ASCENT - Center for Technical Knowledge

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Fundamentals - Mixed Units
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The *AutoCAD®/AutoCAD LT® 2016 Fundamentals* training guide is designed for those using AutoCAD® or AutoCAD LT® 2016 with a Windows operating system. This training guide is not designed for the AutoCAD for Mac software.

The objective of *AutoCAD/AutoCAD LT 2016 Fundamentals* is to enable students to create a basic 2D drawing in the AutoCAD software. Even at this fundamental level, the AutoCAD software is one of the most sophisticated computer applications that you are likely to encounter. Therefore, learning to use it can be challenging. To make the process easier and provide flexibility for instructors and students, the training guide is divided into two parts that can be taken independently.

Chapters 1 through 20 cover the essential core topics for working with the AutoCAD software. The teaching strategy is to start with a few basic tools that enable the student to create and edit a simple drawing, and then continue to develop those tools. More advanced tools are introduced throughout the training guide. Not every command or option is covered, because the intent is to show the most essential tools and concepts, such as:

- Understanding the AutoCAD workspace and user interface.
- Using basic drawing, editing, and viewing tools.
- Organizing drawing objects on layers.
- Inserting reusable symbols (blocks).
- Preparing a layout to be plotted.
- Adding text, hatching, and dimensions.
Chapters 21 through 32 continue with more sophisticated techniques that extend your mastery of the software. For example, here you go beyond the basic skill of inserting a block to learning how to create blocks, and beyond the basic skill of using a template to understand the process of setting up a template. You learn skills such as:

- Using more advanced editing and construction techniques.
- Adding parametric constraints to objects.
- Creating local and global blocks.
- Setting up layers, styles, and templates.
- Using advanced plotting and publishing options.

This training guide refers to both the AutoCAD and AutoCAD LT software as the AutoCAD software. All topics, including features and commands, relate to both the AutoCAD and AutoCAD LT software unless specifically noted otherwise.

**Note on Software Setup**

This training guide assumes a standard installation of the software using the default preferences during installation. Lectures and practices use the standard software templates and default options for the Content Libraries.

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In this Guide

The following images highlight some of the features that can be found in this Training Guide.

FTP link for practice files

Practice Files

To download the practice files that are required for this training guide, use the following steps:

1. Type the FTP address shown at the bottom of this page into the address bar of your internet browser. The FTP address must be typed exactly as shown. If you are using an ASCENT ebook you can click on the link to download the files.

2. Proceed to "Get" and follow the instructions to download the .ZIP file that contains the Practice Files.

3. Once the download is complete, unzip the file to a local folder to extract an .EXE file.

4. Double-click the .EXE file and follow the instructions to automatically install the Practice Files to the C drive of your computer.

Be sure to install the Practice Files in the location in which the Practice Files folder is installed. Doing so will avoid the files from working correctly and cause errors when completing the practices in the training guide.


Practice Files

The Practice Files page tells you how to download and install the practice files that are provided with this training guide.

Getting Started

In this chapter you will learn how to start the AutoCAD® software, become familiar with the basic layout of the AutoCAD screen, how to access commands, use your pointing device, and understand the AutoCAD Cartesian workspace. You will also learn how to open an existing drawing, view a drawing by zooming and panning, and save your work in the AutoCAD software.

Learning Objectives for the chapter

- Launch the AutoCAD software and complete the initial setup of the drawing environment
- Identify the basic layout and features of the AutoCAD window including the titlebar, drawing area, command line, and status bar
- Locate commands and tools using the ribbon, contextual menus, application menus, and tool palettes
- Locate objects in the AutoCAD Cartesian workspace
- View and change existing objects and attributes in this location
- View a drawing using the Zoom and Pan commands, and the Navigation bar
- Save drawings in various formats and set the automatic save options using the Save As dialog box.

Chapters

Each chapter begins with a brief introduction and a list of the chapter’s Learning Objectives.
Side notes

Side notes are hints or additional information for the current topic.

Instructional Content

Each chapter is split into a series of sections of instructional content on specific topics. These lectures include the descriptions, step-by-step procedures, figures, hints, and information you need to achieve the chapter's Learning Objectives.

Practice Objectives

Practices

Practices enable you to use the software to perform a hands-on review of a topic.

Some practices require you to use prepared practice files, which can be downloaded from the link found on the Practice Files page.

Chapter Review Questions

Chapter review questions, located at the end of each chapter, enable you to review the key concepts and learning objectives of the chapter.
**Command Summary**

The Command Summary is located at the end of each chapter. It contains a list of the software commands that are used throughout the chapter, and provides information on where the command is found in the software.

