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# 4

## Chapter Four RUNNING AN ANIMATION

There are many ways to launch Proof. When you install Proof, a program group is automatically added to the Windows Start menu, and a shortcut icon for Proof is placed in the Wolverine folder on your desktop. Also, you can associate .LAY files with Proof so that opening them launches Proof. Finally, it is possible to also launch Proof from a command prompt or from within a running program.

Let's try running an animation.

### Exercise 4-1: Controlling Viewing Speed and Time

#### *Starting Student Proof*

Install your version of Proof if you have not already done so.

Start Proof now by choosing **Start, Wolverine, Student Proof Animation** from the Windows Start menu. (The program group name may be different from Wolverine depending on your version of Proof.) After a brief delay, Proof comes up in Run Mode. Some menu and toolbar options will be grayed out, because no animation files have yet been opened. The top of the Proof window will appear as shown in Figure 4-1.

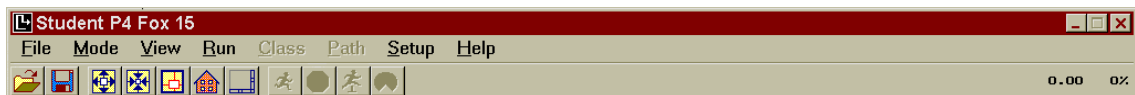


Figure 4-1. Proof's Run Mode Menu and Toolbar

#### *Opening a Layout and Trace File*

At the left end of the Proof menu bar is a **File** pop-up menu that you can use to open existing Proof files. Choose **File, Open Layout & Trace**; select the **exercise** folder; select **pickbest.lay**, the layout file for the first animation you're going to view.

## Starting and Stopping an Animation

Once you've loaded pickbest.lay, three of the four toolbar options that were initially grayed out will be colored in, as shown in Figure 4-2.

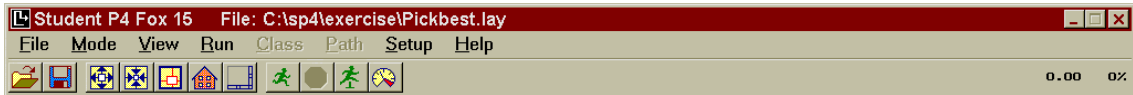





Figure 4-2. Menu and Toolbar after Loading Layout & Trace Files


At the right end of the toolbar, a number and a percentage are shown. The number is the current animation clock value, and the percentage is the approximate utilization of your computer's central processing unit (CPU). The animations you'll be viewing in this book will not require a lot of computation.

You use the following toolbar buttons to *Start* and *Stop* an animation:


-  Run (start or resume) an animation
-  Stop a running animation.

To start the pickbest animation, you can either choose **Run, Go** from the menu bar or click on the  **Run** icon. Please start the animation now. After the animation starts, the Run icon will be grayed out, and the Stop icon will show in red. After the animation has run for a few seconds, you can stop it by clicking on the Stop icon. (Actually, if you click anywhere or type any key, Proof assumes that you want to do something and stops execution, so clicking directly on the stop sign is just another option.) Please stop the animation now. Try starting and stopping the animation several times. Watch the animation clock value and the percentage value change at the right end of the toolbar.

## Speeding Up and Slowing Down an Animation

You use the  **Speed** button to control the *Viewing Speed* of an animation. Click on the **Speed** icon. A dialog box appears, asking you to enter a *new simulation : viewing time ratio*. The value you enter becomes the ratio of simulated time (or more precisely, the time units used in the animation trace commands) to seconds of viewing time. For example, if the time unit in a simulation is one second, specifying an animation speed of 1.0 causes the animation to run in real time. Specifying a value of 10.0 causes the animation to run ten times faster. Try speeding up and slowing down the pickbest animation (you can click **OK** or press the <Enter> key after entering your new speed value). Note that each time you specify a new speed, you'll have to resume the animation by choosing **Run**.

## ***Jumping Ahead and Back in Time***

You use the  **Time Jump** button to *jump* forward or backward in time. Try this. Click on the **Time Jump** icon. A dialog box appears, asking you to enter a new time to which to jump. Enter a time value that's a little past the current time and click **OK** or press <Enter>. Proof quickly fast forwards to the specified time and updates the current positions of all objects. **Run** the animation for a short time, then click the **Time Jump** icon once more. This time, specify a time earlier than the current animation time. Since Proof cannot run an animation in reverse, it will close the pickbest Trace file, reopen it at animation time zero, and fast forward to the time you have specified.

To test your ability to jump ahead and back in time, try running the pickbest animation in the neighborhood of animated time 495. It's around this time that the colored "sensor" first changes to a red color, indicating blockage on the conveyor aside which the sensor is located. You may find it helpful to slow down the animation.

This concludes Exercise 4.1. You can exit Proof by choosing **File, Exit** or typing <Alt-F>, x. You can also exit Proof by clicking the X at the top right corner of the Proof window, but on some systems this does not work cleanly.

