

The Power of Pictures: Using Image Files with ODS, SAS®, and SAS/GRAPH® LeRoy Bessler PhD, Fortis, Milwaukee, Wisconsin, USA

Abstract

You might want to use a logo. You may have images created with a digital camera. Hardcopy photos or illustrations, or even a 3D object, can be converted to image files with a scanner. There are stock photos and clip art, free or for fee, on the web or bundled with software. You can create images with SAS/GRAPH or other software. This tutorial shows how to create image files with SAS/GRAPH, and how to imbed an image in a graph, but emphasis is on various ways to imbed image files, from any source, in web pages (and other output), using the SAS Output Delivery System. Besides imbedding images in tables, graphs, web pages, etc., you can import images into Microsoft Word or PowerPoint, for use as is, or after adjustments there (clipping, resizing, and other manipulation) without fancy expensive image editing tools. The tutorial compares characteristics, advantages, and disadvantages of image file types (GIF vs. JPEG), and explains how to minimize web download wait. SAS 8.2 is used. Experience with ODS and SAS/GRAPH is assumed.

Introduction

This is a tutorial about creating images, and especially about imbedding images, taught with examples, code, tips, and guidelines.

My scope is limited to what fits in the presentation time available.

Slides for the stand-up presentation, and code used here and there, as well as code omitted in this paper (its omission is usually shown here as "..."), are available via email in a zip file. If you have comments or questions, or suggestions on what to cover in a future edition, please send them.

The Power of Simplicity

The Number One Usability Concern of Web Users: download time.

Simple web pages download faster. So, avoid excessive use of images, if they are only for decoration. Unneeded complexity can distort, distract, and delay communication. A sparse web page focuses attention. The Power of Simplicity—Shows Them What's Important.

Image File Formats for the Web

To reduce download time, all image file formats for the web use compression. This is the removal of "extra" data from the file that was the original image. GIF and PNG use lossless compression. JPG uses lossy compression, but the result usually may not be noticeable.

GIF (Graphic Interchange Format) is used primarily for graphs, logos, simple cartoon-like illustrations, icons, and other images with areas or segments of solid colour (also called "flat colour"). Its advantages include: (a) small file size—quick download; (b) support for transparency; and (c) support for animation. Transparency permits the web page background to show through your image—if you wish that to happen. It eliminates the effect of a box around your image. Though animation is not usually relevant for business graphics, it can be used to show evolution over time of measurements that have to be displayed via a map (e.g., population change over time). GIF animation is easier and cheaper than any other animation alternative. GIF's main "theoretical" disadvantage is the fact that it supports only 256 colours (8-bit colour). This is not necessarily a serious limitation. There are only 216 "browser-safe" (a.k.a. "web-safe") colours. If you create an image with SAS/GRAPH, you cannot use more than 255 colours. It is unlikely that you would design a graph with anywhere near 255 colours, much less want to use more than the 256-colour GIF limit. GIF is the oldest format used for web images, and the most popular choice, except when dealing with photographs. It is universally supported: all browsers, all versions of browsers. All web page screen images in this paper were captured

with Version 7.04 of Jasc Paint Shop Pro, and saved as GIF files. Except for two photos and the logo, all images in my web pages were created as GIFs with SAS/GRAPH.

JPG (a.k.a. JPEG, for Joint Photographic Experts Group) is used for photographs, which are continuous tone images. Its main advantage is its support for 24-bit colour (16.7 million colours). JPG uses a "lossy" compression. Some of the data is thrown away and not recoverable. You may not notice the difference, however. Despite compression, JPG files are usually larger and slower to download, because photographs require a lot of data to digitally define them. Also decompression by the web browser takes extra time. JPG has no support for transparency or animation. The JPG compression algorithm works well for continuous tone colour, but areas of "flat" (or solid) colour, areas with sharp edges, lines, and text are adversely affected. Though JPG supports 16.7 million colours, if it is displayed on a 256-colour display (there are a surprisingly large number of these out there), the colours are remapped to the 216-colour browser-safe palette and "dithered". Dithering is a way to try to simulate the unsupported colours.

Tip: Before you edit a JPG image, be sure to make a duplicate of the original. When you save the edited image, it gets compressed further. And if you edit that result and save it, it gets recompressed yet further. After enough progressive compression, the result will be unacceptable.

