

BMM3643 Manufacturing Processes

Introduction to Manufacturing Processes

by

Dr Mas Ayu Bt Hassan
Faculty of Mechanical Engineering
masszee@ump.edu.my



Introduction to Manufacturing Processes

- Aims
 - Explain about the meaning of manufacturing, a brief of history of manufacturing and processes
- Expected Outcomes
 - Understand the meaning of “manufacturing”
 - Understand the importance of manufacturing, and
 - Differentiate the classification of manufacturing processes

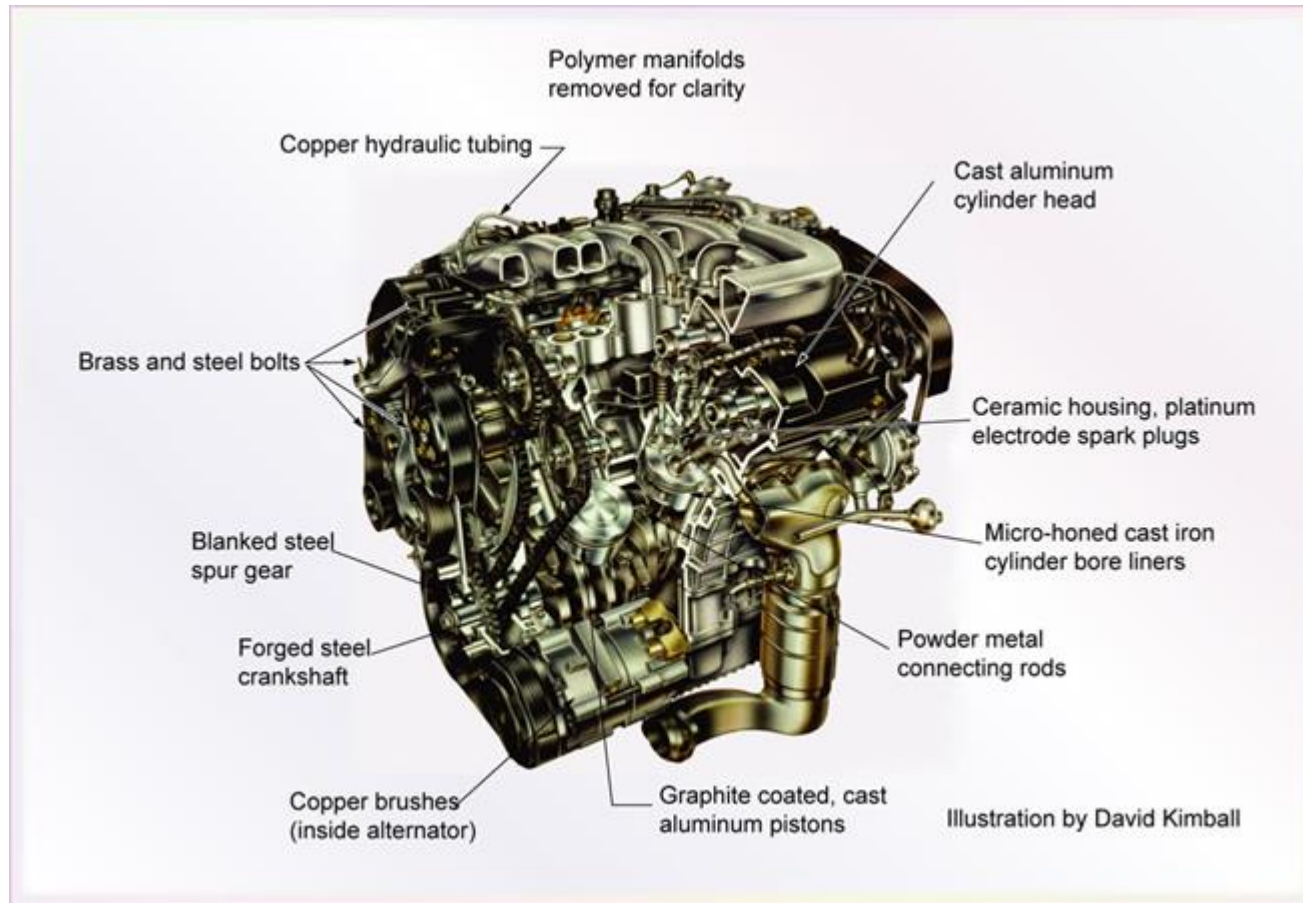


What is Manufacturing?