---

**Certification Exam Objectives**

This appendix includes a list of the topics and objectives for the Autodesk Certification exams, and the chapter and section in which the relevant content can be found.

---

**Icons in this Training Guide**

The following icons are used to help you quickly and easily find helpful information.

- **New in 2016** Indicates items that are new in the AutoCAD/AutoCAD LT software.
- **Enhanced in 2016** Indicates items that have been enhanced in the AutoCAD/AutoCAD LT software.
Chapter 1

Getting Started with AutoCAD

In this chapter you learn how to start the AutoCAD® software, become familiar with the basic layout of the AutoCAD screen, how to access commands, use your pointing device, and understand the AutoCAD Cartesian workspace. You also learn how to open an existing drawing, view a drawing by zooming and panning, and save your work in the AutoCAD software.

Learning Objectives in this Chapter

• Complete a basic initial setup of the drawing environment.
• Identify the basic layout and features of the AutoCAD user interface.
• Locate commands and launch them using various command interfaces.
• Locate points in the AutoCAD Cartesian workspace.
• Open, edit, and close existing drawings.
• Move around a drawing using the navigations options.
• Save drawings in various formats and set the automatic save option.
1.1 Starting the Software

The AutoCAD 2016 software runs on most recent versions of the Windows operating system, including Windows 7 Enterprise, Home Premium, Professional, and Ultimate (32 or 64-bit versions), and Windows 8/8.1 Pro and Enterprise (32 or 64-bit versions). The 64-bit versions provide a huge improvement in processing speed.

Launch the software using the Windows desktop icon or Start menu.

- Double-click on (AutoCAD 2016) on the desktop.

If there is no shortcut on the desktop, click (Start) in the Task bar at the bottom of the screen and select All Programs> Autodesk>AutoCAD 2016>AutoCAD 2016.

- When the AutoCAD software is launched, an initial Start Window is displayed.

When you launch the software or if you click in the Start tab while working in an active drawing, the initial Start window displays, as shown in Figure 1–1.

- By default, the Start tab is always available as the first tab in the File Tabs bar.
- You can click it to display the initial Start window anytime.
- You can use <Ctrl> +<Home> to jump from an active drawing to the Start tab.
- The Start window contains two content frames: Learn and Create.
Figure 1–1

Learn

- Contains videos, tips, and online resources to help you learn about new items in the software and how to start using the software.

- It provides you with a Tip of the Day on how to use the software effectively. This frame, which is updated every 24 hours, also provides access to training resources online.

Create

- Contains tools that enable you to start using the software by creating new drawings, or opening existing, sample, or recently used files.

- It enables you to connect to Autodesk® A360 to access online services.

- When you click on Start Drawing, a new, blank drawing automatically opens. In the tab bar, click (New Drawing) to start another new blank drawing. The new drawing is opened and made active.
1.2 User Interface

The interface includes the main components that are used to operate the AutoCAD software. By default, the display of the interface uses the Dark color scheme. You can change it to the Light color scheme by expanding (Application Menu) and clicking Options to open the Options dialog box. Select the Display tab. In the Window Elements area, expand the Color scheme drop-down list and select Light, as shown in Figure 1–2. Then, click OK for the background color of the interface components to change to light. The light color scheme is used throughout this Student Guide for printing clarity.

![Figure 1–2](image)

The AutoCAD software interface is shown in Figure 1–3. The Drawing Window color has been changed to white for printing clarity.

![Figure 1–3](image)
1. Application Menu

The Application Menu provides access to AutoCAD file commands, settings, and documents. Click (Application Menu) to expand the Application Menu and display its contents.

2. Crosshairs and Prompts

The Crosshairs indicate the current cursor location. As you draw, prompts display near the cursor to explain how to complete each command. It displays badges that provide additional information when you are working in a command. This can help you to successfully complete the command.

3. Drawing Window

The Drawing Window is the area of the screen in which the drawing is displayed. Near the lower left corner of the window a horizontal line labeled X and a vertical line labeled Y might be displayed. This is called the UCS icon and indicates the current drawing plane. Several drawing windows can be open at the same time. They can be resized, minimized, and maximized.

4. Quick Access Toolbar

The Quick Access Toolbar provides access to commonly used commands, as shown in Figure 1–4.

5. Ribbon

The Ribbon contains the AutoCAD tools in a series of tabs and panels, as shown in Figure 1–5. Clicking on a tab displays a series of panels. The panels contain a variety of tools, which are grouped by function.
6. InfoCenter

The *InfoCenter* enables you to quickly access the online Help system. You can specify which Help documents to search, and collapse or expand the search field to save screen space. Commands can be quickly identified in the Ribbon, Status Bar, and the Application Menu by clicking **Find** next to the command’s icon in the Help window, as shown in Figure 1–6. A red animated arrow displays in the interface identifying the location of the command, as shown in Figure 1–6.

