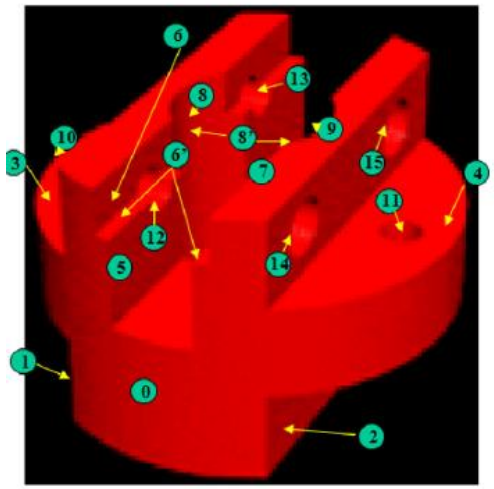
Process and System



# number of feature	Name of feature
1	Lower Left *STEP*
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15	Right Boss Second *HOLE*

HYUNSOO LEE

Chapter 0. Engineering

- Science Vs. Engineering
  - Science
    - Knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method [Webster Dictionary, 2009]
    - Systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe. [Propper,2002]
  - Engineering
    - The discipline, art, skill and profession of acquiring and applying scientific, mathematical, economic, social and practical knowledge, in order to design and build structures, machine devices, systems, materials and processes. [Oxford English Dictionary, 2010]

Chapter 1. Engineering

- In Engineering, "Industrial Engineering"
  - a branch of engineering dealing with the optimization of complex or systems.
  - concerned with the development, improvement, implementation and evaluation of
    - integrated systems of people, money, knowledge, information, equipment, energy, materials, analysis and synthesis
  - Integrate mathematical, physical and social science together with the principles and methods of engineering design
    - to specify, predict, and evaluate the result to be obtained from such systems or processes.

Chapter 1. Industrial Engineering

- History

1 Georgia Institute of Technology → School of Industrial and Systems Engineering
2 University of Michigan Ann Arbor → Department of Industrial and Operations Engineering
3 University of California Berkeley → Department of Industrial E. and Operations Research
4 Northwestern University → Department of Industrial E. and Management Science
4 Penn State University Park → Department of Industrial and Manufacturing Engineering
4 Stanford University → Department of Management Science and Engineering
4 Virginia Tech → Department of Industrial and Systems Engineering
8 Cornell University → School of Operations Research and Information Engineering
8 Texas A&M University → Department of Industrial and Systems Engineering
10 Purdue University,West Lafayette → School of Industrial Engineering
10 University of Wisconsin Madison → Department of Industrial and Systems Engineering

