3

Tutorial: Drawing a Schoolhouse

In this chapter, you'll learn how to customize both DataCAD and your drawing before you ever draw a line. Then you'll draw the exterior and interior walls of the schoolhouse and add doors and windows to it.

In this chapter:

- Drawing walls
- Drawing windows
- Drawing doors

Setting Up a New Drawing

DataCAD contains many options for customizing the way your system operates. In this tutorial, you will make only two modifications: adding layers to a new drawing and changing the snap grid setting.

To begin this tutorial, start DataCAD and start a new drawing, as described in "The Drawing Board" chapter.

Setting the Snap Grid for the Tutorial

First, you'll need to change the snap grid setting.

➔ To set the snap grid:

1. Press (S) on your keyboard. Make sure Caps Lock is off. In the Message Area, you are prompted to "Enter X-snap grid."
2. Type **.1** and press (Enter). You are prompted to "Enter Y-snap grid."
3. Type **.1** and press (Enter).

You just set the accuracy of the cursor movement to one inch. Move your cursor around the drawing screen and look at the X and Y snap grid values in the Message Area.

Creating New Layers for the Tutorial

When you start a new drawing in DataCAD, it contains only one layer (called Layer1), which is also the active layer. Any settings in the active layer will automatically be used in new layers when you create them. For example, the snap grid setting you entered above will be assigned to each layer you add to your drawing; so you won't have to set the snap grid in every new layer.

➔ To add layers to this drawing:

1. Right-click to return to the Utility menu from the previous exercise.
2. Click on Layers in the Utility menu.
3. Click on NewLayer in the Layers menu.
4. Type **8** and press (Enter). You've just added eight layers to the drawing for a total of nine layers.

Naming Layers for the Tutorial

You'll be given the layer names for this exercise, but you should develop your own plan for naming layers based on the type of work you do. To verify which menu is displayed in the Menu Window, check the Message Area. See Figure 3.1 to locate the menu name display.

➔ To rename your layers:

1. If you aren't in the Layers menu, click on Layers in the Utility menu.

2. Click on Name in the Layers menu. A list of all your layers is displayed in the Menu Window.
3. Click on Layer1. You are prompted to "Enter new name."
4. Type **Walls** and press (Enter). Look at the list of layers in the Menu Window; notice that Layer1 has been changed to Walls.
5. Click on Layer2. You are prompted to "Enter new name."
6. Type **Doors** and press (Enter). Notice that Layer2 is now named Doors in the layer list in the Menu Window.
7. Rename the rest of your layers as follows:Layer3 to Windows, Layer4 to Plumb, Layer5 to Dim, Layer6 to Hatch, Layer7 to Notes, Layer8 to Misc, and Layer9 to Border.
8. Right-click twice to return to the Utility menu.

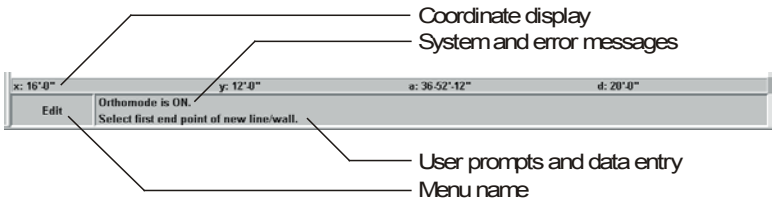

Figure 3.1: The Message Area display

Moving Between Layers in the Tutorial

Now that you've created and named your new layers, you can move among them. To draw walls on the Walls layer and doors on the Doors layer, you have to change to the corresponding layer before you begin drawing. In DataCAD terms, before you place a wall on your drawing you will make the Walls layer the active layer.

The Status Area shows the active layer, or the layer that you are drawing on. As you change active layers, the Status Area is updated with the corresponding layer name. You can only draw on the active layer.

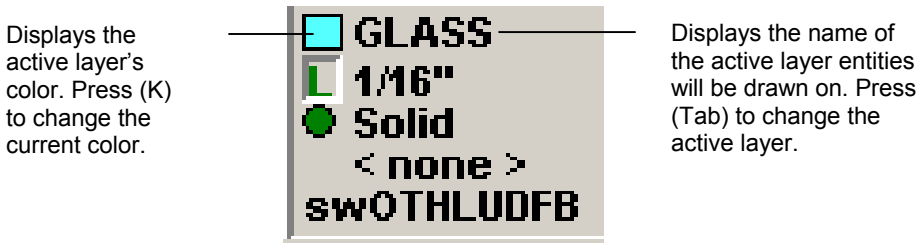

Figure 3.2: Check the Status Area for active layer name and color.

➔ To change the active layer:

1. Press (Tab) on your keyboard. Notice that the active layer name in the Status Area changes.

2. Keep pressing (Tab). Eventually you'll return to the beginning of the layer list. Pressing (Shift) + (Tab) cycles backwards through your layers.

Assigning Colors to Layers in the Tutorial

You can assign different colors to layers, so that any entities you add to a layer will be drawn in that layer's color. You'll be able to tell at a glance what layer an entity is on simply by its color. That color is the active color for that layer until you change it.

➔ To assign layer colors:

1. If you're not in the Layers menu, click on Layers in the Utility menu.
2. Press (Tab) until the Doors layer is the active layer. Check the Status Area to see which layer is active.
3. Click on Color in the Layers menu.

   Shortcut: Press (K) to change the color of the active layer. Pressing (K) will cycle through the colors; pressing (Shift) + (K) cycles backwards through the layers.

4. Click on Green. The color assigned to the Doors layer is now Green, and you can see the layer color box in the Status Area is also displaying green.
5. Press (Tab), so that the Windows layer is active.
6. Click on Color in the Layers menu.
7. Click on Cyan. The color assigned to the Windows layer is now Cyan.
8. Use this same procedure to assign colors to the rest of your layers. Make the Plumb layer Lt. Grey, the Dim layer Lt. Grey, the Hatch layer Brown, the Notes layer Lt. Red, the Misc layer Red, and the Border layer Lt. Green.
9. Right-click to return to the Utility menu.

Drawing Walls, Windows, and Doors

This part of the tutorial introduces you to using DataCAD as an architectural tool. You will learn how to use the wall menu options to begin drawing architectural plans. This tutorial uses Imperial units. See "Customizing Drawing Settings" in the "Before You Draw" chapter for more information on how to change drawing units.

Drawing the Schoolhouse Walls

Each wall that you draw will have two or more lines, rather than just one. In the following exercises, you will draw walls using both the mouse and the keyboard.

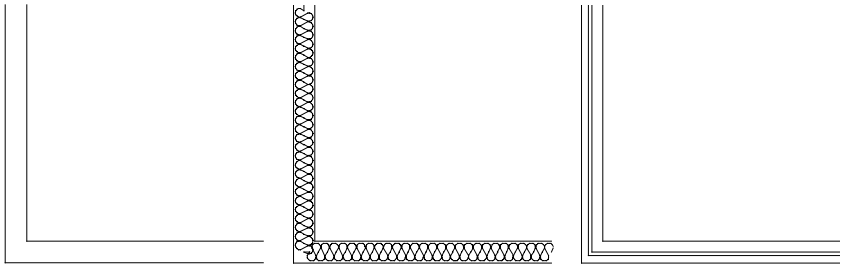

Figure 3.3: Examples, from left to right, of 2-line walls, 3-line walls, and 4-line walls

The Architct menu is used for drawing walls as well as doors and windows.

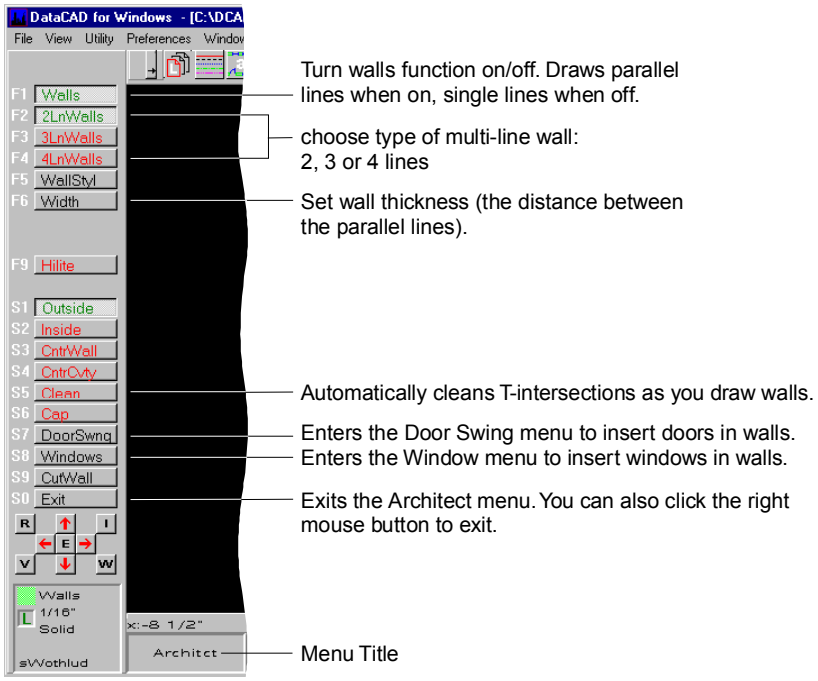

Figure 3.4: The Architct menu is used for drawing walls, windows, and doors.

