# 2 BASIC PHOTO CORRECTIONS

## Lesson overview

In this lesson, you'll learn how to do the following:

- Understand image resolution and size.
- View and access files in Adobe Bridge.
- Straighten and crop an image.
- Adjust the tonal range of an image.
- Use the Spot Healing Brush tool to repair part of an image.
- Use the content-aware Patch tool to remove or replace objects.
- Use the Clone Stamp tool to touch up areas.
- Remove digital artifacts from an image.
- Apply the Smart Sharpen filter to finish retouching photos.

This lesson will take about an hour to complete. Download the Lesson02 project files from the Lesson & Update Files tab on your Account page at www.peachpit.com, if you haven't already done so. As you work on this lesson, you'll preserve the start files. If you need to restore the start files, download them from your Account page.
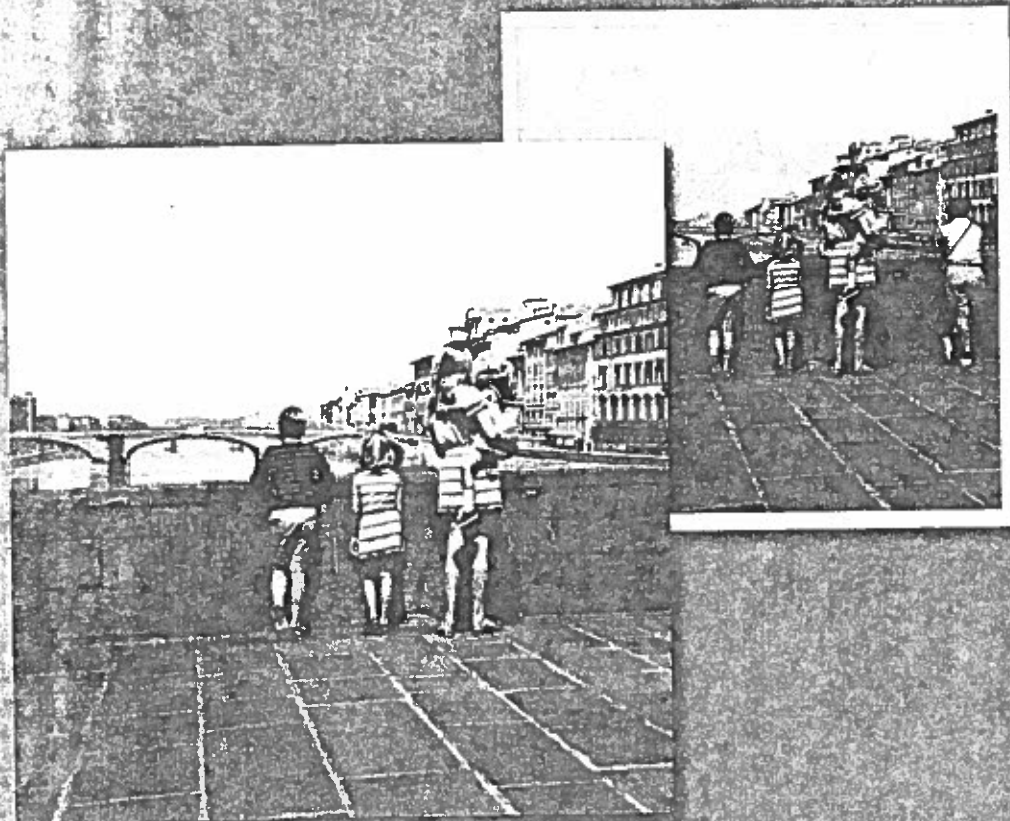
PROJECT: VINTAGE PHOTOGRAPH RESTORATION

Photoshop includes a variety of tools and commands for improving the quality of a photographic image. This lesson steps you through the process of acquiring, resizing, and retouching a vintage photograph.

# Strategy for retouching

How much retouching you do depends on the image you're working on and your goals for it. For many images, you may need only to change the resolution, lighten the image, or repair a minor blemish. For others, you may need to perform several tasks and employ more advanced filters.

## Organizing an efficient sequence of tasks

Most retouching procedures follow these general steps, though not every task may be necessary for all projects:

- Duplicating the original image or scan; working in a copy of the image file makes it easy to recover the original later if necessary
- Ensuring that the resolution is appropriate for the way you'll use the image
- Cropping the image to its final size and orientation
- Removing any color casts
- Adjusting the overall contrast or tonal range of the image
- Repairing flaws in scans of damaged photographs (such as rips, dust, or stains)
- Adjusting the color and tone in specific parts of the image to bring out highlights, midtones, shadows, and desaturated colors
- Sharpening the overall focus of the image

The order of the tasks may vary depending on the project, though you should always start by duplicating the image and adjusting its resolution. Likewise, sharpening should usually be your final step. For the other tasks, consider your project and plan accordingly, so that the results of one process do not cause unintended changes to other aspects of the image, making it necessary for you to redo some of your work.

## Adjusting your process for different intended uses

The retouching techniques you apply to an image depend in part on how you'll use the image. Whether an image is intended for black-and-white publication on newsprint or for full-color online distribution affects everything from the resolution of the initial scan to the type of tonal range and color correction that the image requires. Photoshop supports the CMYK color mode for preparing an image to be printed using process colors, as well as RGB and other color modes for web and mobile authoring.