7. Tooltips

The *Tooltips* display the item’s name, a short description, and sometimes a graphic, as shown in Figure 1–7. They provide information about tools, commands, and drawing objects. Press <F1> to open the Help window and display the help information related to the currently displayed tooltip.
8. Command Line

Command prompts also display in the Command Line, which is a text window located at the bottom of the screen, as shown in Figure 1–8. The command history has a gray background to distinguish it from the active command line. You can press <F2> to open an extended version of the Command Line.

9. Status Bar

The Status Bar enables you to change many of the AutoCAD drafting settings. All the tools are located in the (Customization) list and their icons can be displayed or removed from the Status Bar by selecting them in the list. If the displayed icons cannot fit in a single row, the Status Bar automatically wraps into two rows to accommodate all the icons, as shown in Figure 1–9.

10. Navigation Bar

The Navigation Bar enables you to access the various methods of moving around in the drawing, such as Zoom and Pan, as shown in Figure 1–10.

If the Navigation Bar is not displayed, go to the View tab>Viewport Tools panel, and click (Navigation Bar).
11. File Tabs

The drawing's *File* tabs (shown in Figure 1–11) are located near the top of the drawing window. They provide a quick way of switching between open drawings, creating a new ones, or closing the required drawings. By default, the *Start* tab is always the first tab and clicking it displays the initial Start window.

Figure 1–11
1.3 Working with Commands

The main way to access commands in the AutoCAD software is to use the Ribbon. Several of the file commands are available in the Quick Access Toolbar or in the Application Menu. Some commands are available in the Status Bar or through shortcut menus. There are additional access methods, such as Tool Palettes. The names of all of the commands can also be typed in the Command Line or near the cursor in the Drawing Window (Dynamic Input). A table is included to help you to identify some of the methods of accessing the commands.

Ribbon

The Ribbon provides easy access to the tools, which are organized in tabs and panels. The tabs contain a series of panels which contain tools, such as Draw or Modify. The tools are organized by function.

By default, the Ribbon is docked at the top of the interface, as shown in a partial view in Figure 1–12.

Some panels contain additional tools that are not displayed in the main panel. Select the panel title to expand the panel and display the hidden tools. Panels close automatically when you select another panel or when you start a command, unless they are pinned, as shown in Figure 1–13.

Click (Push Pin) to keep a panel open. The image changes to (Push Pin). Click it again to return the panel to its default setting.
The Ribbon can float (as shown in Figure 1–14) and be docked to the side. To float the entire ribbon, right-click in the empty space at the end of the Ribbon and select **Undock**.

The Ribbon becomes a palette that can be docked to either side and hidden using **Auto-Hide**. If hidden, the Ribbon is displayed when you hover the cursor over its location.

**Figure 1–14**

Individual panels can also be floated in the drawing window, as shown in Figure 1–15. To float a panel, drag it by the title and drop it in the drawing window. To return it to the Ribbon, drag-and-drop it onto the Ribbon. This method can also be used to rearrange the panels available in the Ribbon.

**Figure 1–15**
Some tools include the thumbnail preview of the options that are available, as shown in Figure 1–16. The display of these image previews can be controlled by the system variable GALLERYVIEW which is set as 1, by default. To hide the thumbnail preview, the value can be set to 0.

You can directly enter the name of a command in either the Command Line or in the Dynamic Input prompt. When the Dynamic Input option is On, and you start typing a command name, a command box displays near the crosshair with the letters you are typing. When the Dynamic Input option is Off, you can specifically click and type inside the Command Line.

For both input methods, the AutoComplete option automatically completes the entry you are typing when you pause. It also supports mid-string search by displaying all of the commands that contain the word that you typed, as shown in Figure 1–17. You can then scroll through the list and select a command to start it.
You can also click (Customize) to display the Input Settings.

If you need to stop a command, press <Esc> to cancel it. You might need to press <Esc> more than once.

- The order in which commands are listed in the suggestion list adapts as you use the software.

- To set specific options for command input, including the AutoComplete feature, right-click on the Command Line, expand Input Settings, and select from the various options, such as the ability to search for system variables or to set the delay response time, as shown in Figure 1–18.

![Figure 1–18](image)

- As you work in the AutoCAD software, the software prompts you for the information that is required to complete each command. These prompts are displayed in the Dynamic Input prompt and in the Command Line. It is important that you read the command prompts as you work, as shown in Figure 1–19.

