AutoCAD

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Plan

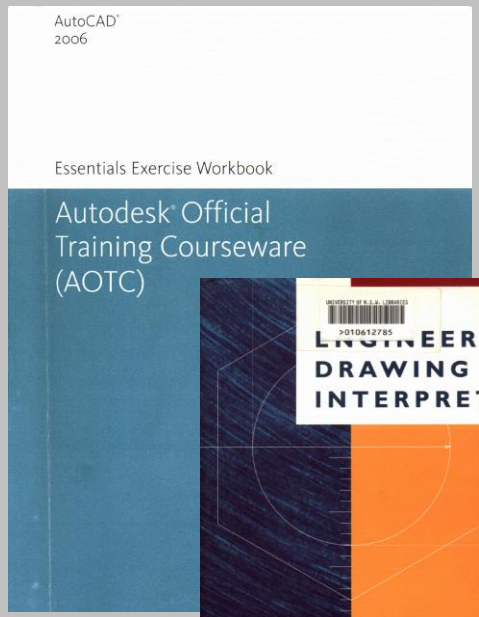
- Lecture 1 – Importance, basics
  - Hands on tasks: Navigation of AutoCAD, changing drawing, drawing basic shapes
- Lecture 2 – Strategies for methodical construction of engineering drawings, useful CAD commands, Australian standards
  - Hands on tasks: Use object snaps and object tracks and use of tools such as Trim, Extend and Offset
- Lecture 3 – Drawing sections, dimension styles and printing
  - Hands on tasks: Section details, dimensions, arrays
- Lecture 4 – Introduction to layers, 3D and animation
  - Complete a computer based quiz for CAD assessment

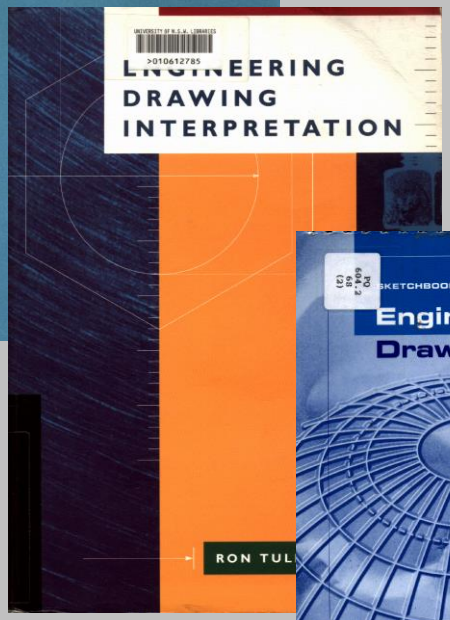
Learning strategy

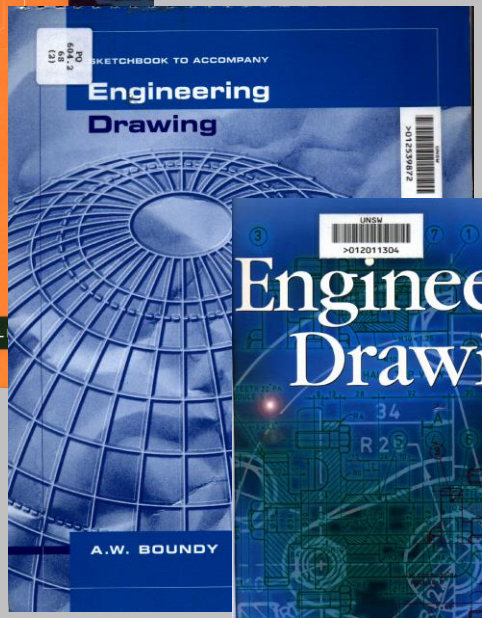
- Hands on software learning
- Self guided tutorials
- Lab tasks given in 9 activity documents during 4 weeks of CAD classes
- Submit results of a specified activity in Week 7.
- Quiz in Week 9.

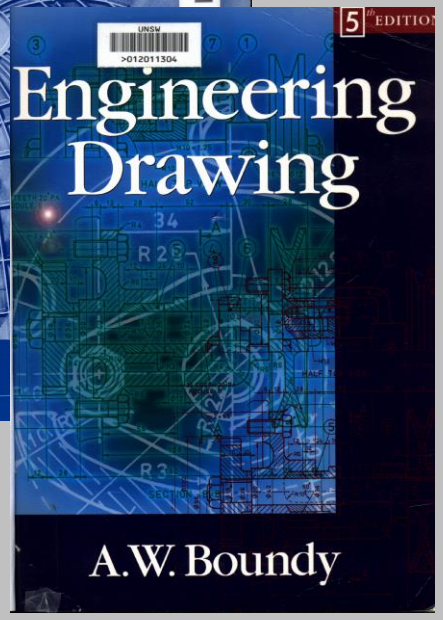
References

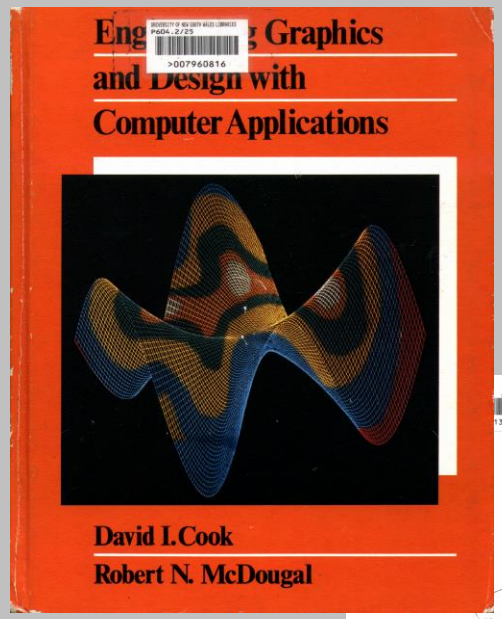
- Autodesk, AutoCAD official training courseware, 2006
- Standards Australia, Technical Drawing for Students, SAA/SNZ HB1: 1994.
- David Cook and Robert McDougal, Engineering Graphics and Design with Computer Applications, Holt Rinehart and Winston, 1985.
- A W Boundy, Engineering Drawing, McGraw Hill, 1998.
- A W Boundy, Sketchbook to Accompany Engineering Drawing, McGraw Hill, 2002.
- Ron Tully, Engineering Drawing Interpretation, Thomas Nelson Australia, 1995.

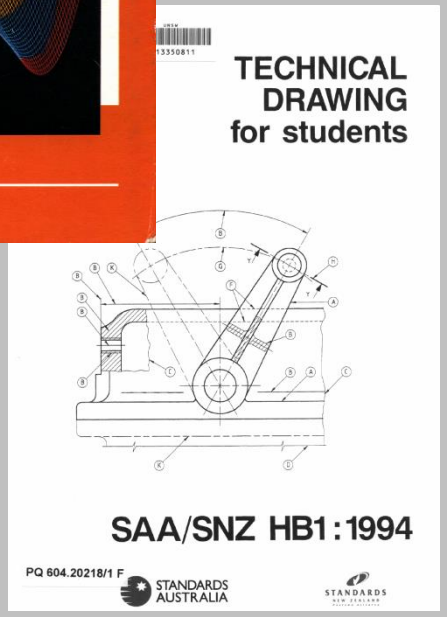

AutoCAD
2006
Essentials Exercise Workbook
Autodesk Official
Training Courseware
(AOTC)


ENGINEERING
DRAWING
INTERPRETATION


SKETCHBOOK TO ACCOMPANY
Engineering
Drawing
A.W. BOUNDY


5th EDITION
Engineering
Drawing
A.W. Boundy


Graphics
and Design with
Computer Applications
David I. Cook
Robert N. McDougal


TECHNICAL
DRAWING
for students
SAA/SNZ HB1:1994
PQ 604.20218/1 F
STANDARDS
AUSTRALIA

Moodle

- CAD files required for hands on work
- Lecture notes
- Self select a computer lab time using the sign-up sheet
  - Tuesdays 9-11; 11-1; 1-3; 3-5.
  - Wednesdays 9-11; 11-1; 1-3; 3-5.
  - Thursdays 9-11.

Moodle

- CAD files required for hands on work
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- Submit specified activity in Week 7
- Quiz – Week 9

Objective today

- Engineering drawing
  - Types of drawings
  - Purpose
- CAD
  - AutoCAD quick start
  - Absolute and Relative dimensions
  - Orthogonal and Polar vectors
  - Basic shapes using Line, arc, rectangle, rotation

Objective today

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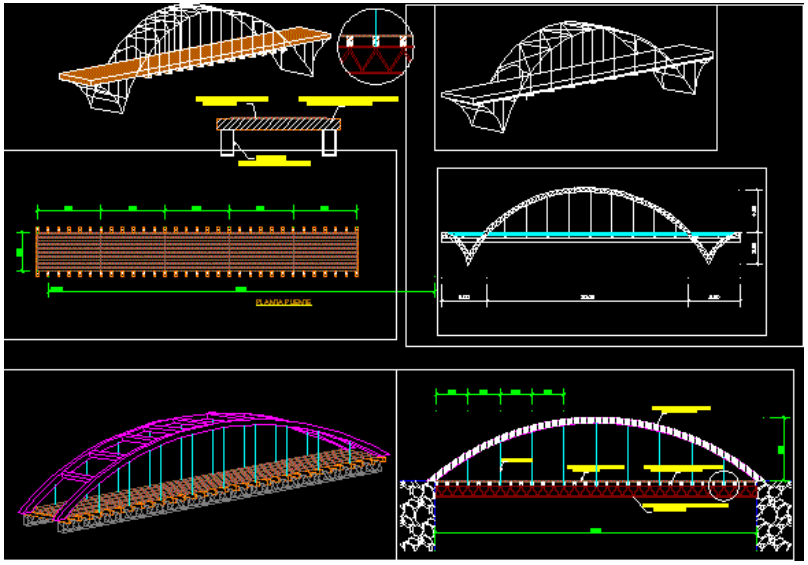
Which one of these features are useful in drawing the technical diagram of your project work?

Drawings

- Illustrations
- Artistic
- Technical



Communication tool

- Location/site/where
- Count/how many
- Size/dimensions
- Legal document
- Accuracy
- Standards

CAD

- Computer aided drafting
- Higher order graphics software suitable for technical drawings
- Digital entry for numerical values
- Aids to maintain accuracy
- Aids to conform to standards
- Reusability with digital files

