These last four modes are sometimes designated as PASM. The X100 has the PASM modes, but no other modes for shooting stills, and it has no mode dial. The modes are all easily selected, but here, again, Fujifilm appears to be assuming that users of this camera will have no problem in learning how to make adjustments that require some understanding of basic photographic principles.

Program Mode

This is the only shooting mode I have discussed in any detail up to this point. Program mode provides more automation than any other mode on the FinePix X100, but it still requires you to make sure several basic settings are adjusted the ways you want them or you risk ending up with results that are unexpected or even unusable.

To set this mode, turn the aperture ring (the large numbered ring around the lens, closest to the camera's body) so the red letter A is next to the indicator line. This setting tells the camera to set the aperture automatically. Then turn the shutter speed dial (the round knob on top of the camera next to the flash shoe) so that its red A is next to the similar indicator line, to make the shutter speed setting automatic as well. You will now see a large white P against a red background at the bottom left of the display, to indicate that Program mode is selected. (There will be no red background if you are using the optical viewfinder instead of the LCD or the electronic viewfinder.)

Program mode lets you control many of the settings available with the camera, except for the two that you have just set to be automatic—shutter speed and aperture. Even though you can't directly set those two values, though, you still can override the camera's automatic exposure to a fair extent by using exposure compensation, Program Shift, and exposure bracketing. I discussed exposure compensation in Chapter 2, and I'll discuss it further, along with exposure bracketing, in Chapter 5.

Program Shift is a feature that lets you adjust the pair of values the camera selects in Program mode for shutter speed and aperture. For example, if the camera selects, say, 1/80 second at f/3.4, the Program Shift feature will find equivalent combinations that result in the same exposure, such as 1/60 second at f/3.5, 1/50 second at f/4.0, or 1/40 second at 4.5. To use this option, when the camera is in Program mode, aim at your subject and let the camera's metering system evaluate the exposure. The selected shutter speed and f-stop (aperture setting) will appear to the right of the P for Program mode. Then, just turn the command dial right or left or press the command control right or left to find an equivalent set of shutter speed and aperture. When the camera is using one of these equivalent pairs of settings rather than the originally chosen setting, it displays those settings in yellow, as shown below; the original settings selected by the camera will appear in white if you turn the control back to select them.

Note that in some cases Program Shift is not available, and turning the command dial will not change the camera's settings of aperture and shutter speed. Those cases are when the flash is turned on, when the Dynamic Range option on the Shooting menu is set to Auto, or when the ISO Auto Control option on the Setup menu is set to On.

Why would you use the Program Shift option? Does it make sense to let the camera make its best calculation of the proper exposure and then override it? Well, yes, it may, in some cases. For example, you may want to see what the "proper" exposure is, and then decide if you can use a somewhat wider aperture

to achieve a blurred background, or a somewhat faster shutter speed to stop the action or prevent blur from camera motion. And, when you're experimenting with the camera to see what it is capable of, it can be very helpful to try various combinations of aperture and shutter speed to find out which combination gives you the best results in different situations. With a digital camera, there's no added cost for trying these different approaches, and Program Shift is one good way to experiment.

One way to look at Program mode is that it greatly expands the choices available through the Shooting menu. You will be able to make choices involving autofocus mode, picture quality, ISO sensitivity, film simulation, dynamic range, metering method, and others. I won't discuss all of those choices here; if you want to explore that topic, go to the discussion of the Shooting menu in Chapter 4 and check out all of the different selections that are available to you.

There is one limitation of Program mode that is worth remembering: With this mode, the slowest shutter speed that the camera will select is ¼ second. In all other modes, the camera can be set to shutter speeds as slow as 30 seconds, as well as the Bulb setting, which I will discuss in the next section. In Program mode, though, even if the lighting conditions would call for a speed of, say, 2 seconds, the camera will not set it. In that case, you could just switch to one of the other modes and make the appropriate settings.