![Figure 1–19](image)

- If you press <Enter> when no command is active, it launches the command that you last used.

- Pressing <F2> opens the AutoCAD Text window, which displays a record of each command and prompt that has been used from the beginning of your drawing session. Press <F2> again to return to the drawing window.
In the Status Bar, click \(\text{Customization}\) and select Dynamic Input in the list to toggle the cursor prompts on and off, as shown in Figure 1–20. Once the Dynamic Input option has been toggled on, \(\text{(Dynamic Input)}\) displays in the Status Bar and can be used to toggle the option on and off.

![Figure 1–20](image)

Selecting Command Options

If a command has options, there are several ways to specify the one you want to use:

- In the Command Line, use the arrow in the dynamic input prompt, or right-click to display the shortcut menu, as shown in Figure 1–21.

![Figure 1–21](image)

- In the Dynamic Input prompt, \(\text{indicates that more options are available. Press <Down Arrow> to expand the list as shown in Figure 1–21.}\)
• The shortcut menu opens when you right-click. It includes the same selections as dynamic input, and several standard options that display with every command.

• In the Command Line, the command name, its default prompt, and a list of options are displayed. You can select the required option in the Command Line or type the option’s capitalized letter(s) (displayed in blue) to activate it, as shown in Figure 1–22.

![Figure 1–22](image1)

Application Menu

The Application Menu (shown in Figure 1–23), contains the file tools. It includes a search field in which you can type command names to locate them in the Ribbon, Quick Access Toolbar, or Application menu, and an area in which to browse for recent and open documents.

![Figure 1–23](image2)
• If you click the primary icon rather than the arrow, the default command starts.

• Click Options to open the Options dialog box and modify the default settings to customize how the AutoCAD software performs. For example, to change the color of the drawing window, click Options, select the Display tab in the Options dialog box, and click Colors. In the Context area, select 2d model space, in the Interface element area, select Uniform background, and in the expanded Color drop-down list, select a color.

• Click Exit Autodesk AutoCAD to close the software.

How To: Find Command Access Locations

1. Expand the Application Menu.
2. In the Search field, start typing the name of a command. Tools related to the command name you are typing are displayed in the Application Menu, as shown in Figure 1–24.

3. Select the command that you want to use.

You do not have to type the full command name. As you start typing, the command options are displayed.

Figure 1–24
How To: Select Drawings from the Application Menu

1. Expand the Application Menu.
2. A list of Recent Documents is displayed, as shown in Figure 1–25.

![Figure 1–25](image)

3. The default display option is **By Ordered List**. In the expanded drop-down list you can also select **By Access Date**, **By Size**, or **By Type** to change the display option. You can also change the size of the images, as shown in Figure 1–26.

![Figure 1–26](image)

4. Click **(Open Documents)** to display a list of open drawings, as shown in Figure 1–27.

![Figure 1–27](image)
Quick Access Toolbar

The Quick Access Toolbar provides fast access to the common tools: **New**, **Open**, **Save**, **Save As**, **Plot**, **Undo**, and **Redo**. You can customize it by adding and removing commands. Click (as shown in Figure 1–28) to expand the list and select from a list of typical commands.

![Figure 1–28](image)

- When no drawings are open, only **New**, **Open**, and **Sheet Set Manager** are displayed in the Quick Access Toolbar.

Additional Shortcut Menus

When you right-click, a menu usually displays next to the cursor, called a *shortcut menu*. The menu that displays depends on what you are doing in the AutoCAD software and where you right-click in the AutoCAD interface.

In the Quick Access Toolbar

When you right-click on the Quick Access Toolbar, a list of options is displayed, which enable you to customize or locate the Quick Access Toolbar, shown in Figure 1–29.

![Figure 1–29](image)
In the Ribbon

If you right-click on a tab in the Ribbon, you can select which tabs or panels to display. You can also change the visibility and docking status of the Ribbon. The options that display in the shortcut menu are determined by where you click in the Ribbon, as shown in Figure 1–30.

If you right-click on an icon in a panel, you can select the tabs and panels to be displayed in the Ribbon. You can also add the icon to the Quick Access Toolbar, as shown in Figure 1–31.

![Ribbon shortcut menu displayed after right-clicking on a panel title](image1)

![Ribbon shortcut menu displayed after right-clicking on empty space in the Ribbon](image2)

**Figure 1–30**

If you right-click on an icon in a panel, you can select the tabs and panels to be displayed in the Ribbon. You can also add the icon to the Quick Access Toolbar, as shown in Figure 1–31.

**Figure 1–31**

- Right-clicking on a Ribbon panel title only displays the tab and panel options.