## **Errors and Warnings Log**

When Proof recognizes an error or warning condition while running an animation, and in some cases to convey status information, it will display a message box. For most run-time errors or warnings, greater detail than that shown on the screen is written to an ASCII-text log file, **xxx.log**, where **xxx** is the base part of the trace file name. You can examine the contents of the log file using your editor or word processor. In some circumstances this may also help you in debugging your animation.

## **Exercise 4-2: Panning and Zooming**

Proof provides a number of ways to pan across the animation "canvas," to zoom in, and to zoom out. To illustrate these viewing tools, we'll again use the pickbest animation. Restart Proof (if you exited) and bring up the pickbest animation.

Note that pickbest will be the first layout file in the recent file history at the bottom of the File menu. (If you prefer the keyboard over the mouse, you can type <Alt-F>, 1 to select recent file number 1 in the File menu.)

## Zooming

Use the following toolbar icons to zoom into and out from the animation canvas:





Zoom In.




Zoom Out.




Activate the Zoom Box.

**Run** the pickbest animation for a short time and stop it. Click the  **Zoom In** button . A menu appears, offering you zoom factors of 110%, 140%, 200%, and 300%. Select any of these options to enlarge (zoom in) the contents of the screen by the specified percentage. Try experimenting with **Zoom In** and  **Zoom Out**.

When using **Zoom In** and **Zoom Out**, the center of the screen remains unchanged. If you want to zoom in on a specific area of the screen, the **Zoom Box** offers a quick way to do so. Click the  **Zoom Box** button. A red, rectangular box appears on the screen, with a red cross at its center. The red cross indicates the point that will become the new center of the screen when you click **OK** in the dialog box that appears. The rectangular box indicates the area that will occupy the viewing window after you click **OK**.


Drag the center of the zoom box to move the box. (Drag means click the mouse button and hold it down and move the mouse while the button is held down.) Drag the edge of the box to make it bigger or smaller. See if you can use the **Zoom Box** to zoom in on the sensor alongside the accumulating conveyor.

By choosing **View, Zoom-to-Fit** from the menu bar, you can squeeze an entire layout into a single screen. Proof automatically determines the minimum and maximum X- and Y-coordinates of your layout and calculates a viewing scale that will accommodate these values plus a small margin.

If you want to quickly go back to the Home View (the startup view that is saved with this Layout), click the  **Home** toolbar button, or press the **Home** key.

Zooming in or out can also be accomplished by specifying a viewing scale factor in the Active Window Properties dialog. We'll discuss this dialog later on in this chapter.

## Panning

You use the  **Scrollbar** icon to *reveal* and to *hide* scrollbars that are used to pan across the animation canvas. Click the **Scrollbar** button. Scrollbars appear at the bottom and right edges

of the screen. By dragging the scrollbar sliders, you can pan across the layout. Try this. Also try clicking within a scrollbar (away from the slider) to pan in increments.

You can hide the scrollbars if you like by clicking once more on the **Scrollbar** button.

Proof provides a second method of panning, called **Out & Back**. Choose **View, Out & Back** from the menu bar. When you do this, Proof remembers the current viewing scale, performs a zoom-to-fit, and asks you to click on what will become the new center of the screen. After you click on the new center of the screen, Proof redraws your layout at the original scale, but centered at the new center. Try this.

### Exercise 4-3: The Active Window Properties Dialog Box

**Restart** Proof and select the pickbest animation if you exited Proof at the conclusion of the previous exercise. Choose **View, Active Window Properties**. The **Active Window Properties** dialog box appears, shown in Figure 4-3, providing you with a number of ways to manipulate the current view.

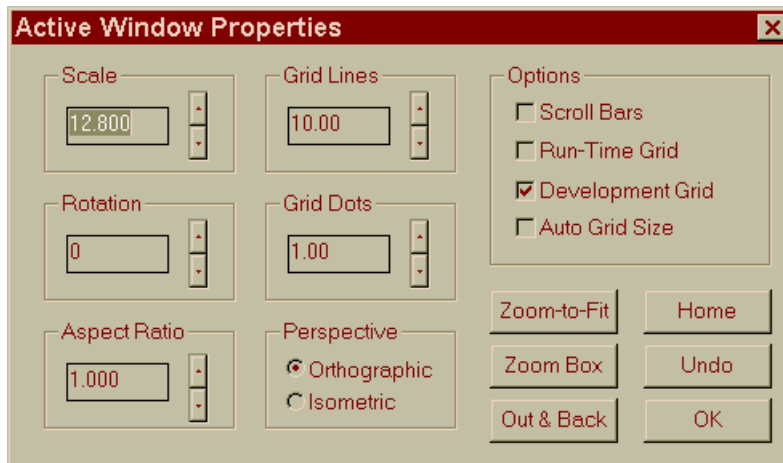


Figure 4-3. The Active Window Properties Dialog Box

By typing in a Scale factor or using the up and down arrows alongside the scale factor, you can change the current viewing scale, effectively zooming in or out.

By typing in an angular Rotation (in integer degrees), you can rotate the current view. Note that rotations by other than 90 degrees usually don't look very good.

Aspect Ratio is the ratio of *vertical scale* to *horizontal scale*. The *default aspect ratio* is 1.0. By specifying values greater than 1.0, you can stretch the current view vertically. By specifying

values less than 1.0, you can compress the current view vertically. The use of aspect ratios other than 1.0 is relatively rare.

