AutoCAD Lab 1

Basics
and
Drawing Fundamentals

EGS 1007

Engineering Concepts and Methods

Will the Computer Ever REPLACE Pencil and Paper Drawings?

Maybe someday…

- **When a computer becomes as light, small, and economically accessible as a pencil and a tablet…**
- **Presently, hand sketching remains one of the most important skills that an engineer can master and it can be done ANYWHERE!**

AutoCAD by Autodesk, Inc.

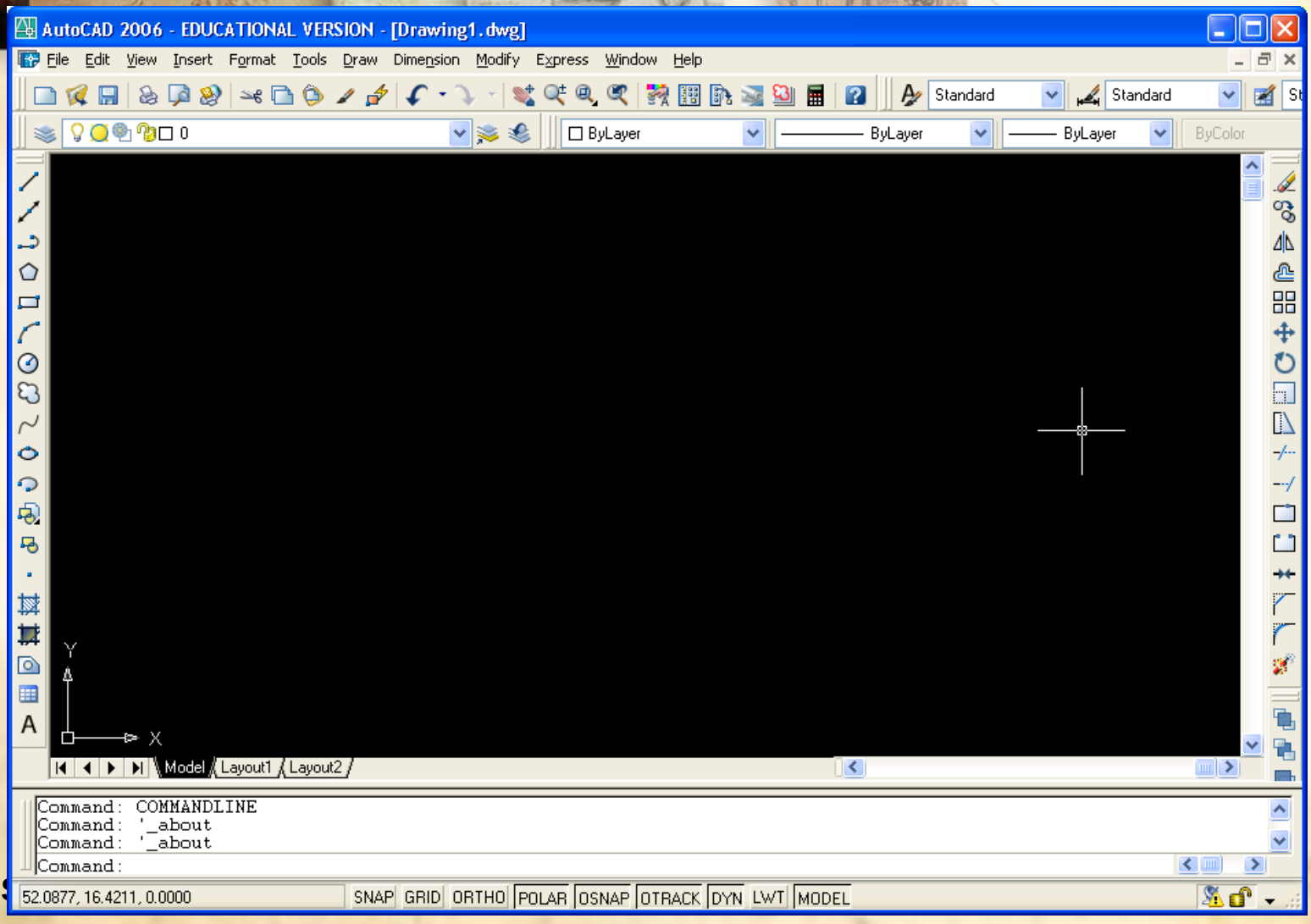
The first and most widely used drafting software in the world…

