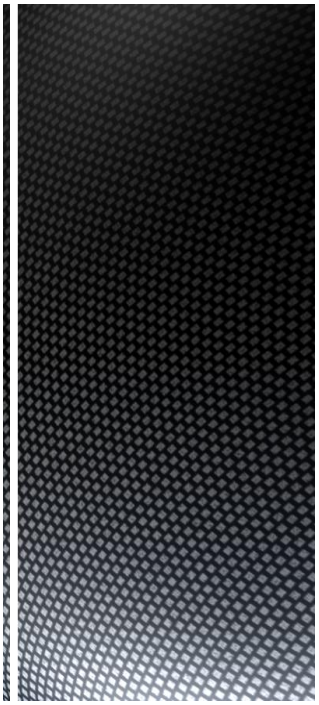
MMIS
(Manufacturing Management Information System)



Department of Industrial Engineering
Sharif University of Technology

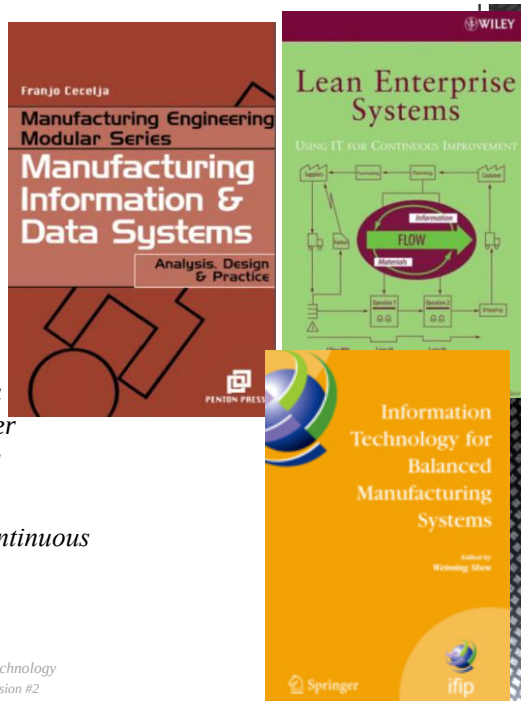
Session# 2

Course Description

- *Instructor*
  - *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
  - *Email: Fvalilai@sharif.edu , Tel: 021-6616-5706*
  - *Website: http://sharif.edu/~fvalilai*
- *Class time*
  - *Saturday* *15:30~18:00*
- *Course evaluation*
  - *Mid-term* *(30%)*
  - *Final exam* *(40%)*
  - *Quiz* *(10%)*
  - *Exercise* *(20%)*

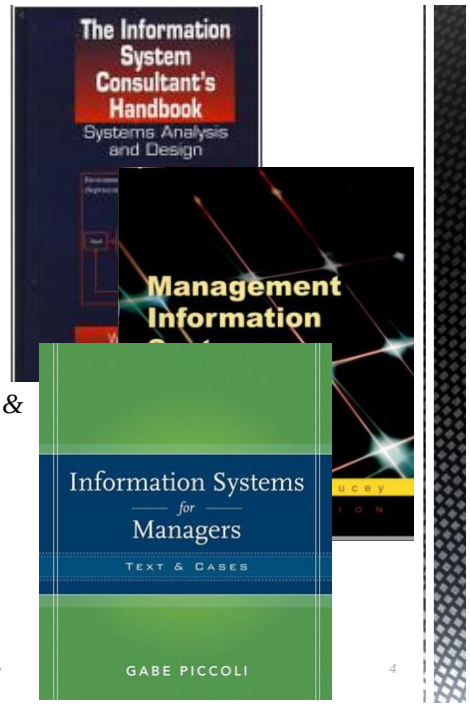
Course Description *(Continued ...)*

- *Mid-term session:*
  - *N/A*
- *Final session:*
  - *N/A*
- *Reference:*
  - *Franjo Cecelja, "Manufacturing Information and Data Systems: Analysis, Design and Practice", 2002, Elsevier*
  - *Shen, Weiming; "Information Technology for Balanced Manufacturing Systems", 2004, Springer*
  - *Steve Bell; "Lean Enterprise Systems: Using IT for Continuous Improvement", 2005, Wiley*



Course Description *(Continued ...)*

- *Reference:*
  - *William S. Davis, David C. Yen, "The information system consultant's handbook: system analysis and design", 2010, Taylor and Francis*
  - *Terence Lucey; "Management Information Systems", 2004, Cengage Learning EMEA*
  - *Gabriele Piccoli; "Information systems for managers: texts & cases ", 2007, John Wiley & Sons Inc*

