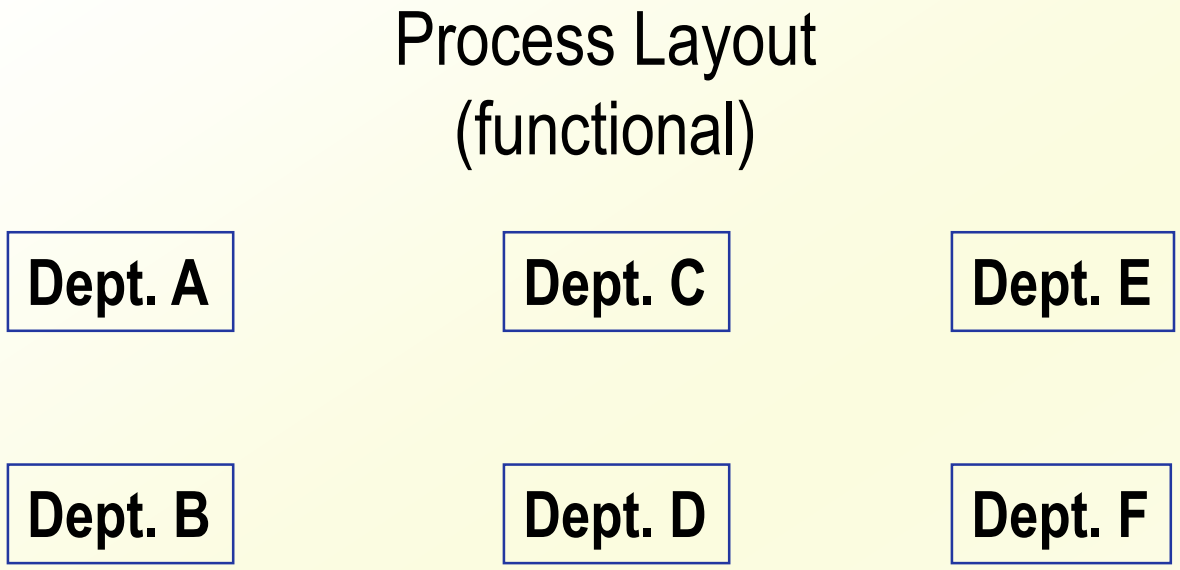
Process Layout



Process Layout - work travels to dedicated process centers

Process Layout

Figure 6.7



Used for Intermittent processing
Job Shop or Batch

Advantages of Process Layouts

- Can handle a variety of processing requirements
- Not particularly vulnerable to equipment failures
- Equipment used is less costly
- Possible to use individual incentive plans

Disadvantages of Process Layouts

- In-process inventory costs can be high
- Challenging routing and scheduling
- Equipment utilization rates are low
- Material handling slow and inefficient
- Complexities often reduce span of supervision
- Special attention for each product or customer
- Accounting and purchasing are more involved

Cellular Layouts

- Cellular Production
  - Layout in which machines are grouped into a cell that can process items that have similar processing requirements
- Group Technology
  - The grouping into part families of items with similar design or manufacturing characteristics

Functional vs. Cellular Layouts

Table 6.3

Dimension	Functional	Cellular
Number of moves between departments	many	few
Travel distances	longer	shorter
Travel paths	variable	fixed
Job waiting times	greater	shorter
Throughput time	higher	lower
Amount of work in process	higher	lower
Supervision difficulty	higher	lower
Scheduling complexity	higher	lower
Equipment utilization	lower	higher