- Manufacturing is a series of process to the transformation of raw materials into finished products.
- This includes all intermediate processes required for the production and integration of a product's components.
- Also called as fabrication by some industries such as semiconductor and steel manufacturers.
- In Latin word called as from *manu factus* meaning made by hand.

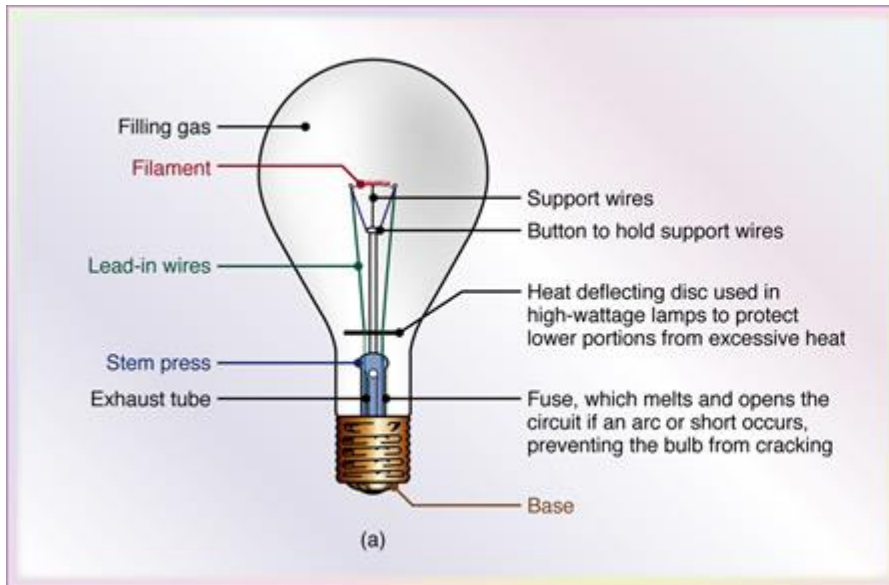


MANUFACTURING - ENGINE

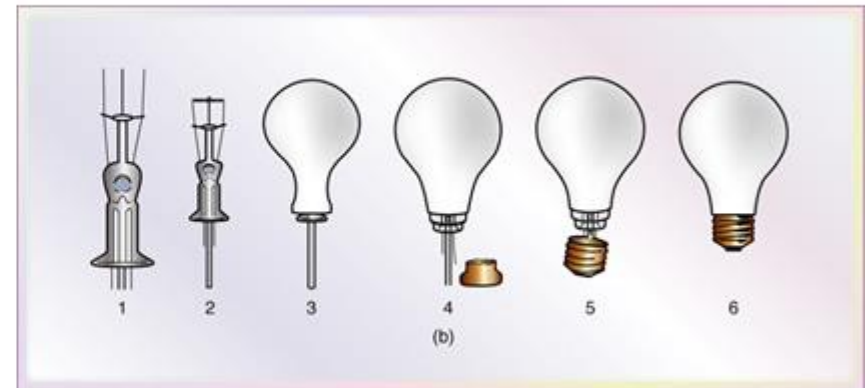


Section of an automotive engine - the Duratec V-6 - showing various components and the materials used in making them.
Source: Courtesy of Ford Motor Company. Illustration by David Kimball.

MANUFACTURING – LIGHT BULB



Components of a common incandescent light bulb. *Source:* Courtesy of General Electric Company.



Manufacturing steps in making an incandescent light bulb. *Source:* Courtesy of General Electric Company.

The Importance of Manufacturing

1. Increasing global competition
2. The demand for high quality products (world class manufacturing and at low prices
3. What else?