Drawing the Schoolhouse's Exterior Walls

Before you draw the exterior walls of the schoolhouse, you should make sure your wall settings are correct.

➔ To set up for drawing exterior walls:

1. Continue with the drawing you started in the previous section of this tutorial.
2. In the Edit menu in the Menu Window, click on Architct. The Architct menu is displayed.
3. Click on Walls in the Architct menu to toggle it on; walls will be drawn instead of single lines. Notice that the "w" in SWOTHLUD in the Status Area is now uppercase. This indicates that you will draw walls instead of single lines.
4. Click on 2LnWalls in the Architct menu, if it's not already toggled on.

5. Click on Width in the Architct menu to set the width of the wall. A value menu is displayed in the Menu Window, and you are prompted to "Enter wall width." For more information on using value menus, see "Value Menus" in "The Drawing Board" chapter.
6. Click 1'-0" in the value menu and then right-click; or type **1** and press (Enter).
7. Click Outside in the Architct menu; any walls you draw will be defined by the outside line of the wall.
8. Right-click to return to the Edit menu.
9. Before you begin drawing the exterior walls, look at the Status Area to see that Walls is your active layer. If it's not, press (Tab) until it is.

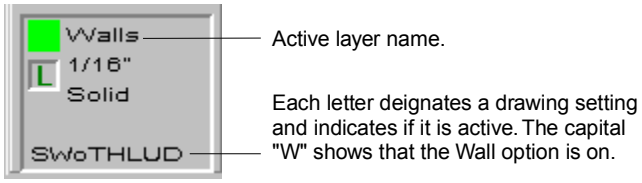

Figure 3.5: You can check both the active layer and the status of the Walls toggle in the Status Area.

Now you are ready to draw the exterior walls.

➔ To draw exterior walls:

1. You'll draw the first wall using the mouse. Notice that the prompt in the Message Area reads "Select first end point of new line/wall." Move the cursor to the lower left of the Drawing Area and click to enter the first end point of the new wall. You are prompted to "Select next end point of line/wall."
2. Move the cursor to the right until the coordinate readout shows an X measurement of 28'-0" and a Y measurement of 0, and click. This defines the exterior line of the wall. You are prompted to "Select a point to define the inside of the wall."
3. Move the cursor to a position anywhere above the displayed line and click. The wall is immediately drawn. You are prompted to "Select next end point of line/wall."

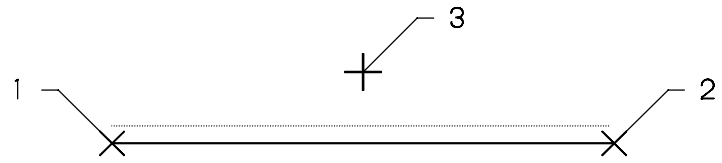

Figure 3.6: Drawing the first wall

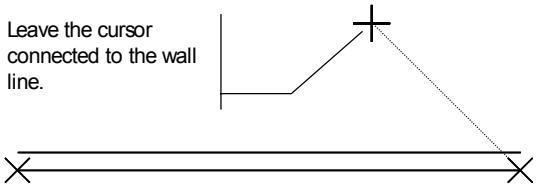

Figure 3.7: The wall is drawn.

4. Now you'll draw a second wall using coordinate entry. Press (Insert) until the Message Area reads "Current input mode = relative polar (distance, angle)." You can also use coordinate entry to enter points. See "Drawing Using Coordinate Entry" in "The Drawing Board" chapter to review coordinate entry methods.
5. Press (Spacebar) to activate coordinate entry. You are prompted to "Enter relative distance."
6. Type **40.6** and press (Enter). (40.6 means 40 feet 6 inches in architectural units.) You are prompted to "Enter relative angle."
7. Type **90** and press (Enter). The wall is drawn and the corner is automatically cleaned. If the new wall extends beyond your view of the Drawing Area, use the arrow keys to move your drawing into view.

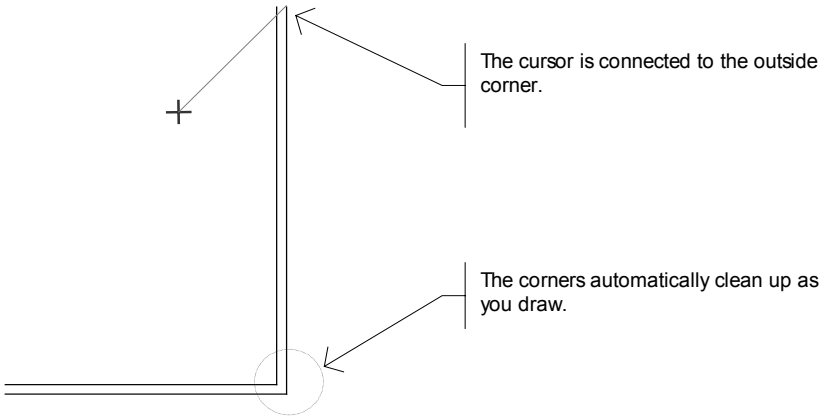

Figure 3.8: The second wall is drawn and the corner is cleaned.

8. Click W on the Navigation Pad to go to the WindowIn menu. The WindowIn menu is displayed in the Menu Window.
9. Click on FreeZoom in the WindowIn menu to toggle it off.
10. Click on Extents in the WindowIn menu to zoom out to the extents of the drawing.
11. Right-click to return to the Edit menu.
12. Press (Spacebar). You are prompted to "Enter relative distance."
13. Type **28** and press (Enter). You are prompted to "Enter relative angle."
14. Type **180** and press (Enter).
15. Move the cursor close to the inside line of the corner where you originally began and click. The last corner is cleaned, leaving a clean outline of the schoolhouse exterior walls.

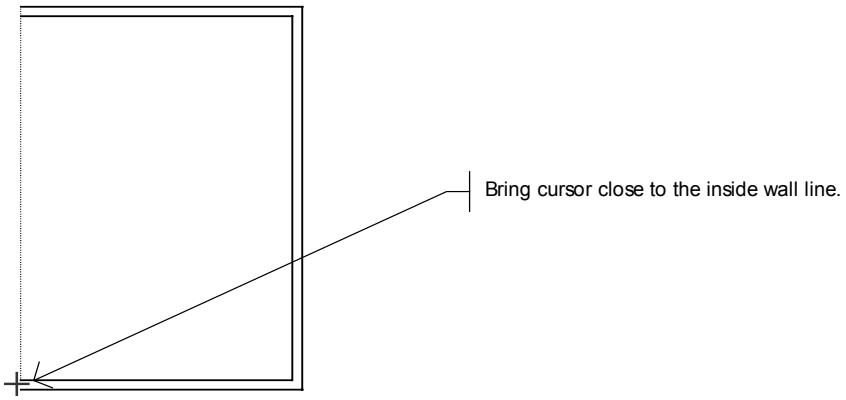

Figure 3.9: Ending your exterior wall

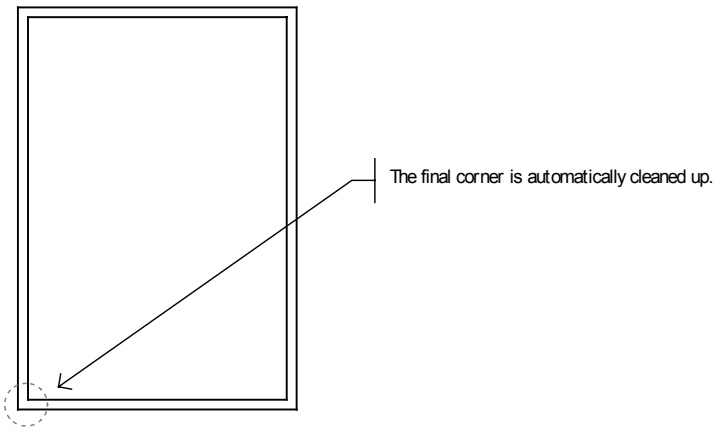

Figure 3.10: The exterior walls are complete.

Drawing the Schoolhouse's Interior Walls

Now you will draw the interior walls. You'll change the wall thickness for the interior walls to four inches.

➔ To set up for drawing the interior walls:

1. In the Edit menu in the Menu Window, click on Architct. The Architct menu is displayed.

   Shortcut: Press (A) to access the Architct menu at any time.

2. Click on Width in the Architct menu. You are prompted to "Enter wall width."
3. Type **.4** and press (Enter).
4. Click on Inside in the Architct menu to define the wall by the inside line.
5. Click on Clean to toggle on automatic T intersection cleaning. Walls and 2LnWalls should still be toggled on.
6. Right-click once to return to the Edit menu.

➔ To draw interior walls:

1. Click W on the Navigation Pad to open the WindowIn menu. You are prompted to "Select first corner of the Zoom window."
2. Position your cursor outside the lower-left corner of the plan and click. You are prompted to "Select second corner of the Zoom window."
3. Move the mouse diagonally, stretching the rubberband box until it encloses the lower half of the plan as in the figure below and click. Your drawing now appears larger.

