

ENG 004 Lecture 10, Oct 30, 2012

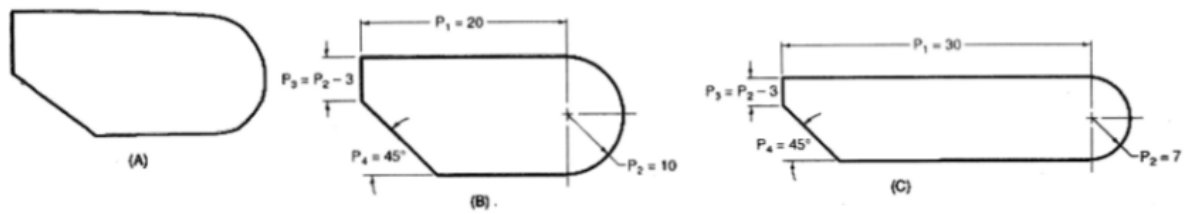
Announcements

- Homework #4 due now
- No homework for this week
- Midterm is Thursday, November 1
- The midterm will take place in **Young 198**

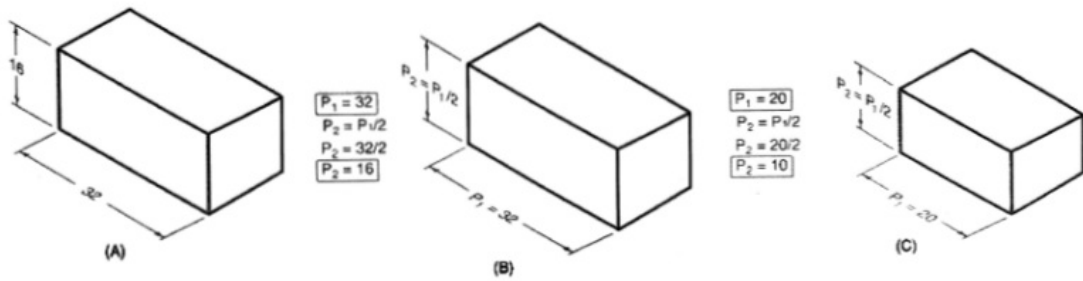
Topics

- Parametric Constraints
- Feature Planning
- Review
- Question & Answer

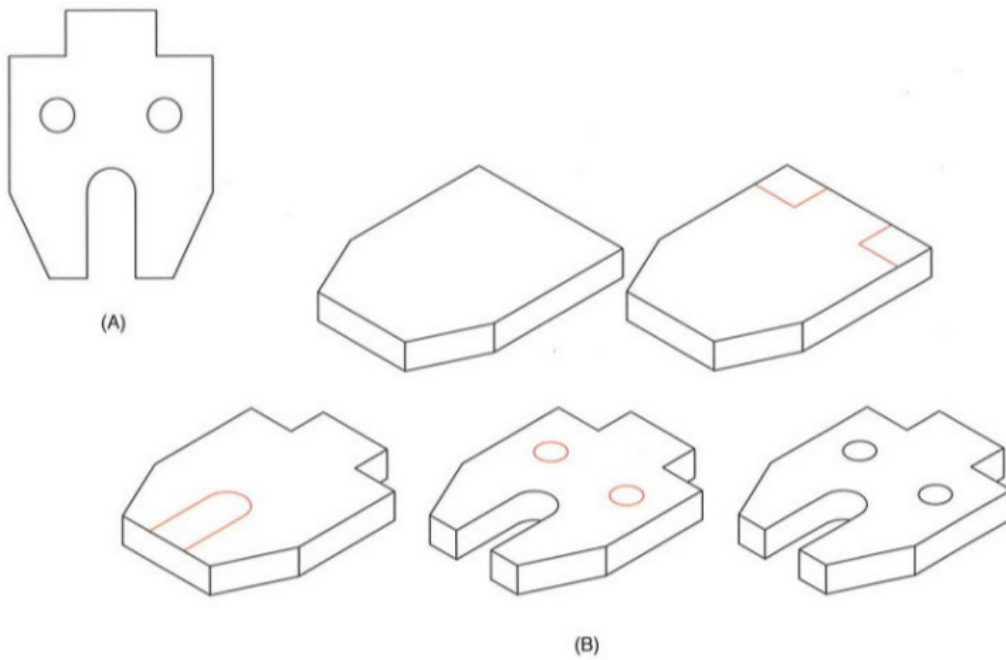
Parametric Constraints



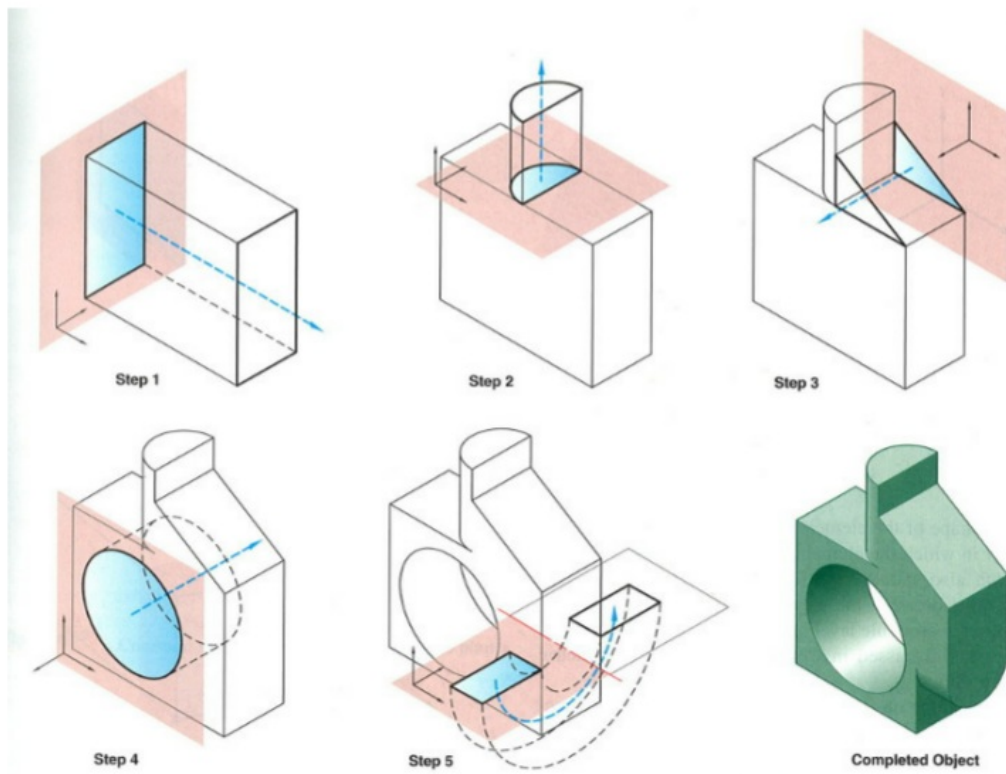
Parametric Constraints



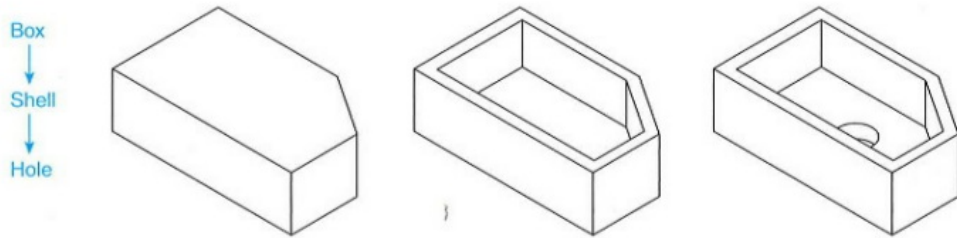
Feature Planning



Feature Planning

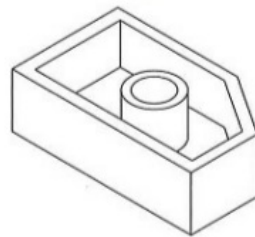


Feature Order



(A)

Box
↓
Hole
↓
Shell



(B)

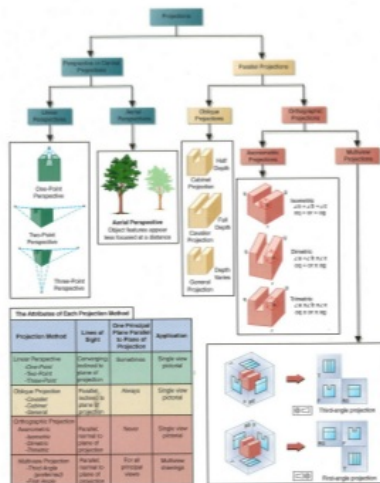
Design

- Design models: concurrent and linear, ETC/ARC
- Ram's Principles
- Design Thinking
- Visual Thinking
- Role of graphics in design: visualization, documentation, communication

Sketching/Drawing

- Types of sketches: contour, upside down, detailed, technical, freehand, mechanical, CAD
- Standards, linetypes
- Proportions and use of constructions lines, miter lines
- Projection Types: multiview, axonometric, oblique, perspective
- Perspective: one point, two point, and three point
- Parallel projections: multiview, isometric, oblique