Chapter 1. Industrial Engineering

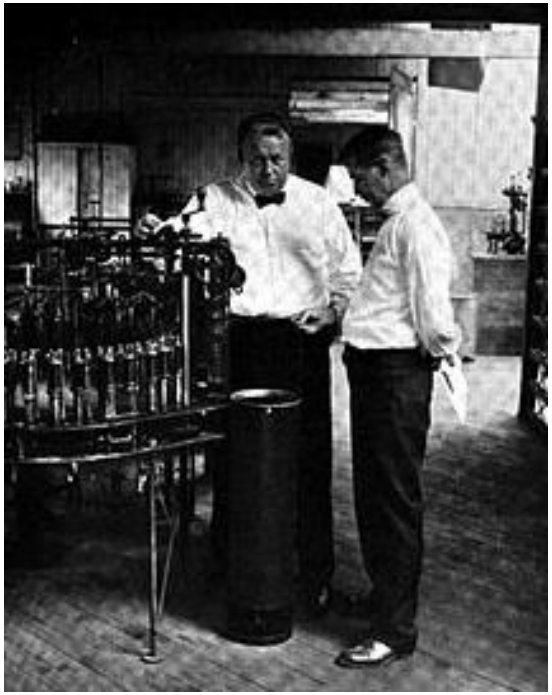
- System

Chapter 1. Industrial Engineering

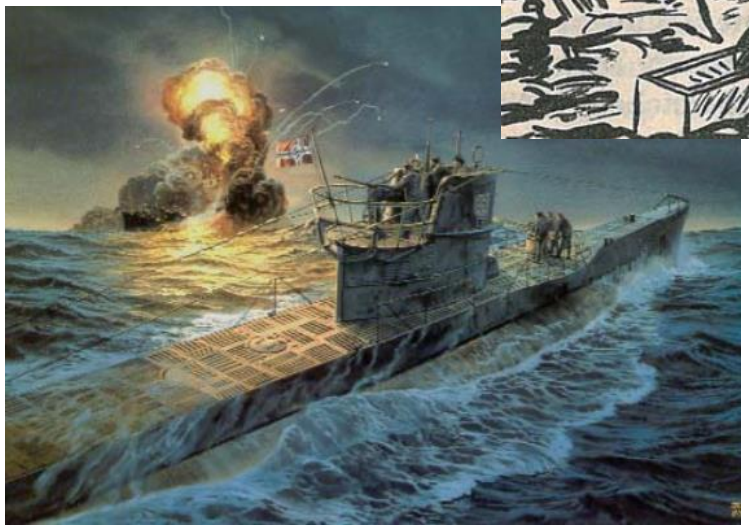
- History

Chapter 1. Industrial Engineering

- History



Chapter 1. Industrial Engineering



Chapter 1. Industrial Engineering

- History – “Blackett’s circus”
  - 3 physiologist
  - 2 physicists
  - 2 mathematical physicist
  - 1 astrophysicist
  - 1 general physicist
  - 1 surveyor
  - 2 mathematician

Chapter 1. Industrial Engineering

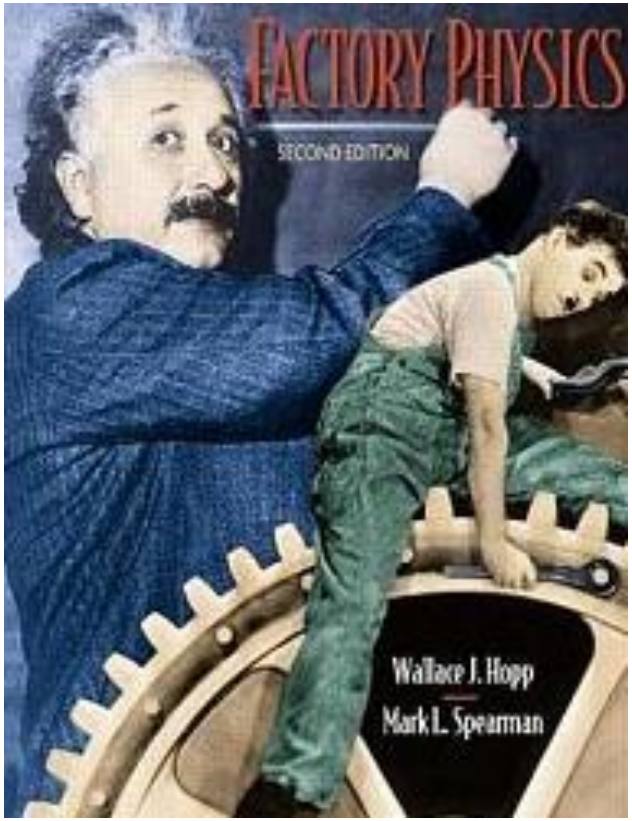
- Seven steps
  - 1) Formulate the problem
  - 2) observe the system
  - 3) formulate a mathematical model
  - 4) verify the model
  - 5) select the suitable alternative
  - 6) Draw conclusion
  - 7) Implementation and evaluate recommendation

Chapter 1. Industrial Engineering

- Physics → ?
  - Statistics

Chapter 1. Industrial Engineering

- Physics → ?