# Resolution and image size

The first step in retouching a photograph in Photoshop is to make sure that the image has an appropriate resolution. The term *resolution* refers to the number of small squares, known as *pixels*, that describe an image and establish its detail. Resolution is determined by *pixel dimensions*, or the number of pixels along the width and height of an image.
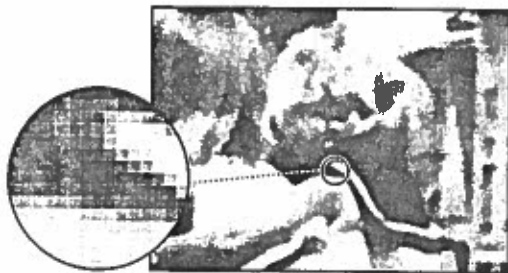


*Pixels in a photographic image*

In computer graphics, there are different types of resolution:

The number of pixels per unit of length in an image is called the *image resolution*, usually measured in pixels per inch (ppi). An image with a high resolution has more pixels (and therefore a larger file size) than an image of the same dimensions with a low resolution. Images in Photoshop can vary from high resolution (300 ppi or higher) to low resolution (72 ppi or 96 ppi).

The number of pixels per unit of length on a monitor is the *monitor resolution*, also usually measured in pixels per inch (ppi). Image pixels are translated directly into monitor pixels. In Photoshop, if the image resolution is higher than the monitor resolution, the image appears larger onscreen than its specified print dimensions. For example, when you display a 1x1-inch, 144-ppi image on a 72-ppi monitor, the image fills a 2x2-inch area of the screen.
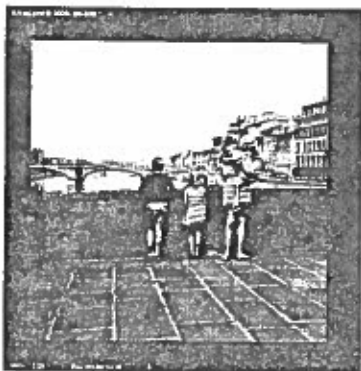
*7x7 inches at 72 ppi; file size 744.2KB*
*100% onscreen view*



*7x7 inches at 200 ppi; file size 5.61MB*
*100% onscreen view*

*The number of ink dots per inch (dpi) produced by a platesetter or laser printer is the printer, or output, resolution. Higher resolution images output to higher resolution printers generally produce the best quality. The appropriate resolution for a printed image is determined both by the printer resolution and by the screen frequency, or lines per inch (lpi), of the halftone screens used to reproduce images.*

Keep in mind that the higher the image resolution, the larger the file size, and the longer the file will take to print or to download from the web.

For more information on resolution and image size, see Photoshop Help.

## Opening a file with Adobe Bridge

In this book, you'll work with different start files in each lesson. You may make copies of these files and save them under different names or locations, or you may work from the original start files and then download them from the peachpit.com website again if you want a fresh start.

In this lesson, you'll retouch a scan of a damaged and discolored vintage photograph so it can be shared or printed. The final image size will be 7x7 inches.

In Lesson 1, you used the Open command to open a file. You'll start this lesson by comparing the original scan to the finished image in Adobe Bridge, a visual file browser that helps take the guesswork out of finding the image file that you need.

**◎ Note:** If Bridge isn't installed, you'll need to install it from Adobe Creative Cloud. For more information, see page 3.

1   Start Photoshop, and then immediately hold down Ctrl+Alt+Shift (Windows) or Command+Option+Shift (Mac OS) to reset the default settings.

2   When prompted, click Yes to confirm that you want to delete the Adobe Photoshop Settings file.

3   Choose File > Browse In Bridge. If you're prompted to enable the Photoshop extension in Bridge, click OK.

Adobe Bridge opens, displaying a collection of panels, menus, and buttons.

4   Select the Folders tab in the upper left corner, and then browse to the Lessons folder you downloaded onto your hard disk, so that the lesssons in the Lessons folder appear in the Content panel.
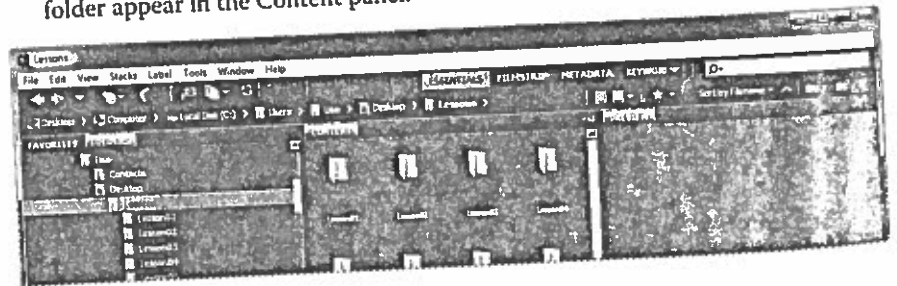
5 With the Lessons folder still selected in the Folders panel, choose File > Add To Favorites.

Adding files, folders, application icons, and other assets that you use often to the Favorites panel lets you access them quickly.

6 Select the Favorites tab to open the panel, and click the Lessons folder to open it. Then, in the Content panel, double-click the Lesson02 folder.