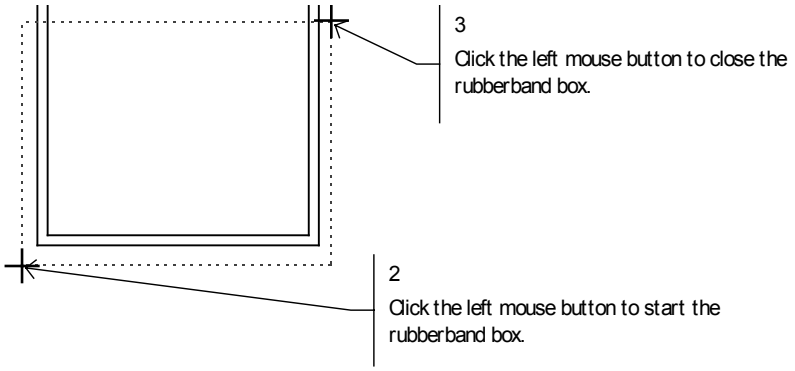

Figure 3.11: Zooming in on the lower half of the plan.

4. Right-click to return to the Edit menu.
5. Press (`) on the keyboard to set X and Y to 0. You are prompted to "Select reference point." The accent key ( (`)) is located in the upper-left corner of your keyboard, just below (Esc) and to the left of (1) on most keyboards.
6. Move the cursor close to the inside left corner of the bottom wall and either click the middle mouse button or press (N) on the keyboard. This sets this corner as the new reference point to work from. Steps 6-9 are the equivalent of placing one end of an architect's scale at a corner and marking a point at 10′-2″.

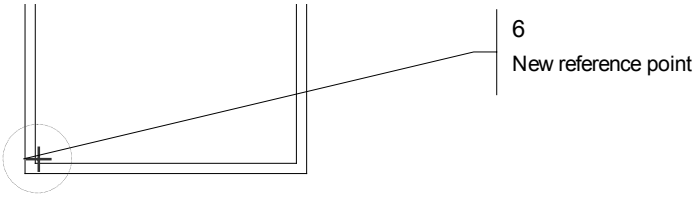

Figure 3.12: Setting a reference point

7. Press (Spacebar). You are prompted to "Enter relative distance."
8. Type **10.2** (the inside dimension of the office) and press (Enter). You are prompted to "Enter relative angle."
9. Type **0** for the relative angle and press (Enter). Notice that your cursor is now attached to the wall exactly 10′-2″ to the right of the corner you used as your reference point. This will be the first point of the interior wall.

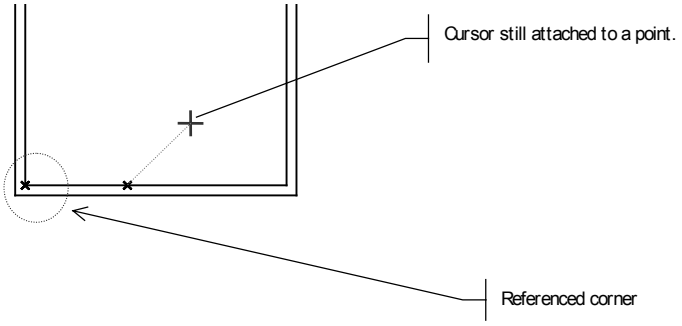

Figure 3.13: Starting your interior wall

10. Press (Spacebar). You are prompted to "Enter relative distance."
11. Type **10.8** (the inside dimension of the office) and press (Enter). You are prompted to "Enter relative angle."
12. Type **90** and press (Enter). You are prompted to "Select a point to define the Outside of the wall."
13. Move the cursor to the right of the displayed line and click to indicate the outside of the wall.

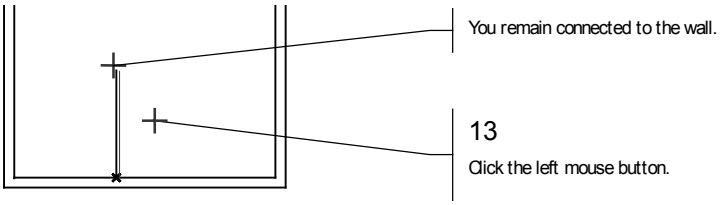

Figure 3.14: Defining the outside of the wall

14. Move the cursor close to the inside line of the left exterior wall and click.

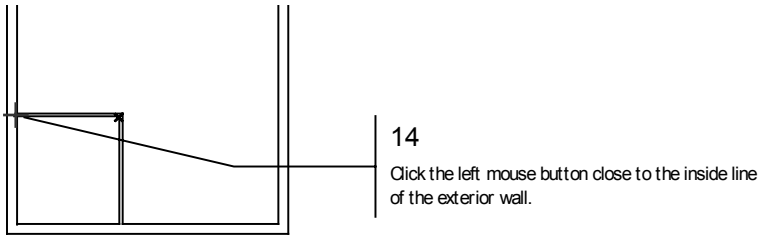

Figure 3.15: Drawing the last office wall

15. Right-click to disconnect from the line. The office area is complete and all intersections are automatically cleaned.

➔ To draw the remaining interior walls:

1. Press (`) on the keyboard. You are prompted to "Select reference point."
2. Move the cursor close to the inside right corner of the bottom wall and click the middle mouse button. Remember, if you don't have a three-button mouse you can also press (N) on the keyboard.

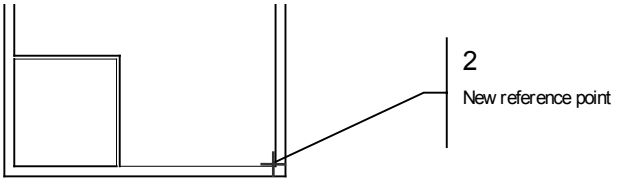

Figure 3.16: Selecting a new reference point

3. Press (Spacebar). You are prompted to "Enter relative distance."
4. Type **10.2** and press (Enter). You are prompted to "Enter relative angle."
5. Type **180** and press (Enter). The cursor connects to a point on the inside line of the exterior wall.
6. Press (Spacebar). You are prompted to "Enter relative distance."
7. Type **10.8** and press (Enter). You are prompted to "Enter relative angle."
8. Type **90** and press (Enter). You are prompted to "Select a point to define the outside of the wall."
9. Move the cursor to the left of the new wall and click to define the outside of the wall.
10. Move the cursor to the right just before the inside line of the exterior wall and click.
11. Right-click to disconnect from the wall line. The wall is drawn and your intersections are cleaned.

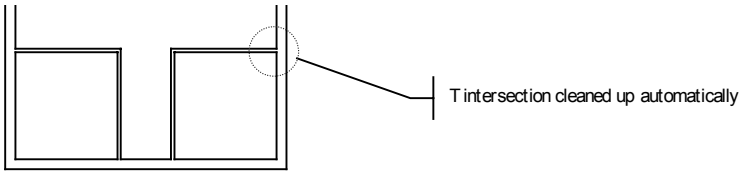

Figure 3.17: The wall is drawn and the intersections are cleaned.

12. Press (`). You are prompted to "Select reference point."
13. Move the cursor near the inside corner of the wall you just drew and click the middle mouse button.

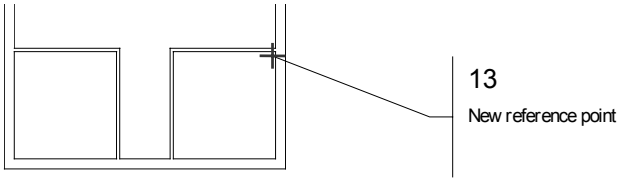

Figure 3.18: Selecting a new reference point

14. Press (Spacebar). You are prompted to "Enter relative distance."
15. Type **5.2** and press (Enter). You are prompted to "Enter relative angle."
16. Type **270** and press (Enter). The cursor connects to a point on the inside line of the exterior wall.

17. Move the cursor to the left, close to the inside line of the wall, and click. You are prompted to "Select a point to define the Outside of the wall." It is important in step 17 to select a point closer to the inside, not the outside, line of the room you just drew so that the correct wall line will be cleaned.
18. Move the cursor below the displayed line and click to define the outside of the wall.

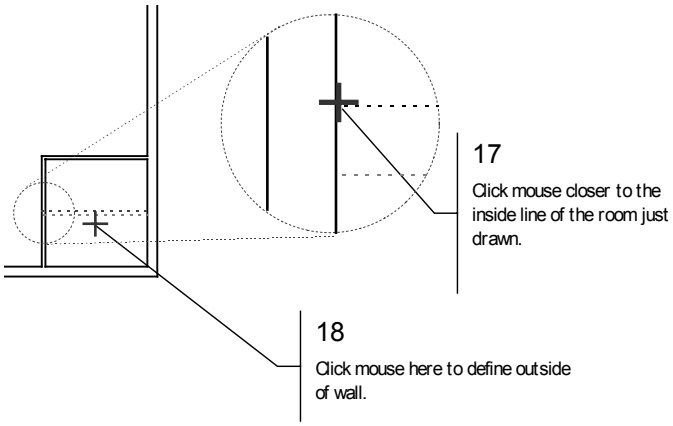

Figure 3.19: Drawing the dividing wall between the bathrooms

19. Right-click to disconnect from the wall.
20. Click on E on the Navigation Pad to view the drawing extents.

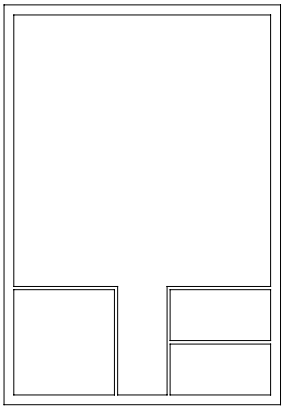

Figure 3.20: The walls of the schoolhouse floor plan

21. Press (Ctrl) + (S) on the keyboard to save the drawing. This is a good habit to get into. You should do it after you enter several items or make a lot of changes to your drawing.