Typical Cost Breakdown in Manufacturing

Design	5%
Materials	50%
Manufacturing	
Direct labor	15%
Indirect labor	30%

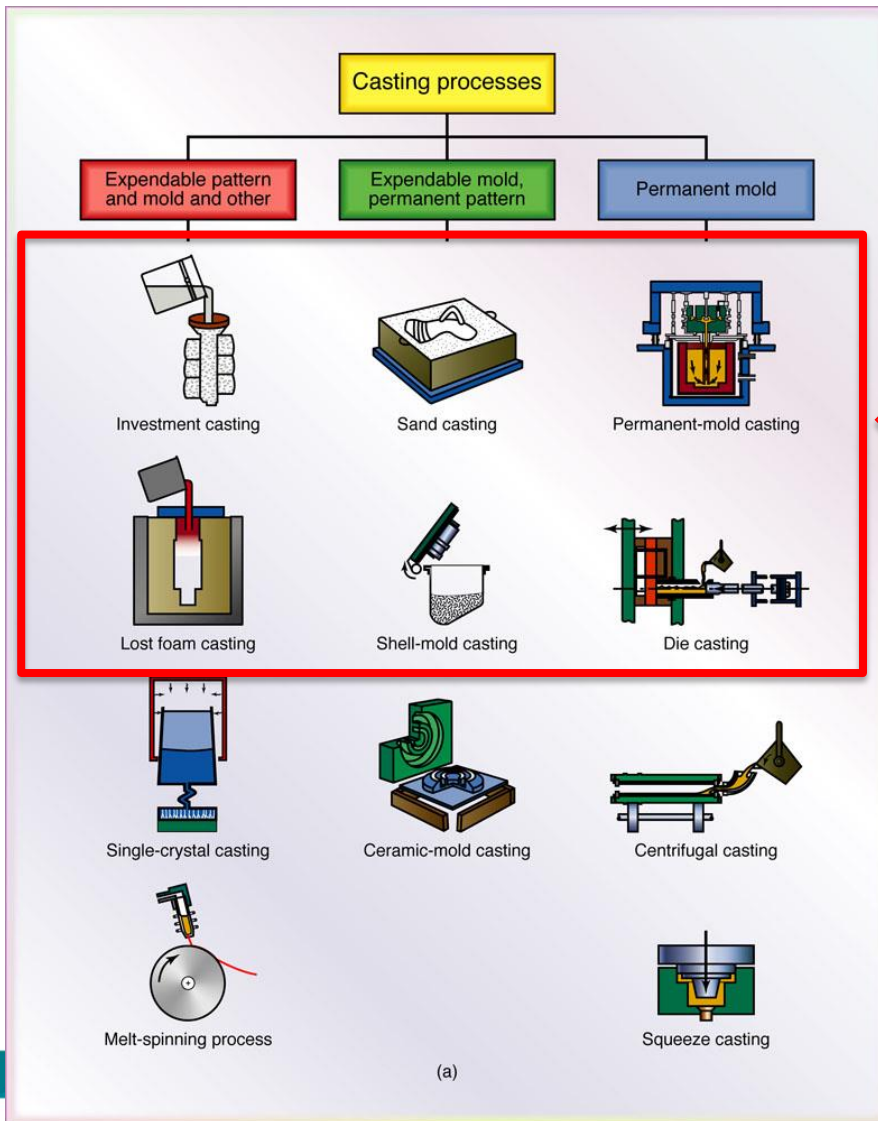
Copyright ©2014 Pearson Education, All Rights Reserved

Classification of Manufacturing Processes

- Numerous processes and operations can be involved in the manufacture of products and components
- These shape-producing processes are grouped into four basic families:
 - Solidification- metal or polymer
 - Forming and Shaping - bulk metal or sheet metal
 - Machining – removing material
 - Joining – assembly of component



Solidification – Types of Metal Casting Processes



Common used in factories and industries

Schematic illustration of various casting processes. Source by Kalpakjian, 2014.

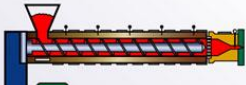


BMM3643 Manufacturing Processes by Mas Ayu H.

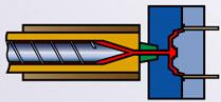
Solidification – Types of Polymer Processes

Polymer processing

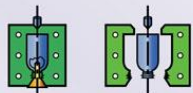
Thermoplastics



Extrusion



Injection molding

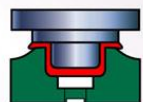


Blow molding

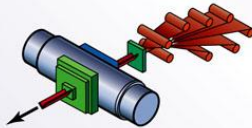


Thermoforming

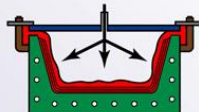
Thermosets



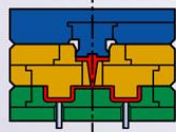
Compression molding



Pultrusion



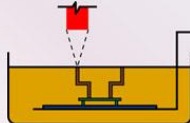
Vacuum-bag forming



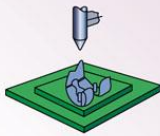
Transfer molding

(d)