Thumbnail previews of the folder contents appear in the Content panel.
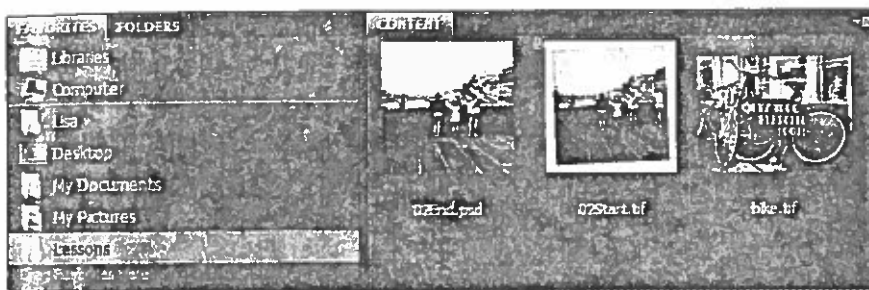


7 Compare the 02Start.tif and 02End.psd files. To enlarge the thumbnails in the Content panel, drag the Thumbnail slider at the bottom of the Bridge window to the right.

In the 02Start.tif file, notice that the image is crooked, the colors are relatively dull, and the image has a green color cast and a distracting crease. You'll fix all of these problems in this lesson, and a few others. You'll start by cropping and straightening the image.

8 Double-click the 02Start.tif thumbnail to open the file in Photoshop. Click OK if you see the Embedded Profile Mismatch dialog box.

9 In Photoshop, choose File > Save As. Choose Photoshop from the Format menu, and name the file 02Working.psd. Then click Save.
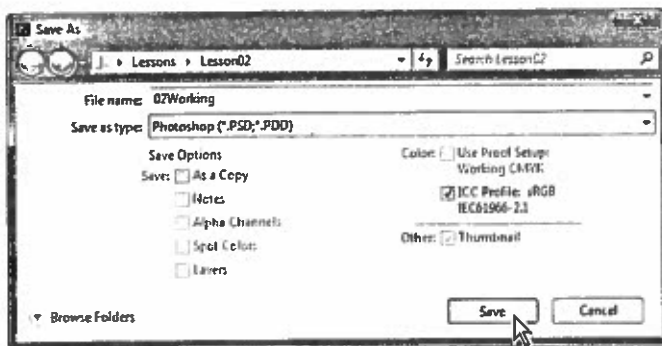
# Straightening and cropping
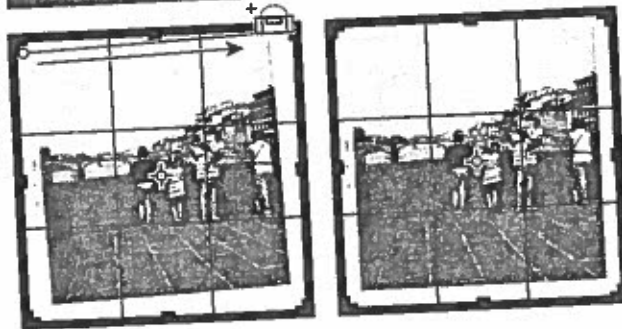# the image in Photoshop

You'll use the Crop tool to straighten, trim, and scale the photograph. You can use either the Crop tool or the Crop command to crop an image. By default, cropping deletes the cropped pixels.

1  In the Tools panel, select the Crop tool (⌖).

Crop handles appear, and a *cropping shield* covers the area outside the cropping selection.

2  In the options bar, choose W x H x Resolution from the Preset Aspect Ratio menu. (Ratio is the default value.)

3  In the options bar, type 7 in for the width, 7 in for the height, and 200 px/in for the resolution. A crop grid appears.
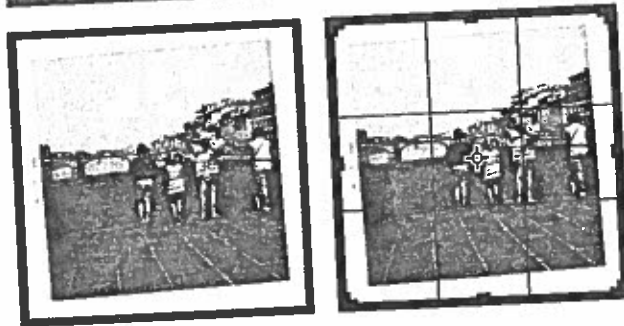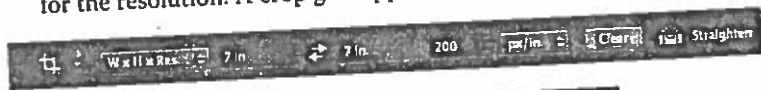


First, you'll straighten the image.

4  Click Straighten in the options bar. The pointer changes to the Straighten tool.

5  Click at the top corner of the photo, press the mouse button as you drag a straight line across the top edge of the photo, and then release.

Photoshop straightens the image, so that the line you drew is parallel with the top of the image area. You drew a line across the top of the photo, but any line that defines either the vertical or horizontal axis of the image will work.

Now, you'll trim the white border and scale the image.

6  Drag the corners of the crop grid in to the corners of the photo itself to crop out the white border. If you need to adjust the position of the photo, click and drag it within the crop grid.

7  Press Enter or Return to accept the crop.

The image is now cropped, and the cropped image fills the image window, straightened, sized, and positioned according to your specifications.
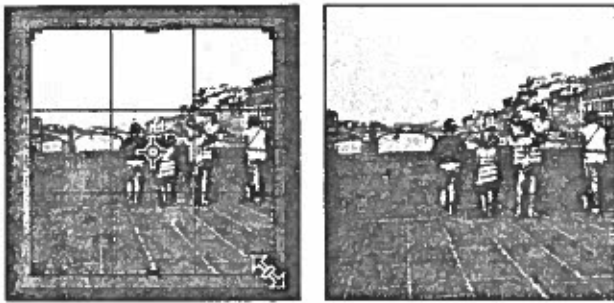


▶ **Tip:** You can choose Image > Trim to discard a border area around the edge of the image, based on transparency or edge color.

