AutoCAD:
Is a CAD (Computer Aided Design) software application for 2D and 3D design and drafting, developed and sold by Autodesk.

3D house model.

Ground floor plan.

Serpent 710 4WD 200mm Gas powered car 3D model

Piping system in 3D

By Abeyou 2008
Chapter One
Introduction to AutoCAD

Welcome to AutoCAD 200i, a product with a rich and unique history. More recently, the introduction of microprocessors and computer combinations have made possible the development of computer-aided design and computer-aided manufacture (CAD and CAM) technology.

First released in 1982 under the name MicroCAD, the first AutoCAD ran under the CP/M operating system on Intel 8080 computer. The first AutoCAD release started a revolution in drafting and design. Today, AutoCAD is translated into 18 languages and used by millions of users worldwide on computers a thousand times more powerful than those early 8080 microprocessors.

CAD is an acronym for computer aided Design or computer Aided Drafting. CAD allows you to accomplish Design and Drafting activities using a computer.

CAD is a tool that can be used:

- To make rough ideas drawings, also it is more suited to creating accurate finish drawing and rendering
- To create a two dimensional or three dimensional computer model of the product or system for further analysis and testing by other computer programs.

Getting started with AutoCAD 200i

1.1 Starting AutoCAD 200i

There are two different common methods to start AutoCAD 200i

- From the start menu choose programs. Then choose Autodesk again Autodesk and AutoCAD 200i.
- Double click on AutoCAD 200i icon on the desktop if there is AutoCAD 200i icon on the desktop.
Title bars
This will show you what program you are running and what the current filename is.

Menu bars
These are the standard pull-down menus through which you can access almost all commands.

Toolbars
AutoCAD has a compressive set of toolbars. Choosing a toolbar will activate the command associated with the toolbar.

Working area
This is where you draw. You have an almost infinite area to draw and this is just a 'section' of the entire space.

UCS (user coordinate system)
The UCS system represents the current location and orientation of the X, Y and Z axises within the drawing.

By Abeyou 2008
BDU

**Model and layout tab**
Controls options for existing and new layouts. A layout is a paper space environment in which you can set up drawings for plotting. Paper size, plotter name, drawing orientation, etc

**Command window**
When you type a command, you will see it here. AutoCAD uses this space to 'prompt' you for information. It will give you a lot of information and tell you where you are in the command. A command will either display a set of options or activate a dialogue box. Most commands will have alias. An alias is an abbreviated command or short cut entry.

In the command prompt the default options are always indicated in triangular brackets like so `<Default>` and command options appear within square brackets like so `[Option]`. Each option is separated by a forward slash like this `/`. You can choose to use the alternative options by typing them at the prompt. Note that to invoke a command option, you need only type the upper-case part of the option name.

**Status bar**
The status bar at the bottom of the AutoCAD window always shows the current co-ordinate value at the cursor point and also allows seeing and changing different modes of drawing such as Ortho, Osnaps, Grid, Otrack, etc.

**Coordinates:** shows the current cursor location.

**SNAP / F9:** Snap spacing restricts cursor movement to specific intervals. When you turn on snap mode, the cursor “snaps” to spaced coordinates as if they were cursor managements.

**GRID / Keyboard Grid or F7:** The grid command displays a dot grid within the current viewport and drawing limits. The grid command allows you to set your X,Y values and visibility. The grid is used only for reference and will not show up within a hard copy plot.

**ORTHO / Keyboard Ortho or F8:** Ortho is short for orthogonal, which means either vertical or horizontal. Ortho on and off mode forces the movement of the cursor in horizontal or vertical directions only.

**POLAR / F8:** A precision drawing tool that displays temporary alignment paths defined by user-specified polar angles.

**OSNAP / F3:** Object snap lets you snap to specific geometric points of existing objects in the drawing.

<table>
<thead>
<tr>
<th>ICON</th>
<th>SETTING</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Endpoint" /></td>
<td>Endpoint Snaps to the closest endpoint of an arc, elliptical arc, line, multilinie, polyline segment, spline, region, or ray, or to the closest corner of a trace, solid, or 3D face.</td>
</tr>
<tr>
<td><img src="image" alt="Midpoint" /></td>
<td>Midpoint Snaps to the midpoint of an arc, ellipse, elliptical arc, line, multilinie, polyline segment, region, solid, spline, or xline.</td>
</tr>
<tr>
<td><img src="image" alt="Center" /></td>
<td>Center Snaps to the center of an arc, circle, ellipse, or elliptical arc.</td>
</tr>
<tr>
<td><img src="image" alt="Node" /></td>
<td>Node Snaps to a point object, dimension definition point, or dimension text origin</td>
</tr>
<tr>
<td><img src="image" alt="Quadrant" /></td>
<td>Quadrant Snaps to a quadrant point of an arc, circle, ellipse, or elliptical arc.</td>
</tr>
<tr>
<td><img src="image" alt="Intersection" /></td>
<td>Intersection Snaps to the intersection of an arc, circle, ellipse, elliptical arc, line, multilinie, polyline, ray, region, spline, or xline. Extended Intersection is</td>
</tr>
</tbody>
</table>