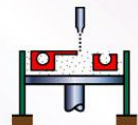
Rapid prototyping



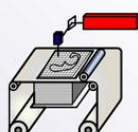
Stereolithography



Fused deposition modeling



Three-dimensional printing



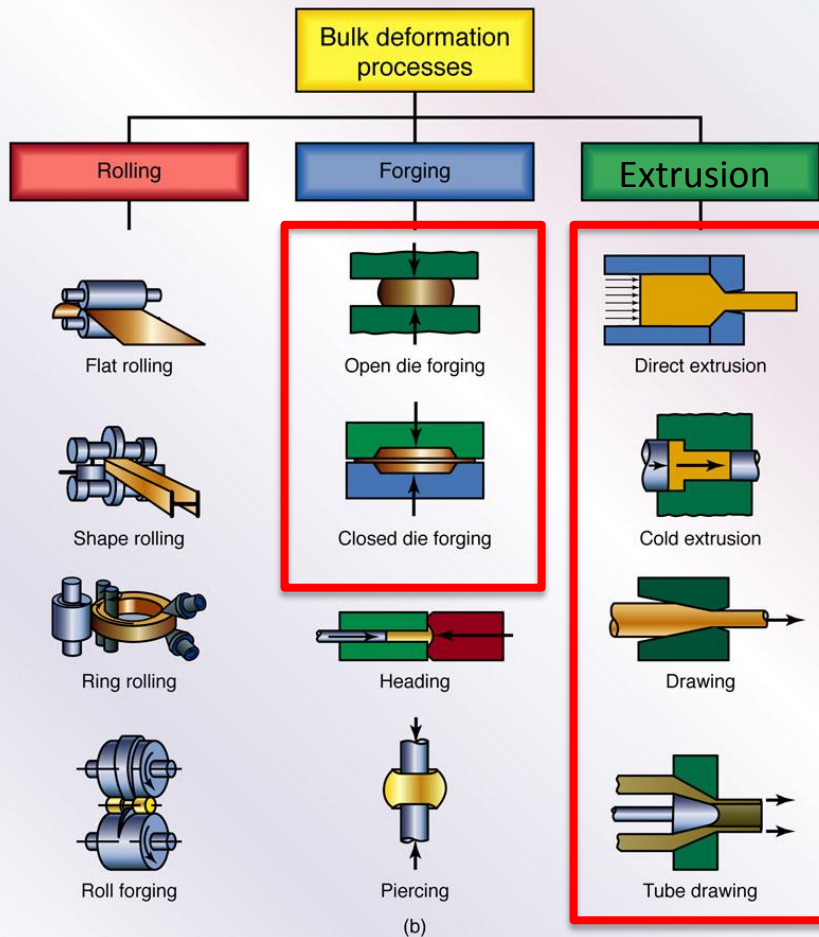
Laminated-object manufacturing

Topics will be covered in this subject:
Thermoplastics & Rapid prototyping

Schematic illustration of various polymer processing methods. Source by Kalpakjian, 2014.