▶ **Tip:** To quickly straighten a photo and crop out the scanned background, choose File > Automate > Crop And Straighten Photos.

8  To see the image dimensions, choose Document Dimensions from the pop-up menu at the bottom of the application window.
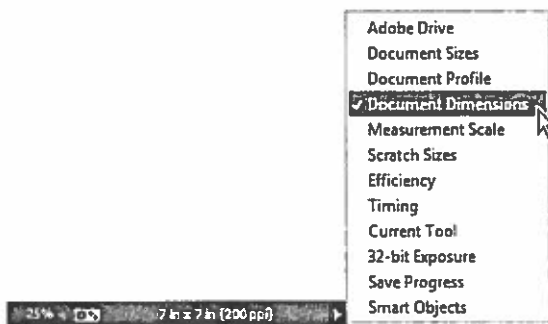


9  Choose File > Save to save your work. Click OK if you see the Photoshop Format Options dialog box.

# Adjusting the color and tone

You'll use Curves and Levels adjustment layers to remove the color cast and adjust the color and tone in the image. Don't let the Curves or Levels options intimidate you. You'll work with them more in later lessons; for now, you'll take advantage of their tools to quickly brighten and adjust the tone of the image.

1  Click Curves in the Adjustments panel to add a Curves adjustment layer.

2  Select the White Point tool on the left side of the Properties panel.
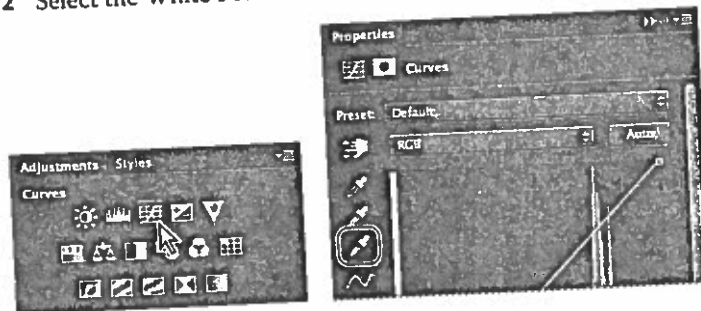


Specifying a white point changes all the colors in the image. The white point is the color that Photoshop defines as pure white, and it adjusts all other colors accordingly. To set an accurate white point, select a white area in the image.

3  Click a white stripe on the girl's dress.



The color tone of the image changes dramatically. You can click different white areas, such as the child's sailor dress, a stripe on the woman's dress, or the girl's sock, to see how each selection changes the color.

In some images, adjusting the white point is enough to remove a color cast and correct the tone of the image. Here, selecting a white point is a good start. You'll use a Levels adjustment layer to fine-tune the tone.

**4** Click Levels in the Adjustments panel to add a Levels adjustment layer.

The Levels histogram in the Properties panel displays the range of dark and light values in the image. You'll learn more about working with levels in later lessons. Right now, you just need to know that the left triangle represents the black point (the point Photoshop defines as the darkest in the image), the right triangle represents the white point (the lightest in the image), and the middle triangle represents the midtones.

**5** Drag the left triangle (blacks) under the histogram to the right, where the blacks are more pronounced. Our value was 15.

**6** Drag the middle triangle a little to the right to adjust the midtones. Our value was .90.
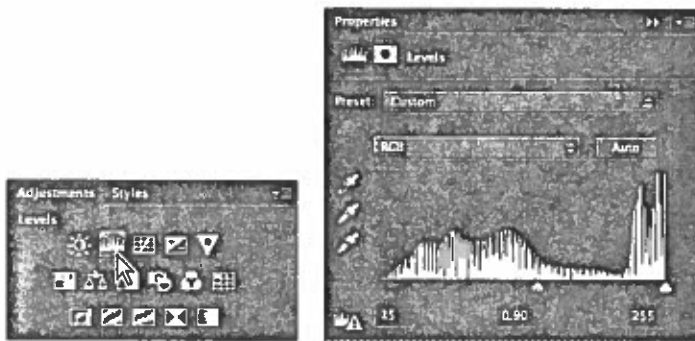


Now that you've adjusted the color, you'll flatten the image so it's easier to work with while you touch it up. Flattening an image merges its layers. After you flatten an image, you can no longer edit layers individually, but the file is smaller, and you can easily make changes to the entire image at once.

**7** Choose Layer > Flatten Image.

The adjustment layers merge with the Background layer.

As owner of Gawain Weaver Art Conservation, Gawain Weaver has conserved and restored original works by artists ranging from Eadward Muybridge to Man Ray, and from Ansel Adams to Cindy Sherman. He teaches workshops internationally as well as online on the care and identification of photographs.

Find out more at gawainweaver.com.

## Real-world photo restoration

The tools in Photoshop make restoration of old or damaged photographs seem like magic, giving virtually anyone the power to scan, retouch, print, and frame their photo collections.

