CHAPTER ONE

Introducing AutoCAD

IN THIS CHAPTER:

- Exploring AutoCAD’s interface
- Working with AutoCAD files
- Getting to know basic tools
- Drawing a rough sketch
Chapter One

Introduction

The way things were in the Elizabethan era, a director would have expected a set builder to produce a set by hand without any drawings. Over time, theatre has embraced the newest and most innovative technologies. It has progressed from candles to computerized lighting boards, from backstage Foley artists to surround sound, and from hand-operated fly systems to motorized fly systems. As a new approach to drafting, which has largely been done by hand, many theatres have begun to use computer-aided drafting (CAD, also commonly referred to as computer-aided design) software.

Originally developed to lower costs and reduce the time needed to create complex prototypes, CAD software generates two- and three-dimensional graphics by processing geometric calculations. This helps designers from several industries prepare accurate drawings and specifications for production purposes. Industries that use CAD include engineering, manufacturing, architecture, interior design, and of course, entertainment.1

For theatre, CAD can be used to generate accurate and detailed technical drawings for set designs, but it also has many additional benefits. For example, drafters who use CAD can work out calculations “on the fly,” reduce the time and energy needed for laborious drawing tasks, and make quick alterations to existing drawings. Furthermore, CAD drawing files can be easily emailed to theatres around the world, where they can be printed on demand.

One of the most exciting aspects of CAD—and what really sets it apart from hand drafting—is that it allows the director and production team to virtually “walk through” the set in three dimensions to scrutinize, review, and modify it before it is built. It’s like having a digital version of a designer’s traditional maquette.

In this book, we’ll introduce you to one of the more popular CAD applications, AutoCAD, to start you on your way to drafting accurate technical drawings for set designs. Now let’s get this show on the road!

Downloading a Free Copy of AutoCAD

If you are a student, you are probably working on a licensed educational version of AutoCAD at school. If you would like to work with AutoCAD on your home computer, you can obtain a free copy from the AutoDesk Education Community at the following link:

http://students.autodesk.com

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Getting Started with the Set-Up

Though you’re probably eager to jump right in and start drawing, before you start drafting in AutoCAD, you need to understand the basics of using the application. Let’s have a look at AutoCAD’s interface, drawing files, and some drawing commands. This will make it easier to understand the book and communicate with other AutoCAD users. Now let’s get started.

LAUNCHING AUTOCAD

AutoCAD launches just like any other Windows application.

1) Double-click the AutoCAD 2011 - English shortcut (Fig. 1.1) on your desktop.
   Alternatively, launch the application through your computer’s start menu: Start > All Programs > Autodesk > AutoCAD 2011 > AutoCAD 2011 – English (Fig. 1.2a).
   Your computer will make some noise and launch AutoCAD.

THE WELCOME SCREEN

When you launch AutoCAD 2011 for the first time after it is installed, the Welcome Screen will be the first thing you see. It includes videos, workshops, and other information to help you learn about AutoCAD 2011.

1) For now, uncheck the box next to Show this dialog at startup at Fig. 1.3a.
2) Close the Welcome Screen by clicking the X at Fig. 1.3b.*

* We won’t cover the Welcome Screen in this manual, but any time you would like to browse through its demos and videos, simply open it like this:
1) Click the arrow for the Help drop-down menu on the upper right of the application at a:
2) Select Welcome Screen… (b).


**THE APPLICATION WINDOW**

AutoCAD runs within the Windows operating system and opens as a window on your computer screen. This Application Window offers commands and options for AutoCAD drawing files.

Have a look at the Application Window. The title bar is the row that runs across the top of the window (see also Fig. 1.12 on page 36). In the centre of the title bar, you’ll see AutoCAD 2011 - Drawing1.dwg, which is the name of the current document. On the left are the Application Menu and the Quick Access Toolbar. On the right are the InfoCenter and the buttons used to control the Application Window.

As with all Windows applications, the AutoCAD window can be managed with the buttons in the top right corner of the title bar.

Test out the Minimize, Restore, and Maximize buttons (Table 1.1) to see how they behave. Notice how the application is minimized to the Windows taskbar at the bottom of your computer screen (Figs. 1.4, 1.5). If you accidentally close AutoCAD, there’s no need to worry; you can easily relaunch it as shown earlier.