Forming & Shaping – Bulk Material

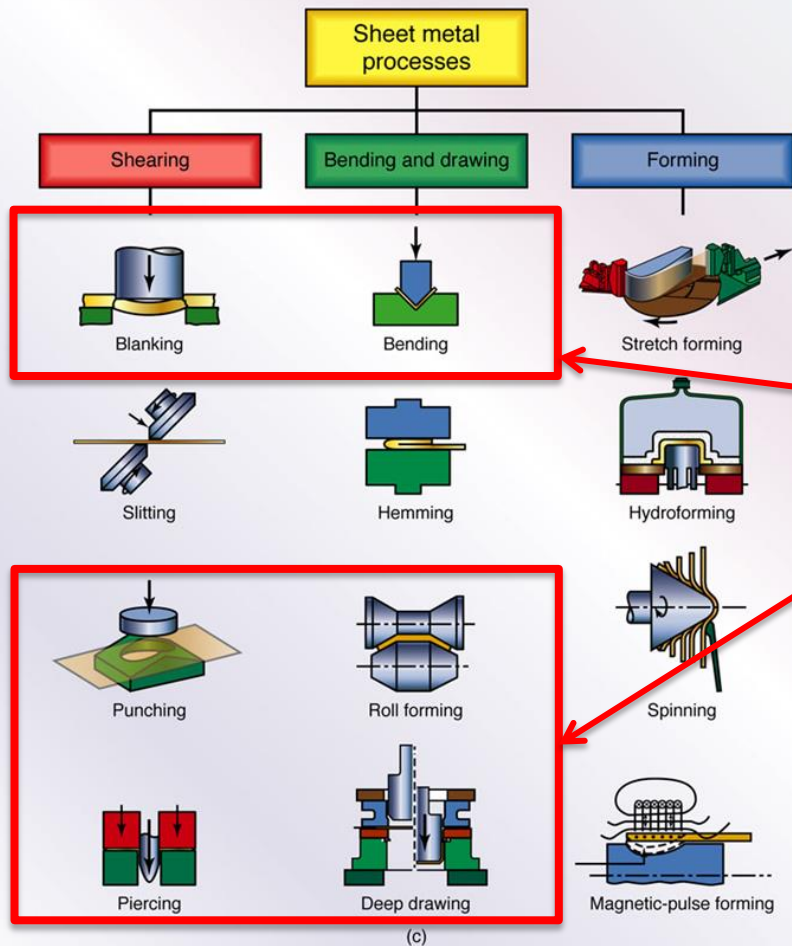


Focus will be given more on these types of processes for Bulk Material

Schematic illustration of various forming and shaping for bulk material. Source by Kalpakjian, 2014.