However, when dealing with works by famous artists, museums, galleries, and collectors need to preserve original objects to the greatest degree possible despite deterioration or accidental damage. Professional art conservators are called upon to clean dust and soiling from print surfaces, remove discoloration and staining, repair tears, stabilize prints to prevent future damage, and even paint in missing areas of a work.
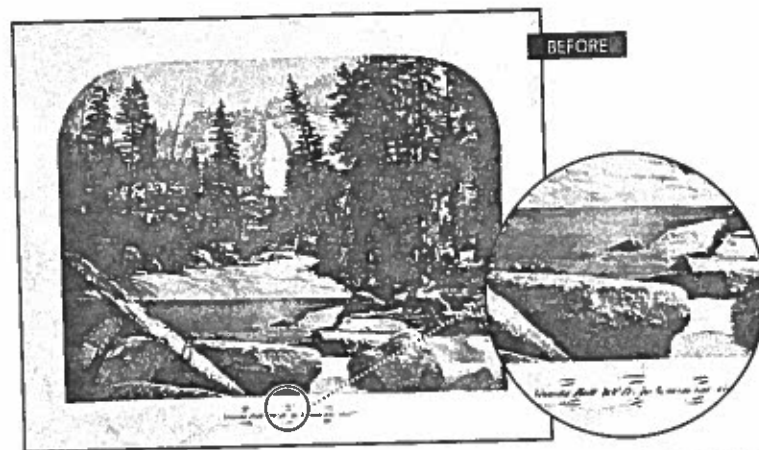


Carleton E. Watkins, Nevada Fall, 700 FT, Yosemite Valley, CA, mammoth albumen print, 15⅛"x20¾".
This print was removed from its mount to remove the stains and then remounted.

"Photograph conservation is both a science and an art," says Weaver. "We must apply what we know about the chemistry of the photograph, its mount, and any varnishes or other coatings in order to safely clean, preserve, and enhance the image. Since we cannot quickly 'undo' a step in a conservation treatment, we must always proceed with great caution and a healthy respect for the fragility of the photographic object whether it's a 160-year-old salt print of Notre Dame or gelatin silver print of Half Dome from the 1970s."

Many of the manual tools of an art conservator have analogous digital versions in Photoshop:

An art conservator might wash a photograph to remove the discolored components of the paper, or even use a mild bleaching process known as light-bleaching to oxidize and remove the colored components of a stain or overall discoloration. In Photoshop, you can use a Curves adjustment layer to remove the color cast from an image.

A conservator working on a fine-art photograph might use special paints and fine brushes to manually "in-paint" damaged areas of a photograph. Likewise, you can use the Spot Healing Brush in Photoshop to spot out specks of dust or dirt on a scanned image.

A conservator might use Japanese papers and wheat-starch paste to carefully repair and rebuild torn paper before finalizing the repair with some skillful in-painting. In Photoshop, you can remove a crease or repair a tear in a scanned image with a few clicks of the Clone tool.
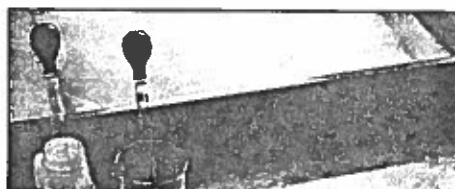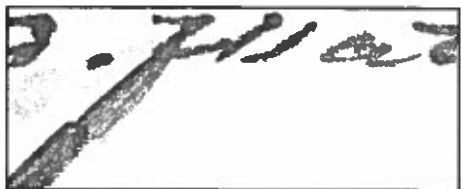


*A fixative was applied to the artist's signature with a small brush to protect it when the mount was washed.*

*"Although our work has always been first and foremost about the preservation and restoration of the original photographic object, there are instances, especially with family photographs, where the use of Photoshop is more appropriate," says Weaver. "More dramatic results can be achieved in far less time. After digitization the original print can be safely stored away, while the digital version can be copied or printed for many family members. Often, we first clean or unfold family photographs to safely reveal as much of the original image as possible, and then we repair the remaining discoloration, stains, and tears on the computer after digitization."*
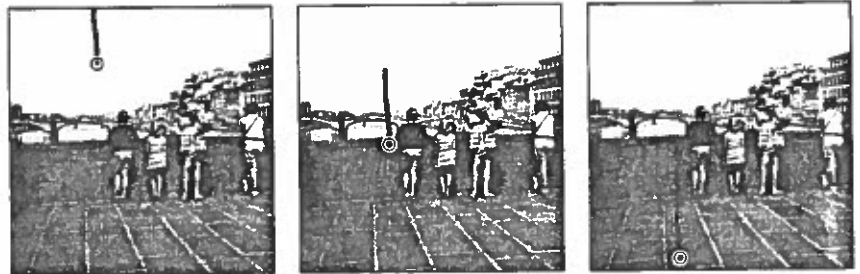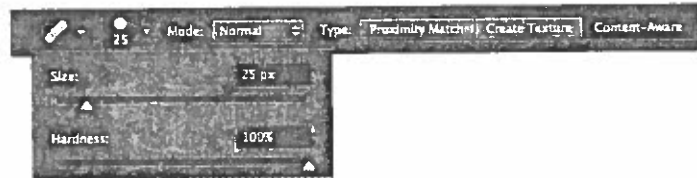
# Using the Spot Healing Brush tool

The next task is to remove the crease in the photo. You'll use the Spot Healing Brush to erase the crease. While you're at it, you'll use it to address a few other issues.