![Fig. 1.4](image)

**Windows Taskbar:**
AutoCAD window minimized

![Fig. 1.5](image)

**Windows Taskbar:**
AutoCAD window floating or maximized

![Fig. 1.6](image)

Notice that when you click the Restore button, it becomes the Maximize button as the application switches to a floating window. In this state, the Application Window can be resized to suit your needs.

1) Move the mouse pointer to a corner or an edge of the Application Window. The pointer will become a resize handle (Fig. 1.6a).
2) Press and drag the mouse to adjust the window to your liking.

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2 Although there is a version of AutoCAD available for the Mac, this book will deal only with the Windows version.
THE APPLICATION MENU

When you click the big red A at a in Fig. 1.7, the Application Menu will open. It contains common commands for managing files, most of which will be discussed later in the book. Take note of the Drawing Utilities item at b, which contains options, such as Units, for adjusting your drawing.

Also helpful are the Recent Documents and Open Documents buttons at c. Recent Documents provides you with an alphabetical list of the most recently opened drawings. To keep a file in the list long-term, click the push-pin button at d.

Clicking the Open Documents button at c shows you the list of documents currently open in AutoCAD and provides you with a quick way to switch between them.

Notice that this menu also provides you with a button at e for quick access to the application’s main Options dialogue box where you can change settings, such as the background colour* of the drawing area.

Fig. 1.7

* Note that a number of words, such as “color,” “center,” “dialog,” etc. are spelled according to American conventions within the AutoCAD interface.
The Quick Access Toolbar

To the right of the Application Menu is the Quick Access Toolbar, which contains many of the same commands.

1) Hover your mouse over the buttons to see their tooltips: New... (Fig. 1.8a), Open... (b), Save (c), Save As... (d), Undo (e), Redo (f), and Plot... (g) (or Print...).

Notice that to the right of the Undo and Redo buttons at e and f are downward arrow buttons that each open a drop-down list of recent actions you performed in your drawing. You can jump to any of these actions with just a click.

The InfoCenter

Included on the right side of the title bar is the InfoCenter. Its two key features are the Help button at Fig. 1.9a and the Type a keyword or phrase search field at b.

The Help button (a) simply launches AutoCAD 2011 Help in your default browser.

1) Click the Help button.

The AutoCAD 2011 Help home page will open. Notice the Search field at the top right of the website and, in the navigation bar on the left, the User’s Guide and Command Reference links are particularly useful.*

You can also find information on a topic directly within AutoCAD. Try the following example.

1) Type InfoCenter in the search field at Fig. 1.10a and press Enter.

A drop-down list appears. Notice that within the list, major dark grey headings collapse and expand vertically with a click, and there are navigation arrows to the right of the subsection headings (b) to allow you to scroll through more information horizontally.

2) Click Search For Information at c under the User’s Guide section.

A browser window will open the appropriate section of AutoCAD 2011 Help.

* You can also launch the Help home page by typing “Help” in the command line and pressing Enter.
WORKSPACES

A workspace is the collection of items that are set up to create different user interfaces (UI) for specific types of drawings. If you look at Fig. 1.12 (page 36), the workspace is made up of the ribbon, drawing area, command window, and status bar.

AutoCAD offers several different workspaces. Set designers and drafters are most likely to use the 2D Drafting & Annotation workspace and the 3D Modeling workspace.

For the technical drawings of the set, we’ll work with 2D Drafting & Annotation, which opens by default when you launch the application for the first time. We’ll also work with the 3D Modeling workspace in Chapter 6 to create a three-dimensional drawing.

Check to see whether your workspace is set to something other than the default. If it is, change it back now:

1) Click the Workspace drop-down menu at the top left of the application.
2) Select 2D Drafting & Annotation at Fig. 1.11a.

After using a workspace, you will quickly become accustomed to where things are located and be able to work efficiently.

THE 2D DRAFTING & ANNOTATION WORKSPACE

Now let’s examine some basic components of the two-dimensional workspace.
Fig. 1.12

Application menu  Quick Access Toolbar  InfoCenter

Below the title bar in Fig. 1.12, you will find a palette called the ribbon which contains many of the application’s commands and options.