Steps

- Login

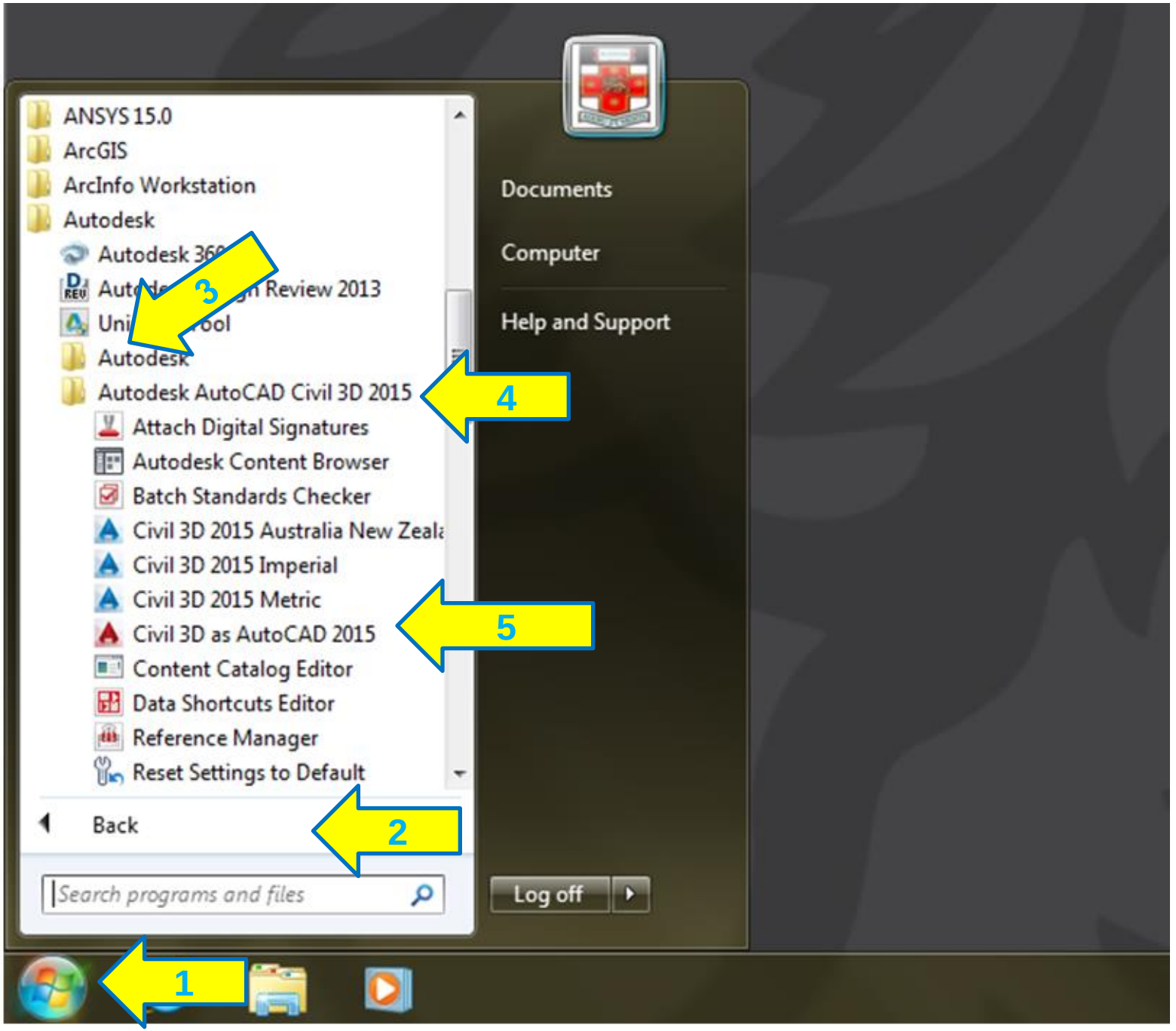
- Start button > All Programs > Autodesk

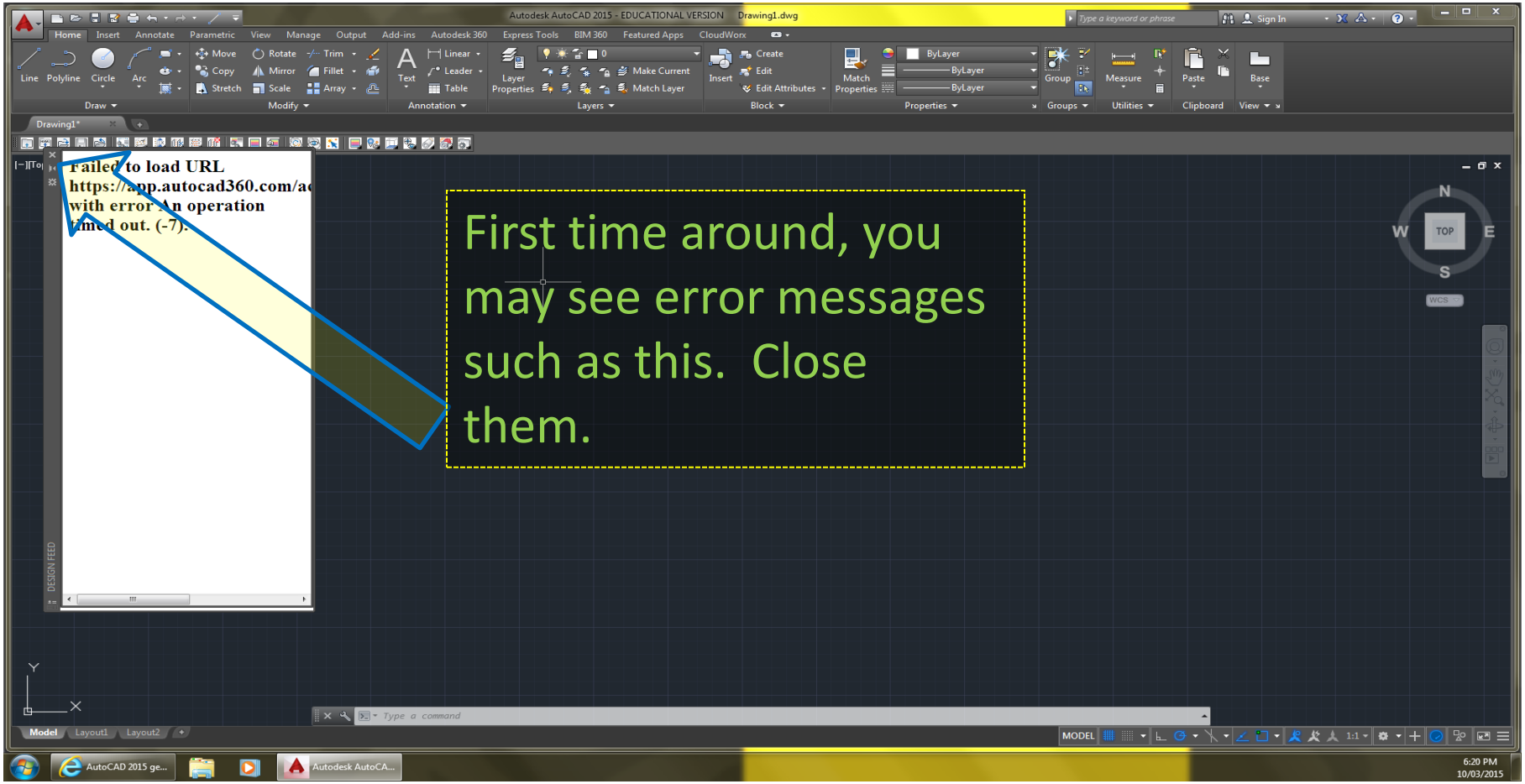
> Autodesk AutoCAD Civil 3D 2015 (or 2016)

>  Civil 3D as AutoCAD 2015 (or 2016)

- On the first time, please wait while installation is completed.

See following slides


ANSYS 15.0
ArcGIS
ArcInfo Workstation
Autodesk
Autodesk AutoCAD Civil 3D 2015
Attach Digital Signatures
Autodesk Content Browser
Batch Standards Checker
Civil 3D 2015 Australia New Zeala
Civil 3D 2015 Imperial
Civil 3D 2015 Metric
Civil 3D as AutoCAD 2015
Content Catalog Editor
Data Shortcuts Editor
Reference Manager
Reset Settings to Default
Back
Search programs and files
Documents
Computer
Help and Support
Log off
1
2
3
4
5



Note: this screenshot is for CAD 2015

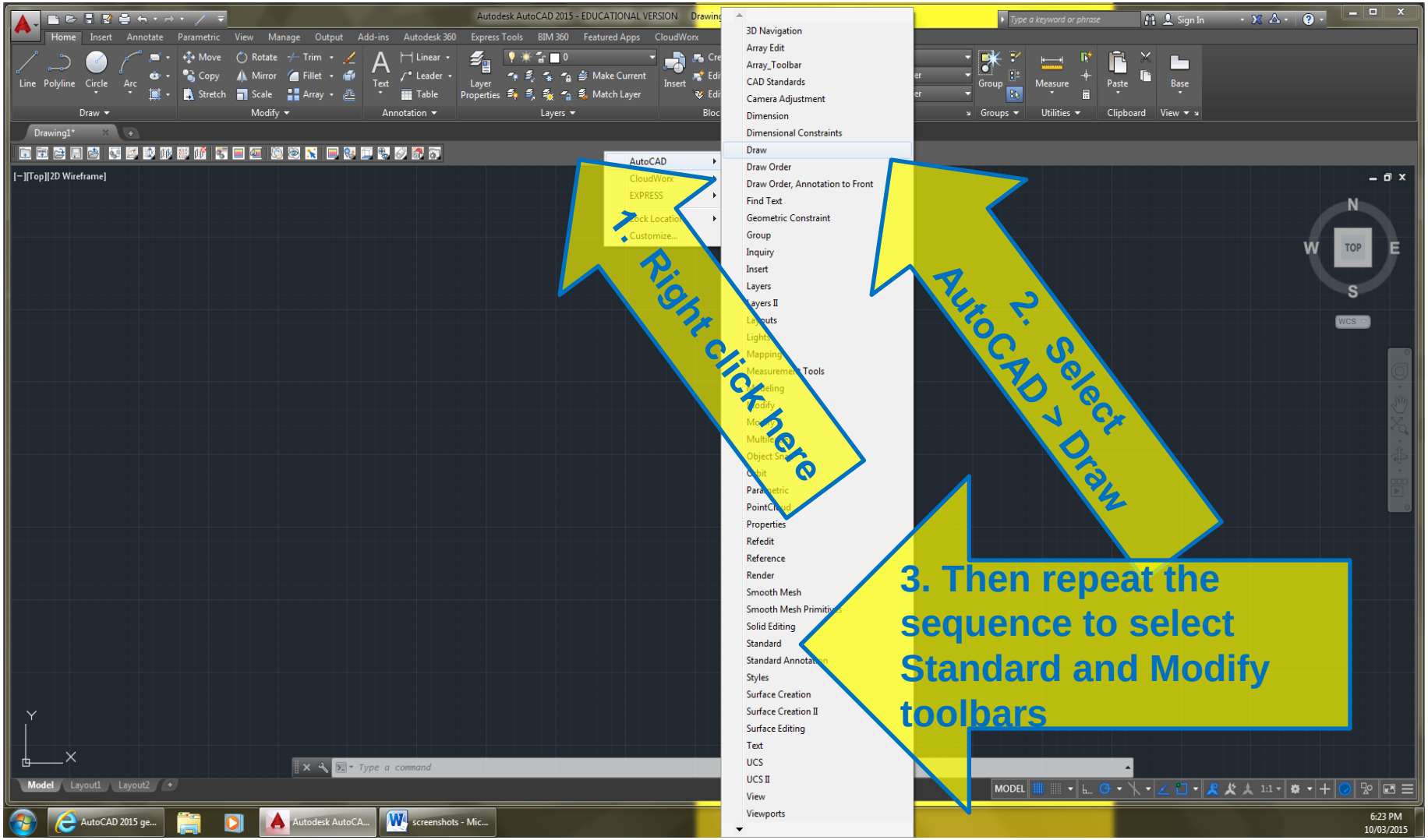
Simplify the workspace by adding Draw and Modify toolbars/panels and closing other features on workspace (note these toolbars may already be displayed).

