CODING AND CLASSIFICATION SCHEMES

- Design and manufacturing are principal functional areas considered
- Coding refers to assigning a multidigit alphanumeric code to an item
- Each digits and letters in a code represents a feature or attribute about the item like its dimensions, materials, and machining requirement
- The intent is to compactly describe those part characteristics that will facilitate determination and retrieval of similar parts
- Codes should reflect how activities could or should be performed
- When constructing a coding scheme avoid institutionalizing existing practices
- The code should inform us as to what machines or processes could be used
- Most classification and coding systems are one of the following:
  - Systems based on part design attributes
  - Systems based on part manufacturing attributes
  - Systems based on both design and manufacturing attributes

Codes exist for:
- Design retrieval
- Machining
- Casting
- Parts feeding
- Robot end effector selection

Construction of Coding System

- Four major issues guide the construction of a coding system
  - Part (component) population
  - Code detail
  - Code structure and
  - Digital representation

Part Population

- Designed to cover the entire class or population of parts to be coded
- Scope of part type to be included must be known – rotational, prismatic, sheet metal or some substance
- Flexible to handle future as well as current parts
• **Discriminate** between parts with different values for key attributes – part characteristics, choice machining process, machines, tooling, tolerances, routings, etc

**Code Detail**

• Code has to be short so, that could uniquely identify each part and fully describe the part from design and manufacturing viewpoint

• During design of code trade of between extra details and efficiency may be considered

• An alternative to a too long and complex code is composite part

• As a general rule all information necessary for grouping the part for manufacturing should be included whenever possible in the code

• For design, if a feature is such that the design for existing parts with this feature forms a useful starting point, then the feature should be included in the code

• Primary and secondary shapes feature inclusion depends on the code complexity

**Code Structure**

• Depending on how the digits of a code are linked, there are three coding system:
  
  Monocode (hierarchical code)
  
  Polycode (attribute code or chain code)
  
  Mixed code (hybrid code)

**Monocode**

• Inverted-tree hierarchy

• Meaning of a digit in the code depends on the values of preceding digits

• Efficient - relevant information need be considered at each digit and fewer digits needed

• Difficult to learn because of the large number of conditional inference

• Preferred by design people

**Polycode**

• Each digit position in a polyc ode has the same attribute or feature of a part (consistent meaning)

• Each digit has values 0-9 or A-Z, and each value has a particular meaning, which is maintained in a reference table

• Easy to learn, use and alter

• Length of code may become excessive of its limited combinatorial features

• Preferred by manufacturing department

• Simple items and geometrically complex items have same length of code

*Coding and Classification Schemes*
Hybrid Structure

- A section of code is chain in nature and then switch to several hierarchical digits
- Several such chain/hierarchical sections may exists

Code Representation

- Individual digits should be alphabetic or numeric
- A code always produces numeric/alphabetic/numeric values is easier to remember and verify (eg: 3B2, 5A6)
- Humans comfortable with characters that convey meaning such as ‘S’ for smooth or ‘T’ for thread
- Adhering to standard industrial terminology will facilitate comprehension of the code and interpersonal communication