You have now completed all the walls of the schoolhouse plan and saved your drawing. If any of the walls did not clean, and your drawing doesn't look like the figure above, the next section will help you straighten up your plan.

Cleaning the Schoolhouse's Wall Intersections

As you insert walls, DataCAD automatically cleans intersections. If you right-click by accident and disconnect from a wall prematurely, or your intersections clean at the wrong wall line, you will need to clean them.

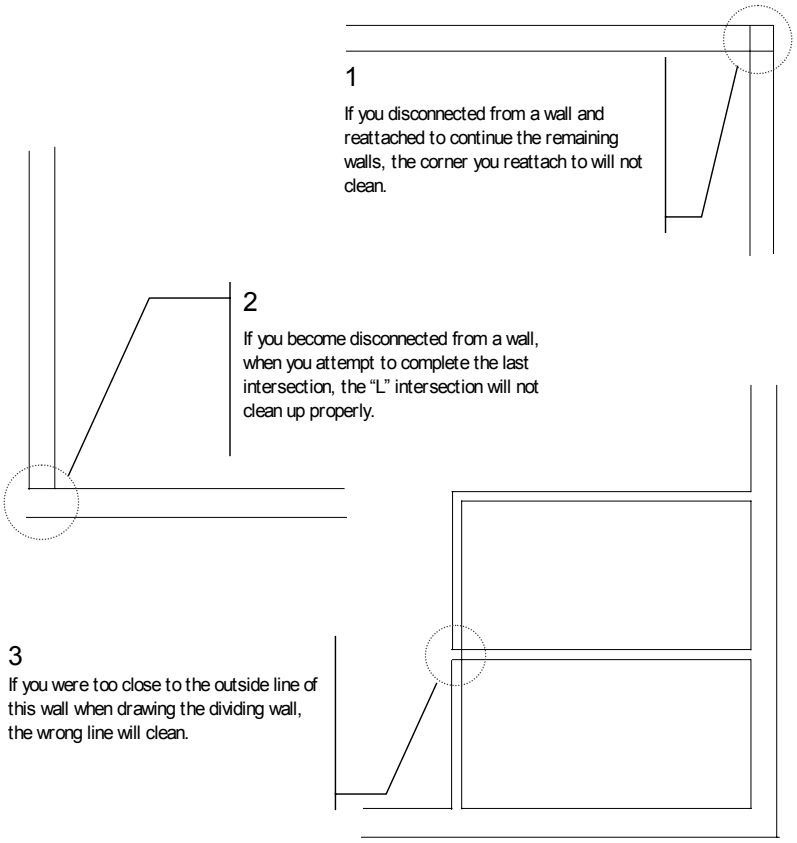

Figure 3.21: Examples of wall intersections that were improperly drawn

If an L intersection doesn't clean properly, despite Clean being toggled on when you drew the walls, it may be because you disconnected your cursor from the end of one wall and then started drawing the next wall. In such a case, you may have to use 2LnTrim in the Cleanup menu so the wall lines intersect properly, and then use Erase to remove any unwanted lines within the intersection.

➔ To fix the error shown in example 1:

1. In the Edit menu in the Menu Window, click on Cleanup.
2. Click on LIntSct in the Cleanup menu. You are prompted to "Select 1st corner around L intersection (wall lines only)."
3. Click above and to the right of the intersection.
4. Diagonally drag the cursor to the lower left of the intersection, stretching the rubberband box, and click.

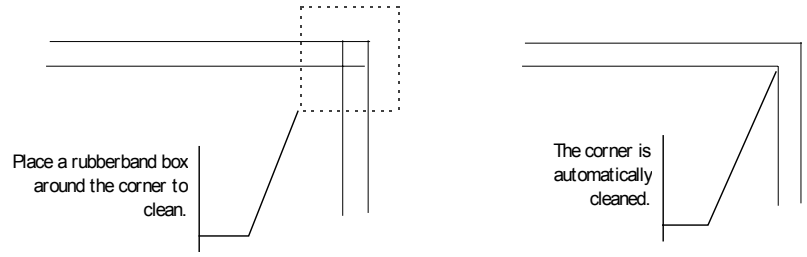

Figure 3.22: Cleaning an L intersection

➔ To fix the error shown in example 2 on the previous page:

1. In the Edit menu in the Menu Window, click on Cleanup.
2. Click on LIntSct in the Cleanup menu. You are prompted to "Select 1st corner around L intersection (wall lines only)."
3. Click above and to the right of the intersection.
4. Diagonally drag the cursor to the lower left of the intersection, stretching the rubberband box around the intersection, and click.

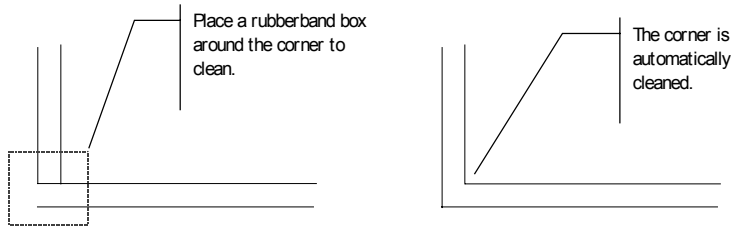

Figure 3.23: Cleaning an L intersection

➔ To fix the error shown in example 3 on the previous page:

1. In the Edit menu in the Menu Window, click on Cleanup.
2. Click on 1LnTrim in the Cleanup menu. You are prompted to "Select first point of line to clip to."
3. Click on Entity in the 1LnTrim menu. You are prompted to "Point to line to trim to."
4. Click on the inside wall line, shown in Figure 3.24. The line you select becomes dashed. You are prompted to "Point to outside."
5. Click to the left of the dashed line. You are prompted to "Select entity to trim."
6. Click on the two wall lines to select them as the lines to trim. The lines are trimmed.

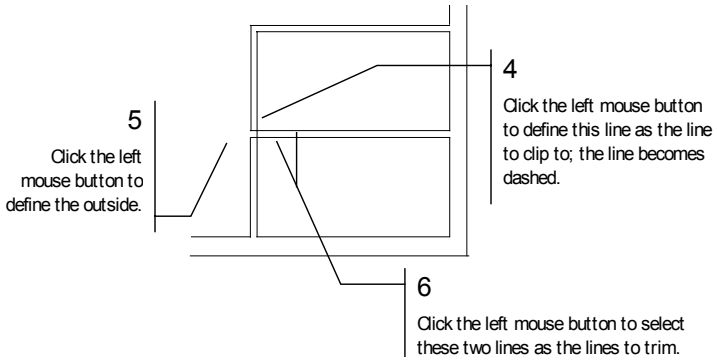

Figure 3.24: Completing a 1-line trim

7. Right-click once to return to the Cleanup menu.

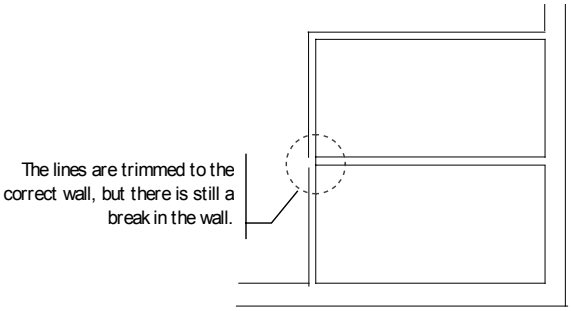

Figure 3.25: Trimming wall lines to the correct wall

8. To fix the break in the outside wall, click on WeldLine in the Cleanup menu. You are prompted to "Select first line to weld."
9. Click on one of the lines of the broken wall to select it; it becomes dashed. You are prompted to "Select second line to weld."
10. Click on the other line of the broken wall to select it. The line mends and becomes a single entity.

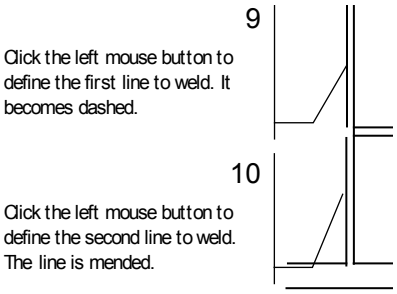

Figure 3.26: Selecting lines to be welded

11. Right-click once to return to the Cleanup menu.

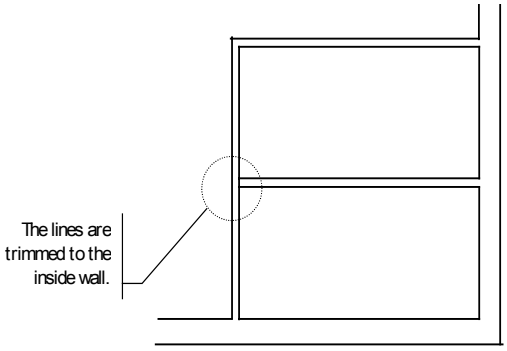

Figure 3.27: The wall line is welded.