In the Command Line

When you right-click on the Command Line, you can select the various **Copy** and **Paste** commands, as shown in Figure 1–32. You can also access the **AutoComplete** options using the **Input Settings** selection. Using the Options dialog box, which can be accessed by selecting **Options**... in the shortcut menu, you can change many of the AutoCAD settings.
In the Drawing Window

If no command is active when you right-click in the drawing window, you have the option of repeating the previous command or recently used commands (**Recent Input**), selecting **Zoom** and **Pan**, and the standard Windows clipboard functions. You can also access several other utilities, as shown in Figure 1–33.

![Figure 1–32](image)

![Figure 1–33](image)
1.4 Cartesian Workspace

Locating Points

The AutoCAD software uses Cartesian (X,Y) coordinates to indicate locations in a drawing. Points are located by designating a horizontal (X) and vertical (Y) distance as measured from the origin (0,0), as shown in Figure 1–34. There is also a third coordinate (Z), which is only used in 3D drawings.

The current coordinate location of the cursor can be displayed in the Status Bar, as shown in Figure 1–35. By default, this display is toggled off. If you want to display the coordinates, click (Customization) in the Status Bar and select Coordinates.

When you start a drawing command that requires you to select a point, the current coordinates also display near the crosshair in the Dynamic Input prompt (When Dynamic Input option is toggled On). For example, to draw a line, you must indicate where to begin and end the line. You can specify the point using one of two methods:

- Selecting a point on the screen with the cursor.
- Typing coordinates (when it is requesting point entry) in the form X,Y as shown in Figure 1–36. For example, the point (6,4) would be typed as 6,4.
Measuring Angles

With the Cartesian coordinate system, you also need to understand how angles work in the AutoCAD software, as shown in Figure 1–37. This becomes important for coordinate entry, rotating objects, and working with arcs.

- By default, the AutoCAD software measures angles in a counter-clockwise direction relative to the positive X-axis.

Drawings Created at Full Scale

The AutoCAD Cartesian workspace is essentially unlimited in size. Whatever object you are creating, you typically draw it in the software at full scale, as shown in Figure 1–38. Whether you are drawing a building that is 100 x 200 meters or feet, a city that is 10 square kilometers or miles, or an IC chip that is 0.1” x 0.1”, you always draw in the real units of the object. Your drawing area is as big as you need it to be. If needed, the entire solar system could be drawn at full scale in the software.

- Scaling the drawing only becomes necessary when the drawing is printed.

Hint: Drawing Accuracy

In addition to being potentially enormous, the AutoCAD drawing plane is also remarkably precise. Each point you enter in the software has an accuracy of at least 14 significant digits (e.g., 1.0000000000000).
1.5 Opening an Existing Drawing File

The **Open** command enables you to open and edit an existing drawing. This command opens the Select File dialog box that is similar to the standard Windows File dialog box, as shown in Figure 1–39.

![Figure 1–39](image)

- Drawings that have recently been opened can be reopened quickly using Recent Documents in the Application Menu or the initial Start window.

**Open**

- **Quick Access Toolbar:**
- **Application Menu:**
- **Command Prompt:** `open` or `<Ctrl>+<O>
- **Start tab:** Open Files
How To: Open a Drawing

1. Start the Open command.
2. In the Select File dialog box, locate the required file folder.
3. Select a drawing from the list. A preview is displayed on the right side of the dialog box.
4. Click Open or double-click on the drawing name.

File Location Options

- History: Displays shortcuts to recently opened drawings.
- Documents: Goes to the My Documents folder.
- Favorites: Goes to the Favorites folder (Windows\Favorites), which stores shortcuts to files or folders. You can add items to the Favorites folder by selecting Tools>Add to Favorites in the dialog box.
- Desktop: Displays the Windows Desktop and enables you to navigate to any folder. Select a file to display a preview.
- (A360), (FTP), and (Buzzsaw) are options for opening drawings from Internet locations.

Navigation and File Options

- Back to: Returns to the previous folder.
- Up one level: Moves up one level in the directory structure.
- Search the Web: Opens the Web Browser window. In this window, you can locate a web site to download files, etc.
- Delete: Deletes the selected file(s).
- Create new folder: Creates a new folder in the current folder.
- Views: Select the List, Details, or Thumbnails view for files, and toggle the Preview window on or off.
- Tools: Locates files in the AutoCAD search path, adds FTP locations, or adds files or folders to the Favorites folder.
• To make your most commonly used folders easier to access, you can select them individually in the Look in: drop-down list and then select **Tools>Add Current Folder to Places** to add them to the File Location drop-down list.