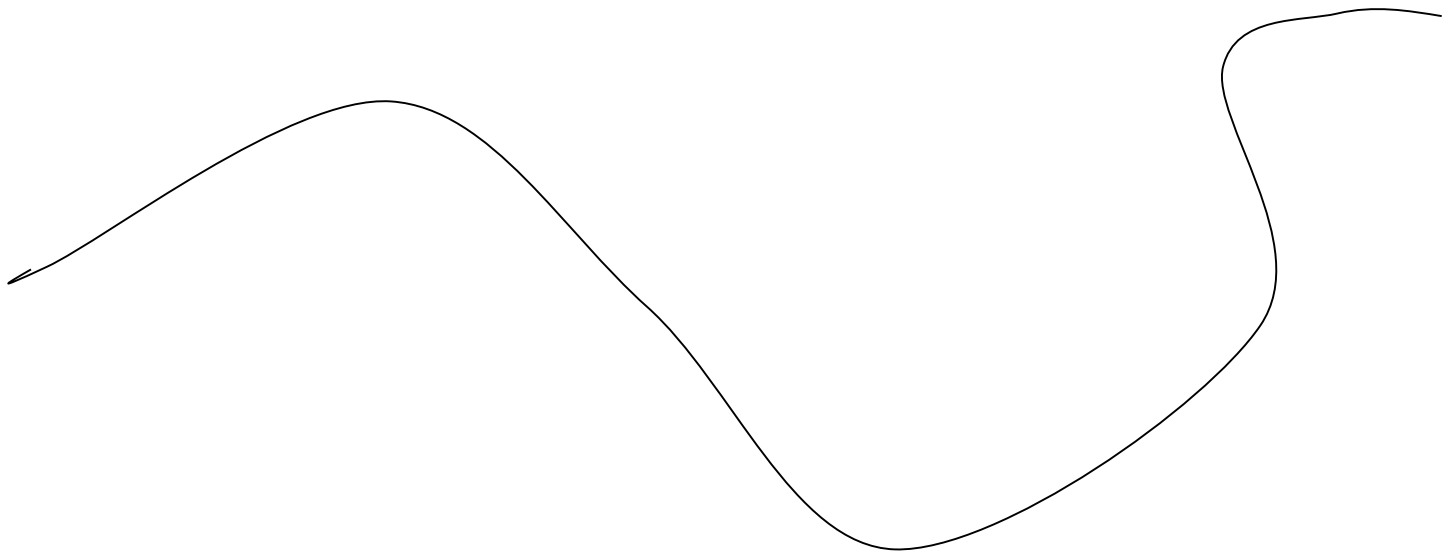
$$L = \lambda W$$

Chapter 1. Industrial Engineering

- Manufacturing

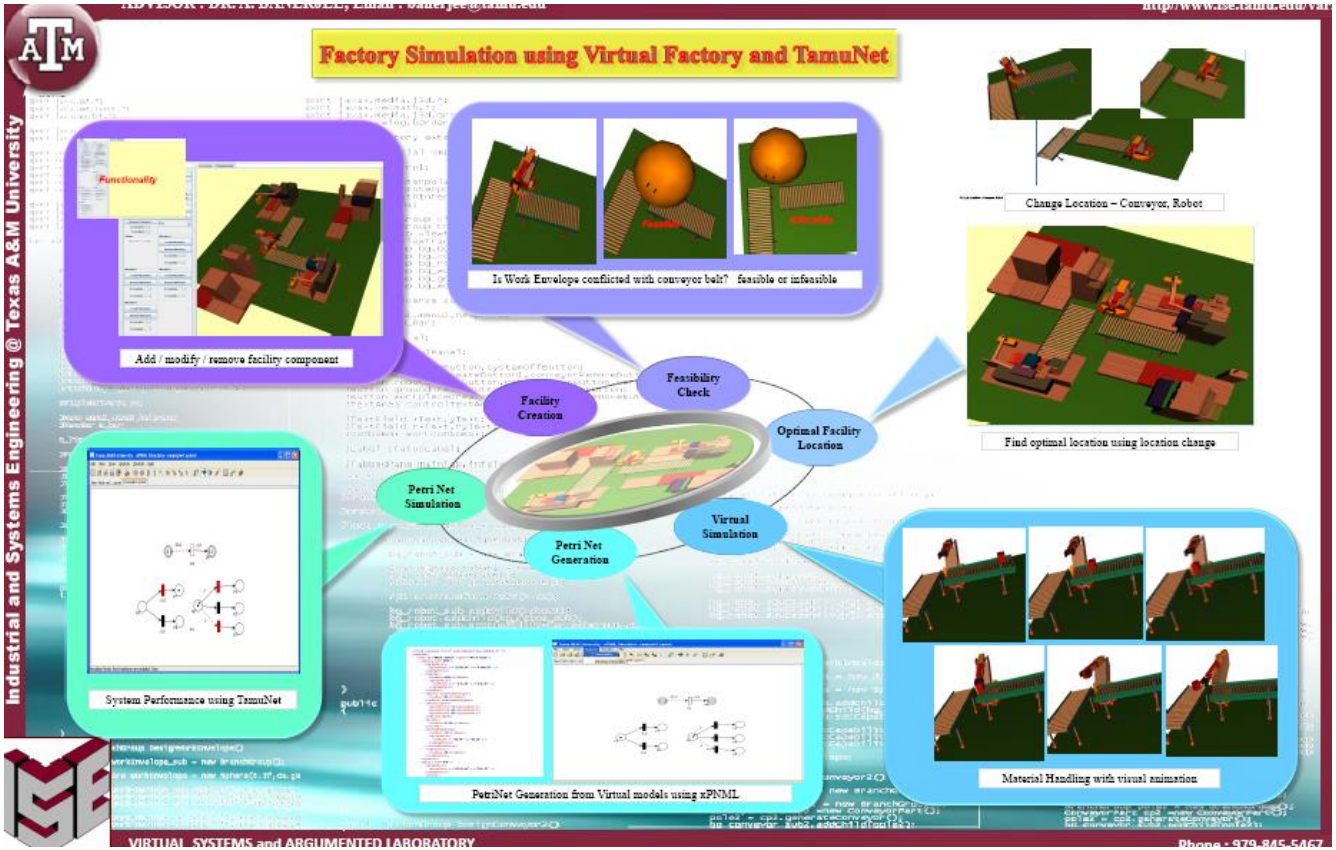
Chapter 1. Industrial Engineering

- CAD / CAM
  - Bezier



Chapter 1. Industrial Engineering

- Virtual Engineering



Process, process model and Process Planning