12. To clean up the T intersection in the wall, click on TIntsct in the Cleanup menu. You are prompted to "Select 1st corner around "T" intersect (wall line ends only)".
13. Click at the lower left of the intersection you want to clean. You are prompted to "Select 2nd corner around "T" intersect (Wall line ends only)."
14. Move the cursor above and to the right of the intersection to enclose the corner to clean and click. You are prompted to "Point to a wall line to trim to."
15. Click on the inside line to select it as the line to trim to.
16. Right-click twice to return to the Edit menu.

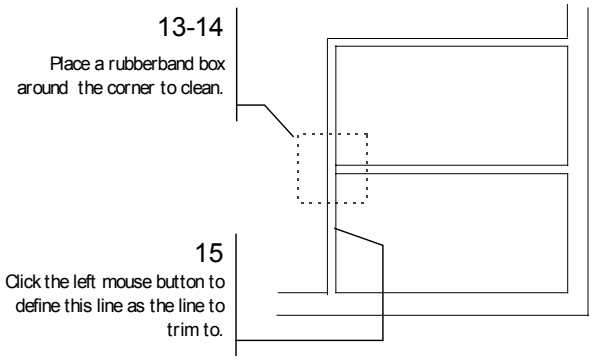

Figure 3.28: Completing a T intersection

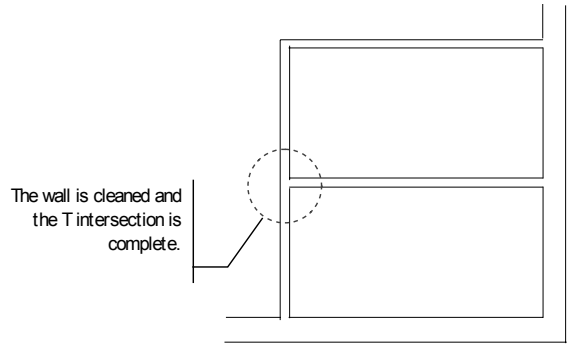

Figure 3.29: The wall intersection is cleaned.

Drawing Countertops in the Schoolhouse

While the 3-line walls function is usually used for drawing walls, we'll use it here to quickly draw parallel lines representing countertops.

➔ To set up to draw countertops:

1. Click on Architct in the Edit menu.
2. Click on 3LnWalls in the Architct menu to toggle on the 3-line wall option. This allows you to draw three parallel lines at once. The two outer lines will define the edges of the counter and the centerline will be a dashed line to represent the upper cabinets. Walls should still be toggled on.
3. Click on CntrLine in the Architct menu to set the attributes of the centerline of the two parallel lines. This will represent the upper cabinets.
4. Click on LineType in the CntrLine menu. All available linetypes are listed in the Menu Window.
5. Click on Dashed in the LineType menu to make the centerline dashed.
6. Right-click once to return to the Architct menu.
7. Click on Width in the Architct menu. You are prompted to "Enter wall width."
8. Type **2** and press (Enter). This sets the width of the countertop at two feet.
9. Click on Outside in the Architct menu; the wall will be defined by the outside line.
10. Click on Cap in the Architct menu to automatically cap the end of the parallel lines, or in this case countertops.
11. Right-click to return to the Edit menu.

Now you are ready to draw the countertops.

➔ To draw countertops on the plan:

1. Click W on the Navigation Pad to open the WindowIn menu. You are prompted to "Select first corner of the Zoom window."
2. Click near the lower-left corner of the bottom wall. You are prompted to "Select second corner of the Zoom window."
3. Diagonally move the mouse until the rubberband box encloses the lower half of the plan and click. The plan now appears larger.
4. Right-click once to return to the Edit menu.
5. Move the cursor to the corner marked 6 in Figure 3.30 and click the middle mouse button to select it as your first reference point.

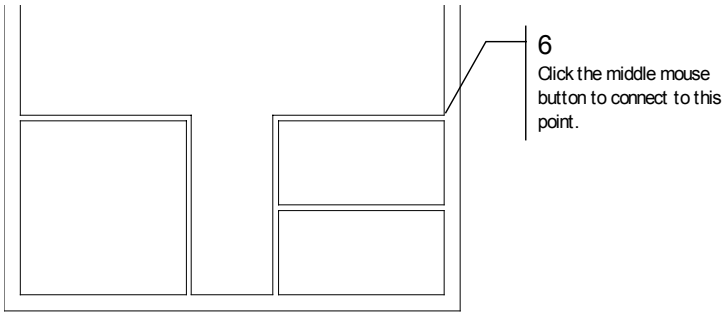

Figure 3.30: Selecting the starting point of the countertop

6. Press (Spacebar). You are prompted to "Enter relative distance".
7. Type **10.2** and press (Enter). You are prompted to "Enter relative angle".
8. Type **180** and press (Enter).
9. Move the cursor above the displayed line and click to define the other side of the counter.

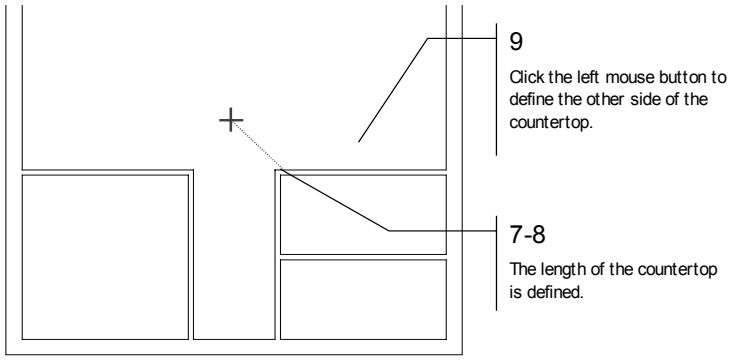

Figure 3.31: Drawing the countertop

10. Right-click to disconnect from the counter. The countertop lines are drawn and the end is capped.

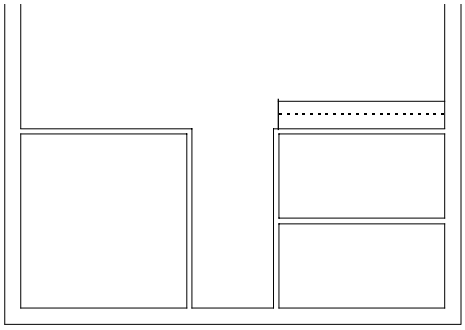

Figure 3.32: The first countertop is drawn.

11. Repeat steps 5 - 10 for the counter on the opposite side. Remember that the relative angle for this counter will be 0.

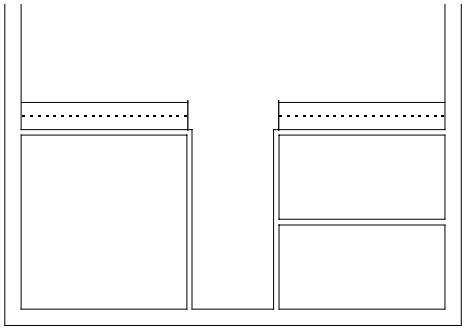

Figure 3.33: The second countertop is drawn.

12. Click E on the Navigation Pad to view the extents of the drawing.
13. Press (Ctrl) + (S) to save the drawing.

Drawing the Schoolhouse's Doors and Windows

Now that you have drawn the walls for the schoolhouse plan, you are ready to insert doors and windows.

➔ To set up to draw a door:

1. Before you begin to draw doors, press (Tab) until the Doors layer is the active layer in the Status Area.
2. In the Edit menu in the Menu Window, click on Architct.
3. Click on DoorSwng in the Architct menu.

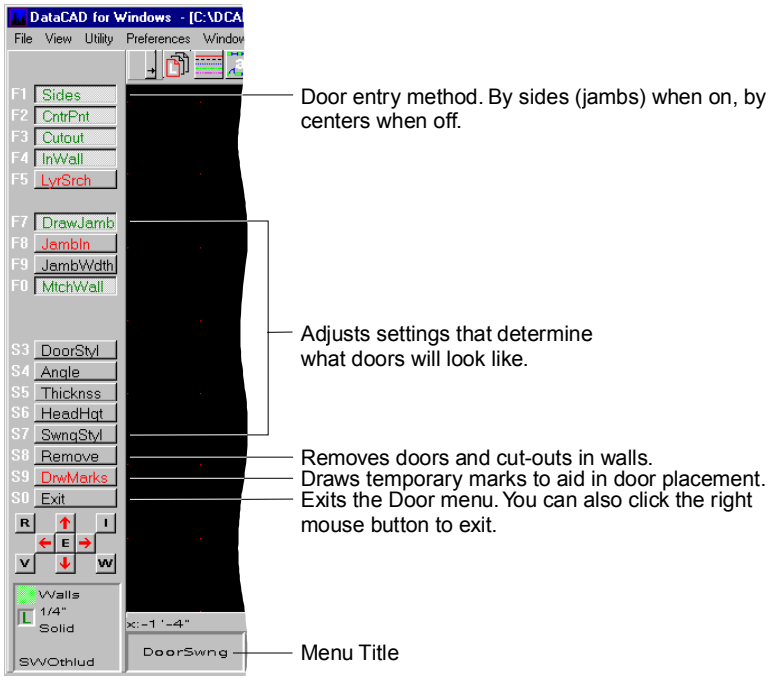

Figure 3.34: The DoorSwng menu

4. Click on DrwMarks in the DoorSwng menu to toggle the Draw Marks option on.

5. Click on LyrSrch to toggle it on. (If LyrSrch is already toggled on, click on it to toggle it off; then toggle it back on again.) You are prompted to "Select layer to search for walls", and a list of your layers is displayed in the Menu Window.
6. Click on Walls. DataCAD now knows where to find your walls when it needs to cut them for doors and windows.