The Spot Healing Brush tool quickly removes blemishes and other imperfections. It samples pixels around the retouched area and matches the texture, lighting, transparency, and shading of the sampled pixels to the pixels being healed.

The Spot Healing Brush is excellent for retouching blemishes in portraits, but also works nicely wherever there's a uniform appearance near the areas you want to retouch.

1   Zoom in to see the crease clearly.

2   In the Tools panel, select the Spot Healing Brush tool ( ✐ ).

3   In the options bar, open the Brush pop-up panel, and specify a **100%** hard brush about 25 px in diameter. Make sure Content-Aware is selected in the options bar.

4   In the image window, drag the Spot Healing Brush down from the top of the crease. You can probably repair the entire crease with four to six neat downward strokes. As you drag, the stroke at first appears black, but when you release the mouse, the painted area is "healed."





5   Zoom in to see the white hair in the upper right area of the image. Then select the Spot Healing Brush again, and paint over the hair.
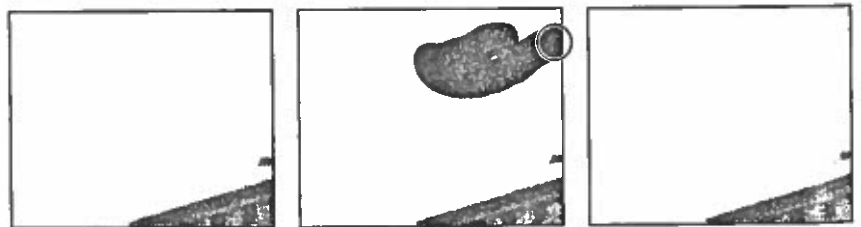
6   Zoom out, if necessary, to see the full sky. Then click the Spot Healing Brush wherever there are dark areas you want to heal.

7   Save your work so far.

## Applying a content-aware patch

Use the Patch tool to remove unwanted elements from an image. You'll use a content-aware patch to remove an unrelated person from the right side of the photo. In Content-Aware mode, the Patch tool creates nearly seamless blending with the nearby content.

1   In the Tools panel, select the Patch tool (⊖), hidden beneath the Spot Healing Brush tool (✐).

2   In the options bar, choose Content-Aware from the Patch menu, and make sure that Sample All Layers is selected. Then click the Adaptation gear icon, and choose 5 from the Structure menu.

The Structure menu determines how closely the patch reflects the existing image patterns. You can choose from 1 to 5, with 1 allowing the loosest adherence to the source structure and 5 requiring the strictest.

3   Drag the Patch tool around the boy and his shadow, as closely as possible. You may want to zoom in to see him more clearly.

4   Click within the area you've just selected, and drag it to the left. Photoshop displays a preview of the content that will replace the boy. Keep dragging to the left until the preview area no longer overlaps the area occupied by the boy, but without overlapping the woman or the girl she's holding. Release the mouse button when the patch is positioned where you want it.
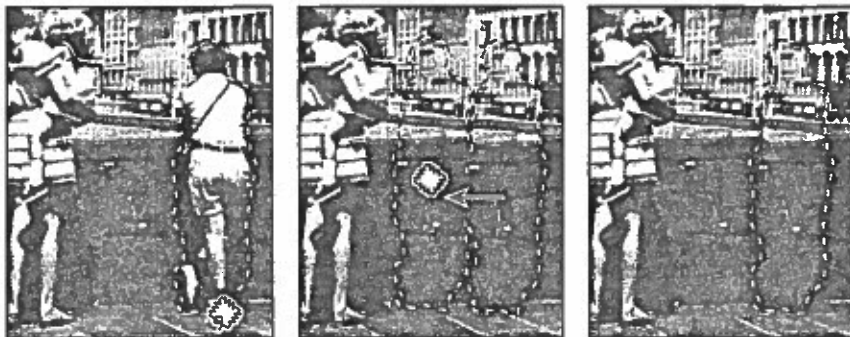


The selection changes to match the area around it. The boy is gone, and where he stood is a section of the bridge wall, and a building.

**5** Choose Select > Deselect.

The effect was pretty impressive, but not quite perfect. You'll touch up the results next.

# Repairing areas with the Clone Stamp tool

The Clone Stamp tool uses pixels from one area of an image to replace the pixels in another part of the image. Using this tool, you can not only remove unwanted objects from your images, but you can also fill in missing areas in photographs you scan from damaged originals.

You'll use the Clone Stamp tool to smooth out some irregularities in the height of the bridge wall and the windows on the building.

**1** Select the Clone Stamp tool (🖋) in the Tools panel, and select a **60 px** brush with **30%** hardness. Make sure that the Aligned option is selected.

**2** Move the Clone Stamp tool to an area where the top of the bridge wall is smooth. That's the area you want to copy to smooth out the area that was patched.

**3** Alt-click (Windows) or Option-click (Mac OS) to start sampling that part of the image. (When you press Alt or Option, the pointer appears as target cross-hairs.)