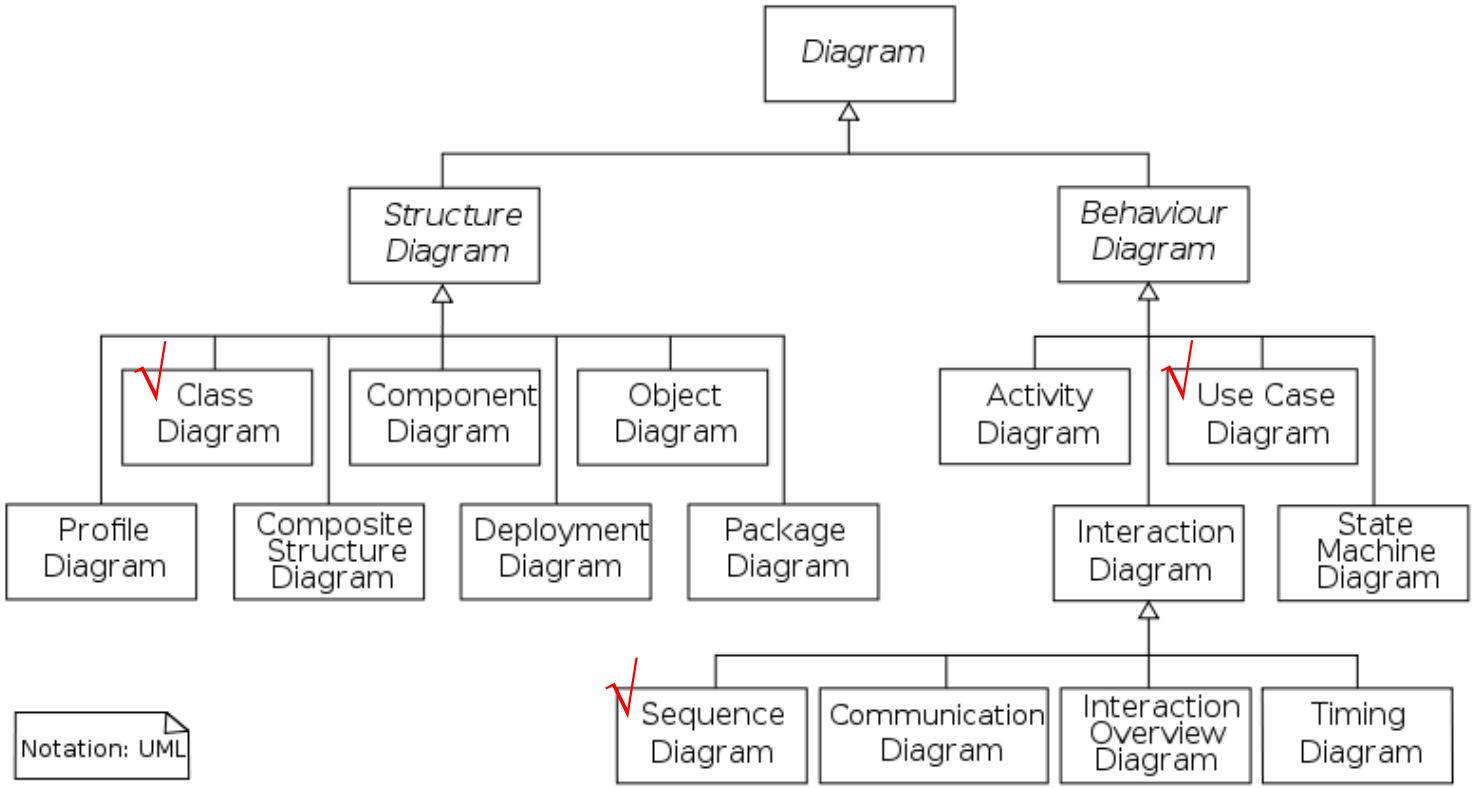
- Process
  - A series of actions, changes or functions bring about a result [*online dictionary*]
  - The action of taking something through Set of Procedures or Steps [*Wikipedia*]
- Process model
  - A description of a process [*Wikipedia*]
  - Meta-process