There are two methods to draw a door: by defining both of its sides and by defining one side and its center. You'll draw the first door by sides. To position and begin drawing a door, you need to reference and measure from an existing point on the drawing.

➔ To draw a door by sides:

1. Click W on the Navigation Pad to go to the WindowIn menu. You are prompted to "Select first corner of the Zoom window."
2. Click at the lower-left corner of the bottom wall. You are prompted to "Select second corner of the Zoom window."
3. Diagonally move the mouse until the rubberband box encloses the lower half of the plan and click. The plan now appears larger.

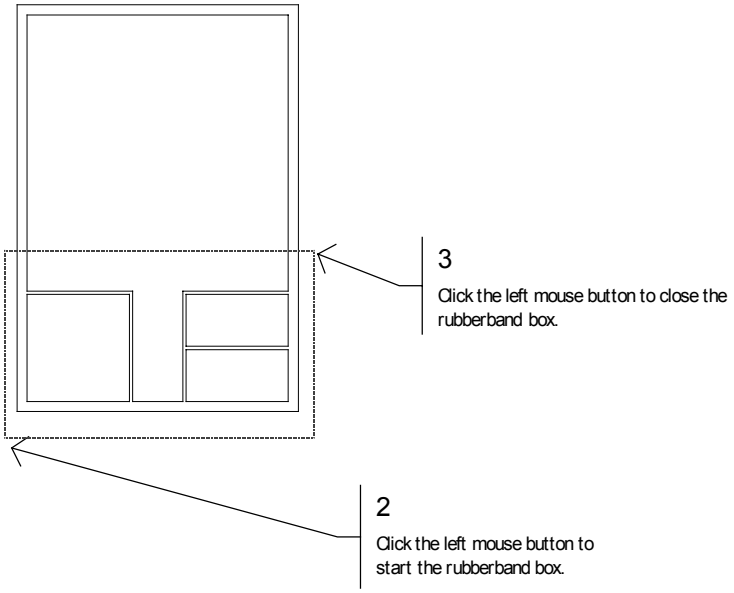

Figure 3.35: Zooming in on the plan

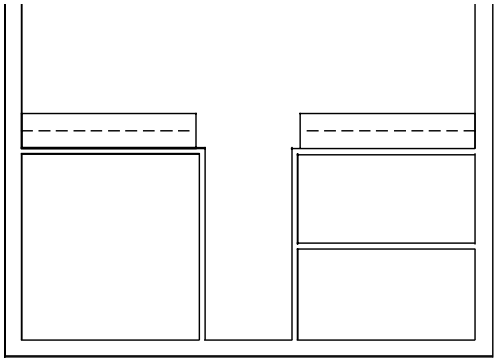

Figure 3.36: The result of zooming in on your drawing

4. Right-click once to return to the DoorSwng menu.
5. Press (`) on the keyboard. You are prompted to "Select reference point".
6. Click the middle mouse button near the upper-right corner of the first room you drew, as shown in Figure 3.37. Stay close to the inside of the corner. This will be your reference point. You are prompted to "Select hinge side of door".

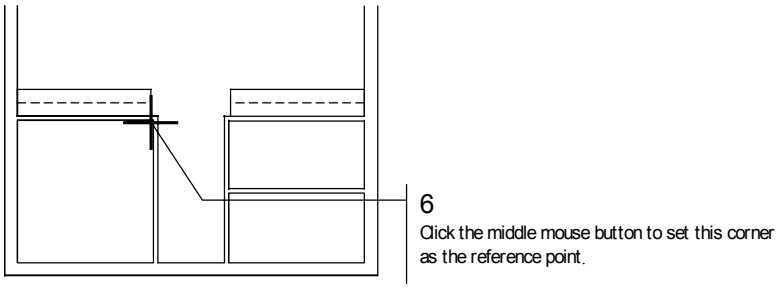

Figure 3.37: Setting a reference point.

7. Press (Spacebar). You are prompted to "Enter relative distance".
8. Type **.3** and press (Enter). You are prompted to "Enter relative angle".
9. Type **270** and press (Enter). You are prompted to "Select strike side of door".
10. Press (Spacebar). You are prompted to "Enter relative distance".
11. Type **3** and press (Enter). You are prompted to "Enter relative angle".
12. Type **270** and press (Enter). You are prompted to "Select direction of door swing".
13. Click anywhere inside the office (on the left side of the wall); this defines the direction of the swing. The wall is cut, and you are prompted to "Select any point on the outside of the wall".
14. Click to the right of the outside wall to define the non-printing snap point location. The door is drawn.

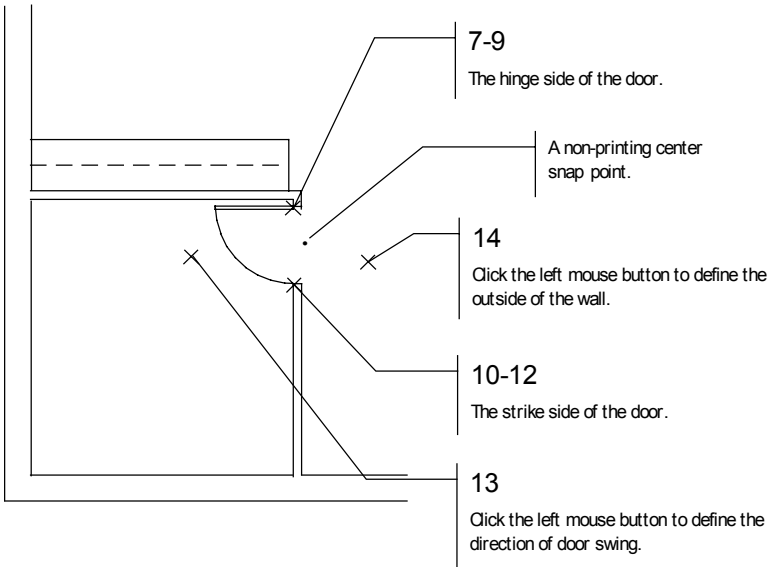

Figure 3.38: Drawing the door

➔ To draw a second door by center:

1. Click on Sides in the DoorSwng menu to toggle off the Sides option. Now you can define doors by entering their center and strike side.
2. Move the mouse to the location shown in Figure 3.39. Click the middle mouse button to snap to the midpoint of the inside front wall. You are prompted to "Select strike side of door".

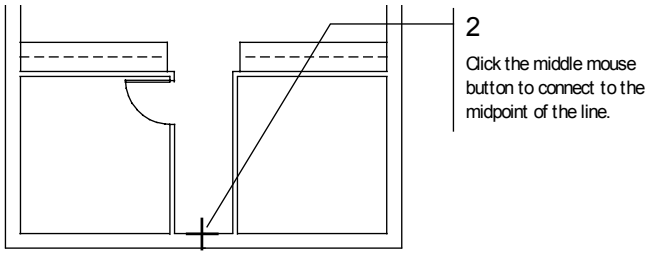

Figure 3.39: Defining the center of the front door

3. Press (Spacebar). You are prompted to "Enter relative distance".
4. Type **1.6** and press (Enter). You are prompted to "Enter relative angle".
5. Type **0** and press (Enter). You are prompted to "Select direction of door swing".
6. Click inside the hall (above the wall) to define the direction of the door swing. The wall is cut. You are prompted to "Select any point on the outside of the wall".
7. Click anywhere on the outside of the exterior wall where you want to locate the non-printing snap point. The door is drawn.

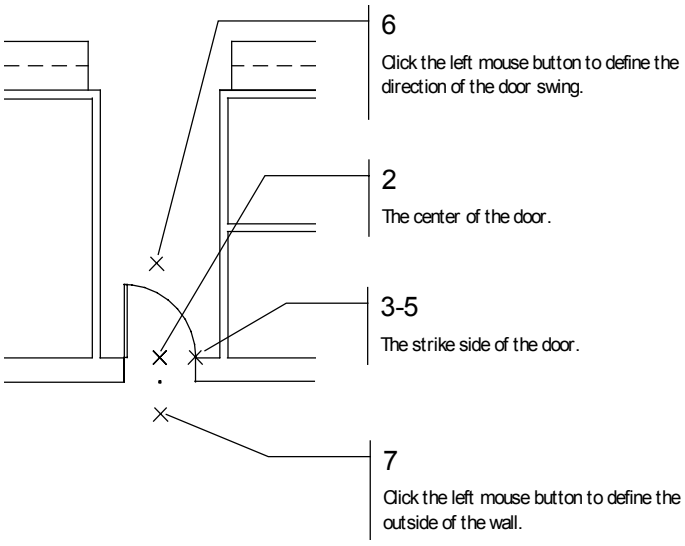

Figure 3.40: The front door is drawn.

8. Click on Sides to toggle on the Sides option.
9. Press (`) to set a new reference point.
10. Click the middle mouse button near the upper-left corner of Room A, shown in Figure 3.41. You are prompted to "Select hinge side of door".