- **CAD: Computer-Aided Design**
- **CADD: Computer-Aided Design and Drafting**
- **CAM: Computer-Aided Manufacturing**
- **CIM: Computer-Integrated Manufacturing**

AutoCAD Systems Offer:

- Increased accuracy
- Increased drawing speed
- Easy to revise
- Better design analysis
- Better presentation
- Libraries of drawing aids
- Improved filing

AutoCAD Main Screen



Drawing Elements May Be Invoked By:

- Using the pull-down menu
- Using the toolbars…
  - ✓ Click on View → Toolbars
  - ✓ Check commands you'll need for your drawing
- Typing the commands directly in the command line
- Typing the first letter of command in the command line (see Figure 1.6)

Basic Drawing Commands

- Arc (A)
- Circle (C)
- Dimstyle (D)
- Distance (DI)
- Erase (E)
- Fillet (F)
- Insert (I)
- Line (L)
- Layer (LA)
- List (LS)
- Linetype (LT)
- Move (M)
- Mspace (MS)
- Offset (O)
- Osnap (OS)
- Pan (P)
- Pedit (PE)
- Pspace (PS)
- Pline (PL)
- Redraw (R)
- Regen (RE)
- Rotate (RO)
- Mtext (T)
- Explode (X)
- Zoom (Z)

AutoCAD Command Input Coordinates

Input (coordinates) may be entered:

- **Through dialog windows (depending on the command).**
- **Through the command line.**
- **Using dynamic input on the boxes that appear near the cursor location. (The DYN status button must be selected)**

Three Ways to Repeat Past Commands:

1. **Arrow up or down to see past commands**

   (To see more than just the last command entered…)
2. **Press Enter**

   (To see LAST command entered)
3. **Press Space Bar**

   (To see LAST command entered)

Helpful AutoCAD Hints

To change the background color…

- **Right click on screen**
- **Select Options**
- **Go to Display tab**
- **Click on Colors**
- **Change color**
- **Apply and close**

Helpful AutoCAD Hints

To modify Grid and Snap settings:

- **Right click on *Grid* tab**
- **Select settings**
- **Enter new Grid settings in "*Grid X spacing*"**
- **Enter new Snap settings in "*Snap X spacing*"**
- **Hit *OK***

Helpful AutoCAD Hints

To modify global linetype scale factor:

- **Type *ltscale* in command line**
- **Type in new *linetype* scale factor**

Helpful AutoCAD Hints

Hit *F6* to change from:

Absolute (XYZ) Coordinate System

to

turn off Coordinate Display

Helpful AutoCAD Hints

- Hit enter to end a command sequence
- To undo something, type ***U*** and hit enter
- To get out of a command immediately, hit the escape key

Helpful AutoCAD Hints

To turn off the user coordinate system icon:

- **Type *ucsicon***
- **Then type off**

Helpful AutoCAD Hints

To check a length of something:

- **Use *Distance* Command**
- **Use List Command**

AutoCAD Tour

Open the AutoCAD software through the Autodesk folder under “programs” or by double-clicking on the desktop shortcut:

- *Drawing1.dwg* is an empty AutoCAD drawing that opens by default.
- Explore the pull-down menu.
- Read the tool-tips by moving the cursor over the toolbars.
- Notice the status buttons on the bottom of the screen.

AutoCAD Tour

- Start a new drawing by selecting "*File*" -> "*New*" from the pull-down menu.
- The "*Select Template*" dialog box appears.