1) Click the Home, Insert, etc., tabs on top. You’ll see that each contains different sets of command buttons inside rectangular panels.

2) In the Home tab at Fig. 1.13a, click the arrow next to the title of the Draw panel at b. This opens a menu called a slide-out or fly-out menu, which contains additional commands.

3) Click other arrows on the panels and you’ll see they also contain additional command buttons.

4) Whenever you need to, click the push-pin button (Fig. 1.14a) to lock a slide-out menu open.

THE RIBBON
As you just saw, the ribbon contains buttons that allow you to activate AutoCAD commands or display options and information. The buttons we’ll use frequently in the beginning can be viewed in the Home tab panels:

**Draw** activates drawing commands such as *Line*, *Arc*, *Circle*, *Rectangle*, *Polyline*, and *Hatch*, which you will use to draw lines or objects.

**Modify** activates commands that allow you to modify lines and objects you have drawn. Some examples are *Erase*, *Rotate*, *Scale*, *Stretch*, *Copy*, *Mirror*, *Offset*, and *Fillet*.

**Layers** activates commands to add drawing layers, or hide or lock them. This panel also contains commands to configure layer *Linetypes* and *Colors*, and to select the *Current* layer to draw on.

**Properties** controls the properties that are associated with each object that you have drawn. Several drop-down lists can control object *Color*, *Lineweight*, *Linetype*, *Transparency*, and *Plot Style*. Most objects inherit the default properties assigned to them by the layer (*ByLayer*) in which they are drawn, but groups of objects called blocks can be assigned their own properties (*ByBlock*) and individual objects can also be assigned their own unique properties.

**Utilities** contains commands used to measure a *Distance*, *Radius*, *Angle*, and *Area* in a two-dimensional drawing. It will come in very handy when we begin drafting. Besides the measuring commands, you’ll find the *ID Point* button, which is used to determine the exact location of a point.

Later when we add measurements and labels to drawings, we’ll also examine panels such as *Dimensions* in the Annotate tab and we’ll learn about panels that are specific to 3D drawings. If you don’t understand much of this right now, don’t worry; you’ll catch on as we put it into practice.
TOOLTIPS AND THE F1 KEY

A great feature to take advantage of on the ribbon is the tooltip. Pause your mouse pointer over a button on the interface, and a small pop-up tip will appear. As you can see in the Line command tooltip in Fig. 1.15, you can press the F1 key to open the related help topic (a) while the tooltip is active or after the command is activated.

Fig. 1.15

THE MINIMIZE RIBBON BUTTON

Another neat feature of the ribbon is the space-saving Minimize button. It’s a small upward arrow button to the right of the Express Tools tab (Fig. 1.16); notice the small drop-down arrow next to it.

1) Click the drop-down arrow (Fig. 1.16a). You’ll see a menu with four options for minimizing the ribbon.
2) Select one of the first three options to set the level of minimization you want. The Cycle through All option at c sets the button so you can alternate between all three minimization levels.
3) Now, click the upward arrow button at b. See how you can switch between the full ribbon and the minimized option you chose.
4) Click it again to switch back.
**THE COMMAND WINDOW**

At the bottom of the Application Window, you’ll find the command window (Fig. 1.17). This is a palette that gives you feedback by displaying commands, options, messages, and variables. It also prompts you for keyboard and mouse input. The chronological list of every command you’ve activated during a work session can be seen by using the scrolling arrows at the right or by resizing the window using the vertical resize handle on the top edge of the palette.

The input line at the bottom of the command window is called the command line. It allows you to use the keyboard to tell AutoCAD what to do.

Often when you activate a command by pointing and clicking your mouse, the command window lets you know what your next step is and what information you have to enter.