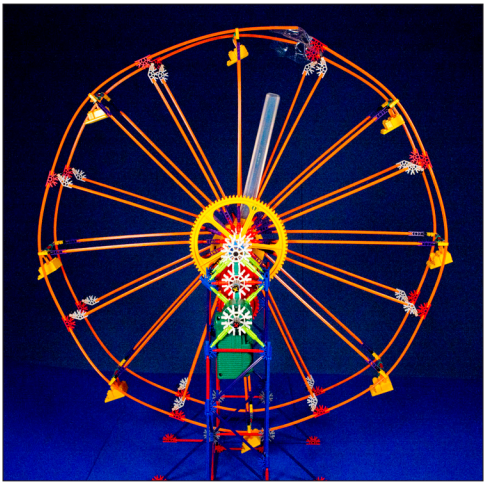
Shutter Priority Mode

In Shutter Priority mode, you choose whatever shutter speed you want, and the camera will set the corresponding aperture in order to achieve a proper exposure of the image. In this mode, you can set the shutter to be open for a variety of intervals ranging from 30 full seconds to 1/4000 of a second in some circumstances. If you are photographing fast action, such as a baseball swing or a hurdles event at a track meet and you want to stop the action with a minimum of blur, you will

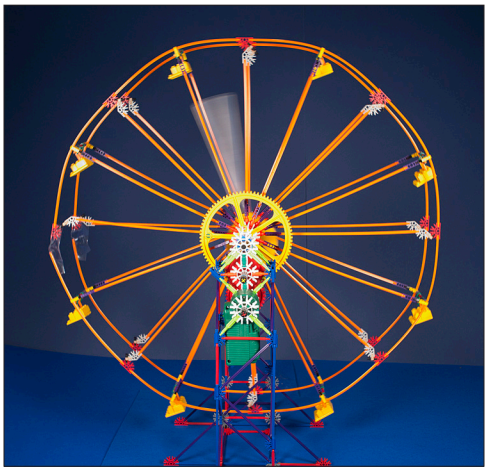
want to select a fast shutter speed, such as 1/1000 of a second. In other cases, for creative purposes, you may want to select a slow shutter speed to achieve a certain effect, such as leaving the shutter open to capture a trail of automobiles' taillights at night.

Controlling shutter speed is a powerful tool for creative photography. Here are some examples, for which I used a working model of a Ferris Wheel that has colored, blinking lights on a bar that rotates inside the wheel. All three shots were taken indoors under artificial light.

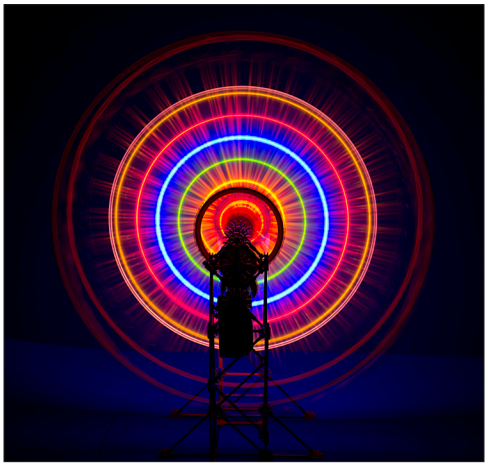
For the first exposure, below, I used a shutter speed of 1/1000 second to stop the rapid motion of the wheel. In this image, the wheel is basically frozen in place; you can see the rotating light bar standing still.



For the second exposure, I used a shutter speed of 1/60 second, considerably slower than with the first image, but still fast enough to make the wheel look as if it's stopped, though the rotating bar is blurred.



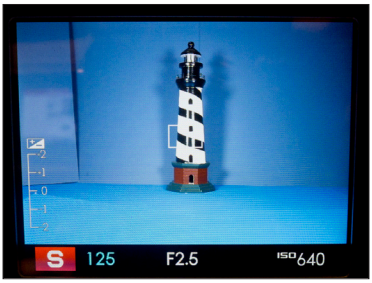
Finally, for the last photo, I used a long shutter speed of 10 seconds. For this shot, I turned out the lights in the room to allow the colored lights on the rotating bar to show up. This approach resulted in the solid, circular trails of color traced by the blinking lights as they rotated rapidly in the dark room. Using this very slow shutter speed essentially transformed the



subject of the picture into a different object. Of course, you can also use shutter speed settings to capture more ordinary scenes, such as sporting events. This next shot caught a bicycle

stunt rider in mid-air, with the X100 set to a shutter speed of 1/1000 second.