  Select the *acad.dwt* default template.
- Save the file by selecting "*File*" -> "*Save*" from the pull-down menu.
- Browse to a working folder (create if necessary).
- Type the name "*Lab 1 Shapes*" (the .dwg extension is appended automatically) and click "*Save*".

AutoCAD Tour

Try some AutoCAD features:

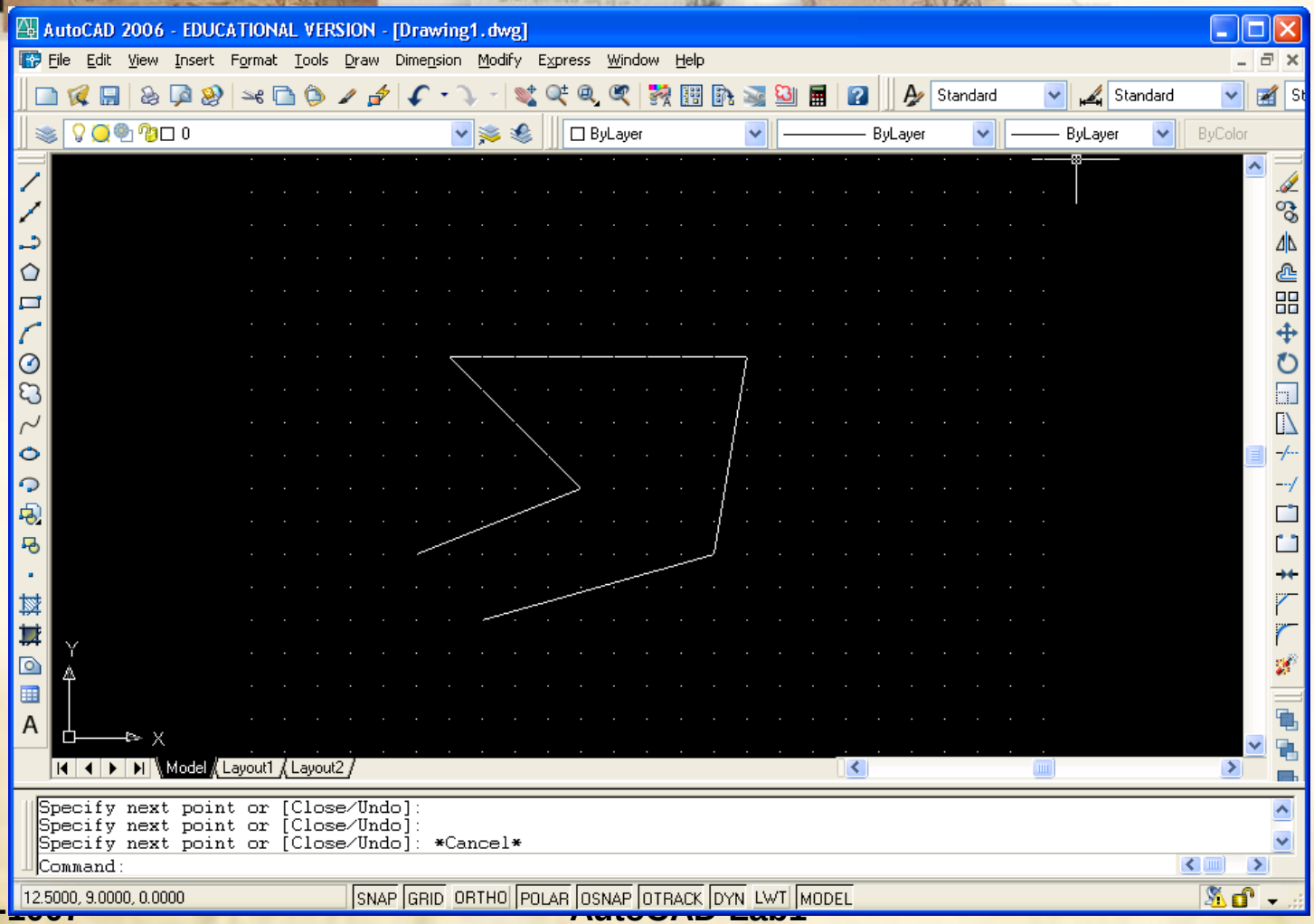
- **Turn the *GRID ON* by pushing the GRID status button.**
- **Turn the *SNAP ON* by pushing the SNAP status button.**
- ***ZOOM* in a section of the screen by using the toolbars.**
- **Type *ZOOM* on the command line and type *a* for ALL.**