**4** Drag the Clone Stamp tool across the top of the bridge wall in the patched area to even it out, and then release the mouse button.
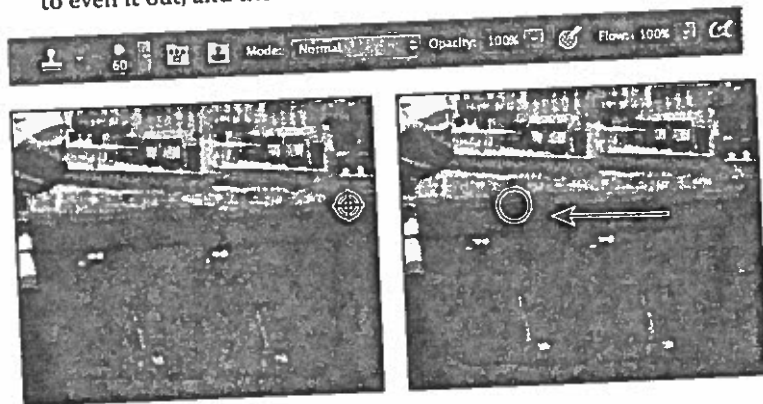


Each time you click the Clone Stamp tool, it begins again with a new source point, in the same relationship to the tool as the first stroke you made. That is, if you begin painting further right, it samples from stone that is further right than the original source point. That's because Aligned is selected in the options bar. Deselect Aligned if you want to start from the same source point each time.

5   Select a source point where the bottom of the bridge wall is even, and then drag
    the Clone Stamp tool across the bottom of the wall where you patched it.
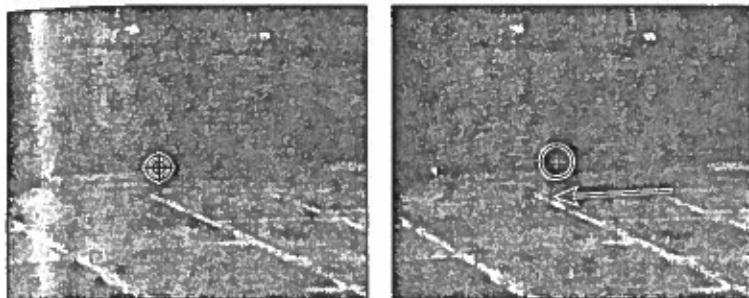


6   Select a smaller brush size, and deselect Aligned. Then select a source point over
    the rightmost windows in the lowest row on the building you patched. Click
    across to create accurate windows there.
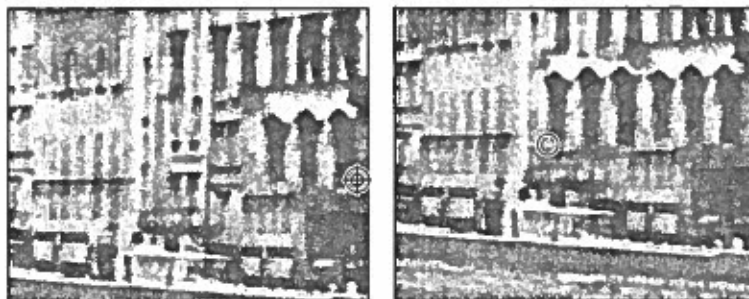




7   Repeat step 6 to make any adjustments you want to make to the lowest area
    of the building and the wall that runs in front of it.

8   If you like, you can use a smaller brush
    size to touch up the stones in the patched
    portion of the wall.

9   Save your work.

# Sharpening the image

The last task you might want to do when retouching a photo is to sharpen the image. There are several ways to sharpen an image in Photoshop, but the Smart Sharpen filter gives you the most control. Because sharpening can emphasize artifacts, you'll remove those first.

1 Zoom in to about 400% to see the boy's shirt clearly. The colored dots you see are artifacts of the scanning process.

2 Choose Filter > Noise > Dust & Scratches.

3 In the Dust & Scratches dialog box, leave the default settings with a Radius of 1 pixel and Threshold at 0, and click OK.
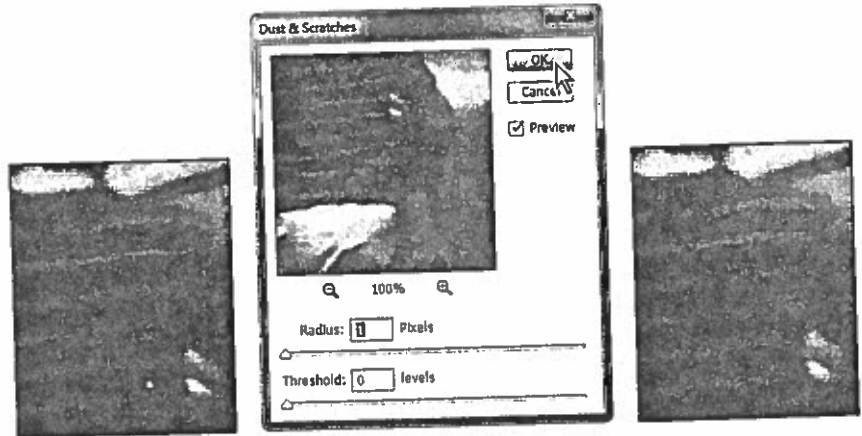


The Threshold value determines how dissimilar the pixels should be before they are eliminated. The Radius value determines the size of the area searched for dissimilar pixels. The default values are great for tiny dots of color like the ones in this image.

Now that the artifacts are gone, you can sharpen the image.

4 Choose Filter > Sharpen > Smart Sharpen.

5 In the Smart Sharpen dialog box, make sure that Preview is selected, so you can see the effect of settings you adjust in the image window.

You can drag inside the preview window in the dialog box to see different parts of the image, or use the plus and minus buttons below the thumbnail to zoom in and out.