Modeling methodology

- modeling methodologies
  - 1) UML
  - 2) IDEF
  - 3) Process Plan Graph
  - 4) Discrete Event Simulation Modeler
  - 5) Petri Net
  - …..

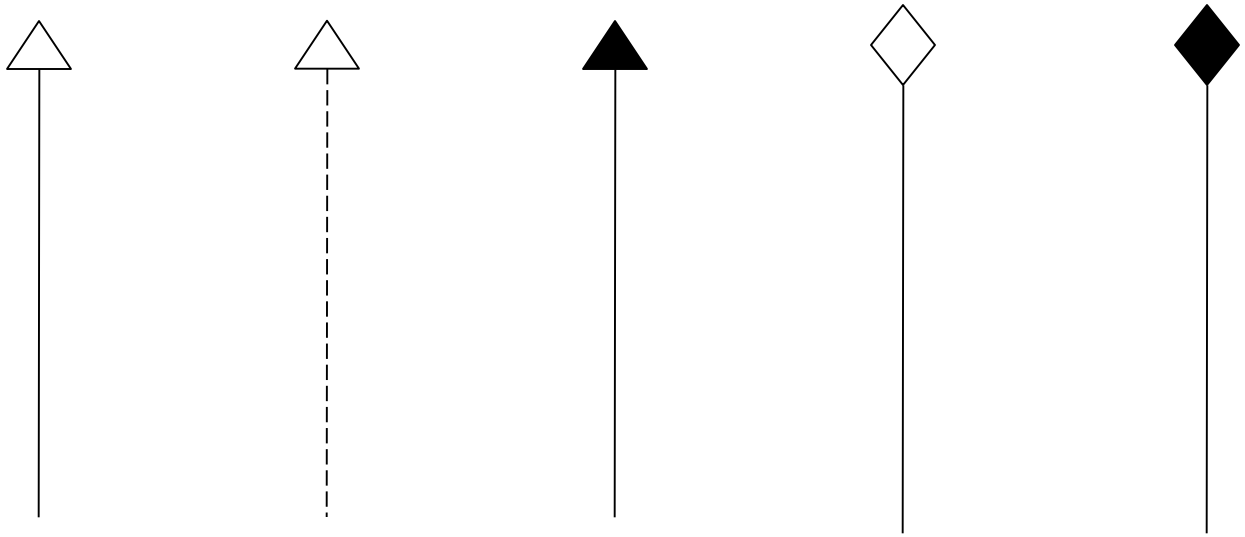
UML (1)

- UML : Unified Modeling Language



UML (2)