AutoCAD Tour

Now try some AutoCAD drawing commands:

- **Draw lines by either selecting "*Draw*" -> "*Line*" from the pull-down menu, typing "*Line*" or "*L*" on the command line, or by selecting the "line icon" from the toolbar.**
- **Click on different positions along the grid and use the "*ESC*" key when you are ready to exit the command.**
- **Now erase everything by typing "*Erase*" or "*E*" on the command line and selecting the objects on the screen.**

AUTOCAD TOUR



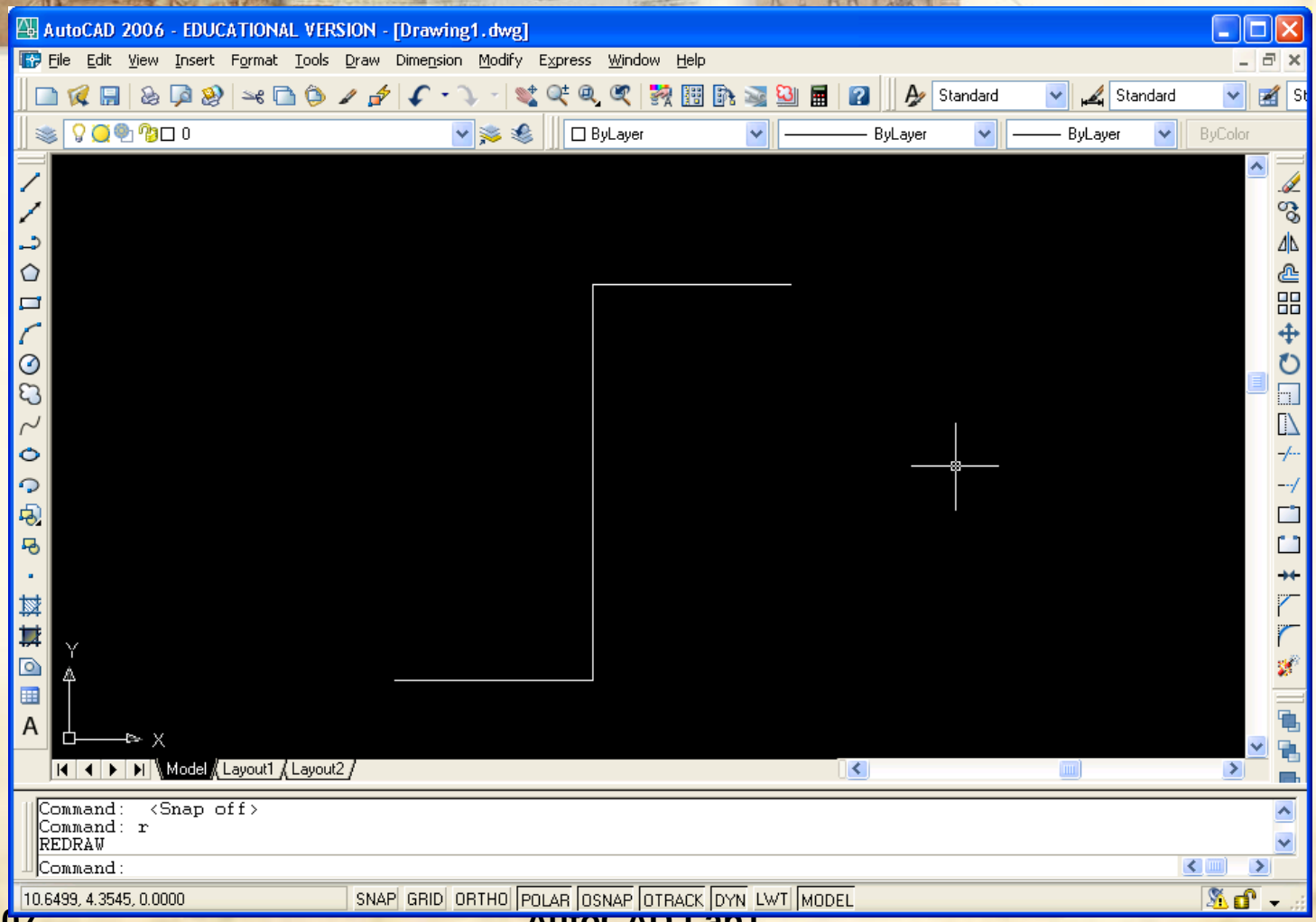
AutoCAD Tour

- Now turn OFF the SNAP and the GRID.
- Let's try to draw a set of lines by entering coordinates.
- Select "*Line*" and specify the first point: *2.15,1.1*
- Next point: *5.15,1.1*
- Next point: *5.15,7.1*
- Next point: *8.15,7.1* and press "*ESC*"
- These are *absolute* coordinates.

AutoCAD Tour

- Erase all the objects on the screen.
- Select a "*line*" again.
- Enter the first point: *2.15,1.1*
- Enter next point: *@3<0*
- Enter next point: *@6<90*
- Enter next point: *@3<0* and press "*ESC*"
- These are *relative* polar coordinates.