Forming & Shaping – Sheet Metal

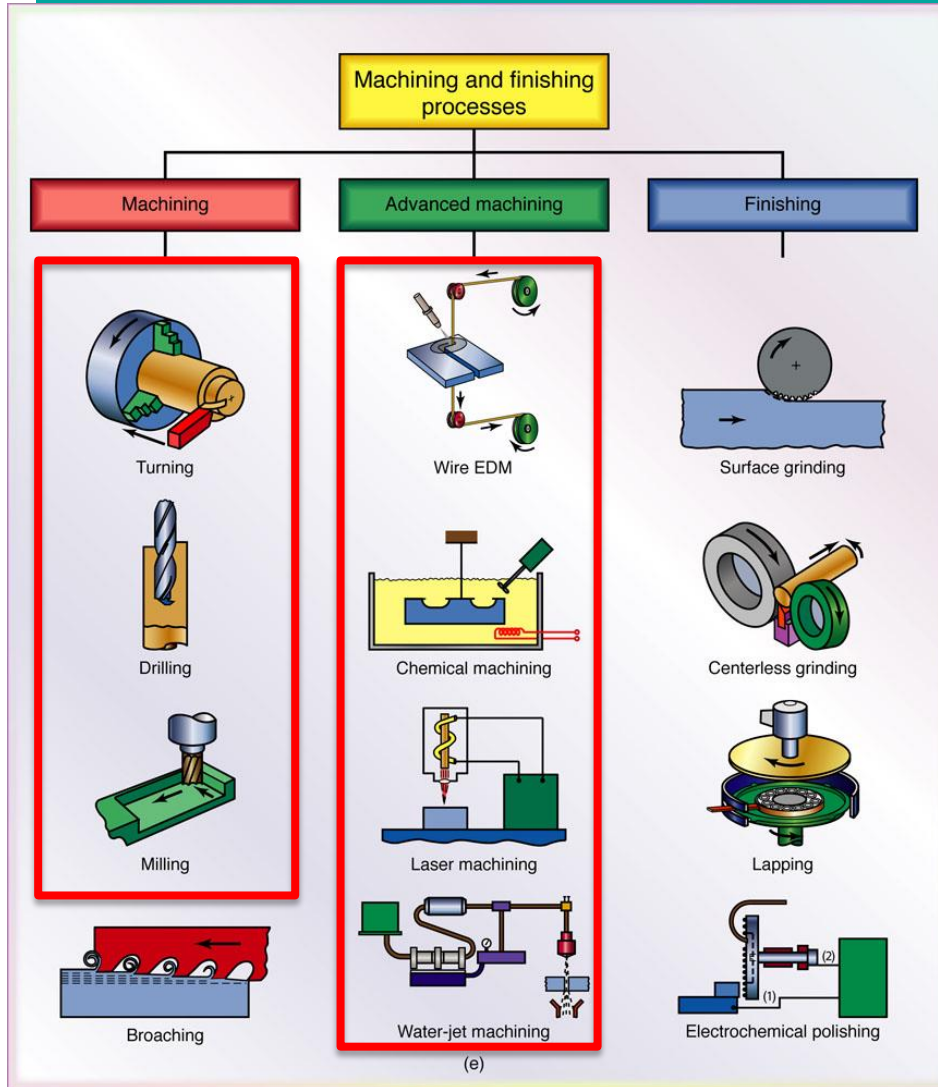


Focus will be given more on these types of processes for Sheet Metal

Schematic illustration of various forming and shaping for sheet material. Source by Kalpakjian, 2014.



Machining – Removing Material

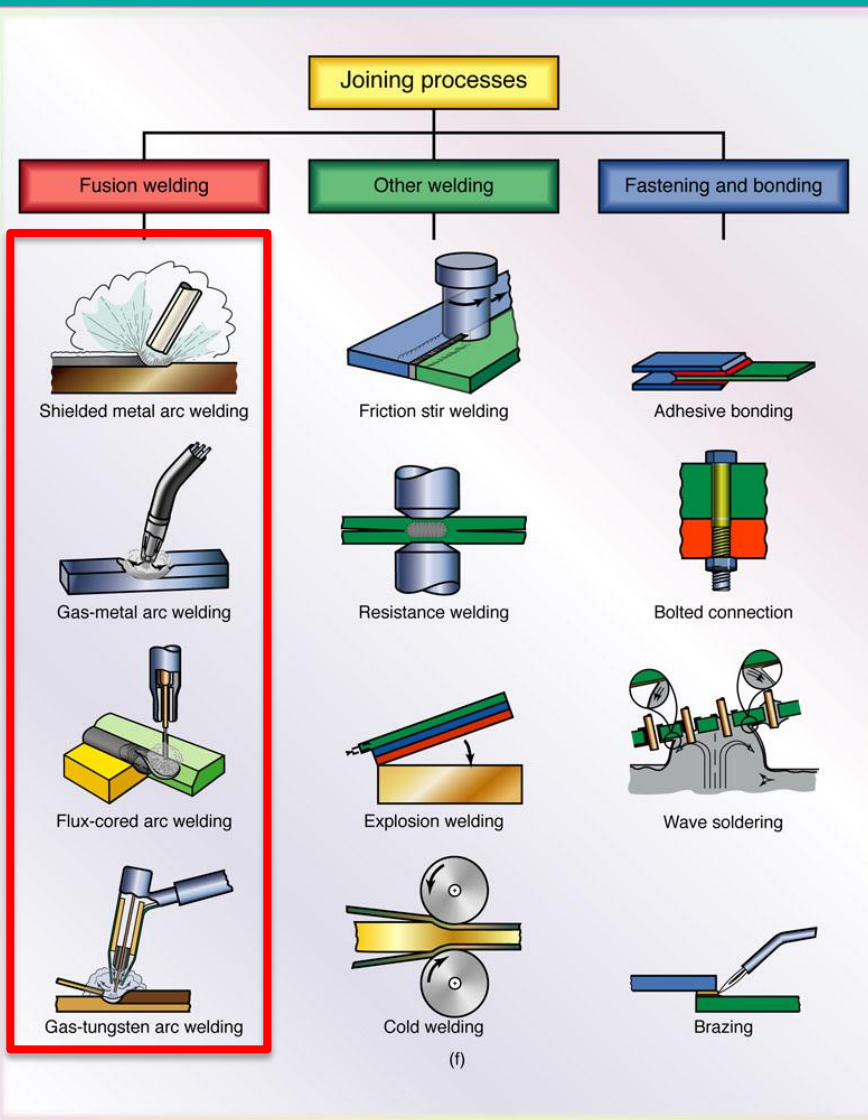


Topics will be covered in this subject: **Machining & Advanced Machining**

Schematic illustrations of various machining and finishing processes. Source by Kalpakjian, 2014.



Joining – Assembly of Component



Topics will be covered in this subject: **Fusion Welding**

Schematic illustration of various joining processes. Source by Kalpakjian, 2014.



Any Questions?