**THE APPLICATION STATUS BAR**

You’ll find the application status bar (also called the status bar) at the bottom of the workspace. The status bar contains several buttons for turning drawing and display options on and off. These buttons are highlighted in blue to indicate that they are turned on. We’ll turn on these buttons as we need them throughout the manual. For now, toggle them all off.*

At the left end of the status bar, you’ll see three sets of numbers separated by commas (Fig. 1.18a). This is the drawing coordinates display. The first number is the X coordinate of your cursor and the second one is the Y coordinate. The X coordinate refers to the horizontal location of a point on a grid, whereas the Y coordinate refers to the vertical location of the same point. The third number, known as the Z coordinate, is only active when you draft in 3D. Together, these display the coordinate values of your current cursor position within the drawing area.

Try moving your cursor around to see how its coordinates change at Fig. 1.18a.**

* You’ll need to pay a little more attention to the Transparency button, which still looks highlighted when it is turned off.

** Looking at the coordinate values, you’ll see that inches are displayed in decimals. This is done for the sake of precision, but it is more common to format inches with fractions. We’ll change this a little later.
AutoCAD lets you personalize the workspace the way you like it. By default, the tabs and panels adhere to the docking region at the top, sides and bottom of the drawing area. But as you’ll see, you can easily drag items around the interface. For example, you can drag the tabs to change their order. It’s also possible to detach and reattach palettes and panels at your convenience. This is called floating and docking.

To float a panel:

1) Click the panel’s name to drag it into the drawing area at Fig. 1.19. The panel will float and its move handle will appear on its left. You can move it around and place it where you like.

2) Click the Return Panels to Ribbon button at b to reset it in the ribbon. Or drag it back into place on the ribbon.

To float the ribbon:* 

1) Place the cursor over any tab and right-click to see the ribbon’s context menu (the right-click menu).
2) Select Undock at Fig. 1.20a. The ribbon palette will float on the drawing area.
3) Right-click the palette’s move handle, which is the vertical grey bar on its left, and you’ll see the Properties menu at Fig. 1.21a. (Note that you can also get this menu by clicking the third button from the top.) This will give you options to dock the ribbon to the left or right of the drawing area. When you need more space, the Auto-hide option at Fig. 121b can be handy. You can also prevent a palette from docking if you prefer it to float by default.**

For now we’ll return the palette to its original spot.

1) Press and hold the move handle and drag it back to the top of the drawing area to see what happens. When the pointer approaches the edge, the palette will be replaced by a rectangular outline indicating it is ready to be docked.
2) Let go, and the ribbon will dock itself.***

Now that you are familiar with the interface, you can rearrange the workspace the way you like it. The Save Current As... item of the Workspace drop-down menu lets you name and save your customized workspace.

* The name of the palette becomes visible once it’s floating.

** If you accidentally close the floating ribbon palette, just enter the word “ribbon” in the command line.

*** You can often double-click the move handle of a floating or docked palette to instantly change its state. Try double-clicking the move handle of the command window to float it. Now do it again to dock it.
**THE DRAWING AREA**

The area reserved for drawing files is the dark space in Fig. 1.22. This is called the *drawing area*. AutoCAD uses dark grey as the default background colour. ******

Notice the drawing’s *Model* tab (Fig. 1.23a) at the bottom left of the *drawing area*. It shows you that you are currently working in the drawing’s *model space*.

1) Click the *Layout 1* tab at the bottom left of the drawing area (Fig. 1.23b).
   The *MODEL* button (not the same as the tab) on the right side of the *status bar* will change to *PAPER* to show that *paper space* is turned on. This white area represents a sheet of paper used when your drawing is ready to print.

2) Click the *Model* tab (a) at the bottom left of the application window to return to *model space*.

**THE VIEWCUBE**

You can see the *ViewCube* in the upper right corner of the drawing area. We will cover this in Chapter 6, so we’ll turn it off for now.

1) Click the *View* tab on the *ribbon*.
2) Locate the *Windows* panel.
3) Click *User Interface*. A drop-down list will appear.
4) Uncheck *ViewCube*.

**** Often the drawing area in this manual has been changed to white for the sake of clarity. If you’d like to change the background colour, right-click the drawing area and select Options... from the context menu. Then select Display, click the *Colors...* button and choose White from the Colour: drop-down menu; click the Restore all contexts button to return to the default colours.
THE NAVIGATION BAR

The *navigation bar* contains tools that help you look at your drawing. You can decide which tools are visible by clicking the arrow for the fly-out options menu at the bottom of the bar. The most commonly used tools for 2D drawings are the *Pan* and *Zoom* tools (see Fig. 1.24a and b). We’ll look at these in detail later.