6 Make sure Lens Blur is chosen in the Remove menu.

You can choose to remove Lens Blur, Gaussian Blur, or Motion Blur in the Smart Sharpen dialog box. Lens Blur provides finer sharpening of detail and reduced sharpening halos. Gaussian Blur increases contrast along the edges in an image.

Motion Blur reduces the effects of blur that resulted from the camera or the subject moving when the photo was taken.

7  Drag the Amount slider to about **60%** to sharpen the image.

8  Drag the Radius slider to about **1.5**.

The Radius value determines the number of pixels surrounding the edge pixels that affect the sharpening. The higher the resolution, the higher the Radius setting should usually be.

9  When you're satisfied with the results, click OK to apply the Smart Sharpen filter.
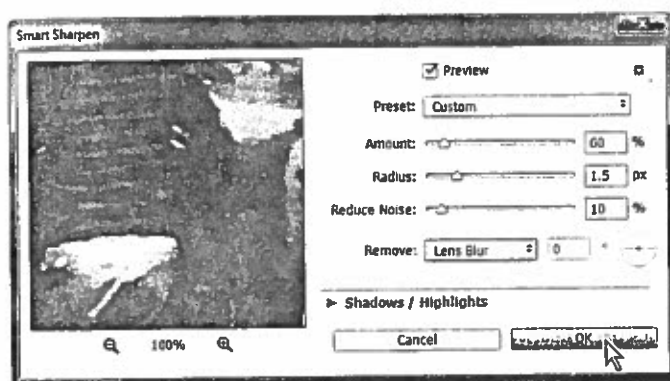


10  Choose File > Save, and then close the project file.

Your image is ready to share or print!

# Extra credit

## Converting a color image to black and white

You can get great results converting a color image to black and white (with or without a tint) in Photoshop.

1   Choose File > Open, and navigate to the bike.tif file in the Lesson02 folder. Click Open.

2   In the Adjustments panel, click the Black & White button to add a Black & White adjustment layer.
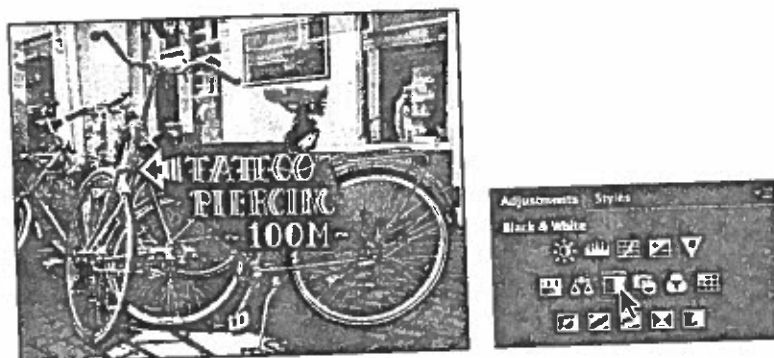


3   Adjust the color sliders to change the saturation of color channels. You can also experiment with options from the preset menu, such as Darker or Infrared. Or, select the tool in the upper left corner of the Adjustments panel, and then drag it across the image to adjust the colors associated with that area. (We darkened the bike itself and made the background areas lighter.)

4   If you want to add a tint to the photo, select Tint. Then, click the color swatch and select a tint color (we used R=227, G=209, B=198).
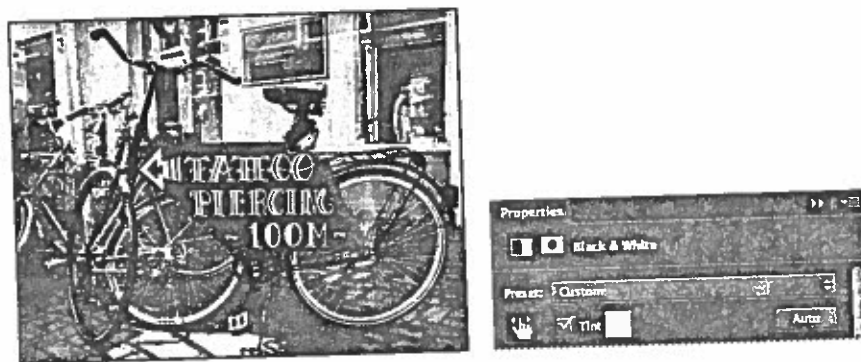
## Review questions

1 What does *resolution* mean?

2 What does the Crop tool do?

3 How can you adjust the tone and color of an image in Photoshop?

4 What tools can you use to remove blemishes in an image?

5 How can you remove digital artifacts such as colored pixels from an image?

## Review answers

1 The term *resolution* refers to the number of pixels that describe an image and establish its detail. *Image resolution* and *monitor resolution* are measured in pixels per inch (ppi). *Printer,* or *output, resolution* is measured in ink dots per inch (dpi).

2 You can use the Crop tool to trim, scale, or straighten an image.

3 To adjust the tone and color of an image in Photoshop, first use the White Point tool in a Curves adjustment layer. Then refine the tone using a Levels adjustment layer.

4 The Healing Brush, Spot Healing Brush, Patch tool, and Clone Stamp tools let you replace unwanted portions of an image with other areas of the image. The Clone Stamp tool copies the source area exactly; the Healing Brush and Spot Healing Brush tools blend the area with the surrounding pixels. The Spot Healing Brush tool doesn't require a source area at all; it "heals" areas to match the surrounding pixels. In Content-Aware mode, the Patch tool replaces a selection with content that matches the surrounding area.

5 The Dust & Scratches filter removes digital artifacts from an image.