- First angle, third angle projections

Projections



Sketching/Drawing

- Diagrams: tree, flow, Venn, engineering
- Grids: simple, square, iso, circle/ellipse
- Multiview drawings: 3D to 2D, miter line, oblique lines, circles, hidden lines, construction lines
- Choice of views, minimal # of views, view spacing
- Revolution conventions
- Isometric: 2D to 3D

Coordinate Systems

- 2D: Cartesian (rectangular), polar
- 3D: rectangular, cylindrical, spherical
- Handedness: right/left
- Coordinate planes
- Absolute/relative coordinates
- World and Local coordinates

Primitives

- 2D primitives: nodes/points, lines, arcs, circles, rectangles, curves from intersections, interpolated and Bézier curves
- 3D primitives: parallelepiped, sphere, cylinder, cone, space curve, surface patch, plane, surfaces
- Surfaces: general surface, ruled surface, generatrix/directrix, developed/undeveloped
- 3D models: node, surface, solid

Constraints

- Implicit/Explicit
- Fully-, over-, under-constrained
- Closure, segment overlap, coincident, tangency, parallel, perpendicular, concentric, equal

Solid modeling

- Sketch planes
- Boolean operations
- Constructive operations: extrude, revolution, sweep, loft
- Fillets/rounds, holes/bolts
- Feature planning