You can have several drawings open at once. You can open them individually and have them open at the same time or open several files together by using <Ctrl> or <Shift> and selecting them in the Select File dialog box. You can open multiple new drawings by clicking (plus) in the **File Tabs** bar.

• All the open drawings are displayed as tabs in the **File Tabs** bar. The currently active drawing is displayed with a white background.

You can switch between the drawings by:

• Pressing <Ctrl>+<Tab>.

• Selecting the required **File** tab (as shown on the left in Figure 1–40).

OR

• Expanding (Application Menu) and selecting a drawing under Open Drawings (as shown on the right in Figure 1–40).
Closing Files

You can close a file without leaving the software by:

- Clicking (Close) in the Application Menu.
- Clicking (Close) in the upper right corner of the drawing window.

OR

- Clicking (Close) in the required File tab.

In the Application Menu, (Close) has two options:

- (Current Drawing), which closes the current drawing.
- (All Drawings), which closes all the drawings together, leaving the Start tab open.

You can close all the active drawing at once by:

- Right-clicking on a tab and selecting Close All to close all the drawings.
- Selecting Close All Other Drawings to close all the drawings except the drawing where you opened the shortcut menu from.

OR

- Using the CLOSEALLOOTHER command to close all the drawings except the current drawing and the Start tab.

When you close all of the drawings, the Quick Access Toolbar changes to only display (New), (Open), and (Sheet Set Manager).

The software prompts you to save any changes if you have not yet saved the drawing.

The Start tab is always persistent in the Tab bar.

New in 2016
**Practice 1a Opening a Drawing**

**Practice Objective**

- Open and close existing drawings, and switch between open drawings.

In this practice you will use the Select File dialog box to open two existing files and view them, as shown in Figure 1–41.

1. In the Quick Access Toolbar, click **Open** or if you are in the **Start** tab window>Create frame, select **Open Files**. Navigate to your practice files folder if it is not the active folder.

2. In the Select File dialog box, in the **Name** area, select **Building Rock.dwg** and click **Open**.

3. Start the **Open** command again. In the Select File dialog box, in the **Name** area, select **Building Side.dwg** and click **Open**.

4. In the **File Tabs** bar, in addition to the **Start** tab, the names of all opened files display as tabs, as shown in Figure 1–42.

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*Figure 1–41*

*Figure 1–42*
5. Expand the Application Menu and click (Open Documents). The two files you have opened are listed as shown in Figure 1–43.

![Figure 1–43](image)

6. In the Application Menu, in the Open Documents list, select Building Rock.dwg. It becomes the active drawing.

7. In the File Tabs bar, select Building Side.dwg. It becomes the active drawing.

8. Press <Ctrl>+<Home>. The Start tab is active and the initial Start window is displayed.

9. In the Create frame of the Start window, in the Recent Documents area, select Building Side.dwg to make it active.

10. Right-click in the Building Side tab and select Close All. If prompted to save changes, click No. This closes all the open drawings and the Start window is displayed again.
1.6 Viewing Your Drawing

Because AutoCAD drawings are drawn to full scale, it would be difficult to create them precisely on the computer screen without being able to move in and out around your work.

For example, if you are working on a map of the United States, you need to get closer to clearly display the roads in specific cities. If you are working on a house, you might want to focus on specific areas to be able to place doors precisely, as shown in Figure 1–44.

The **Zoom** and **Pan** commands enable you to specify which area of the drawing to display on the screen.

**Wheel Mouse Zoom and Pan**

- Roll the mouse wheel away from you to zoom in and roll the wheel toward you to zoom out. The AutoCAD software zooms in and out around the location of the cursor.
- Hold the wheel and move the cursor to pan. Note that a hand icon displays at the cursor location while panning.
- Double-click on the wheel to fit the entire drawing on the screen.
- Press <Ctrl> while you hold the wheel and move the mouse to use another mode of panning, called **joystick pan**.
Navigation Tools

In the AutoCAD LT software, only the 2D Steering Wheel, Pan, and Zoom are available in the Navigation Bar.

Navigation tools are located in the Navigation Bar, as shown in Figure 1–45.

![Figure 1–45](image)

The Navigation Bar provides a quick way of accessing the viewing tools. It displays in a very light gray until you hover the cursor over it. A displayed below a tool indicates that it can be expanded and additional options can be selected. In Paper Space, fewer tools display because you can only use 2D viewing commands. The different options are shown in Figure 1–46.

![Figure 1–46](image)

In the AutoCAD LT software, the Navigation Bar looks like the Paper Space version shown in Figure 1–46.
In the AutoCAD LT software, the ViewCube is not available.