- In the toolbar area Right click then:
  - AutoCAD > Draw
  - AutoCAD > Modify
  - AutoCAD > Standard

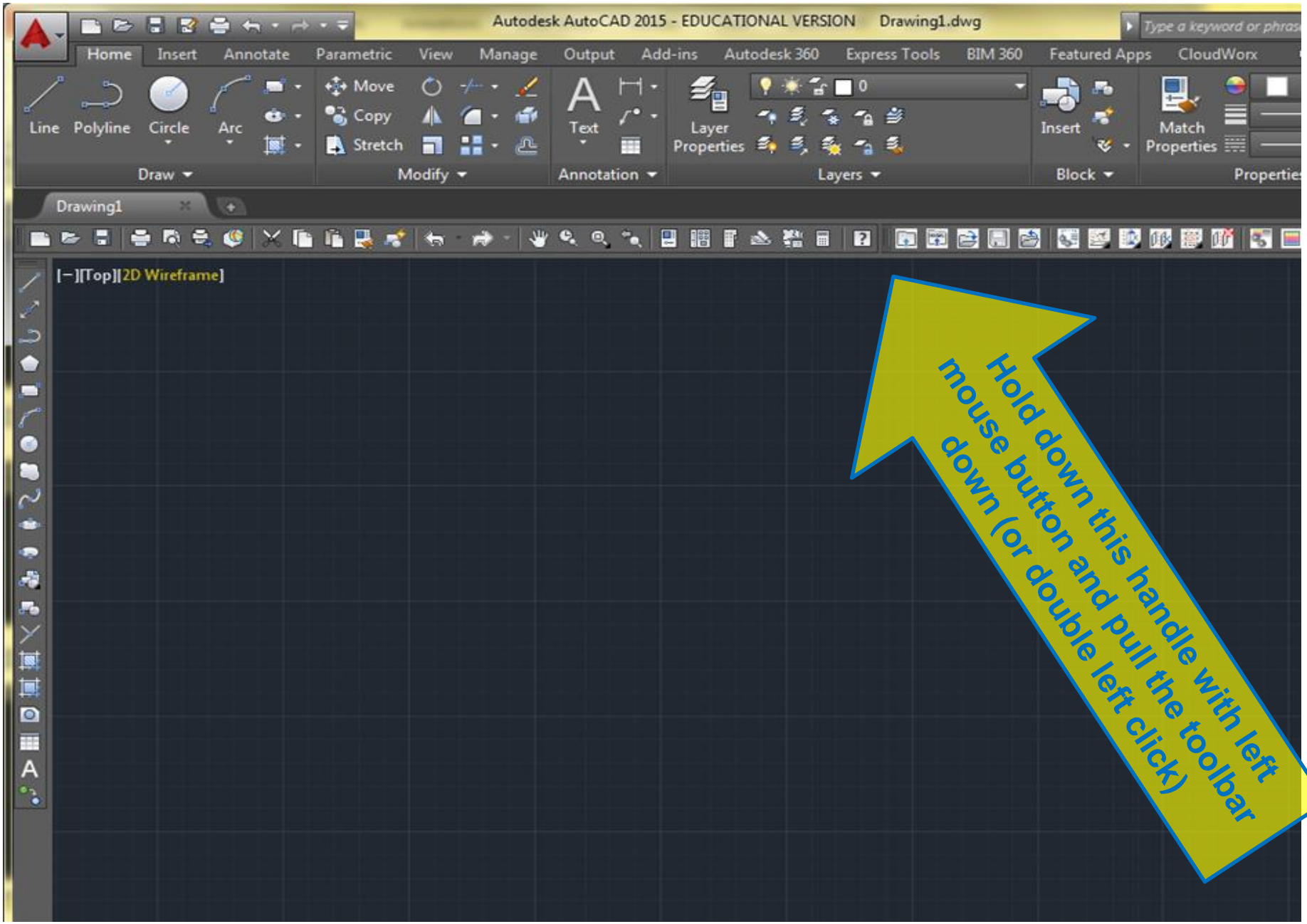
- Hold down the handle of CloudWorx toolbar with left mouse button, pull down to workspace and right click close icon (2015 version only)

- Right click three times the icon for Minimize to panel buttons (located at the end of menu line)