Other Service Layouts

- Warehouse and storage layouts
- Retail layouts
- Office layouts

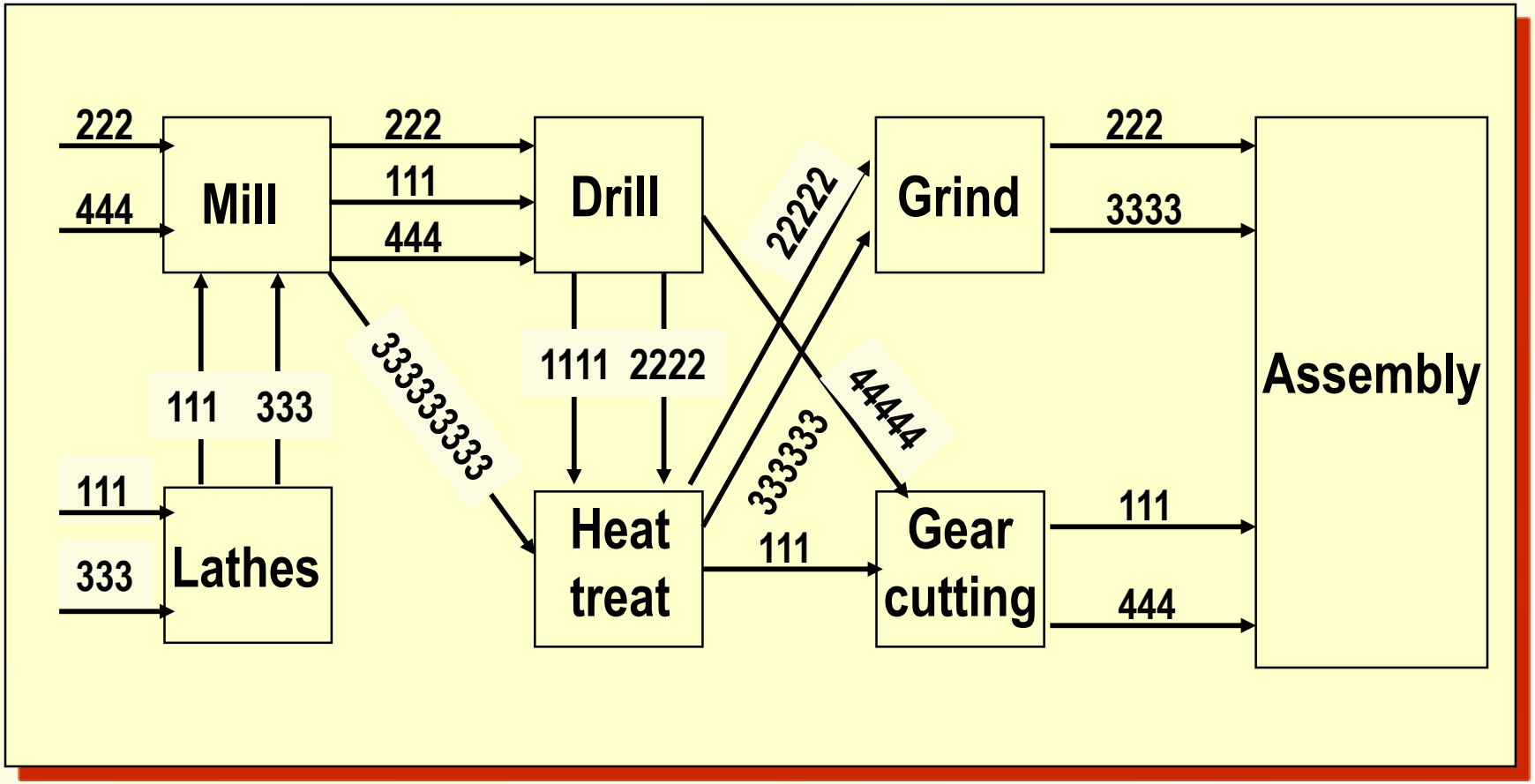
Design Product Layouts: Line Balancing

Line Balancing is the process of assigning tasks to workstations in such a way that the workstations have approximately equal time requirements.