THE WORLD COORDINATE SYSTEM (WCS) AND USER COORDINATE SYSTEM (UCS)

Remember the drawing coordinates at the left of the status bar? They are measured in relation to the *world coordinate system* (WCS). If you think of the drawing as a digital world, the WCS is the fixed origin of the coordinates that define a drawing’s points. When the *Grid Display* setting on the status bar is on (turn it off after you experiment), you’ll also see a red horizontal line representing the X-axis and a green vertical line for the Y-axis of the coordinate system.

When the *origin* is within the drawing area, the WCS icon will overlay the *origin*. If the *origin* is not in the drawing area, the icon will dock itself in the lower left corner of the *drawing area*.

Sometimes it is useful to move the *origin* to create a *user coordinate system* (UCS), which gets its name because it is user-defined. However, when an object with a UCS is copied from one drawing to another, AutoCAD will always drop the UCS and reorient the object to the WCS. As a general rule, try to stick with the WCS. There is no need to worry much about UCS yet, as this is a fairly advanced topic.
**Working with Drawing Files**

Drawing files are the most important documents for your project because they store your work. They are opened in the drawing area and saved separately from the rest of the workspace.

**CREATING NEW FILES FROM TEMPLATES**

AutoCAD starts new documents from templates. A template contains a set of preferences allowing you to create new files without having to make changes to the settings each time. For example, templates set drawing units and the background colour of the drawing area.

As we’ve seen in Fig. 1.12, when AutoCAD launches, a new file called Drawings1.dwg opens with it by default. This is typically a file made from a template that contains preferences for two-dimensional drafting.

Let’s cover the New command to give you a better idea of templates.*

It’s time to create a new file.

1) Click the Application Menu in the upper left corner of AutoCAD.
2) Select New > Drawing from the menu options (Table 1.2). The Select template dialogue box appears.
3) Select acad.dwt (Fig. 1.26a), which is a template file.
4) Click the Open button (b). A blank drawing called Drawing2.dwg will open in the drawing area.

AutoCAD is used in many different industries, so it offers a choice of templates to start drawings with. The two that are covered in this manual are the classic acad template and the acad3D template. Both have decimal formatted imperial inches as the default units. This means, for example, that a quarter of an inch will be displayed as 0.25”.

* Throughout the manual, tables such as Table 1.2 are provided to show you ways to activate a command either with your mouse or with your keyboard.
SWITCHING AND MANAGING DRAWING WINDOWS

Just like the Application Window, drawing files also have Minimize, Restore, Maximize, and Close buttons just below the ribbon to the right (Fig. 1.27). These buttons are particularly useful for switching between files when you are working with more than one at a time.

1) Click the active drawing's Minimize button. Your drawing file will minimize within the drawing area and you'll also be able to see the other drawing either restored or minimized.

2) Click the Maximize button for one of your two drawings so that it fills the drawing area again.

Probably the simplest way to switch between open windows is through the Switch Windows button.

1) Click the View tab. You'll see the Windows panel at the right side.
2) Click the Switch Windows button as shown at Fig. 1.28a. A drop-down list will appear, allowing you to select the drawing you want to switch to.

You can also use the buttons in the Application Menu that were described in Fig. 1.7 (see page 33).

1) Click the Application Menu (the big red A) in the upper left corner of AutoCAD.

2) Click the Open Documents button. You'll see the Open Documents list appear, which allows you to select the open document you want to work on.

Lastly, you can use the Ctrl + Tab and Shift + Ctrl + Tab key combinations to move forwards and backwards through the sequence of open drawings.