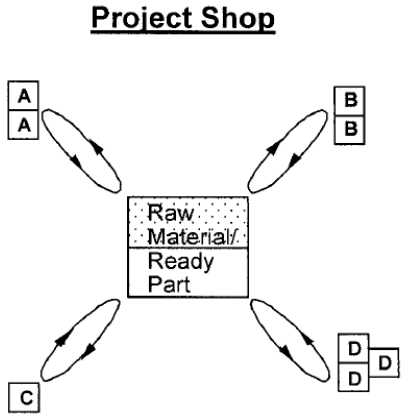


Introduction to manufacturing automation and CIM (Computer Integrated Manufacturing)

- *Types of manufacturing systems*
  - *Project shop*
  - *Job shop*
  - *Batch production system*
  - *Flow line*

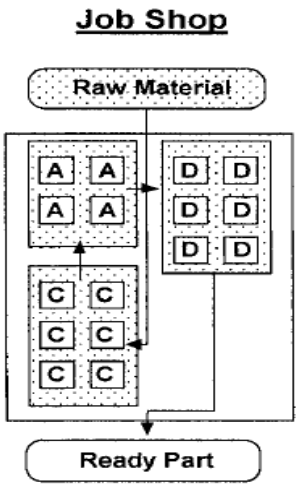
Project shop

- *Characteristics*
  - *product's position remains fixed during manufacturing because of its size and/or weight*
  - *Materials, people, and machines are brought to the product as needed.*



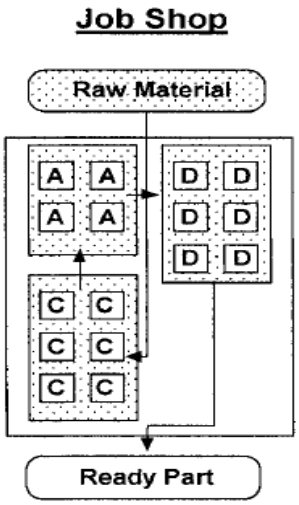
Job shop

- *Characteristics*
  - *Machines with the same or similar material processing capabilities are grouped together*
  - *The machines are usually general-purpose machines, which can accommodate a large variety of part types*
  - *Material handling is very flexible in order to accommodate many different part types*
  - *Within each work center, a number of machines can be used for a particular operation.*



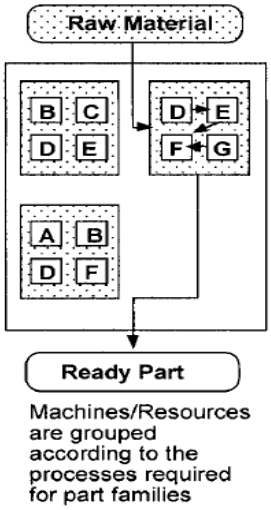
Job shop

- *Characteristics*
  - *Each operation can be assigned to a machine, which yields the best quality or the best production rate*
  - *Machines can be evenly loaded*
  - *Machine breakdowns can be accommodated easily.*
  - *Requires making and implementing complex decisions in real time.*
  - *Parts spending a long time on the job shop*



Batch production

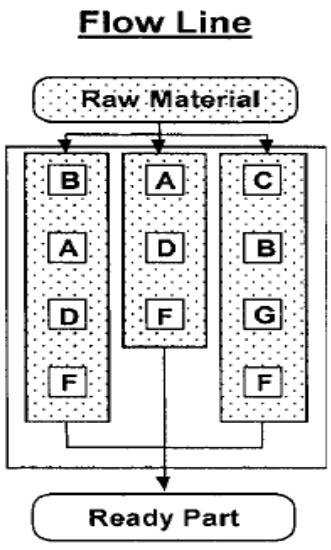
- *Characteristics*
  - *The equipment or machinery is grouped according to the process combinations that occur in families of parts*
  - *Each cell contains machines that can produce a certain family of parts*
  - *Intra-cellular material flow can be performed either automatically or manually*