- Most of the ViewCube options are primarily used in 3D views. However, you can use the Clockwise and Counterclockwise controls to rotate the viewport in the 2D plane, as shown in Figure 1–47.

![ViewCube](image1.png)  
**Figure 1–47**

In the AutoCAD LT software, only the 2D SteeringWheel is available.

- SteeringWheels provide access to groups of commonly used navigation tools. Depending on the wheel selected, you can access a small group of commands, such as Zoom, Rewind, and Pan, or a group with many more options. The SteeringWheel displays at the cursor, enabling you to quickly select the navigation tools.

- **ShowMotion** is used when creating animations in 3D.

In the AutoCAD LT software, **ShowMotion** is not available.

Pan and Zoom Commands

The Navigation Bar and the shortcut menu contain the **Zoom** and **Pan** commands.

The Realtime commands are really two parts of one command. **Pan Realtime** enables you to shift the display without changing the current magnification. **Zoom Realtime** enables you to zoom in closer to the drawing or away from the drawing, displaying the results dynamically (in real time) while the command is used.

**Pan and Zoom**

Navigation Bar: Pan or Zoom  
Shortcut Menu: (right-click in the drawing window) Pan or Zoom  
Command Prompt: pan or P or zoom or Z
Pan in Real Time

1. In the Navigation Bar, click (Pan). The crosshair changes to (Hand cursor).
2. Position the cursor over the part of the drawing that you want to visually move to a different part of the screen. Hold the left mouse button and drag it in the direction in which you want to go.
3. After you release the mouse button, you can pan again, or press <Esc> or <Enter> to complete the command.
   • You can also pan using the scroll bars on the sides of the drawing.

How To: Zoom in Realtime

1. In the Navigation Bar, expand (Zoom) and select Zoom Realtime. The crosshair changes to (Magnifying glass).
2. Hold the left mouse button and drag the cursor up to zoom in or down to zoom out.
3. After you release the mouse button, you can zoom again, or press <Esc> or <Enter> to complete the command.
   • If you select a Zoom option in the Navigation Bar, the top level Zoom icon changes to the selected option.

Switching Between Zoom and Pan

In either Zoom Realtime or Pan Realtime, you can right-click in the drawing window to open a shortcut menu, as shown in Figure 1–48. Select an option and continue with the viewing operation.

![Figure 1–48](image)
• **Zoom Window**: Requires you to hold the left mouse button while you drag a window.

• **Zoom Original**: Returns the display to the view that was current before the **Zoom/Pan Realtime** command was started.

• **Zoom Extents**: Fills the screen with all of the objects in the drawing.
Practice Objective

- Display parts of a drawing using the **Zoom** and **Pan** commands.

In this practice you will use several options in the **Zoom** command and **Pan** to display parts of a large drawing, as shown in Figure 1–49.

1. Open **Bighouse-A.dwg** from your practice files folder.

2. If you have a mouse wheel, scroll the wheel to zoom and press it to pan. Double-click on the mouse wheel to zoom to the extents of the drawing.

3. In the Navigation Bar, expand **(Zoom)** and select **Zoom Realtime**. Zoom in and out of the drawing.

4. Right-click and select **Pan**. Pan around the drawing.

5. Right-click and select **Exit**. Double-click on the mouse wheel to zoom to the extents of the drawing.
6. In the Navigation Bar, expand \( \text{Zoom} \) (Zoom) and select \textbf{Zoom Window}. Select two corner points for the window to zoom in on the kitchen (in the upper right corner of the house).

7. In the Navigation Bar, click \( \text{Pan} \) (Pan). Pan from the kitchen to the Master Bedroom (upper left corner).

8. Right-click and select \textbf{Zoom Extents}. Right-click again and select \textbf{Exit}.

9. Close the drawing. Do not save changes.
1.7 Saving Your Work

Saving your work is vitally important. You should save early and often to avoid losing and redrawing information. To provide added security, you can create automatic saves to a backup file. You can also save your drawings so that they can be used in previous versions of the AutoCAD software that might not be compatible with the one you are using.

- The save commands only save to the current drive. Remember to regularly back up your work to another machine or other data storage.

**Save**

- Quick Access Toolbar: ![Save button]
- Application Menu: ![Save button]
- Command Prompt: `qsave` or `<Ctrl>+<S>`

When you click ![Save button] (Save) in the Quick Access Toolbar or Application Menu, the drawing file you are working on is saved without prompting you for the name or location. This is called a quick save.