Tip: You can mitigate the effect of long download times for a JPG image (or any other image type). Define a tiny box (1 pixel by 1 pixel) at the top of a web page, and "load" the JPG file into it. E.g., you can do this with your home page. In fact, you can load multiple such imperceptible boxes with images. If a linked web page, which the viewer gets to later, references any of these images for full-size display, the image file will be retrieved from a place on the viewer's PC disk where it has been stored, rather than being downloaded again over the network. This creates the illusion of instant download. Of course, enough time must have elapsed since opening the initial web page. Later discussion will explain how to set up these boxes.

PNG (Portable Network Graphic) is a lossless compression format, which results in files that are larger than JPG for the same image content. Besides the 8-bit colour supported by GIF, and 24-bit colour supported by JPG, 16-bit gray scale (very useful for medical images) and 48-bit colour are supported by PNG. There are unique features of PNG, including gamma correction (see below) and variable levels of transparency, but they are not supported by all creation and browsing tools. The main disadvantage of PNG is that, despite its benefits, it does not enjoy the same universality of support as GIF and JPG. Older web browsers and some PCs might not be able to display it.

Gamma Correction. Displays vary in performance. Images created on a Mac look dark on a PC or Unix. Images created on a PC or Unix look washed out on a Mac. Gamma Correction enables a PNG image to display with its intended brightness regardless of platform.

Reducing Image Size without File Compression

Case 1. Creating an image file with SAS/GRAPH. For how to create a minimalist image that is communication-effective (in fact, to see how minimalism enhances communication effectiveness), please see Reference 1. Simpler images are smaller and download faster.

Case 2. Working with a pre-existing image. This could be a stock photo, a digital photo made with your own camera, your output from scanning, etc. You could use a fancy image-editing tool. If you don't have one, and don't want to get one, all hope is not lost. Let's assume that your only need is to crop the image (i.e., to trim off areas from one or more of the edges of the image), and possibly re-size it (you could

reduce it, or enlarge it). Here is my solution. Open MS Word to create a new document. Define your page and/or column size any way you like. Click on Insert. Click on Picture. Click on From File. Find the .GIF or .JPG (or other file type) you want. Highlight the file, and click on Insert. Regardless of the "native" (i.e., natural) size of the image, it will be imported to the space in your page and column. If it is too big, it will shrink to fit. If it is too small, it will occupy only part of the space. Right click on the image, and then Format Picture. This brings up a Format Picture window with five active tabs. The ones of interest are Picture and Size. On the Picture tab, use the Crop From section, which allows you to remove a strip of any width from the Left and/or Right and/or Top and/or Bottom. On the Size tab, use the Size and Rotate section. When adjusting size, do not change options in the Scale section. The Lock Aspect Ratio box in the Scale section may already be checked. If not, check it before changing the size. With Lock Aspect Ratio checked, you can change either Height or Width, and the other dimension will be automatically scaled to prevent image distortion. Having cropped and/or resized the image, now "export" it. Here's how. In this MS Word "pseudo-document", click File, then Save As. For "Save as type", select "Web Page". Enter a folder and filename, and click Save. Now go to that folder. There you will find an HTML file, with the name you selected. It is a web page containing only the edited image. This is NOT what you want. You will also find a subfolder with name "YourHTMLfilename_files", where by "YourHTMLfilename" I mean the name specified when you saved the web page. Inside the folder are three files. The one you want is called image002, which is the result of your editing. Rename image002 to something meaningful, and move it to a permanent folder location. The other three outputs can be deleted.

Getting Pre-existing Images

Formal Means. You can find stock photo and clip art suppliers on the Internet. Any search engine should help you. (I like google.) These images fall into three categories: (a) free and unrestricted re-use; (b) free re-use for non-commercial purposes; and (c) for-fee only.

Informal Means. Besides using the above formally offered sources of images, you can save to your disk almost any image that is displayed by a web page. If you place your mouse over the image, and right click it, a window opens to permit you to do several things. You can display its Properties: name of the file; type of image file; fully qualified URL for where the source image file is; file size in bytes (to judge the impact of storage on your disk); dimensions of the image in pixels; and dates of creation and modification. You can save the image to your disk, in either the same format, or as a BMP (always a much bigger size file).

Caution. Some images are marked with a copyright. Even if it is permissible to reuse such an image for non-commercial purposes, it would be tacky, and probably illegal, to crop off the copyright, and republish the image. A second-hand viewer could assume there was no copyright asserted for the image, and might reuse it commercially.