- In Class Diagram

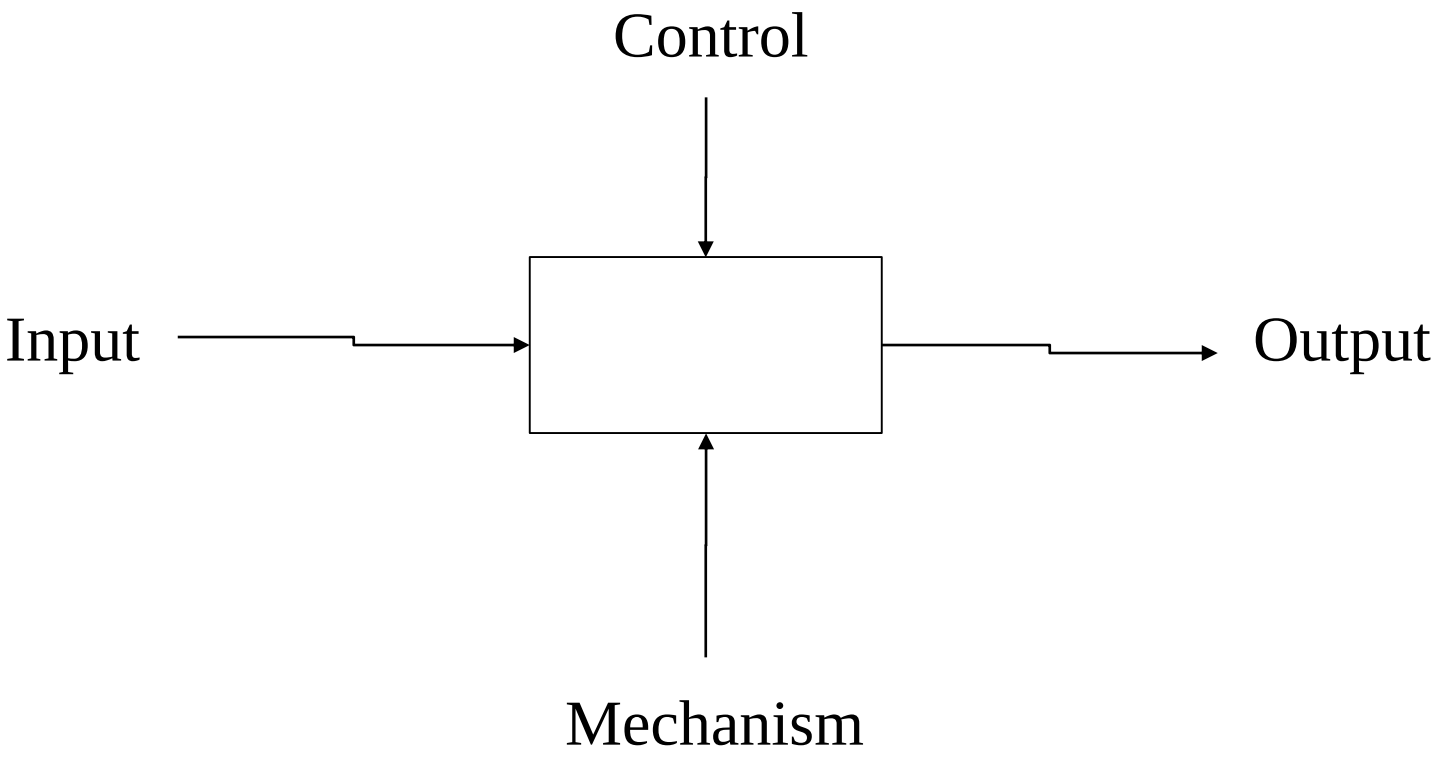


IDEF (1)

- Integrated Definition
  - IDEF 0 : Function modeling
  - IDEF 1 : Information Modeling
  - IDEF 3 : Process Description
  - IDEF 4 : Object- Oriented Design
  - ….
  - IDEF 14 : Network Design

IDEF (2)