The Active Window Properties dialog box allows you to turn Grid Lines on and off and specify their spacing. By default, Grid Lines are shown in “development” modes (Draw, Class, and Path Modes), and not shown in Run modes (Run, Debug, and Presentation Modes). You can override these defaults by checking or unchecking the Run-Time Grid and Development Grid options.

You can override Proof’s default choice of Grid Line/Dot Spacing by specifying values of your own. If you do so, the Auto Grid Size option will be unchecked, as it appears in Figure 4-3. If you later change your mind, you can revert to Proof-selected grid properties by checking the Auto Grid Size option.

By default, Proof draws layouts using orthographic projection, a “normal,” rectangular view. By clicking on the Isometric option, you can have Proof draw your layout in a tilted and rotated view. This view is sometimes called 2½-D, since it appears to be almost 3-D. (Proof implements Isometric perspective by rotating the layout by 45 degrees and changing the aspect ratio to 0.5.)

*Layout grid properties are stored in a Layout’s Home view. To permanently attach any changes you make to the grid, you must manually save the Home view.*

Other options in the Active Window Properties dialog box have already been discussed. **Zoom-to-Fit** and **Out & Back** are also available through the **View** menu, and **Zoom Box** is also a button. The Home View can be selected by clicking on the **Home** button in the toolbar or the <**Home**> key. Scroll bars can be turned on and off by clicking on the **Scrollbar** button in the toolbar.

Experiment with all of the viewing options until you’re satisfied that you have mastered them.

## Exercise 4-4: Named Views

### *Selecting a Previously Stored Named View*

A **Named View** is a set of window properties (scale, location, etc.) that you can store or recall. **Restart** Proof and select the pickbest animation if you exited Proof at the conclusion of the previous exercise. Choose **View, Select/Delete Named View**, and the dialog box shown in Figure 4-4 appears. Click on the down arrow, and a list of named views appears. Click on one of these names, then on **OK**. Try selecting several of the named views that have been defined in the pickbest layout.

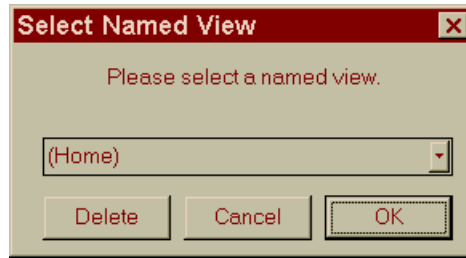


Figure 4-4. Selecting Named Views

You will notice that there is a (**Previous**) option in the list of views. Proof can always backtrack to the Previous view. It is not possible to save the Previous view.

### **Storing a Named View**

Use Proof's pan and zoom tools to select a view of the pickbest layout that you find interesting. Choose **View, Save Current View As**. Enter a new name for the view you have just defined, and click **OK**. The Named View you have just defined can be used later to switch to the view properties you just saved. If you save the Layout file, the definition of this new view will be saved.

Note: If you modify the active window properties with the intention of permanently changing the Home View (or any other Named View), the modifications will not be saved with the layout file unless you perform a **Save Current View As** operation and specify (**Home**) (or the **Named View** you wish to update) at some point prior to saving the layout file.

### **Deleting a Named View**

Choose **View, Select/Delete Named View**. Select a view name and click the **Delete** button. Proof will warn you that there is no undo operation for View deletion and asks you if you really want to delete the Named View you have selected. If you click ok, the Named View will be deleted

## **Exercise 4-5: Splitting the Screen**

### **Creating a New Screen Split**

**Restart** Proof and select the pickbest animation if you exited Proof at the conclusion of the previous exercise. Choose **View, Split Screen**, and the Split Screen dialog box shown in Figure 4-5 appears.



Figure 4-5. Split Screen Tools

Choose **Split Left-Right**, and a red vertical line appears in the center of the screen. As you move the mouse left and right, the red line automatically follows it, and the percentage of the screen split is tracked in the Split Screen dialog box. When you are satisfied with the screen split defined by the position of the red line, click the mouse, and the screen will split into two windows, each surrounded by a border. The border of the active window will show in red. Click **Done** to exit the screen splitting dialog. Now click **View, Zoom-to-Fit**, and the entire layout will be squeezed into the active window. Note that the other window does not change. Click anywhere in the other window. It will become the active window, and its border will show in red.

Choose **View, Split Screen** once more. This time, click on **Split Top-Bottom**. A horizontal red line appears, but only in the *active* window. As you move the mouse up and down, the red line follows it. Note that if you move the mouse into the inactive window, the red line then “flips” into that window. You can subdivide windows to an arbitrary depth. By allowing only subdivision, Proof forces each window to be a rectangle. Please click the mouse to create your second (vertical) screen split.

### Removing a Screen Split

Choose **View, Split Screen, Remove Split**. Proof will tell you that you can remove a split by clicking inside the window to be deleted, near the border you wish to delete. Try this once, and then click **Undo**. Now try clicking near an outside border, and Proof will tell you that you can’t delete such borders. Outermost windows must extend to the limits of Proof’s main window.