SAVING DRAWING FILES

Saving your files lets you store your drawings until you are ready to work on them again. The AutoCAD drawing file extension is .dwg (an abbreviation of “drawing”), and it is automatically added to the end of the file names you save (Table 1.3). This file extension lets the computer know which application is used to open the document. If it is not visible, your Windows operating system may be set to hide extensions; if so, it is useful to change your Windows folder settings to display file extensions. If the extension is removed from a file's name, you may encounter difficulties when you try to open it.*

* Remember that getting into the habit of saving frequently is good practice. This helps you avoid losing your work should AutoCAD or your computer ever crash.
Connect your USB drive if you have one—more on this later. Next, name and save one of the files immediately:

1) Activate the Save As… command by choosing a method in Table 1.5. The Save Drawing As dialogue box will open (Fig. 1.29).
2) Click the Save in: drop-down list shown at Fig. 1.29a.
3) Select your main saving location. In this book, it’s a portable USB drive, though you may want to save to another location.
4) Name the document rough_sketch at b.**
5) Click the Save button (c).

Table 1.4. Save command

<table>
<thead>
<tr>
<th>Quick Access Toolbar:</th>
<th>Application Menu:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Access Toolbar:</td>
<td>Application Menu:</td>
</tr>
<tr>
<td>Keyboard shortcut: Ctrl + S</td>
<td>Command line entry: save</td>
</tr>
</tbody>
</table>

Table 1.5. Save As command

<table>
<thead>
<tr>
<th>Quick Access Toolbar:</th>
<th>Application Menu:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Access Toolbar:</td>
<td>Application Menu:</td>
</tr>
<tr>
<td>Keyboard shortcut: Shift + Ctrl + S</td>
<td>Command line entry: saveas</td>
</tr>
</tbody>
</table>

** The way you name your files helps you sort and find them easily. In this book, file names use underscores (_) instead of spaces between words. File names for the set drawings will begin with a capital letter while other drawings will stick with lowercase letters. A rule used to name files is called a naming convention. For other options for naming files effectively, see Appendix A on naming files.
DRAWING VERSIONS

Occasionally, you may need to open your drawing files in an older version of AutoCAD. For this situation, you have the option to save your document in various versions of AutoCAD in the Files of type: drop-down menu. Whenever you are in such a situation, refer to the options in Table 1.6 to decide which file type to choose for the version of AutoCAD you will be using.*

* Note that settings such as drawing units that apply directly to your document will be saved with your file. You won’t need to reset those each time you reopen it. However, workspace settings are not saved with files.

**Table 1.6. AutoCAD versions and file types**

<table>
<thead>
<tr>
<th>AutoCAD Version</th>
<th>Files of type</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010, 2011</td>
<td>AutoCAD 2010 (*.dwg)</td>
</tr>
</tbody>
</table>
**DISPLAYING THE FULL FILE PATH**

If you are new to computers and AutoCAD, you may find it difficult to find your files. It is possible to see the complete path to an open file in the *title bar* if you change the *Open and Save* options in the *Options* dialogue box:

1. Click the *Application Menu* button.
2. Select the *Options* button on the lower right side of the menu (see Fig. 1.7 on page 33). The *Options* dialogue box will open (Fig. 1.30).
3. Select the *Open and Save* tab as shown at a.
4. Locate the *File Open* box at the top right side.
5. Check off the *Display full path in title* option (Fig. 1.31a).

Another quick way to open the *Options* dialogue box is to right-click the *drawing area* and select *Options* from the right-click (context) menu.

Now, whenever you have a file open in AutoCAD, you’ll be able to see the breadcrumb trail within the *title bar* as shown in Fig. 1.32.

![Fig. 1.30](image1)

![Fig. 1.31](image2)

![Fig. 1.32](image3)
PROTECTING YOUR WORK

Drat! Computers and applications can crash. Files can become corrupted and impossible to use. Hard drives wear out over time. USB drives can be damaged or lost and networks can fail. In order to protect the hours of work you’ve put into a drawing, you need to save often. However, you also have several other alternatives to protect your work.

BACKUP FILES

Generally, when you save an AutoCAD file, AutoCAD saves a backup copy in the same location (Table 1.7). This is helpful if your current file gets corrupted; simply replace the .bak extension with .dwg to regain your file.*

FILE HISTORIES AND EMAIL

Every time you open an existing file, work on it, and then save it again, you overwrite your previous work. Each time you save, it represents a step in the development of your project. If you only save a single file, you are essentially keeping all your eggs in one basket, and you risk having to start all over again if the file ever gets corrupted.