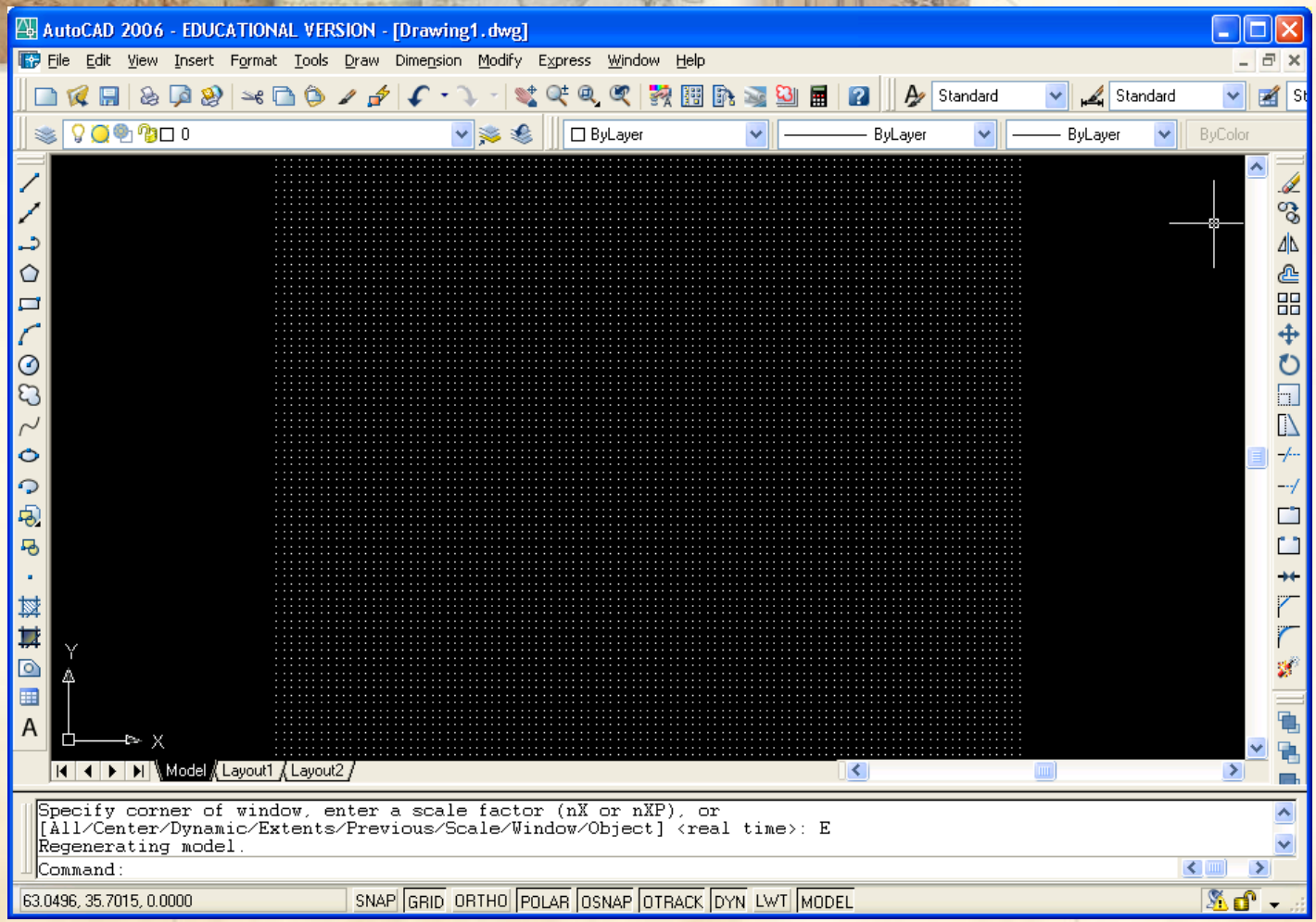
AutoCAD Tour



AutoCAD Tour

- **Erase all the objects on the screen.**
- **Type "*Undo*" or "*U*" to undo the erase command. Type "*Redo*" to execute the erase command again.**
- ***Turn ON the GRID* again.**
- **Set new drawing limits by selecting "*Format*" -> "*Drawing Limits*" from the pull-down menu or by typing "*Limits*".**