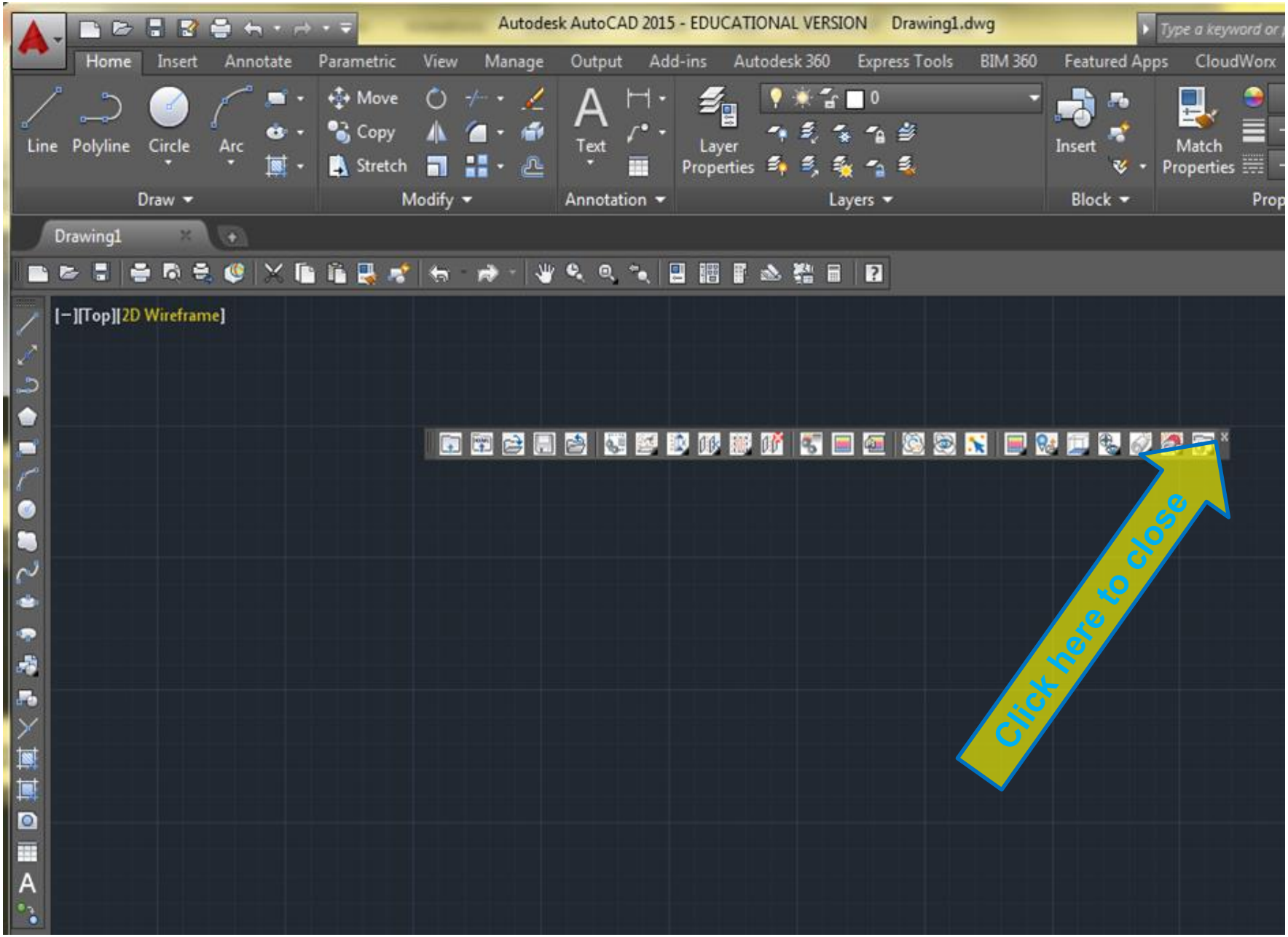
See following slides



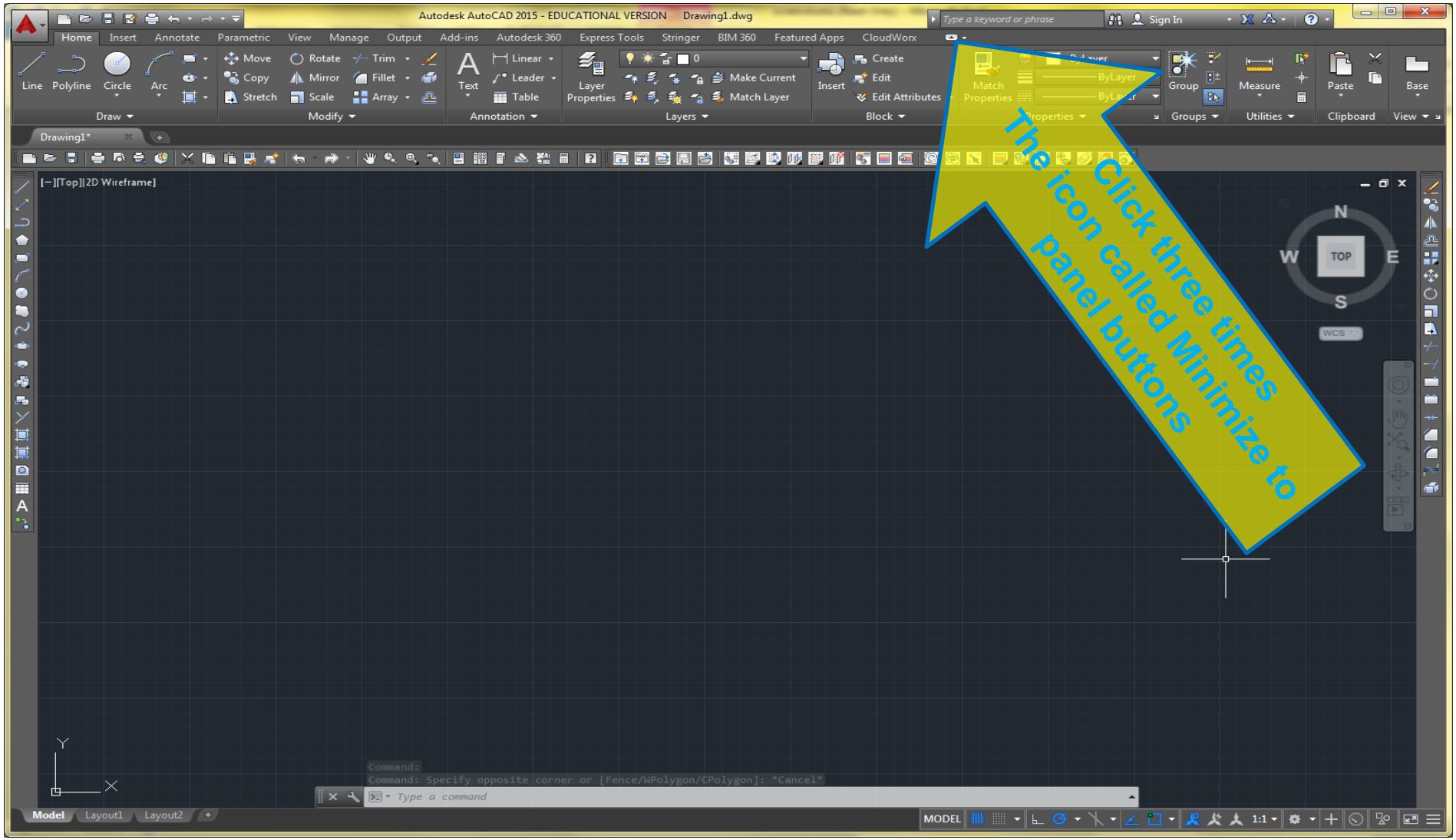
Note: this screenshot is for CAD 2015



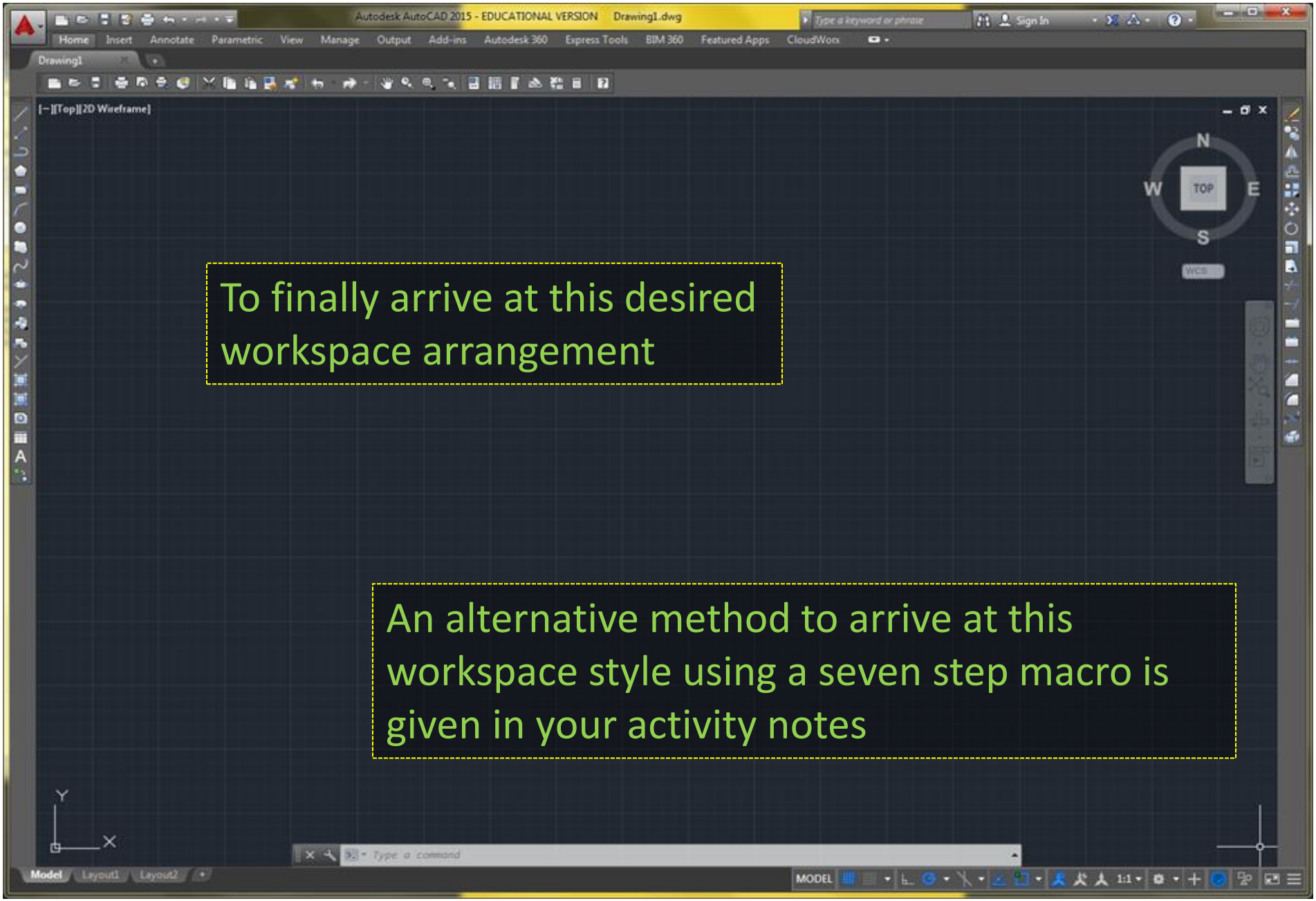
Note: this screenshot is for CAD 2015



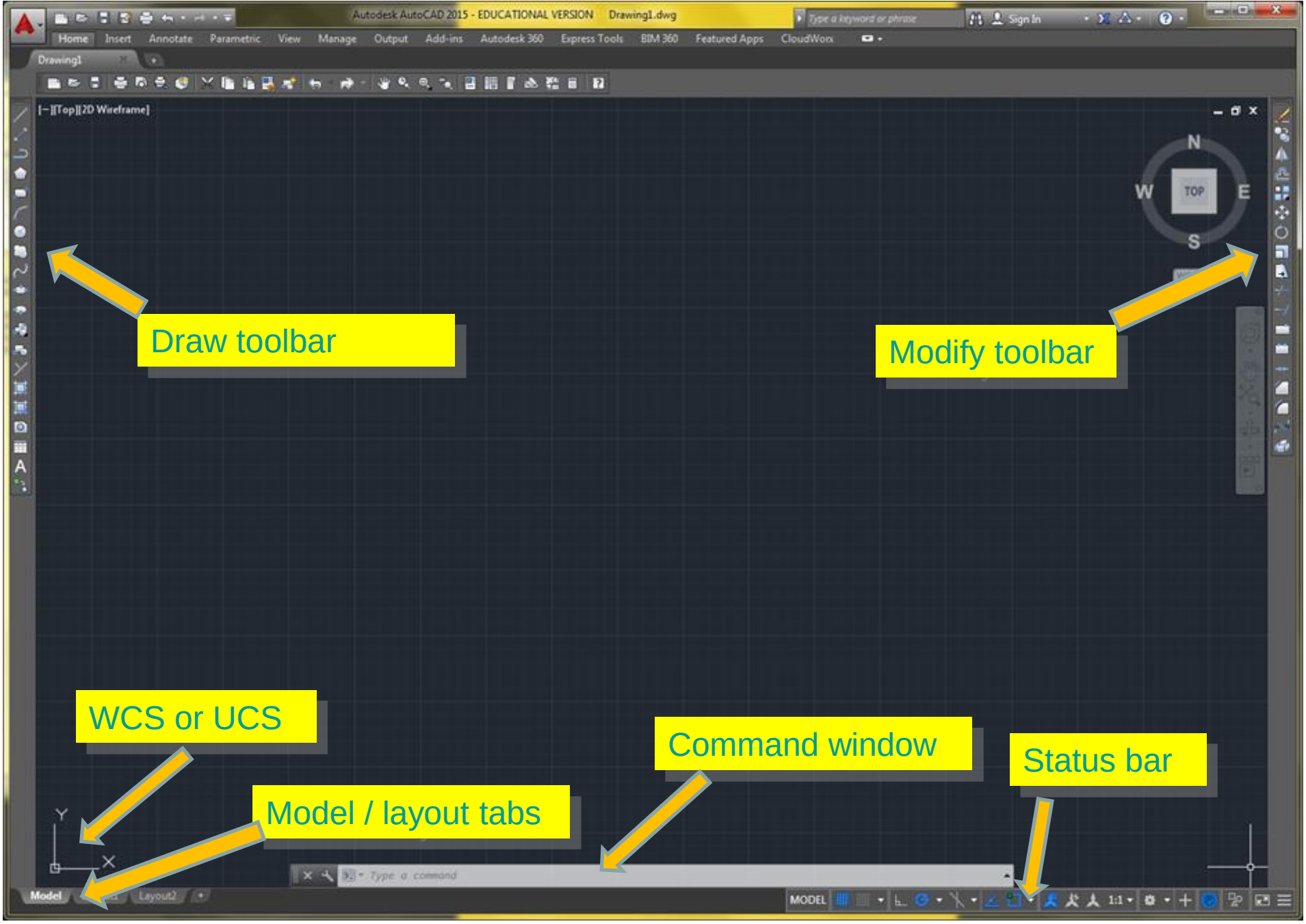
Note: this screenshot is for CAD 2015



Note: this screenshot is for CAD 2015



Note: this screenshot is for CAD 2015

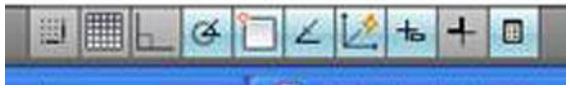


Note: this screenshot is for CAD 2015

Status bar

Status bar icons have changed over the years in different versions of the software