You select the Shutter Priority mode by setting the aperture dial around the lens to the red A, meaning the Automatic setting for aperture. Then you select the shutter speed by turning the shutter speed dial. The LCD (or viewfinder, if selected) will display the selected shutter speed at the bottom left of the screen, immediately to the right of the S indicating Shutter Priority mode.



As you point the camera at scenes with varying lighting, the camera will select and display the appropriate aperture (such as f/4.5, for example, displayed as F4.5 on the screen) to achieve a proper exposure.

Certain shutter speeds are not available directly from the dial on top of the camera, but can still be set. To select these less-

common speeds, when the shutter speed dial is set to a particular number turn the command dial to set intermediate values. For example, if you set the shutter speed dial to the number 125, meaning 1/125 second, you can then turn the command dial and set the nearby speeds of 1/80, 1/100, 1/160, and 1/200 second. The next faster speed, 1/250, is a main selection, which is set on the shutter speed dial itself.

Also, although the camera's overall range of shutter speeds is from 1/4000 second to 30 seconds and Bulb, not all of these speeds are available in every situation. In particular, shutter speeds of 1/4000 and 1/3000 second are available only when the aperture is set to f/8.0 or higher (more narrow apertures); shutter speeds of 1/2000, 1/1600, and 1/1500 second are available only with apertures of f/4.0 or higher. Shutter speeds of 1/1000 second and slower are available with all aperture settings. (In Program mode, as noted earlier, the slowest shutter speed available is ¼ second.)

After you have selected a shutter speed and pushed the shutter button halfway down, you need to watch the aperture number on the display. If that number turns red, that means that proper exposure at the selected shutter speed is not possible at any available aperture, according to the camera's calculations. For example, if you set the shutter speed to 2 seconds in a well-lighted room, the shutter speed number (which likely will be f/16.0, the most narrow setting available) may turn red, indicating that proper exposure is not possible. One good thing in this situation is that the camera will still let you take the picture, despite having blinked the number to warn you. The camera is saying, in effect, "Look, you may not want to do this, but that's your business. If you want an overly bright picture for some reason, help yourself." (Note: This situation is less likely to take place when you're in Aperture Priority mode, because in that mode, there is a wide range of shutter speeds for the camera to choose from—a range from 30 seconds to 1/4000 second in some situations, depending on certain factors, as discussed later in this chapter.)

Some other notes on the shutter speed numbers: When you set the shutter speed, the values will appear in different colors. A blue number means the speed is set appropriately. A red number means that the displayed value is not available. Any value of one second or slower will appear in yellow. This is just the camera's warning that visual "noise" may result at such slow speeds because of the nature of digital image processing and that you should use a tripod.

When setting the shutter speed, note that the faster values can be tricky to read, because only the denominator of the fractions is shown. For example, 1/500 second is shown as 500 and ½ second is shown as 2. The longer times may be easier to read; the camera displays them using quotation marks. So, for example, 2 seconds is displayed as 2", and 1.3 second is displayed as 1.3." In addition, any shutter speed of one second or longer is displayed in yellow, as an added reminder that this is a speed that may require the use of a tripod.

Also, some of the camera's shutter speeds are displayed as fractions whose denominators are decimal numbers, such as 1/1.3. I would have trouble understanding that number without doing some arithmetic, so here is a brief chart that converts these few values into terms that may be easier to comprehend:

1/2.5	0.4 or 2/5 second
1/1.6	0.625 or 5/8 second
1/1.3	0.77 or 10/13 second
	(sometimes listed as 0.8 second)

Time Exposures with the T Setting

As you can see by looking at the X100's shutter speed dial, the slowest shutter speed that can be set from that dial is represented by the number 4, meaning ¼ second. As noted above, you can also set the slower variations of that setting, 1/3 second, and 1/2.5 second (0.4 second) by turning the command