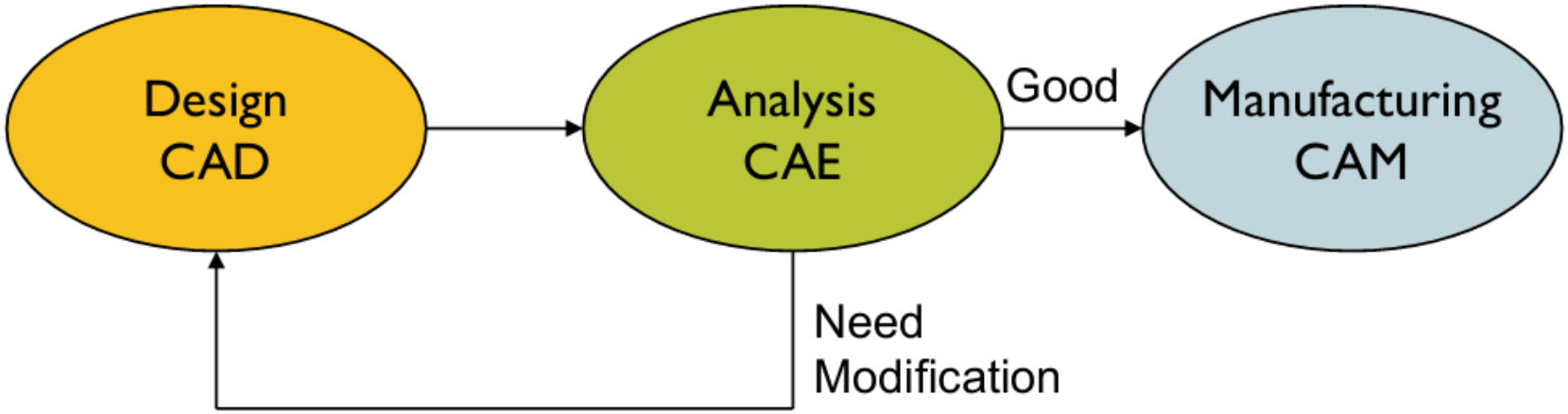
Computer Aided Design CAD

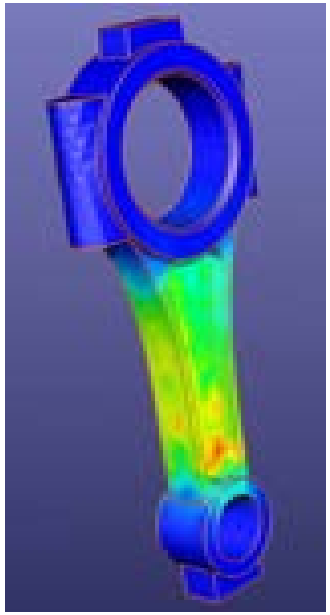
Computer Aided Design (CAD) is the technology concerned with the use of computer systems to assist in the creation, modification, analysis, and optimization of a design.

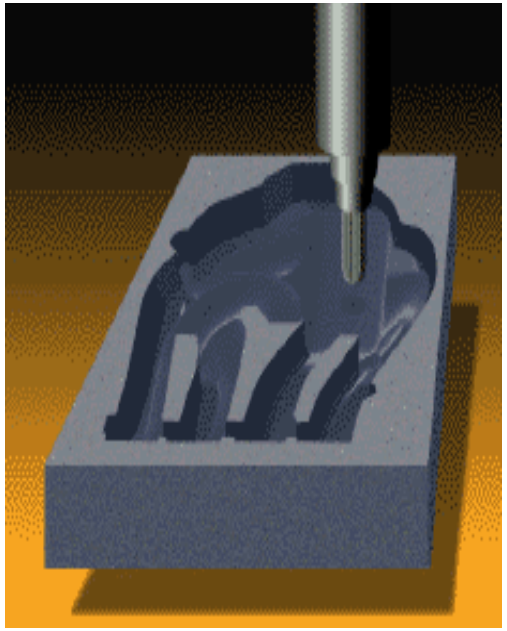
Computer Aided Manufacturing (CAM) is the technology concerned with the use of computer systems to plan, manage, and control manufacturing operations.

Computer Aided Engineering (CAE) is the technology concerned with the use of computer systems to analyze CAD geometry, allowing the designer to simulate and study how the product will behave.

CAD/CAE/CAM Product Lifecycle







Typical tools in CAD system

- Tolerance analysis.
- Mass property calculations: Surface area, Volume, Centroid of a volume, Center of surface area, Cross sectional area.
- Finite-element modeling and visualization.