By Abeyou 2008
BDU

<table>
<thead>
<tr>
<th>Icon</th>
<th>Extension</th>
<th>Causes a temporary extension line or arc to be displayed when you pass the cursor over the endpoint of objects, so you can specify points on the extension.</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Extension Icon]</td>
<td>Insertion Point</td>
<td>Snaps to the insertion point of an attribute, a block, a shape, or text.</td>
</tr>
<tr>
<td>![Perpendicular Icon]</td>
<td>Perpendicular</td>
<td>Snaps to a point perpendicular to an arc, circle, ellipse, elliptical arc, line, multiline, polyline, ray, region, solid, spline, or xline.</td>
</tr>
<tr>
<td>![Tangent Icon]</td>
<td>Tangent</td>
<td>Snaps to the tangent of an arc, circle, ellipse, elliptical arc, or spline.</td>
</tr>
<tr>
<td>![Nearest Icon]</td>
<td>Nearest</td>
<td>Snaps to the nearest point on an arc, circle, ellipse, elliptical arc, line, multiline, point, polyline, ray, spline, or xline.</td>
</tr>
<tr>
<td>![Apparent Intersection Icon]</td>
<td>Apparent Intersection</td>
<td>Snaps to the visual intersection of two objects that are not in the same plane but may appear to intersect in the current view. Apparent and Extended Apparent Intersection do not work with edges or corners of 3D solids.</td>
</tr>
<tr>
<td>![Parallel Icon]</td>
<td>Parallel</td>
<td>Draws a vector parallel to another object whenever you are prompted for the second point of a vector.</td>
</tr>
</tbody>
</table>

**OTRACK:** AutoTrack helps you draw objects at specific angles or in specific relationships to other objects. When you turn on AutoTrack, temporary alignment paths help you create objects at precise positions and angles. AutoTrack includes two tracking options: polar tracking and object snap tracking.

**LWT:** Controls whether lineweights are displayed in the current drawing. If this option is selected, lineweights are displayed in model space and paper space.

**MODEL:** On the Model tab, you can view and edit model space objects. Used to switch between the model and paper space.

**Interpreting the cursor mode**

Several types of cursor icons will be seen when using AutoCAD in this section you will be familiar with some of cursor messages:-

- Standard Cursor
- Point selection cursor
- Object Selection Cursor
- Osnap marker with tool tip

By Abeyou 2008
**Distance entry methods:** there are two different techniques.

i. **Direct distance entry**
This is the simplest way to place series of lines without entering co-ordinate values. You determine your next point by moving the cursor in the direction you want to go and enter the required distance from your current position.

ii. **Co-ordinates entry**
The AutoCAD system provides with a variety of methods to locate a point on the drawing screen in order to carry out a particular action, for instance, to locate the end point of a line or to move one object to new location. The most common methods of Co-ordinate entry are covered below:-

1. **Absolute co-ordinate**
Absolute co-ordinates relate to the X and Y axes and the origin of the current co-ordinate system. That means your coordinates are taken from one datum base point, the lower left corner, X,Y.

2. **Relative co-ordinate**
Relative co-ordinates relate to the current pick point. To specify a relative co-ordinate you need to use the "at" symbol as a prefix. It has @x,y format.

3. **Polar co-ordinate**
Polar co-ordinates relate to the current pick point. To specify a relative co-ordinate you need to use the "at" symbol as a prefix. It has @r<θ format.

Exercise 1 Draw the figure below using co-ordinate entry method. *(Assume the coordinate of point A to be 20,20)*

![Diagram of a figure with coordinates](image)
Absolute co-ordinate entry system
Activate line command using draw toolbar or draw menu.
Specify first point:  20,20  enter  A
Specify next point:  20,40  enter  B
Specify next point:  40,40  enter  C
Specify next point:  40,50  enter  D
Specify next point:  55,50  enter  E
Specify next point:  55,40  enter  F
Specify next point:  75,40  enter  G
Specify next point:  75,20  enter  H
Specify next point:  20 20  enter  A

Relative co-ordinate entry system
Activate line command using draw toolbar or draw menu.
Specify first point:  click any point  A
Specify next point:  @0,20  enter  B
Specify next point:  @20,0  enter  C
Specify next point:  @0,10  enter  D
Specify next point:  @15,0  enter  E
Specify next point:  @0,-10  enter  F
Specify next point:  @20,0  enter  G
Specify next point:  @0,-20  enter  H
Specify next point:  @-55,0  enter  A

Polar co-ordinate entry system
Activate line command using draw toolbar or draw menu.
Specify first point:  click any point  A
Specify next point:  @20<90  enter  B
Specify next point:  @20<0  enter  C
Specify next point:  @10<90  enter  D
Specify next point:  @15<0  enter  E
Specify next point:  @10<270  enter  F
Specify next point:  @20<0  enter  G
Specify next point:  @20<270  enter  H
Specify next point:  @55<1800  enter  A