Older version of status bar



Versions till 2013

Version 2015 (or 2016) in our computer lab

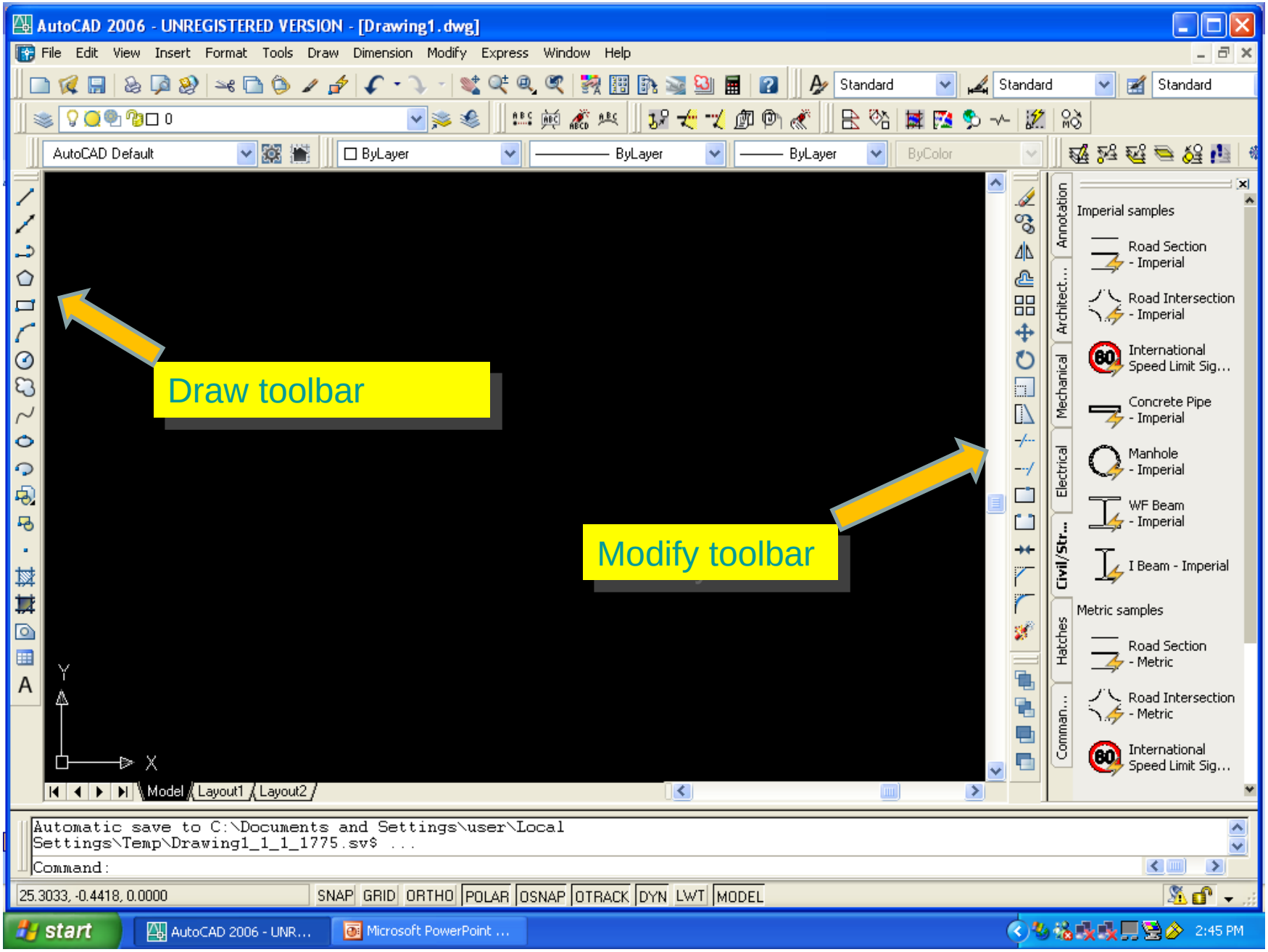
AutoCAD Toolbars

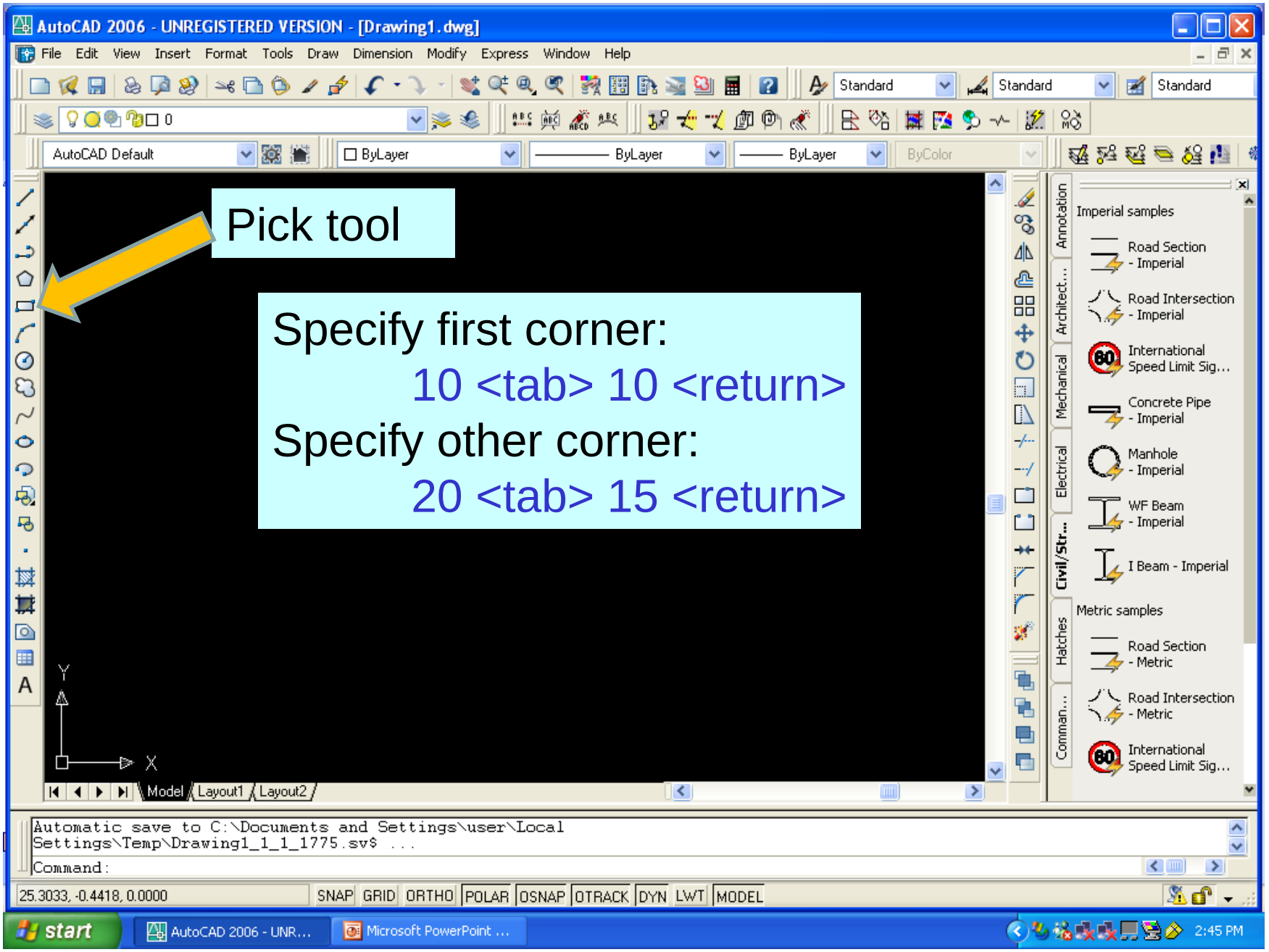
- View > toolbars
- Easier method: hover at toolbar (select an empty area of the toolbar) + right click
- Three options: Floating, docked, locked

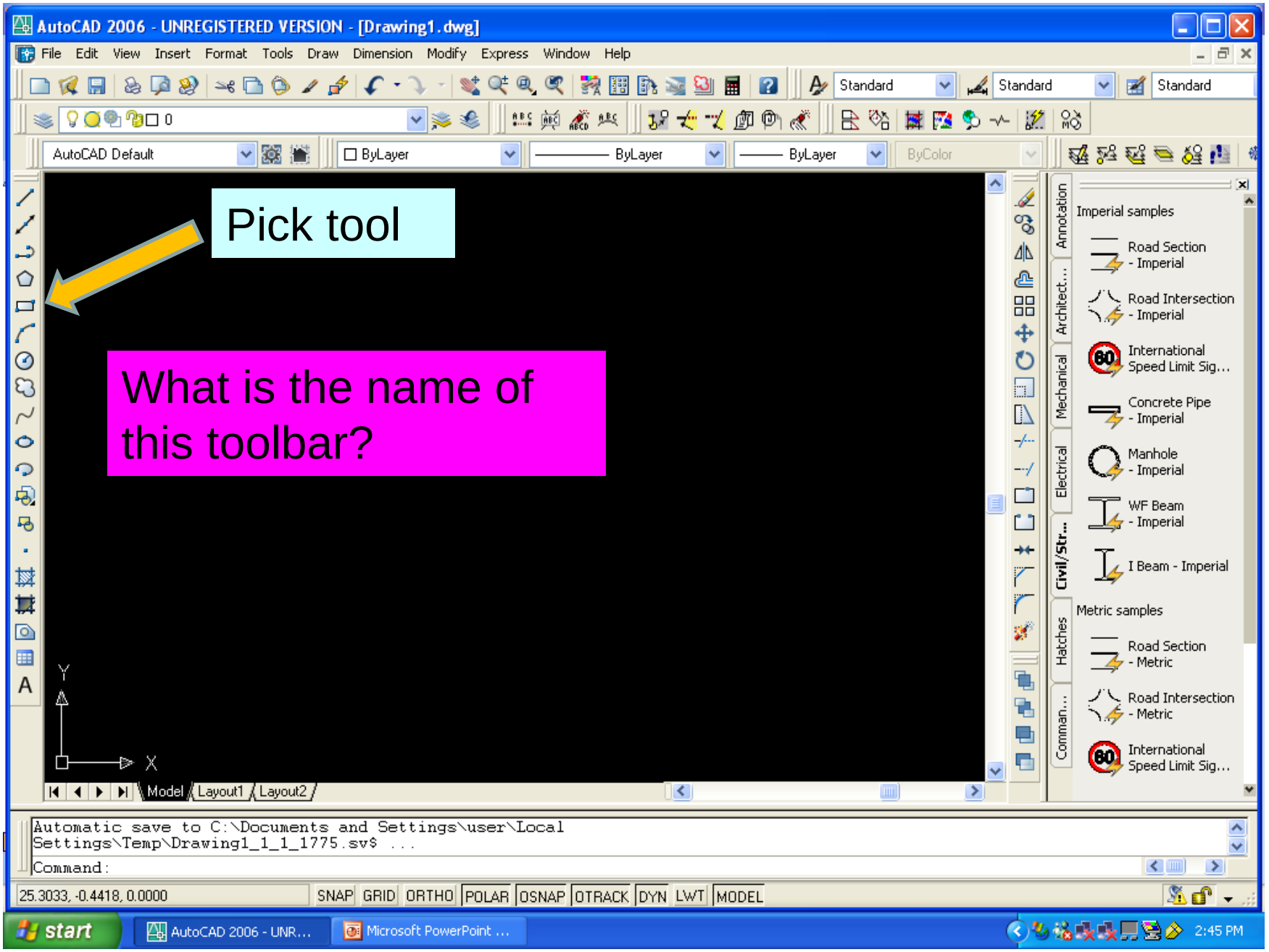
Example

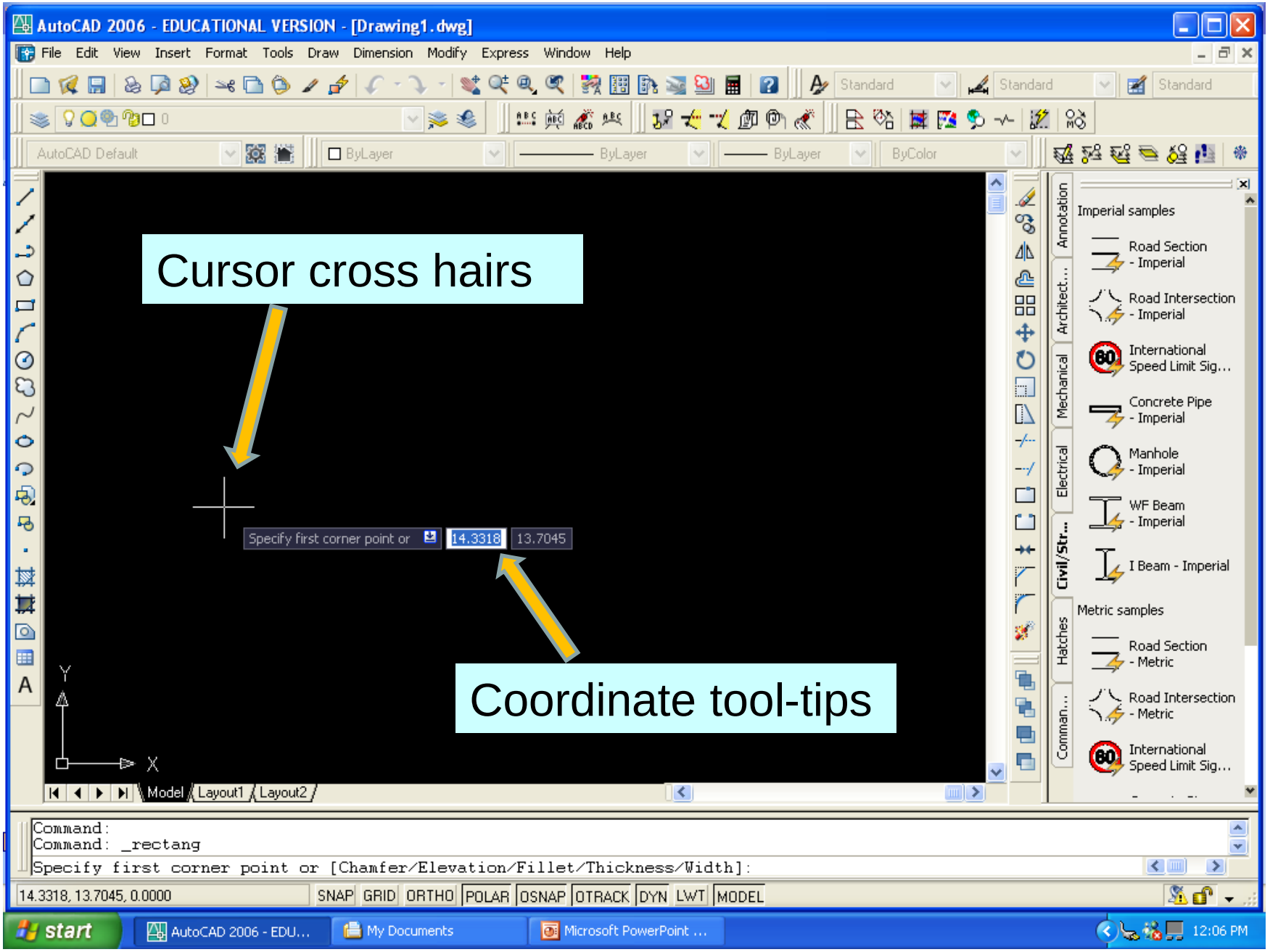
Draw outline of a box:

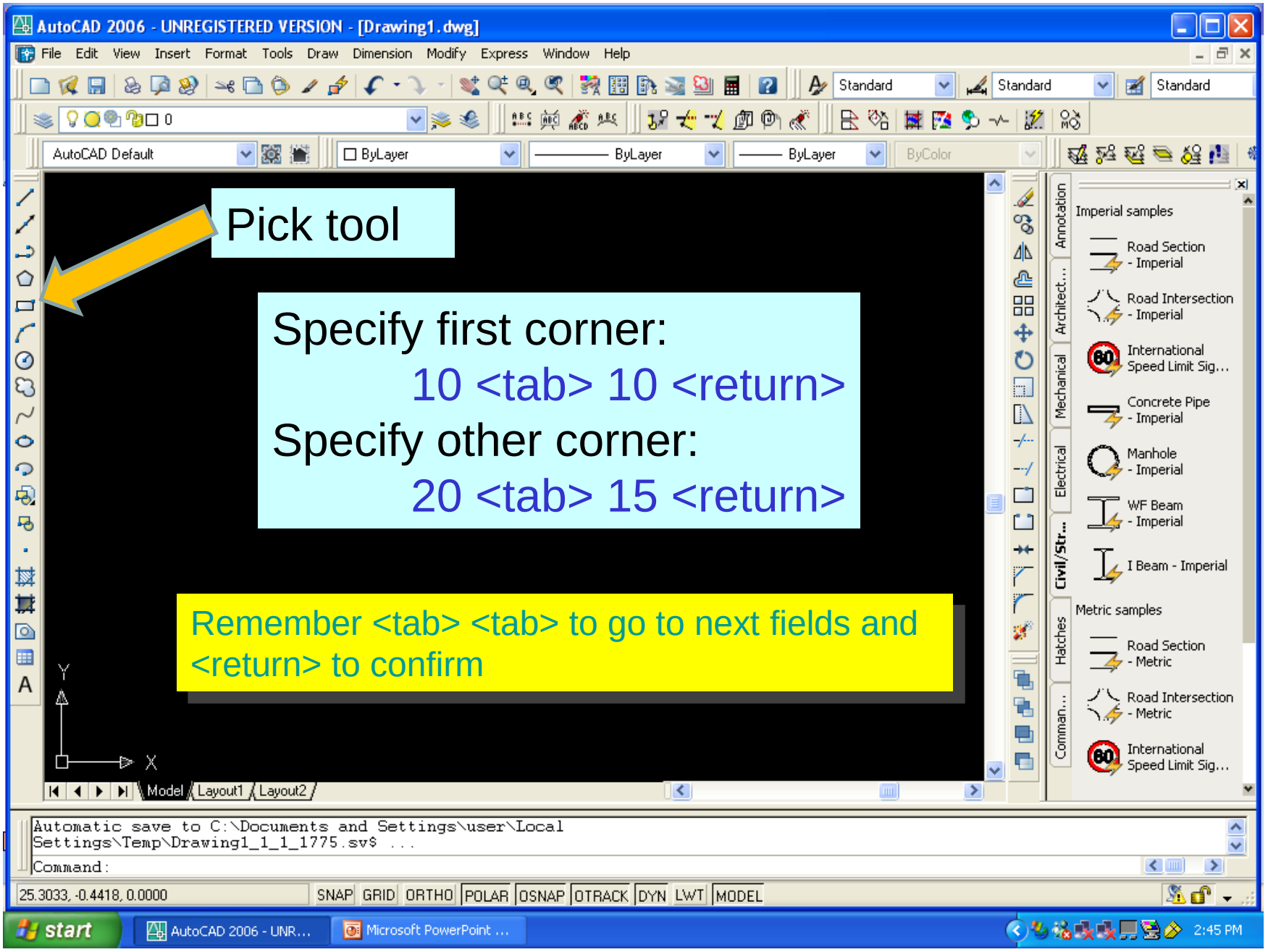
- Length 10 mm
- Width 5 mm

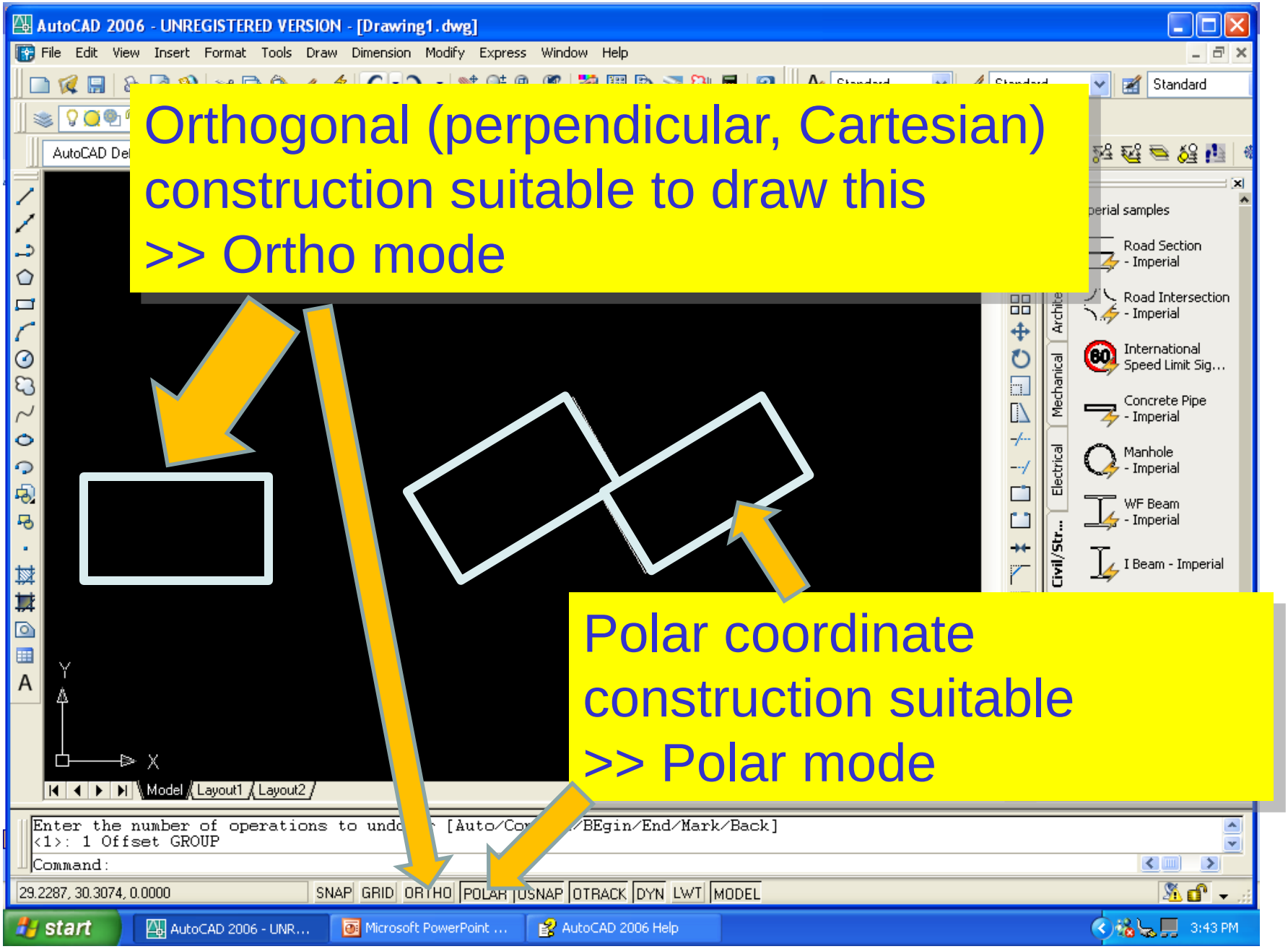

AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Standard
Standard
Standard
AutoCAD Default
ByLayer
ByLayer
ByLayer
ByColor
Draw toolbar
Modify toolbar
Y
X
Model
Layout1
Layout2
Annotation
Architect...
Mechanical
Electrical
Civil/Str...
Hatches
Comman...
Imperial samples
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Metric samples
Road Section - Metric
Road Intersection - Metric
International Speed Limit Sig...
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM


AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Pick tool
Specify first corner:
10 <tab> 10 <return>
Specify other corner:
20 <tab> 15 <return>
Model Layout1 Layout2
Imperial samples
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Metric samples
Road Section - Metric
Road Intersection - Metric
International Speed Limit Sig...
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM


AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Pick tool
What is the name of this toolbar?
Model Layout1 Layout2
Imperial samples
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Metric samples
Road Section - Metric
Road Intersection - Metric
International Speed Limit Sig...
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM


AutoCAD 2006 - EDUCATIONAL VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Cursor cross hairs
Specify first corner point or
14.3318
13.7045
Coordinate tool-tips
Model Layout1 Layout2
Imperial samples
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Metric samples
Road Section - Metric
Road Intersection - Metric
International Speed Limit Sig...
Command:
Command: _rectang
Specify first corner point or [Chamfer/Elevation/Fillet/Thickness/Width]:
14.3318, 13.7045, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - EDU...
My Documents
Microsoft PowerPoint ...
12:06 PM

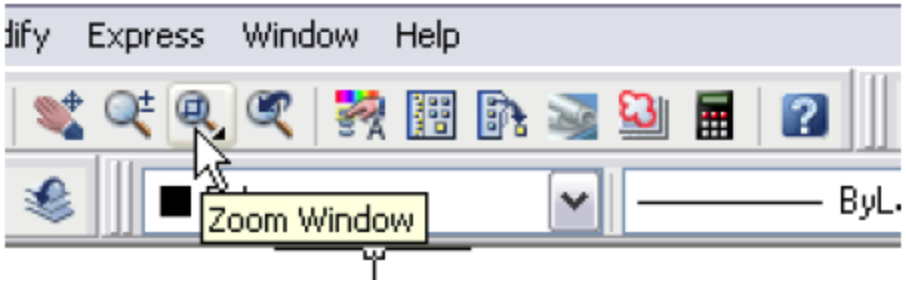

AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Pick tool
Specify first corner:
10 <tab> 10 <return>
Specify other corner:
20 <tab> 15 <return>
Remember <tab> <tab> to go to next fields and <return> to confirm
Model Layout1 Layout2
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
Imperial samples
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Metric samples
Road Section - Metric
Road Intersection - Metric
International Speed Limit Sig...
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM


AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Orthogonal (perpendicular, Cartesian) construction suitable to draw this
>> Ortho mode
Polar coordinate construction suitable
>> Polar mode
Road Section - Imperial
Road Intersection - Imperial
International Speed Limit Sig...
Concrete Pipe - Imperial
Manhole - Imperial
WF Beam - Imperial
I Beam - Imperial
Model Layout1 Layout2
Enter the number of operations to undo [Auto/Control/BEgin/End/Mark/Back]
<1>: 1 Offset GROUP
Command:
29.2287, 30.3074, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
AutoCAD 2006 Help
3:43 PM

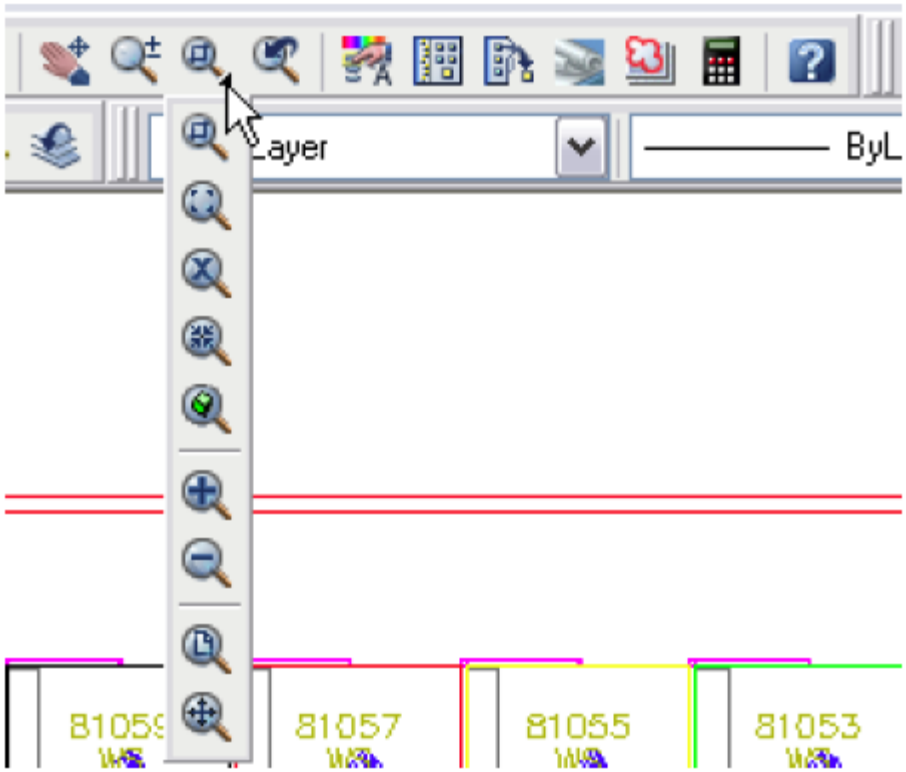
Navigation aids

- Zoom and Pan
  - From toolbar
  - Zoom flyout
  - Zoom extents
  - Zoom window
  - Via right-click