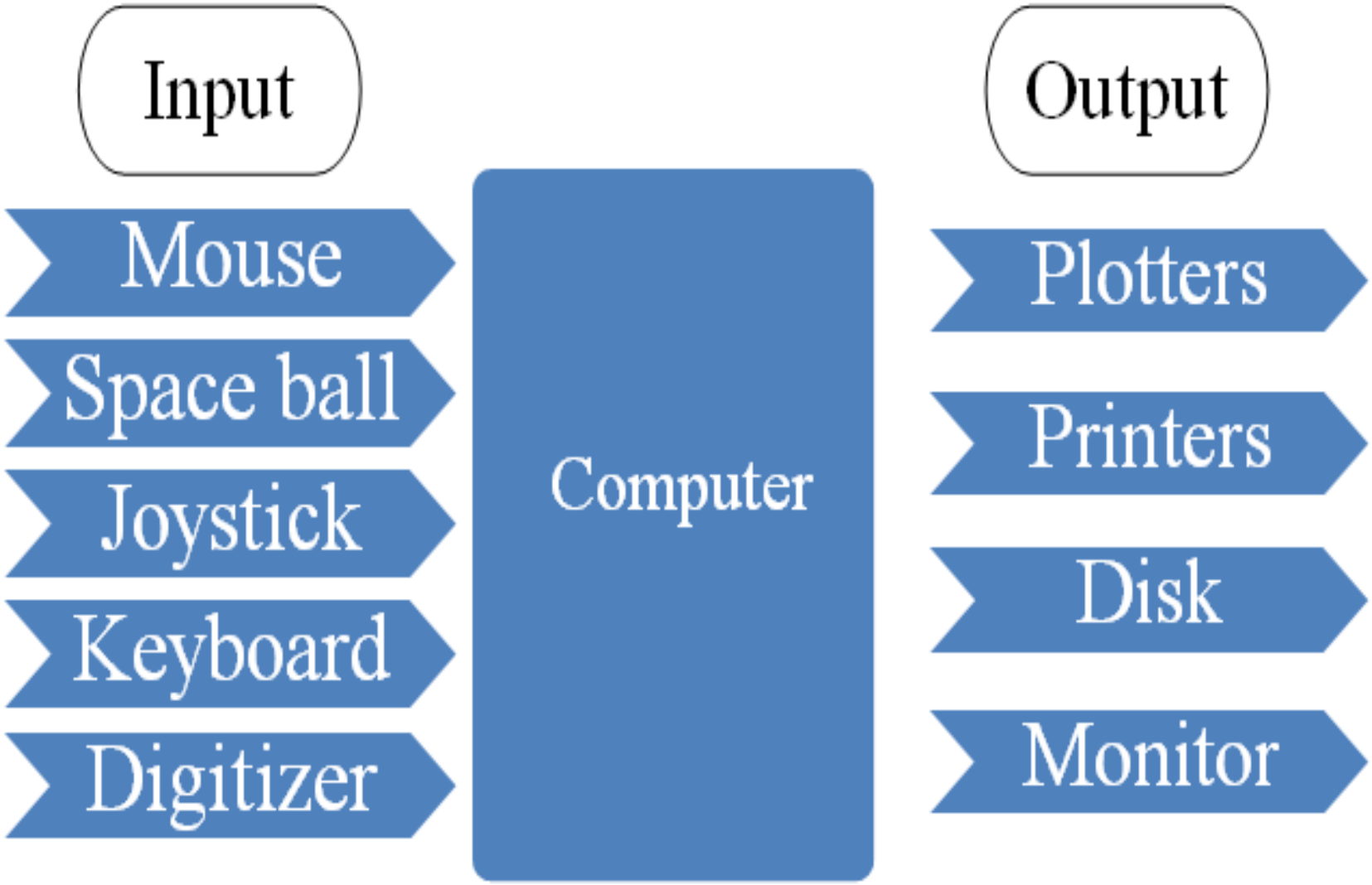
A CAD system consists of three major parts:

- Hardware: computer and input/output devices.
- Operating system software.
- Application software: CAD package.

Hardware Components

- **Input devices:**
  - Mouse
  - Space ball
  - Joystick
  - Keyboard
  - Digitizer

- **Output devices:**
  - Plotters
  - Color laser printers
  - Disk (CD,DVD)
  - Monitor


Input
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Plotters
Printers
Disk
Monitor

Software Components

- CAD software allows the designer to create and manipulate a shape interactively and store it.
- CAM software plans, manages and controls the operations of a manufacturing site.
- CAE software analyzes design geometry, allowing designer to study product behavior.

Advantages of CAD/CAM systems

- Greater flexibility.
- Reduced lead times.
- Increased Productivity.
- Improved customer service.
- Improved quality.
- Better product design.
- Reduced costs.
- Reduction of machine tools.
- Less floor space.