- IDEF 0 : ICOM

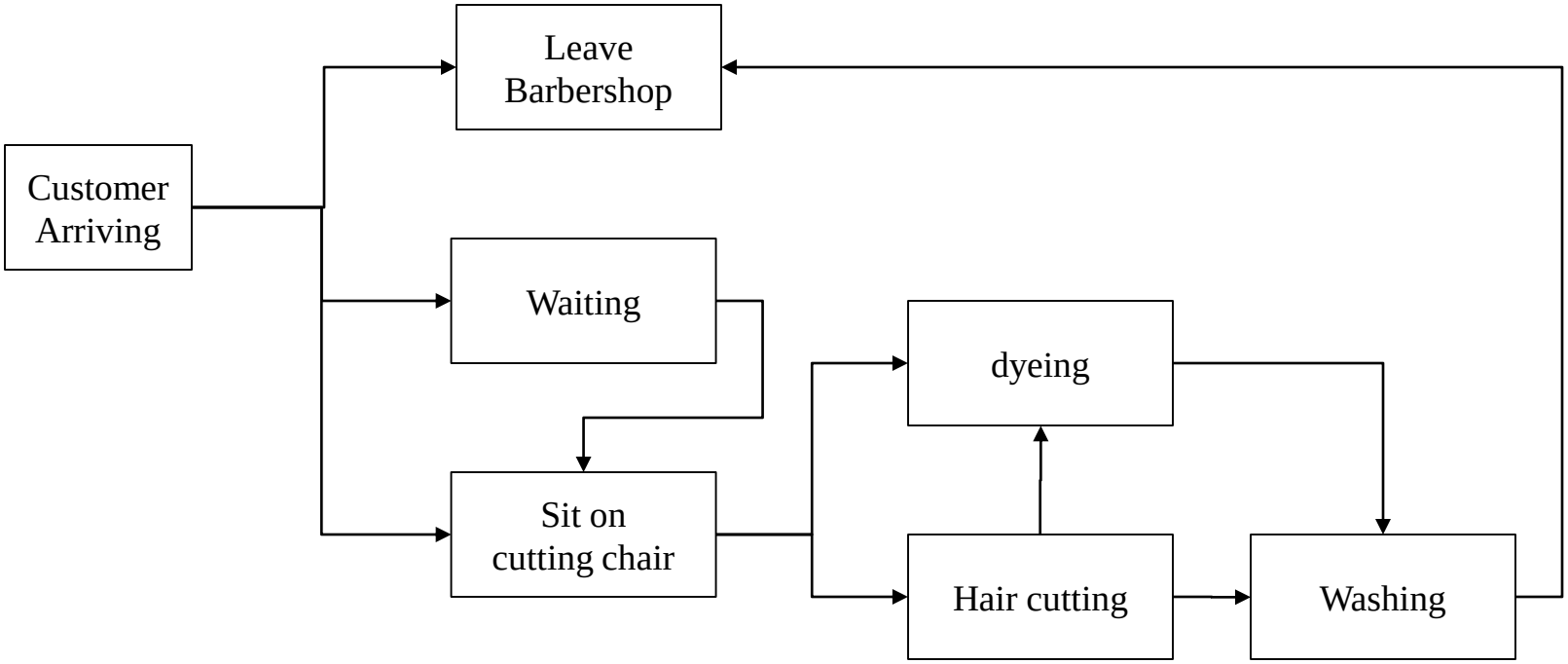


IDEF (3)

- Solving of Quadratic equation

IDEF (4)

- In modeling process, Barbershop case.

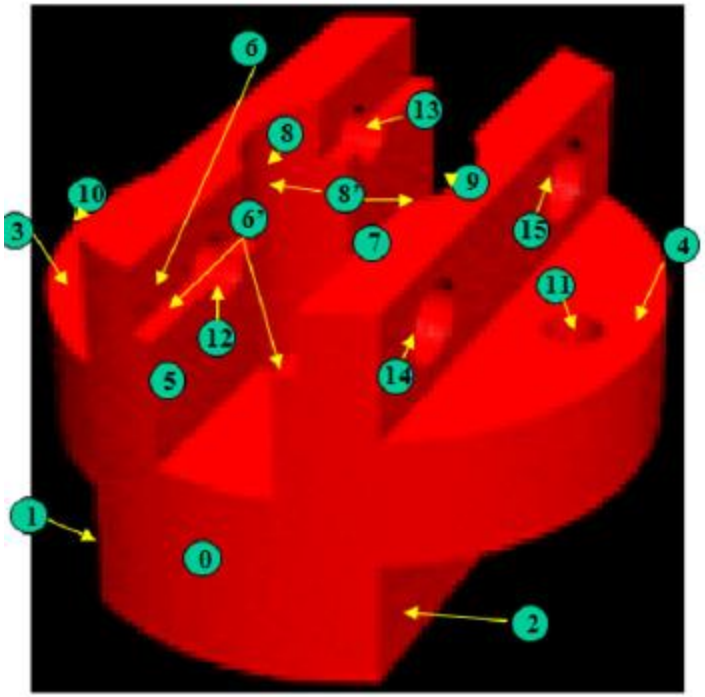


IDEF (6)