- **Specify <0,0> for the lower left corner and <50,40> for the upper right corner.**
- **Now *ZOOM -> All*…**

AutoCAD Tour

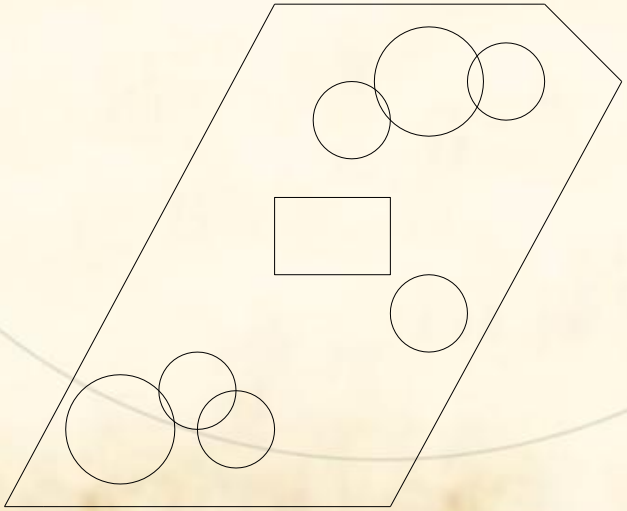


AUTOCAD TOU

- Change the GRID density and SNAP movement by right-clicking on the GRID status button.

  Select x = 2.0 and y = 2.0.