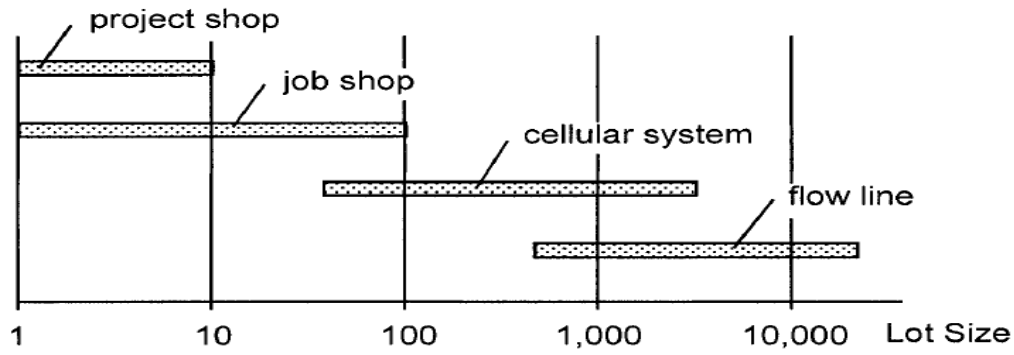
Machines/Resources are grouped according to the processes required for part families

Flow line

- *Characteristics*
  - *machines and other equipment are ordered according to the process sequences of the parts to be manufactured*
  - *Only one part type is produced at a time*
  - *The machines are linked by automated material handling devices, such as conveyors.*
  - *lot size of each part is high enough to guarantee that the capacity of the equipment will be fully exploited and not wasted on the setups*



Manufacturing Systems



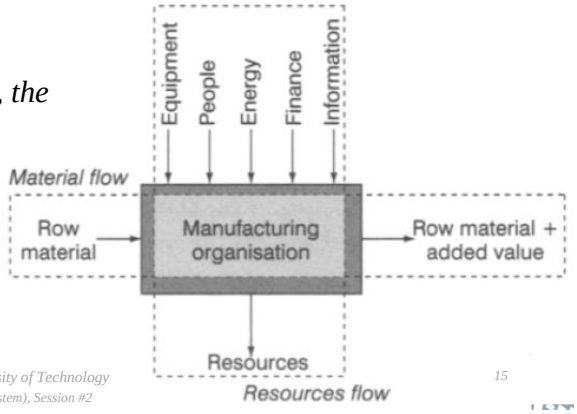
Manufacturing Systems

Type	Job shop	Batch Production	Flow line
Machine allocation	same or similar material processing capabilities are grouped together	grouped according to the process combinations that occur in families of parts	ordered according to the process sequences of the parts to be manufactured
Machine Types	general-purpose machines	machines produce a certain family of parts	
Material handling	flexible	Intra-cellular material flow can be performed either automatically or manually	automated material handling devices,
Product Variety	High	Medium	Low
Product Quantity	Low	Medium	High
WIP	High	Medium	Low
Material Flow	Complicated	material flow within the cell may differ for different parts of a part family	Smooth
Product type	specialized and customized	Family Part	One type of product
Labor	highly skilled	Medium	Not skill

Manufacturing Information and Data Systems: General Concept

- *The role of a manufacturing organization can be seen as the generation of resources, generally financial, to add value to raw materials, then called finished products, for which there is a demand.*

- *In order to achieve this transformation process, the manufacturing organization uses a number of resources in the shape of equipment, people, information, energy and finance*

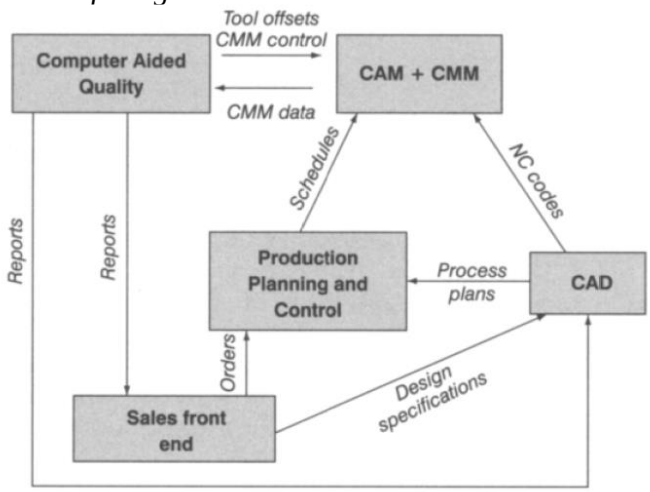


Manufacturing Information and Data Systems: General Concept

- *Information as a vehicle of integration*
  - *Since the creation of computer integrated manufacturing (CIM), information has been seen as an increasingly important*
  - *Information technology both speeds up information transfer and availability, and can therefore be seen as the main integrating factor in today's manufacturing environments.*
    - *Information flows are the vital links between various manufacturing system elements.*
  - *The level of integration between manufacturing functions still varies greatly from one company to another, but, whether integrated or not, information is the lifeblood of an organization.*