Zoom window



Zoom flyout



Use tool-tips and write down the zoom tool names

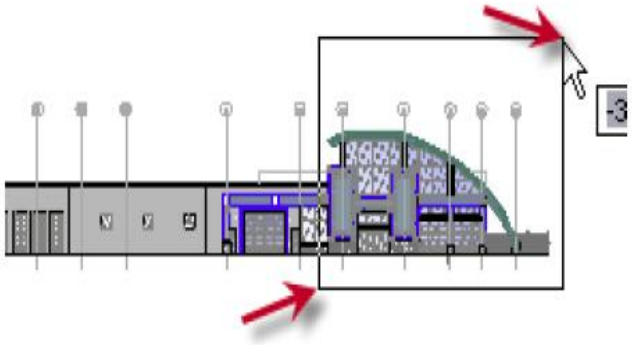
Navigation aids

- Zoom and Pan
  - From toolbar
  - Zoom flyout
  - Zoom extents
  - Zoom window

Zoom and Pan tasks

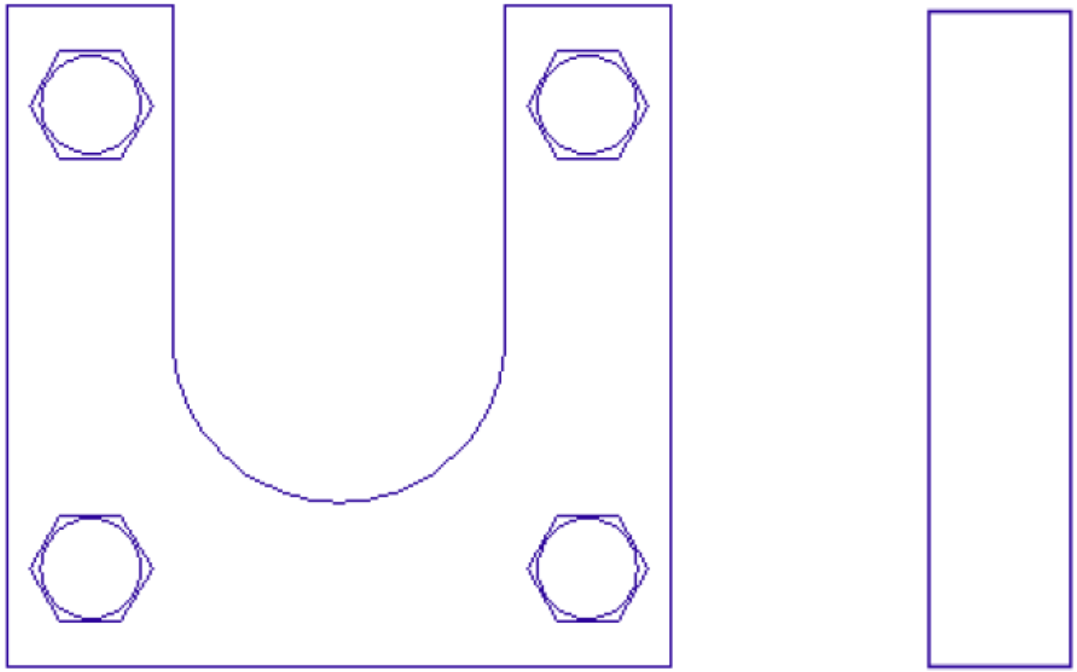
- Chapter 1, pages 1-5
- Download drawing files from e-learning website
- Learn different methods of doing the same task – in real work you may use only few of the methods effective for yourself.

Task 1

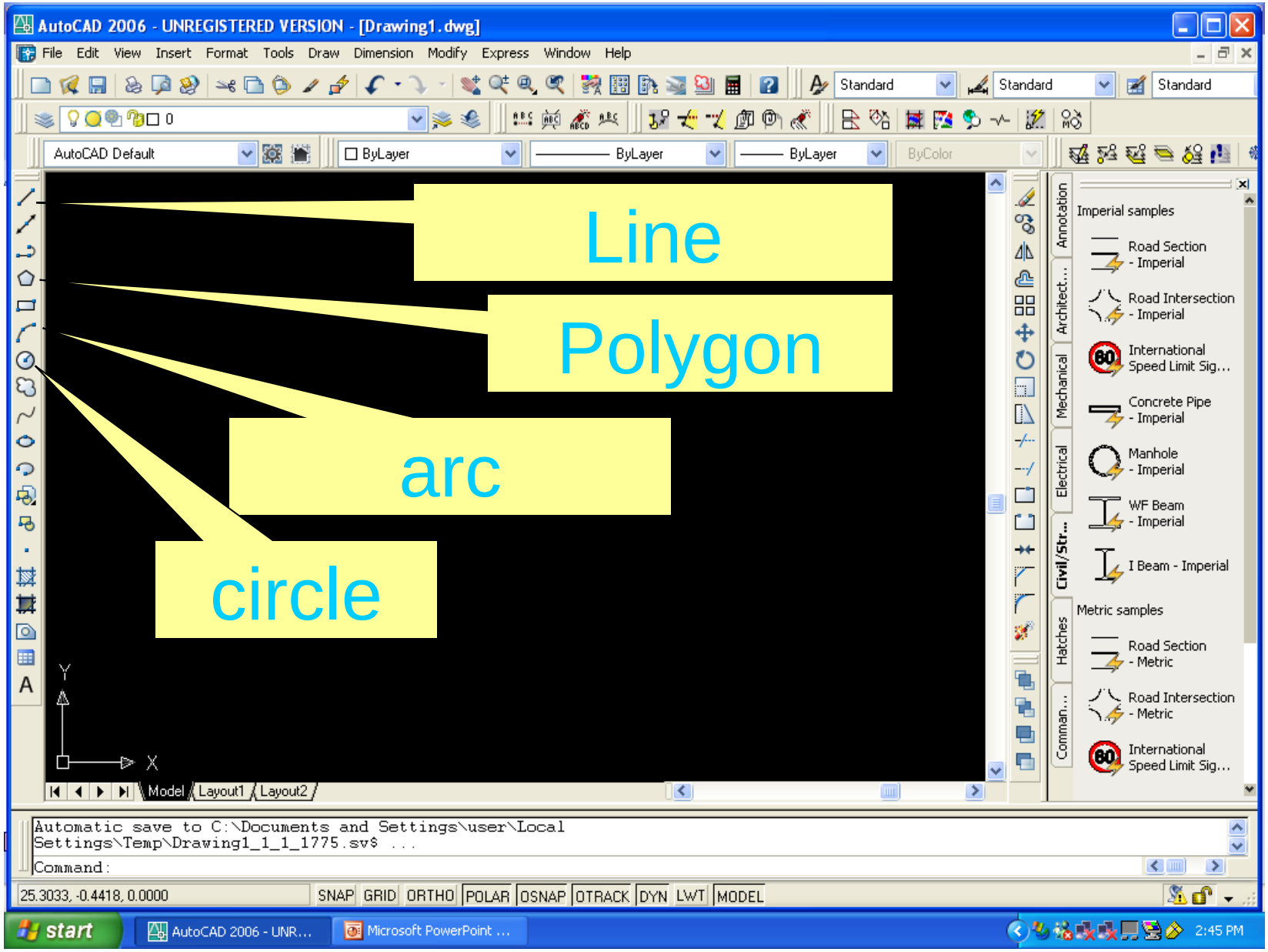


Task 2

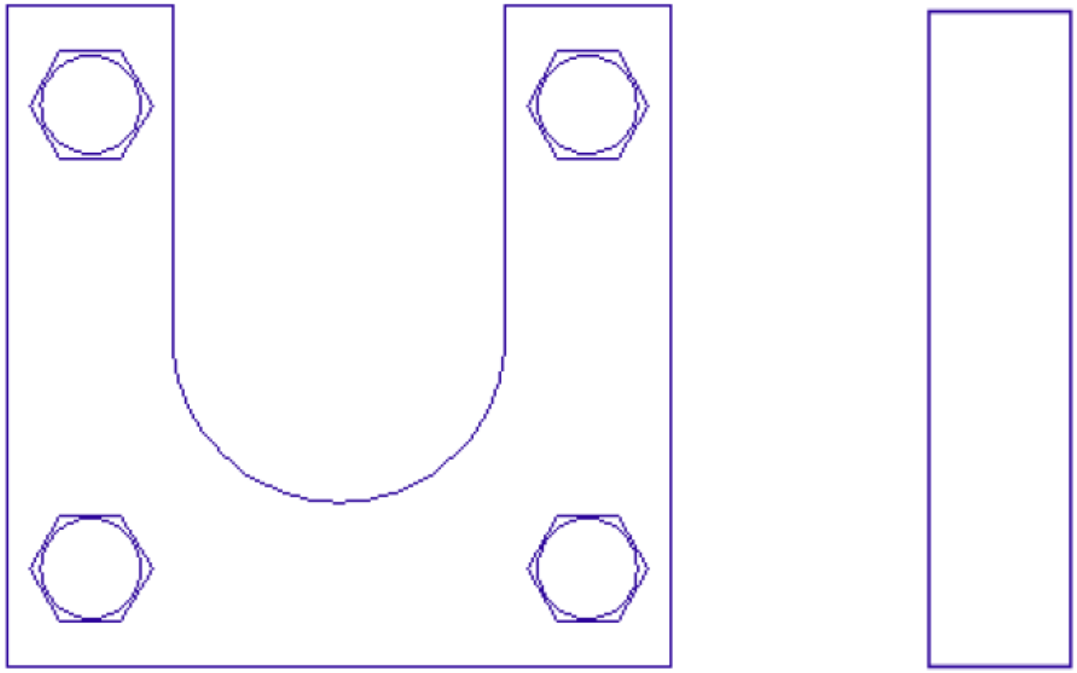
Line, circle, rectangle and polygon



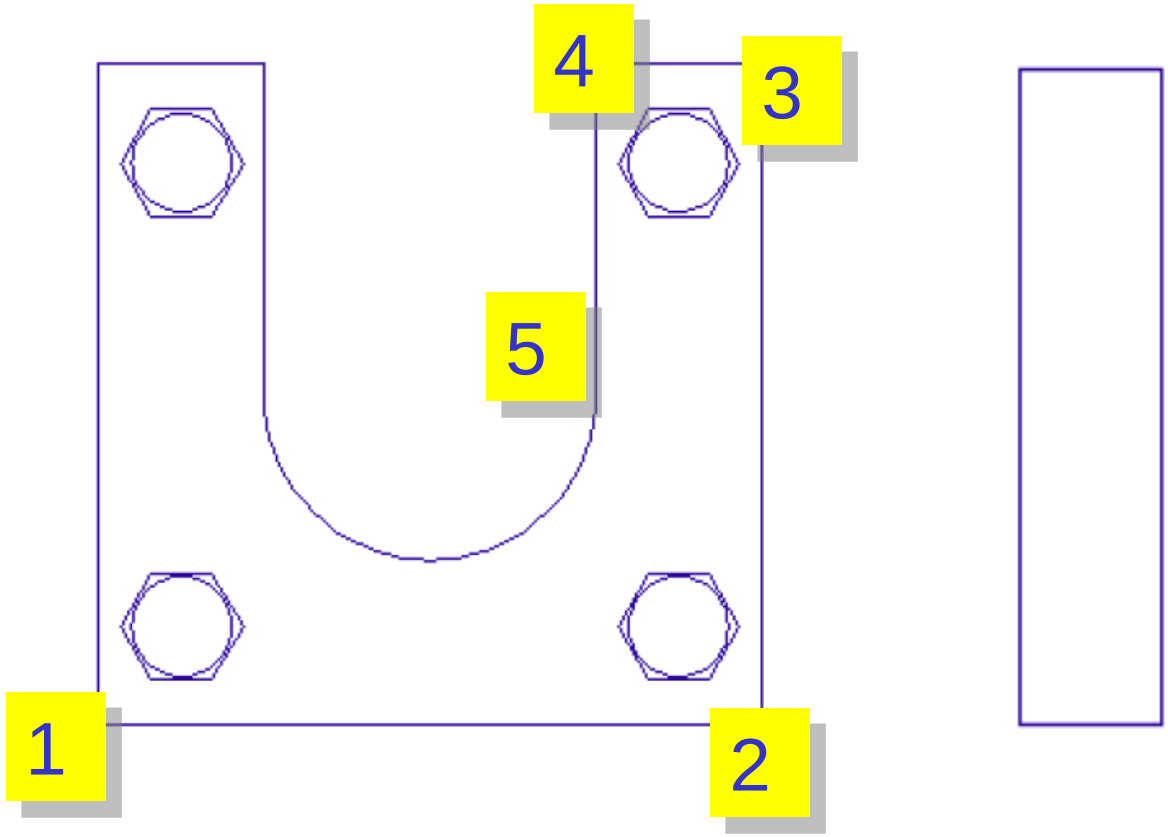
Your final diagram


AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Line
Polygon
arc
circle
Model Layout1 Layout2
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM