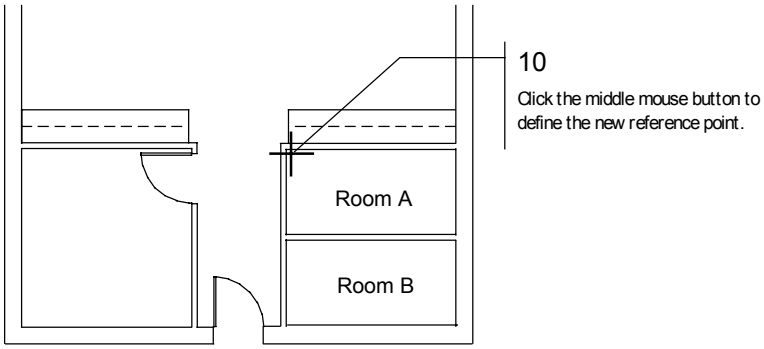

Figure 3.41: Locating the next door

11. Press (Spacebar). You are prompted to "Enter relative distance".
12. Type **.3** and press (Enter). You are prompted to "Enter relative angle".
13. Type **270** and press (Enter). You are prompted to "Select strike side of door".
14. Press (Spacebar). You are prompted to "Enter relative distance".
15. Type **3** and press (Enter). You are prompted to "Enter relative angle".
16. Type **270** and press (Enter). You are prompted to "Select direction of door swing".
17. Click anywhere inside Room A (on the right side of the wall) to define the direction of the swing. The wall is cut. You are prompted to "Select any point on the outside of the wall".
18. Click inside the hall to define the outside of the wall. This defines the non-printing snap point location. The door is drawn.
19. Now repeat steps 9-18 to create a door for Room B.
20. Right-click twice to return to the Edit menu.

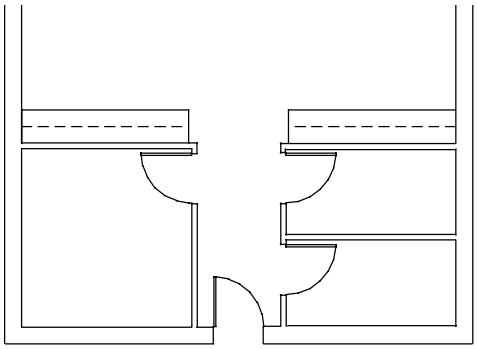

Figure 3.42: The remaining schoolhouse doors are drawn.

21. Click R on the Navigation Pad to recalculate the extents of the drawing.
22. Press (Ctrl) + (S) on the keyboard to save the drawing.

You have now completed entering all the doors for this exercise and saved them to your drawing file.

➔ To set up to draw windows:

1. Before you begin to draw windows, press (Tab) until the Windows layer is the active layer in the Status Area.
2. In the Edit menu in the Menu Window, click on Architct.
3. Click on Windows in the Architct menu. The Windows menu is displayed.

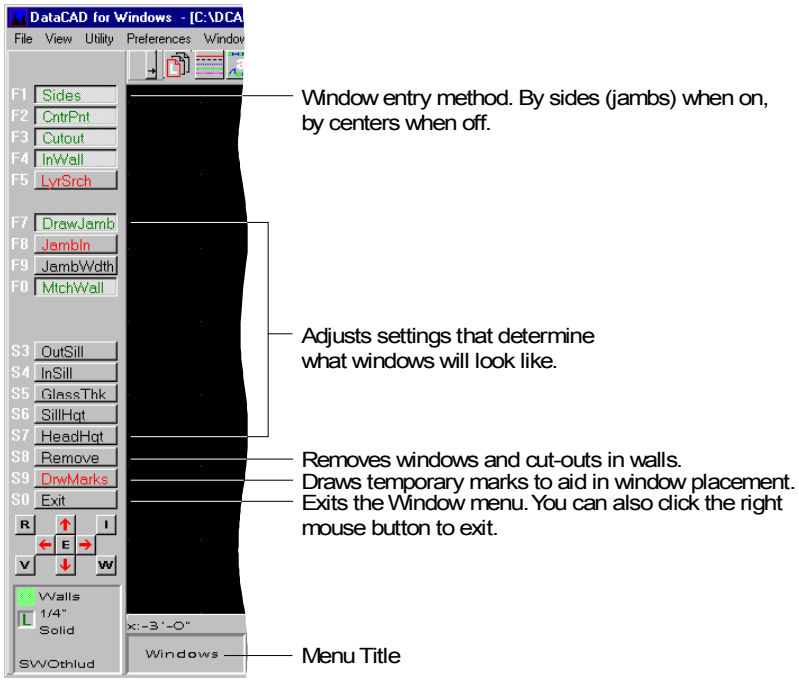

Figure 3.43: The Windows menu

➔ To draw the first window by sides:

1. Click W on the Navigation Pad to open the WindowIn menu. You are prompted to “Select first corner of the Zoom window”.
2. Click at the lower-left corner of the bottom wall. You are prompted to “Select second corner of the Zoom window”.
3. Diagonally move the mouse until the rubberband box encloses the lower half of the plan, and click to zoom in on your plan.

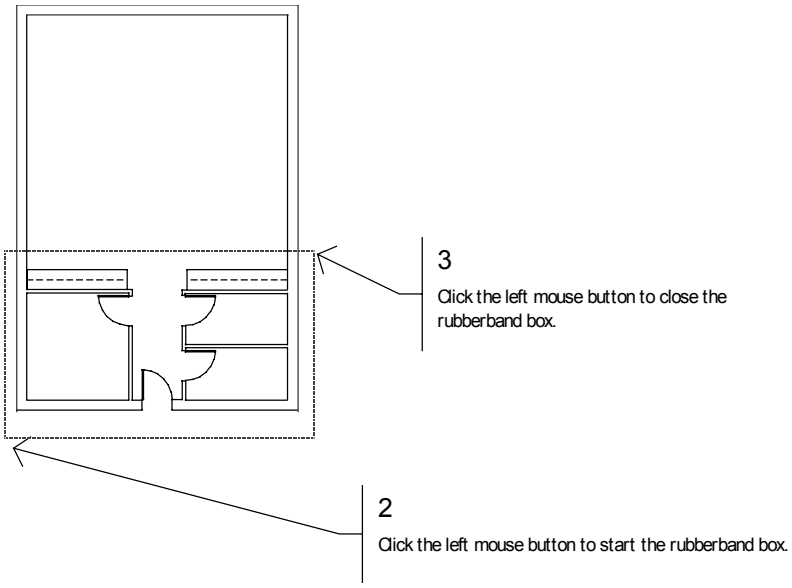

Figure 3.44: Zooming in on the lower half of your drawing

4. Right-click once to return to the Windows menu.
5. Press (`) on the keyboard. You are prompted to "Select reference point".
6. Click the middle mouse button near the lower left corner of the interior wall shown in Figure 3.45. This will be your reference point. You are prompted to "Select one jamb of window".

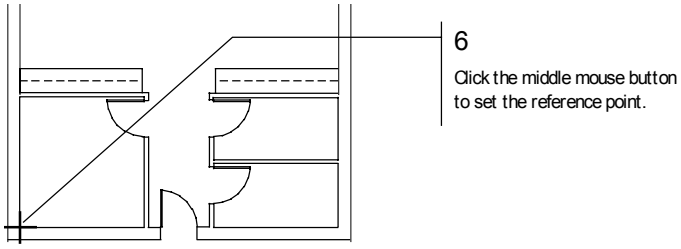

Figure 3.45: Setting a reference point

7. Press (Spacebar). You are prompted to "Enter relative distance".
8. Type **3.7** and press (Enter). You are prompted to "Enter relative angle".
9. Type **0** and press (Enter). You are prompted to "Select one jamb of window".
10. Press (Spacebar). You are prompted to "Enter relative distance".
11. Type **3** and press (Enter). You are prompted to "Enter relative angle".
12. Type **0** and press (Enter). You are prompted to "Select any point on the outside of the wall".
13. Click anywhere on the outside of the exterior wall. The window is drawn.

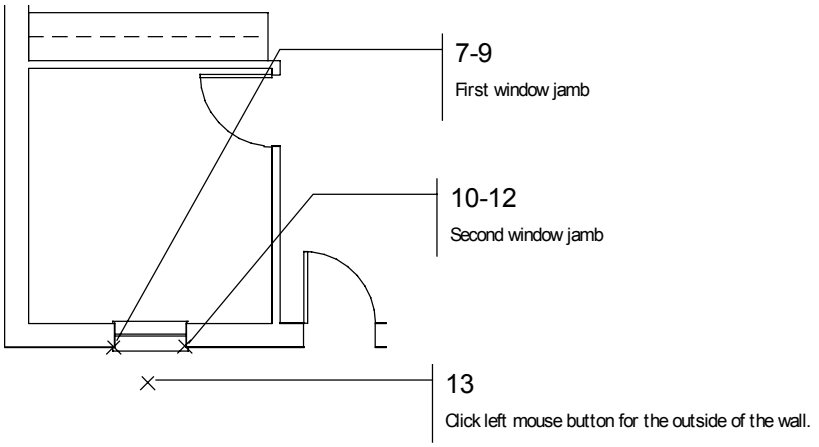

Figure 3.46: Drawing the first window

14. Move the cursor to the bottom right corner of Room B and repeat steps 6 - 14 for the window on the opposite side. Remember that the relative angles will now be 180.
15. Click E on the Navigation Pad to view the extents of the drawing.