- IDEF 3
  - UoB
  - Link
  - Junction
  - References
- Variation of IDEF 3
  - Process plan graph → And / OR graph

Process Plan Graph (1)

- Example



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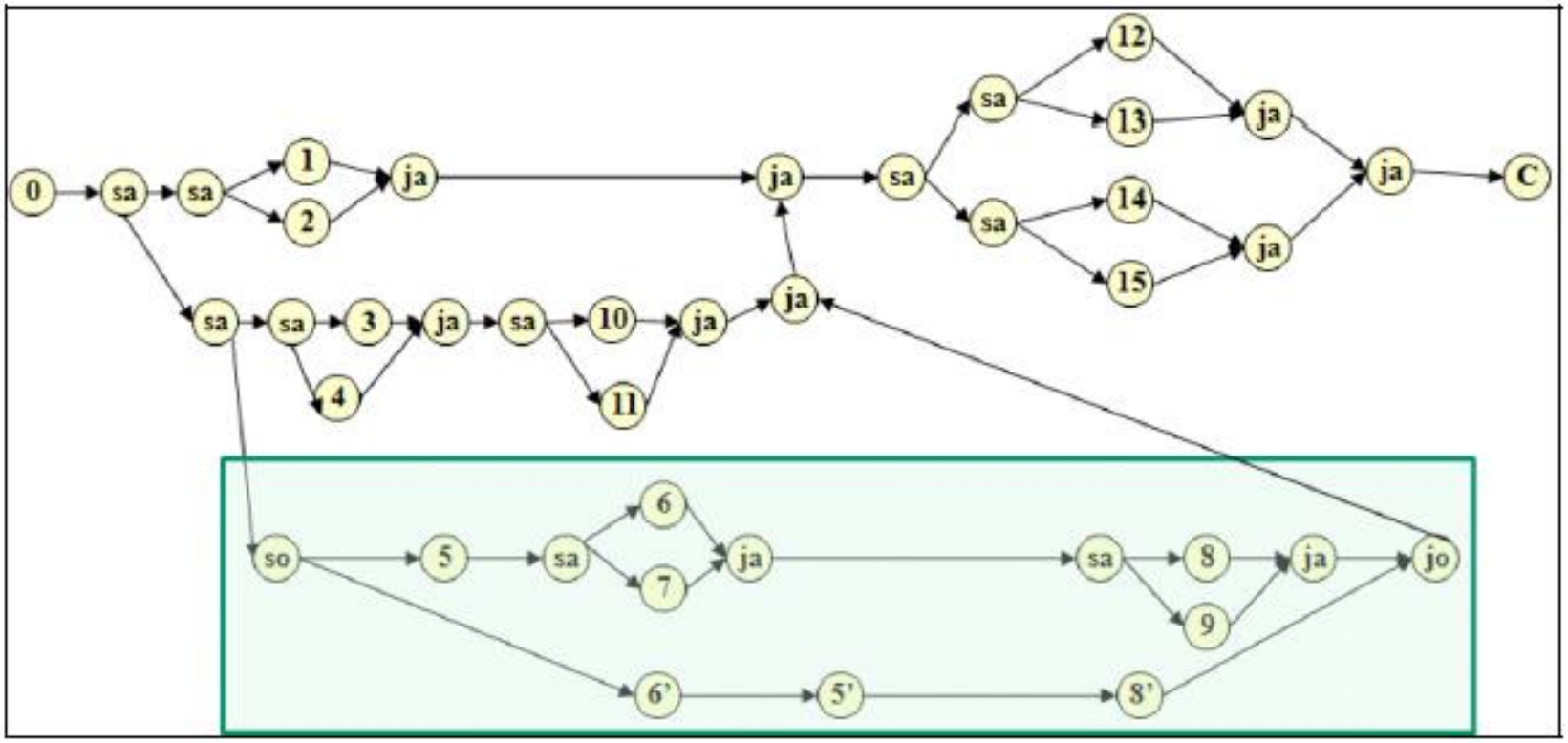
Process Plan Graph (2)

- Process Plan Graph



Homework