A simple solution is to save versions of your work to create a history. Simply add a number to the end of the file name each time you make significant progress in your project (Table 1.8). Then store older versions of your files in a separate folder.

An even easier and thriftier way to create a file history is to email yourself copies of your files after your work sessions. This will give you a chronological series of drawings in both the Sent and Inbox folders of your email account. What’s great about an email account is that it also serves as storage device if you’re on a tight budget.

Don’t take the risk of losing all your work! With a file history, you’ll at least be able to return to a previous step in your project without having to start from scratch.

HARDWARE STORAGE DEVICES

Another way to safeguard your work is by saving your files to different storage devices. This is important in case any one device breaks down. To protect your work, take advantage of storage media such as USB memory drives, email accounts, hard drives, and network servers when available.

The rule is to keep copies of your files on more than one hardware device at a time. Let’s assume that you own a USB drive, have a web email account, and work on school computers that are linked to network servers. These are four locations that you can use to store backup files.**

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* Consult the Backup Files Location and Automatic Saving sections of Appendix B for more information on protecting your files.

** Remember that if you remove your USB drive without ejecting first, the file system can be corrupted and you could lose access to your files. Always right-click it and choose Eject from the menu before pulling it out.

For more strategies for protecting your work, see Appendix B on Extended File Protection.
Beginning with Basic Drawing Tools

And now for the words you’ve been desperately waiting for: Let’s draw! Here are a few tools you will need to start drawing lines.

**THE ESCAPE KEY**

While you draw, it’s helpful to know that when you activate a command in AutoCAD, you can normally use the *Escape* key to deactivate it. The same holds true for many other operations you might want to escape from. For example, if you accidentally clicked the *Open... Ctrl + O* option in the *Application Menu*, simply press *Escape* (see Fig. 1.33a) to cancel the operation and return to your work. Keep the *Escape* key in mind whenever you’re trapped in a sticky situation.

**Table 1.9. Proposed file storage locations for a student**

<table>
<thead>
<tr>
<th>Main Storage</th>
<th>Thrifty Storage</th>
<th>Temporary Storage</th>
<th>Backup Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>External USB storage drive</td>
<td>Email account server</td>
<td>Computer hard drive</td>
<td>Network server</td>
</tr>
</tbody>
</table>

---

**Fig. 1.33**
THE LINE COMMAND

If you haven’t stopped working since the previous sections, you should have two drawings open: rough_sketch.dwg and Drawing2.dwg. If you don’t already have rough_sketch opened, open it now (see Table 1.12 for the Open command).

There is a choice of methods to activate the Line command. Now is the time to experiment with them.

1) Click the Line command in the Home tab (Table 1.10). Notice that whichever method you use to activate the Line command, the command window will prompt you with this message:

Command: _line Specify first point:

The application is asking you to specify where you would like to start your line.

2) Place the cursor (also called the crosshair cursor) anywhere in the drawing area and click the mouse. The command window will offer you the choice to...

Specify next point or [Undo]:

The second choice in the square brackets means that you can enter U to undo the last point without deactivating the command.

3) Move your cursor around the screen and you will notice that a line follows it from the first point you specified. This is known as the rubber band line.

4) Now click anywhere in the drawing area to complete the first segment of your line. Notice that the command window keeps prompting you for the next point. You can keep adding as many segments to the line as you wish.

5) End the line by doing one of the following:
   - Press Enter on the keyboard.
   - Right-click in the drawing area and select Enter from the context menu.
   - Press the Escape key.

* Note that only a few commands allow you to type the first letter as a shortcut.

Table 1.10. Line command

| ✅ Home tab: Draw panel > Line |
| Command line entry: l or line * |
THE UNDO COMMAND

Often you’ll find that you make mistakes and need to return to an earlier stage in your drawing to make a correction. Like most applications, AutoCAD lets you undo the steps you’ve completed.

Both the Quick Access Toolbar and the command line allow you to undo several steps at once (Note: You must have completed at least one command in order to undo it). You’ll notice that the Undo button is accompanied by a drop-down list (Fig. 1.34), which displays a history of steps completed. Select one of the items in the list to return to a previous stage of your work.