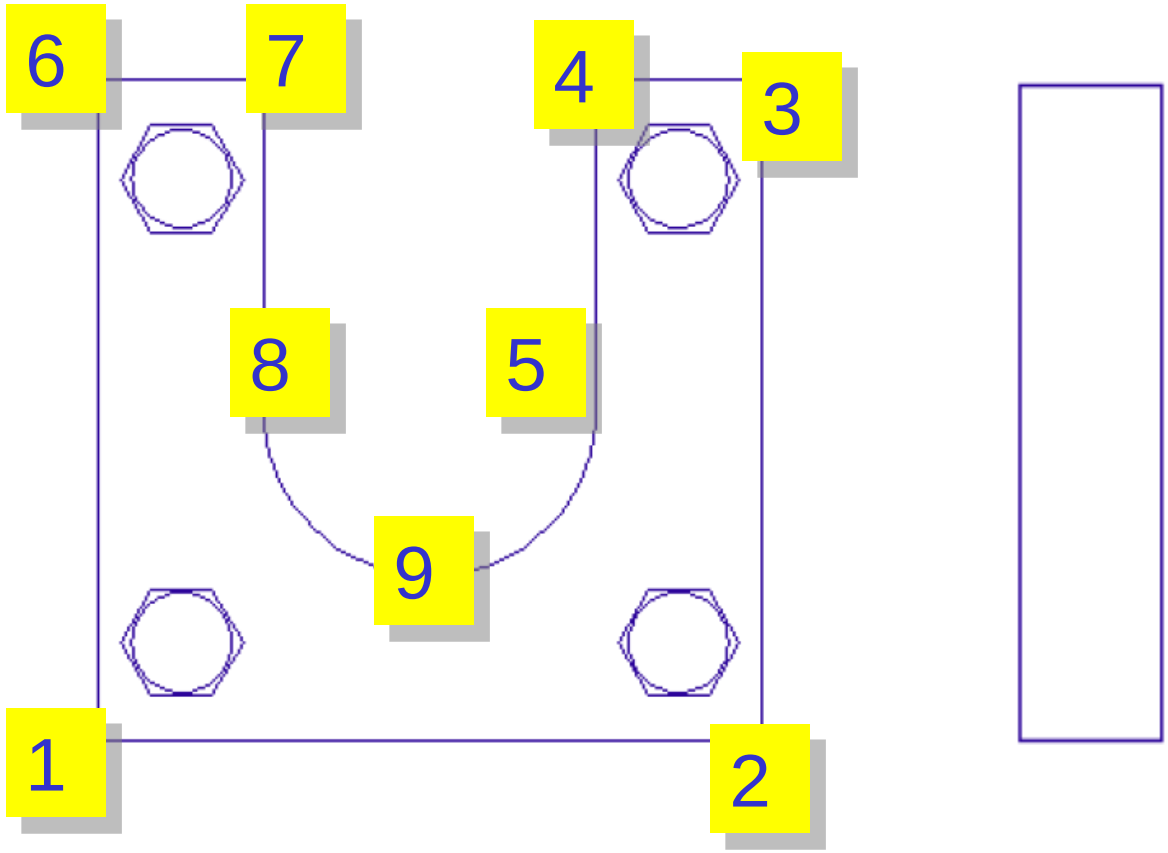
What is the sequence of drawing elements you will use to complete this diagram?



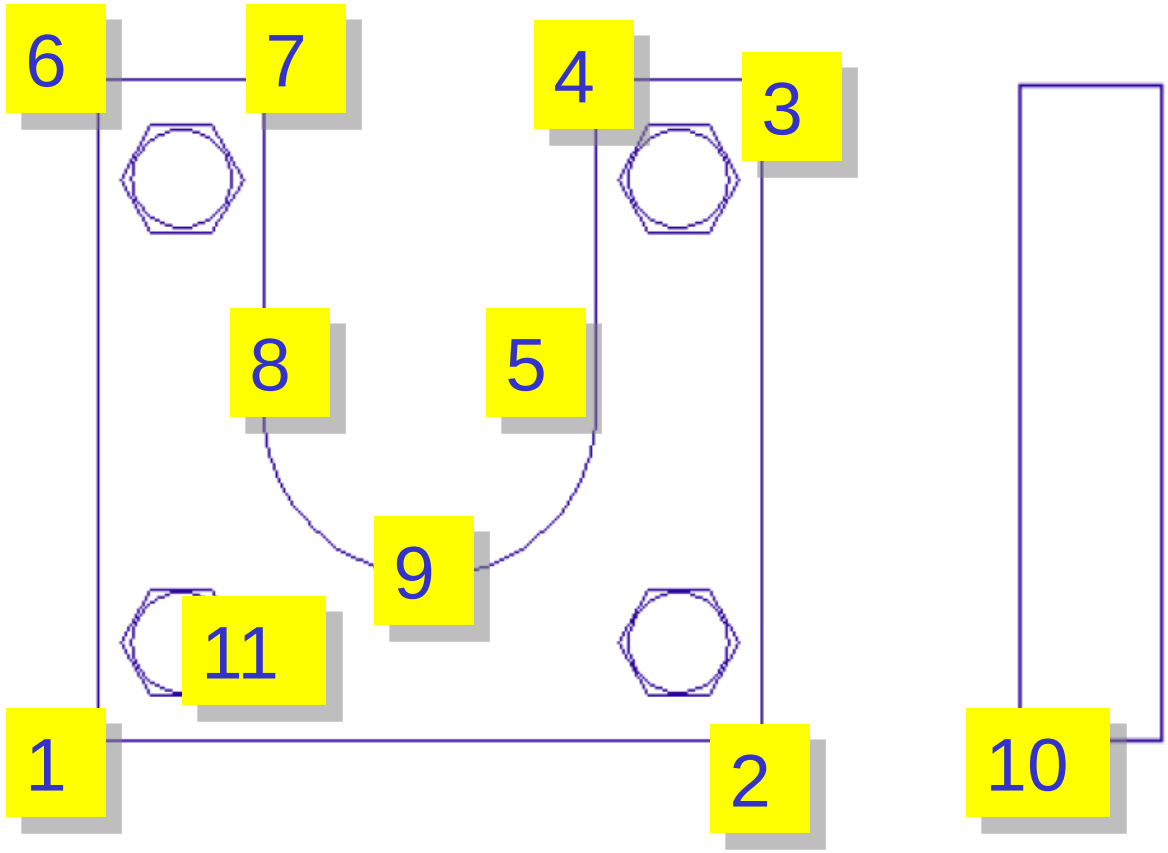
Process



Process

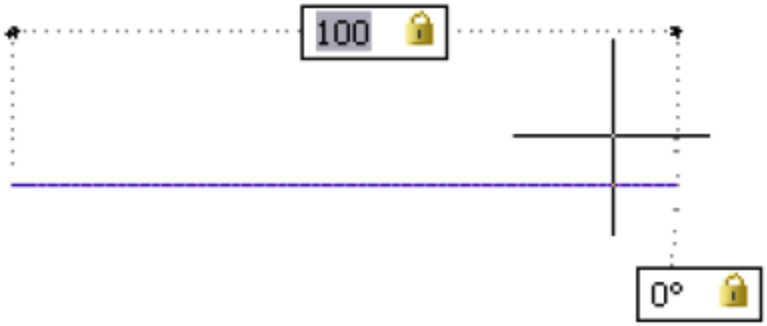


Process



Line, circle, rectangle and polygon

- Settings
- Polar, Osnap, Otrack
- Chapter 2 (pages 1-9)



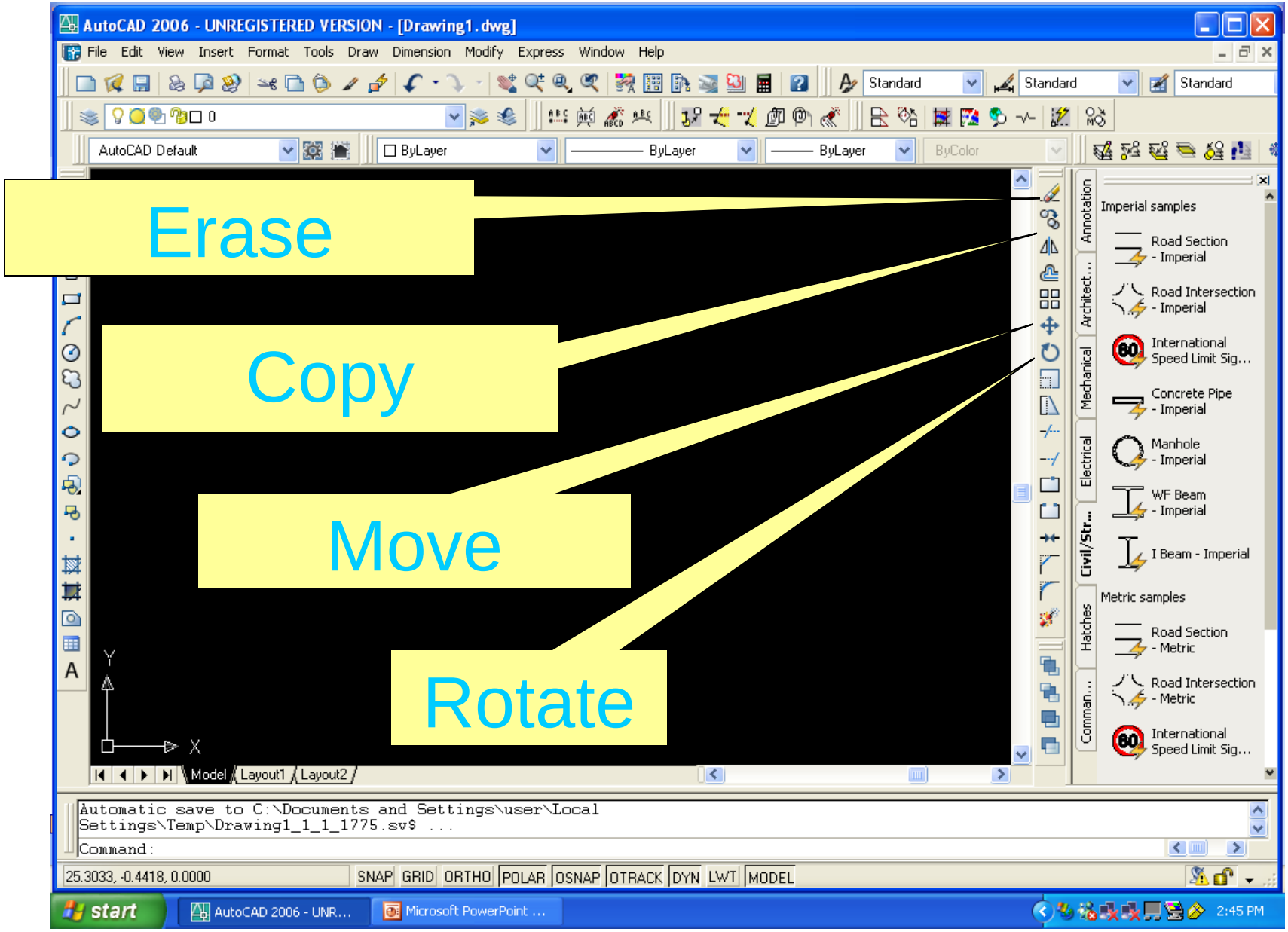
Old versions status bar

New version status bar

Copy, move, erase, rotate

- Chapter 3, pages 1-17
- Multiple methods for
  - Erase
  - Move
  - Copy
  - Rotate

- Consider use of these features in your project task


AutoCAD 2006 - UNREGISTERED VERSION - [Drawing1.dwg]
File Edit View Insert Format Tools Draw Dimension Modify Express Window Help
Erase
Copy
Move
Rotate
Model Layout1 Layout2
Automatic save to C:\Documents and Settings\user\Local Settings\Temp\Drawing1_1_1_1775.sv$ ...
Command:
25.3033, -0.4418, 0.0000
SNAP GRID ORTHO POLAR OSNAP OTRACK DYN LWT MODEL
start
AutoCAD 2006 - UNR...
Microsoft PowerPoint ...
2:45 PM

Things to do

- Self select a computer lab time using the sign-up sheet in Moodle website.

- Attend computer lab at chosen time in Room 611 in the Civil and Environmental Engineering building (H20)

Summary

- Technical drawings as an engineering communication tool
- Accuracy
- Co-ordinate system
- Different methods of doing a specific task in CAD software
- Computer lab work – CAD tasks
- Homework – hand sketch your project drawing and think of sequence of steps and drawing features required