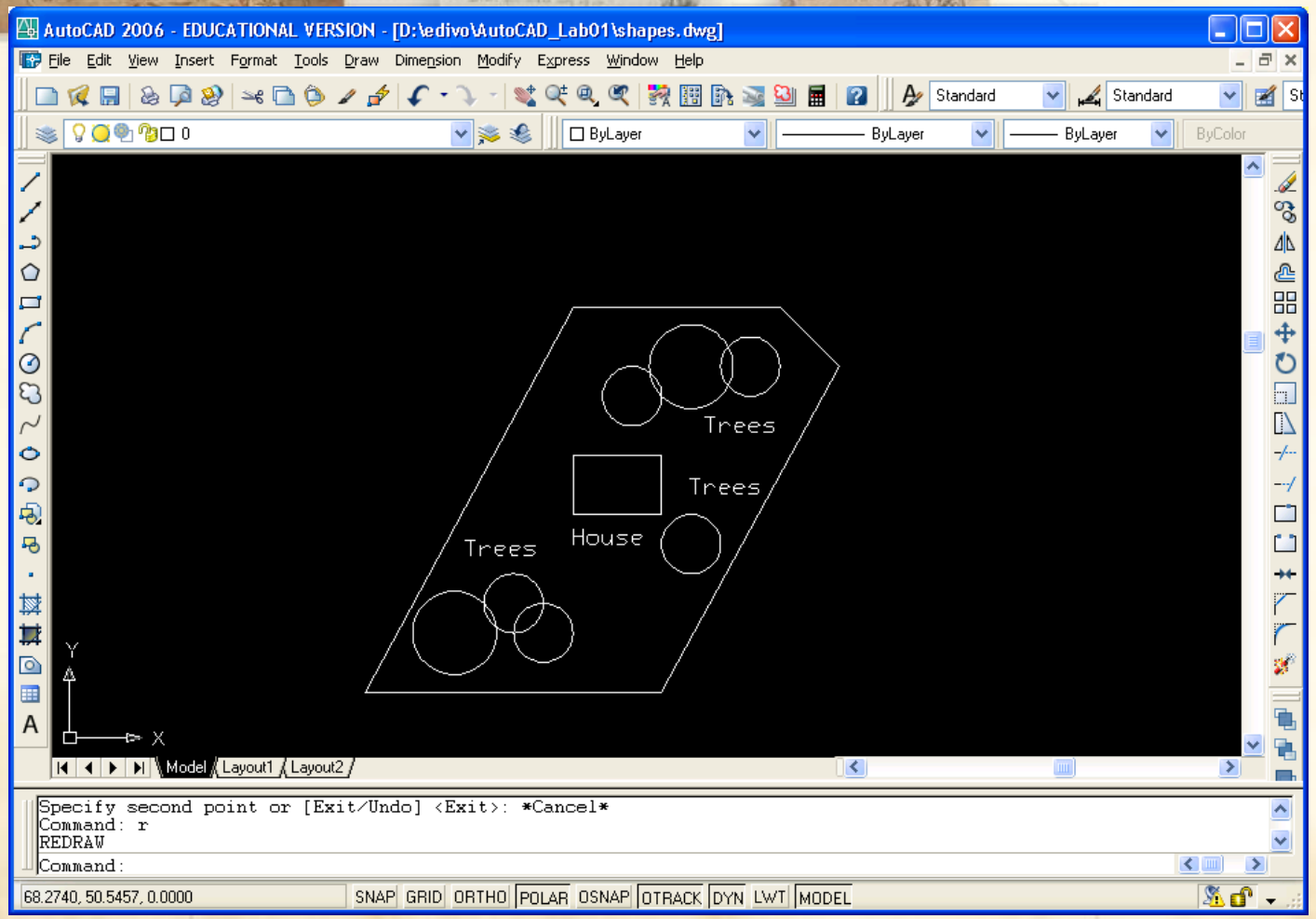
- Try the "*line*" command, the "*rectangle*" command and the "*circle*" command to resemble the shapes below:



AutoCAD Tour

- Type "*Text*" in the command line, specify the start point close to the rectangle, specify a height of 1.0, and specify 0 angle of rotation. Type the word "*House*" and press enter.
- Similarly, specify "*Trees*" close to the circles.
- Use the "*Copy*" command to copy the text object "*Trees*" to other locations.
- *Save* your drawing.

AutoCAD Tour



But WAIT, there's even MORE AutoCAD FUN ahead…

Open your AutoCAD textbook and complete Drawings 1, 2, and 3 within Chapter 1:

- Save Drawing 1 as "Lab 1 Grate.dwg"
- Save Drawing 2 as "Lab 1 Design.dwg"
- Save Drawing 3 as "Lab 1 Shim.dwg"