- If you are working in a new drawing that has not been saved with a specific name, you are prompted for a name and location in the Save Drawing As dialog box.
- Clicking ![Save As button] (Save As) in the Quick Access Toolbar or Application Menu (or typing `save`) enables you to save the current drawing with another name.

While it is critical for you to save a drawing regularly as you are working on it, the AutoCAD software is also set up to save a drawing to a backup file every 10 minutes. These files can be used to recover work that might not have been saved. They have a SV$ extension.

- By default, the AutoCAD software also creates a backup copy of the file every time you save. It has a .BAK extension.
• You can modify the Automatic Save and backup features in the Options dialog box (expand the Application Menu and click Options) in the Open and Save tab. You can also control the interval between saves. By default, the feature is toggled on with an interval of 10 minutes between saves and the Create backup copy with each save option is selected, as shown in Figure 1–50.

In the AutoCAD LT software, the Full-time CRC validation option is not available.

Figure 1–50

Saving in Various Formats

Using the Save As command, you can select an earlier version of the DWG file format so that the file can be opened with earlier versions of the AutoCAD software, as shown in Figure 1–51.

Figure 1–51

• The file format used for drawings in the AutoCAD 2016 software is that of the AutoCAD 2013 software. The file format for the AutoCAD 2012, AutoCAD 2011, and AutoCAD 2010 software is also different from previous formats. If you want to share a drawing with someone that has the AutoCAD 2009 software, you need to save it in the AutoCAD 2007 file format.
Practice 1c  Saving a Drawing File

Practice Objectives

- Open and save a drawing.
- Modify the Automatic save option.

In this practice you will open a drawing, save it, and modify the Automatic save option, as shown in Figure 1–52.

1. Open Building Valley.dwg from your practice files folder.

2. In the Quick Access Toolbar, click (Save). In the Command Line, _QSAVE displays indicating that the AutoCAD software has performed a quick save.

3. In the Application Menu, click Options to open the Options dialog box.

4. In the Open and Save tab, change the time for Automatic save to 15 minutes.

5. Click OK to close the Options dialog box.

6. Save and close the drawing.
Chapter Review Questions

1. How do you switch from the drawing window to the text window?
   a. Use the icons in the Status Bar.
   b. Press <Tab>.
   c. Press <F2>.
   d. Press the <Spacebar>.

2. How can you cancel a command using the keyboard?
   a. Press <F2>.
   b. Press <Esc>.
   c. Press <Ctrl>.
   d. Press <Delete>.

3. What is the quickest way to repeat a command?
   a. Press <Esc>.
   b. Press <F2>.
   c. Press <Enter>.
   d. Press <Ctrl>.

4. To display a specific Ribbon panel, you can right-click on the Ribbon and select the required panel in the shortcut menu.
   a. True
   b. False

5. How are points specified in the AutoCAD Cartesian workspace?
   a. X value x Y value
   b. Y value, X value
   c. X value, Y value
   d. X value - Y value

6. How do you fit the entire drawing in the drawing window?
   a. Double-click on the right mouse button.
   b. Hold <Ctrl> and scroll the mouse wheel.
   c. Double-click on the mouse wheel.
   d. Hold the mouse wheel and move the cursor.
# Command Summary

<table>
<thead>
<tr>
<th>Button</th>
<th>Command</th>
<th>Location</th>
</tr>
</thead>
</table>
| ![Close](image) | Close | • Drawing Window  
• Application Menu  
• Command Prompt: close |
| ![Close Current Drawing](image) | Close Current Drawing | • Application Menu |
| ![Close All Drawings](image) | Close All Drawings | • Application Menu |
| ![Dynamic Input](image) | Dynamic Input | • Status Bar: expand Customization |
| ![Exit Autodesk AutoCAD](image) | Exit AutoCAD | • Application Menu |
| ![Open](image) | Open | • Quick Access Toolbar  
• Application Menu  
• Command Prompt: open, <Ctrl>+<O> |
| ![Open Documents](image) | Open Documents | • Application Menu |
| ![Options](image) | Options | • Application Menu  
• Shortcut Menu: Options |
| ![Pan](image) | Pan | • Navigation Bar  
• Shortcut Menu: Pan  
• Command Prompt: pan or P |
| ![Recent Documents](image) | Recent Documents | • Application Menu |
| ![Save](image) | Save | • Quick Access Toolbar  
• Application Menu  
• Command Prompt: qsave, <Ctrl>+<S> |
| ![Save As](image) | Save As | • Quick Access Toolbar  
• Application Menu  
• Command Prompt: save |
| ![Zoom Realtime](image) | Zoom Realtime | • Navigation Bar: Zoom Realtime  
• Shortcut Menu: Zoom  
• Command Prompt: zoom or Z |