Introduction to AutoCAD
Basic Drawing Skills

Week 1 - Lecture
03/28/05 - 03/30/05

Agenda

- Interface
- Drawing units & Scale
- Spaces
- Template files: Drafting Settings
- Coordinate Systems (Relative and Absolute References)
- Layers

Interface

- Windows, Icons, Menus, Pointer
- Command Line
  - Command sequence trace
- Status bar
  - Toggle keys: SNAP, GRID, ORTHO, POLAR, OSNAP...
- Pointer coordinate trace
  - Position of pointer in model space
### Drawing Units

<table>
<thead>
<tr>
<th>Type</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decimal</td>
<td>Metric units</td>
</tr>
<tr>
<td>Architectural</td>
<td>Feet &amp; fractional inches</td>
</tr>
<tr>
<td>Engineering</td>
<td>Feet &amp; decimal inches</td>
</tr>
<tr>
<td>Scientific</td>
<td>Exponential format</td>
</tr>
<tr>
<td>Fractional</td>
<td>Whole numbers &amp; fractions</td>
</tr>
</tbody>
</table>

Angles: Degrees, Radians and Gradians

### Scale

\[
m'' = 12 \times n''\]

\[
1 = 12 \times \frac{n}{m} = \text{Scale factor}\]

### Scaling Issues

- Paper size and size of model drawn
  - Scaling your drawing to fit paper size: deciding on scale factor
  - Scaling across different units (metric drawing units and English paper units)
- Scaling linetypes
Spaces
- Model Space
  - Limitless drawing board
  - You can set limits using the LIMITS command
  - You can draw at 1:1 scale
- Paper Space
  - How you’d like to look at your plotted drawing
  - Typically scaled from model space to fit paper size
  - Can have multiple viewports

Template Files
- Any AutoCAD drawing file with defaults and settings stored with a .dwt extension
- Allows reusability and re-scalability
- All drawings start from the parent template: acad.dwt or acadiso.dwt
- You can make your own templates.
- Use cee498.dwt for tomorrow.

Drafting Settings
- Allows users to set specs for model space
- Enabling precision drawing techniques using the mouse pointer.
- Snap and Grid (m)
- Polar Tracking (m)
- Object Snap (m)
Coordinate Systems

- Cartesian Coordinates
  
  ![Cartesian Coordinates Diagram]

- Polar Coordinates
  
  ![Polar Coordinates Diagram]

You can turn Polar Tracking on or off.

Absolute vs Relative References

- Specifying exact point locations while drawing
  - Using Cartesian Coordinates

- Calculating point positions relative to last point entered
  - Using Polar Coordinates
Absolute vs Relative References

Layers
- Origin: Pin-registry drafting
- A stack of transparent overlays drawn on the same coordinate system
- Allows organization of drawing information
- Allows Selective viewing of information

Layer Properties: *Nouns*
- Unique descriptive name
- Color
- Linetype
- Lineweight
Layer Properties: *Verbs*

- **On / Off**
  - Whether layers will be displayed or plotted
  - All layers used for drawing regeneration
  - Current layer has to be on

- **Freeze / Thaw**
  - Whether layers will be displayed or plotted
  - Frozen layers not included in drawing regeneration
  - Layer can be frozen in current viewport

- **Lock / Unlock**
  - Locked layers cannot be edited