➔ To draw multiple windows:

1. Click on Sides in the Windows menu to toggle Sides off; you can now define windows by the center and one side or jamb.
2. Click W on the Navigation Pad to open the WindowIn menu. You are prompted to "Select first corner of the Zoom window".
3. Click at the upper-right corner of the top wall. You are prompted to "Select second corner of the Zoom window".
4. Diagonally move the mouse until the rubberband box encloses the upper half of the plan, and click to zoom in on the plan.

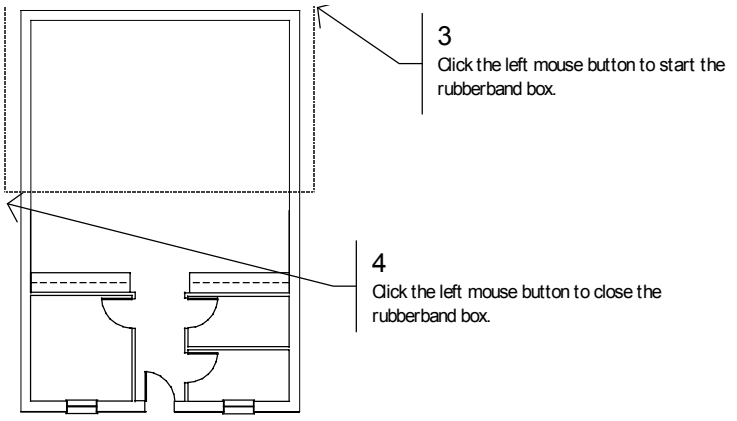

Figure 3.47: Zooming in on the upper half of your drawing

5. Right-click once to return to the Windows menu.
6. Press (`) on the keyboard. You are prompted to "Select reference point".
7. Move the cursor to the top left corner of the interior wall, as shown in Figure 3.48, and click the middle mouse button to set the reference point. You are prompted to "Select center of window".

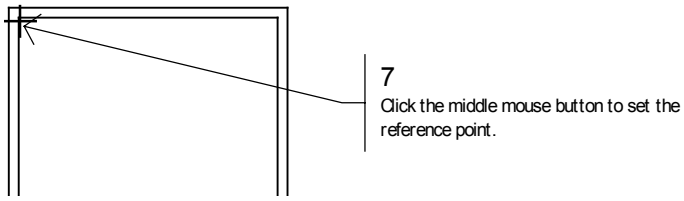

Figure 3.48: Setting a reference point

8. Press (Spacebar). You are prompted to "Enter relative distance".
9. Type **7.8** and press (Enter). You are prompted to "Enter relative angle".
10. Type **270** and press (Enter). You are prompted to "Select one jamb of window".
11. Press (Spacebar). You are prompted to "Enter relative distance".
12. Type **1.6** and press (Enter). You are prompted to "Enter relative angle".
13. Type **270** and press (Enter). You are prompted to "Select any point on the outside of the wall".
14. Click anywhere on the outside of the exterior wall. The wall is cut and the window is drawn.

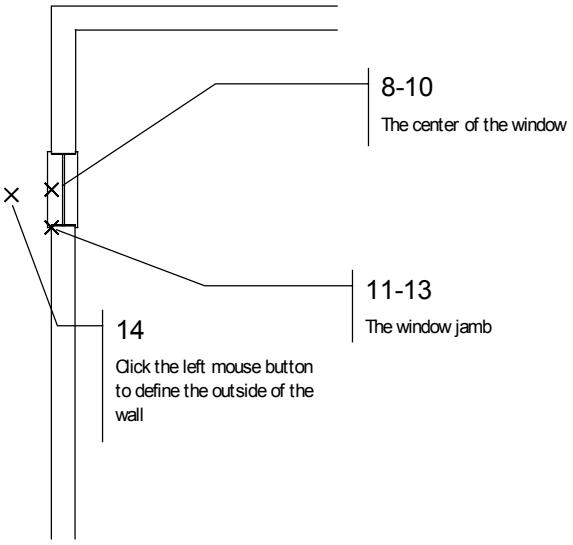

Figure 3.49: The wall is cut and the window is drawn.

15. Press (`) on the keyboard. You are prompted to "Select reference point".
16. Move the cursor to the center snap point of the window you just drew and click the middle mouse button to set the reference point. You are prompted to "Select center of window".
17. Press (Spacebar). You are prompted to "Enter relative distance".
18. Type **5.6** and press (Enter). You are prompted to "Enter relative angle".
19. Type **270** and press (Enter). You are prompted to "Select one jamb of window".
20. Press (Spacebar). You are prompted to "Enter relative distance".
21. Type **1.6** and press (Enter). You are prompted to "Enter relative angle".

22. Type **270** and press (Enter). You are prompted to "Select any point of the outside of the wall".
23. Click anywhere on the outside of the exterior wall. The wall is cut and the window is drawn.

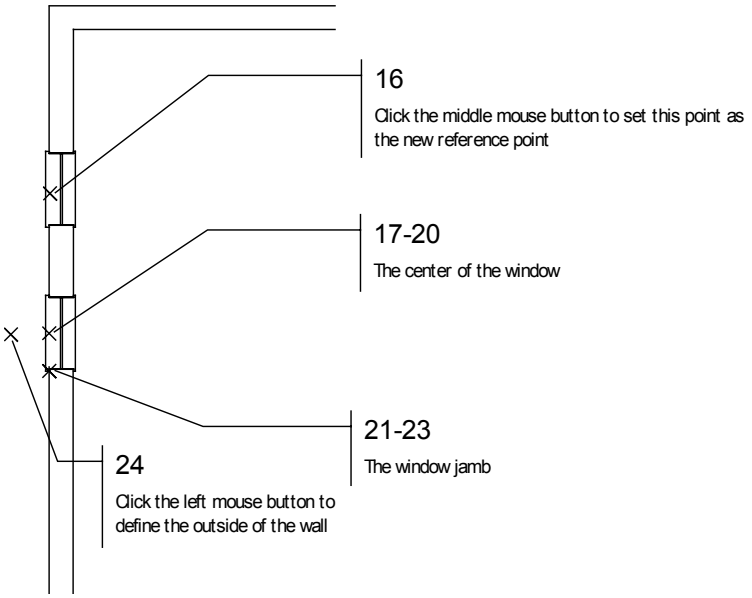

Figure 3.50: The wall is cut and the window is drawn.

24. Repeat steps 15 - 23 for the last window on this wall.
25. Repeat these steps to create the windows on the other wall.
26. Click E on the Navigation Pad to view the extents of the drawing. Your plan should look like Figure 3.51.

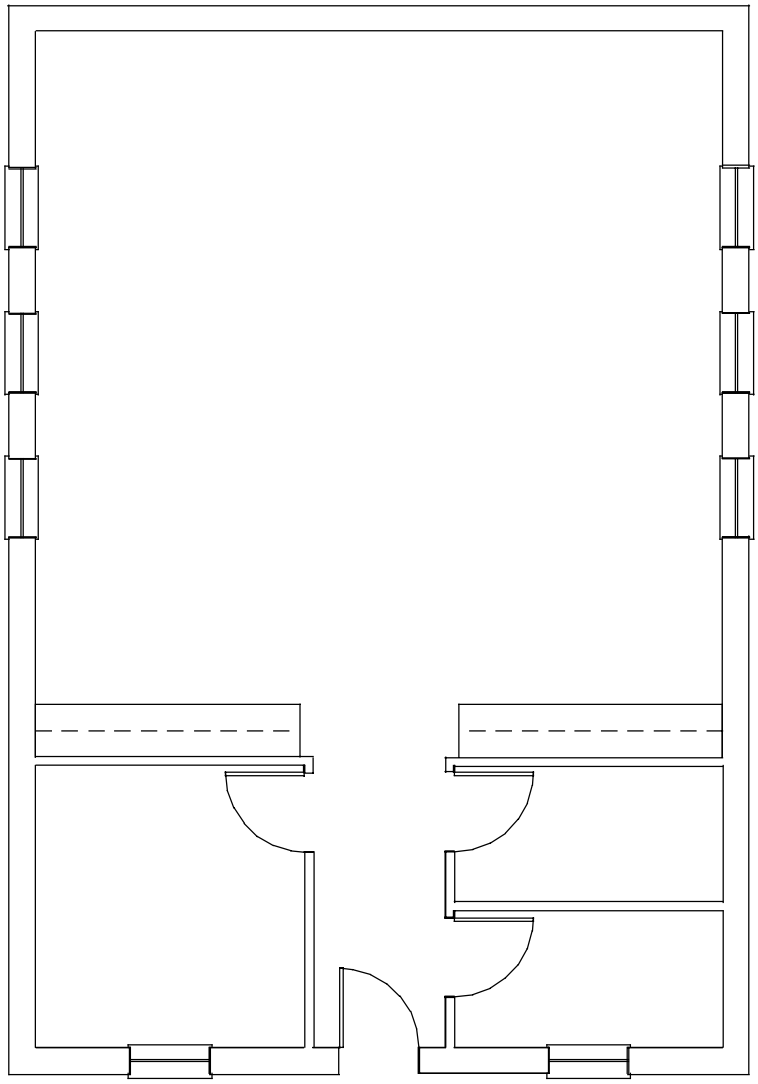

Figure 3.51: The Schoolhouse floor plan.

28. Press (Ctrl) + (S) to save the drawing.