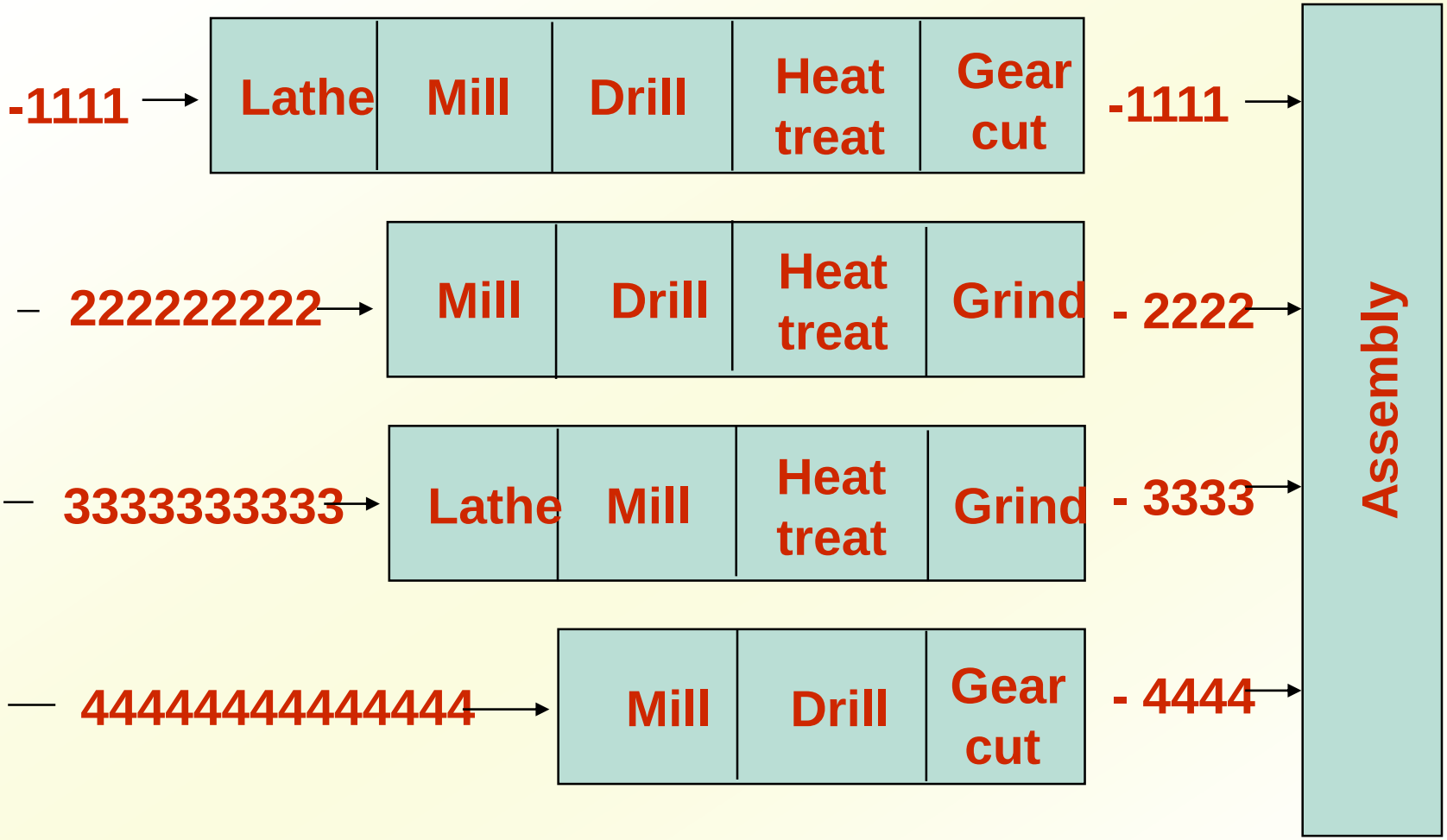
Cycle Time

Cycle time is the maximum time allowed at each workstation to complete its set of tasks on a unit.

Functional Layout



Cellular Manufacturing Layout



Flexible Manufacturing

VD7

Process at Trek Bikes

Location/Criteria

PS11

Guitar site location

Process Overview

AB2

Aluminum tubing, suppliers at Hillerich & Bradsby