Similarly, when you enter the Undo command in the command line, the command window will prompt you to enter the number of steps backwards that you would like to take.

Command: Undo
Current settings: Auto = On, Control = All, Combine = Yes, Layer = Yes

Enter the number of operations to undo or [Auto/Control/BEGin/END/Mark/Back] <1>:

Some current settings are displayed in the command window, but notice what’s written in the command line: <1>. The number in angle brackets at the end of this prompt indicates the default number of “undos,” which is set to 1. You can either just press the Enter key to automatically undo one command or enter another number and press Enter. (Note that any new number you enter will become the default, so try to stick with 1 for now to avoid confusion.)

Guess what? You can undo an Undo. This is called Redo and you’ll notice that the Redo button is to the right of the Undo button.

THE SPACE BAR

Whenever you have used a command and need to use it again, simply press the Space Bar to reactivate it. Try drawing a line. Now press the Space Bar to reactivate the Line command. How handy is that?
SELECTING AND SHIFT-SELECTING

To select several lines or objects there are three alternatives:

- Simply click them one by one.
- Drag from left to right to draw a **window selection box** (Fig. 1.35a) around them with the cursor; the objects must be inside the box to be selected. The resulting light-blue box has a solid outline.
- Drag from right to left to draw a **crossing selection box** (Fig. 1.36a) that simply touches the objects you want. The resulting light-green box has a dashed outline.

Whenever you select an object in the drawing area, it becomes *ghosted* (Fig. 1.37), which means that the line pattern changes to dashed and blue **grips** appear to help you manipulate it as shown at Fig. 1.37a.

If you accidentally select too many lines, simply press the **Shift** key and click the objects you want to deselect.
**Drawing a Rough Sketch**

**SHAKESPEARE.** I would like you to create a rough sketch of the ground plan for *A Matter of Murder and Peerage in the Scottish Manor* to give me a taste of all this modern technology. I hear that using AutoCAD for drafting looks a little different from using a pencil and I would like to compare.

Let’s give this sketch a try.

**OPENING A FILE**

Before you begin, make sure that your external storage drive is connected to the computer and that the `rough_sketch.dwg` file you previously saved is open.

1) Activate the Open command (Table 1.12). The Select File dialogue box will open (Fig. 1.38).
2) Now select the file as shown at Fig. 1.38a and click the Open button at Fig. 1.38b (or simply double-click on the file name to open your document).

![Image of a rough sketch](image.png)

**Table 1.12. Open command**

<table>
<thead>
<tr>
<th>Quick Access Toolbar:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Quick Access Toolbar" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application Menu:</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Application Menu" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Keyboard shortcut:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctrl + O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Command line entry:</th>
</tr>
</thead>
<tbody>
<tr>
<td>open</td>
</tr>
</tbody>
</table>

Fig. 1.38
We are going to draw a ground plan freehand style. Sometimes this is called the interactive method of drawing; it allows you to test out your ideas quickly. It's not quite drafting because the drawing is not scaled or measured, but it will let you to get a feel for drawing with AutoCAD. This method can be useful for testing different possibilities for a stage layout.

Do It Yourself *

Referring back to what we've already covered, recreate the drawing pictured in Fig. 1.39 as closely as you can.

In Fig. 1.40, notice there is a Preview box (a). This is where a thumbnail image of your drawing shows up before you open it. In order for it to show your entire drawing, your drawing needs to be centred in the drawing area before you save it.
1) Locate the navigation bar.
2) Click the Zoom Extents button. (Hover the pointer over the buttons to see the tooltips if necessary.)
3) Save the sketch.**

** In general, this book asks you to save to a USB drive. However, AutoCAD is increasingly available for students to install on their own computers. If you have your own copy of AutoCAD, feel free to save your drawings to your personal computer.

**Chapter Summary**

**Skills Learned**

You now know the names of AutoCAD’s interface elements. You can open, switch between, and save drawing files as well as apply strategies to protect your work. Finally, you know how to use some basic drawing commands to draw lines, undo and escape from commands, and reactivate commands quickly through the keyboard.

**Project Check**

You created and saved this file: rough_sketch.dwg