Manufacturing Information and Data Systems: General Concept

- *Information as a vehicle of integration*



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Manufacturing Information and Data Systems: General Concept

- *History of manufacturing information systems*
  - *Financial evolution of production systems*
  - *Technical evolution of computer systems*
    - *During the 1970s, with the appearance of mini-computers and the drop in price of hardware and improvement in performance of computers, this spread into industrial applications and robots became part of the industrial landscape.*
    - *The 1990s to the present date is often referred to by the popular press as the information age and is, as far as manufacturing engineering is concerned, representing a move towards manufacturing communication at a global level and the total integration of manufacturing information systems and manufacturing data systems.*

Manufacturing Information and Data Systems: General Concept

- *Manufacturing information systems Challenges*
  - *The design of manufacturing information systems and the selection of equipment and software is still a difficult process.*

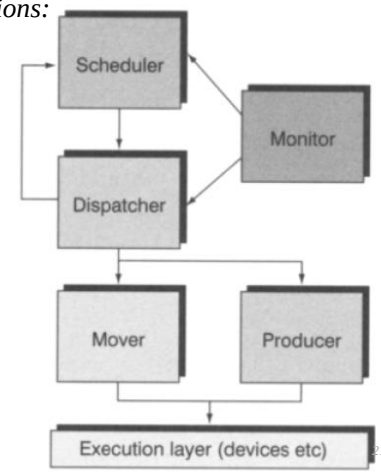
Potential benefits of MIDS	Costs/potential costs of MIDS
Competitive technology lead	Cost of equipment
Product quality enhancement	
Enhanced delivery performance	Loss of one-to-one contact with the customer
Production system flexibility	Cost of training
Efficiency and effectiveness gains	Loss of knowledge and know-how about the product
Readily available management information	
Social gains (quality of the work place, remote login, etc.)	Social costs

Manufacturing Information and Data Systems: General Concept

- *Manufacturing Information systems (Manufacturing Information Data Systems)*
  - *In general, manufacturing control systems are seen as implementation of two major activities, namely factory co-ordination and production activity control.*
  - *This analysis is based on a functional decomposition of the activities (tasks) involved in factory management (Gupta and Biegel, 1991).*
  - *At the factory level, production management is concerned with factory co-ordination, which can be further subdivided into two functions. One is concerned with the design of the production environment and the other with overall factory control.*

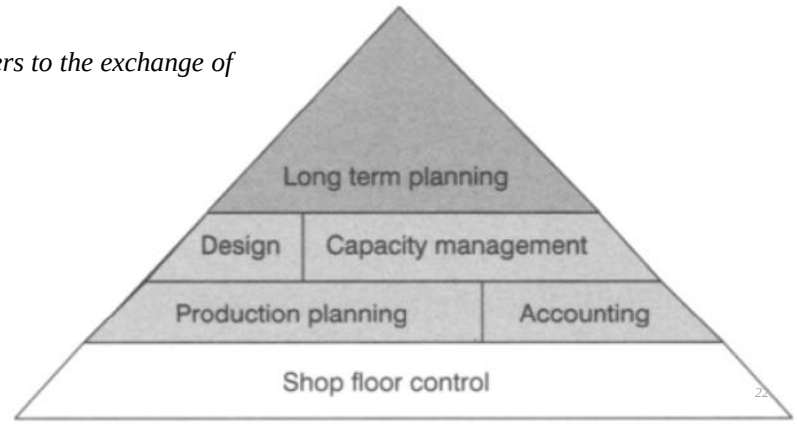
Manufacturing Information and Data Systems: General Concept

- *Manufacturing Information systems (Manufacturing Information Data Systems)*
  - *In this architecture, control activities comprise five sub-functions:*
  - *Scheduler;*
  - *Dispatcher;*
  - *Monitor;*
  - *Mover;*
  - *Producer.*



Manufacturing Information and Data Systems: General Concept

- *CIM concept*
  - *Vertical integration refers to the exchange of information across levels of the pyramid.*
  - *Horizontal integration refers to the exchange of information within levels*



Manufacturing Information and Data Systems: General Concept

- *CIM concept*
  - *In the IBM model, the emphasis is on the idea that a typical CIM environment can be divided up into six functional areas, which work together (vertical integration)*
  - *Three services are needed to support these manufacturing functions (horizontal integration)*