Sizing Considerations for Web Images

Screen Resolution. Sizing a web image in centimeters or inches has no value. The physical dimensions of an image are a function of screen resolution. It is frequently claimed that the typical screen resolution is as low as 72 pixels per inch. It is a fact that you can get screen resolutions at least as high as 133 pixels per inch. So, e.g., an image with a width of 400 pixels will display with a width of 5.5 inches on the low-resolution screen, but only 3 inches on the high-resolution screen. In any case, you should plan your web page for the lowest probable resolution, which is presumably 72 pixels per inch. Also, PCs with higher resolutions are often set to lower resolutions, perhaps since the user does not know what is possible.

"Live" Area in the Web Browser Window. Not all the space on the PC screen is available for web page display. Besides what Windows uses, the web browser uses space on all four sides, especially the top. How much depends on the web browser, and its version. And "progress" is not necessarily increasing the live space. Just as screen resolution determines physical size of an image, so, too, it determines how much live space is available to display your images and the rest of your web page. For the smaller screen dimensions, 640 X 480, 800 X 600, and

1024 X 768, some designers assume that minimum live areas are, roughly, 625X275, 785 X 400, 1000 X 565. To evaluate your own web design, you can measure it versus space available with a background grid. See the Appendix for examples and their sources.

Scrolling. Do not use scrolling, especially in the horizontal direction, as a web page design solution. The web page should be designed to fit entirely in the smallest probable web browser live space in which it will be displayed. And, certainly, an image—which is intended to be viewed as a whole—should almost never be sized so as to require scrolling. But a large map would be a valid application for scrolling.

Creating Image Files with SAS/GRAPH

```
goptions reset=all;
goptions device=gif; /* make a simple GIF */
goptions gsfname=anyname gsfmode=replace;
filename anyname
    "&IMGPATH.\ImageAtTopOfBody.gif";
goptions border cback=CX99FFFF;
goptions ftext=CENTX htext=30 PCT;
goptions xpixels=50 ypixels=50; /* size */
proc gslide; /* could be any graph PROC */
title j=C move=(+0 PCT,-5 PCT)
    'Top of' j=C 'Body';
run; quit;
```

&IMGPATH is a symbolic (or macro) variable that has been previously initialized with a %LET statement. The above code creates a boring image of two lines of text in a small box. Most images in this tutorial are boring. They are not meant to impress you. They are convenient, compact objects used to illustrate techniques for imbedding images in web pages. It is necessary in some situations to imbed a blank (or, really, transparent) GIF as filler. Here is the code used to make one:

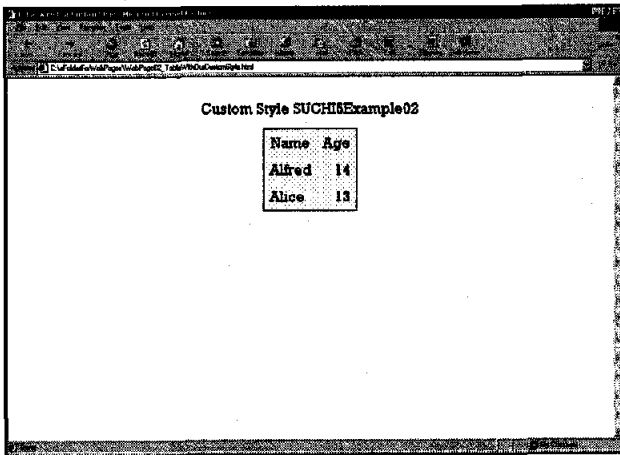
```
goptions reset=all;
goptions device=gif; /* make a filler GIF */
goptions gsfname=anyname gsfmode=replace;
filename anyname "&IMGPATH.\Space50X50.gif";
goptions noborder transparency;
goptions xpixels=100 ypixels=50;
proc gslide; /* make an empty "slide" */
title;
run; quit;
```

The Base Web Page Before Image Enhancements

Most of the examples involve a simple table, created with PROC PRINT and the Names and Ages of some students from SAS sample data set SASHELP.CLASS.

The base ODS Style used is a style developed in my web publishing projects with Dr. Francesca Pierri, who is at the University of Perugia. You can request improved ODS code for our style via email, or find an early edition in Reference 3, or generate something like it, or very different if that suits you better, with a new macro supplied in Reference 2. Colours used for image examples below are NOT inherent to the custom style. Nor are they necessarily recommended for your web page design. They were chosen to be bright—for demonstration purposes—and to be browser-safe. You will see use of base style Styles.SUCHI5Example02, which is a derivative of our custom style, but amended to the purposes of a (more detailed) tutorial on images that I presented at the Fifth Annual SAS Users Chicago International Conference. Many examples in this MWSUG 2003 tutorial are drawn from that introductory, longer tutorial.

Below is a display of the basic web page. "It sets the data free." There are no grid lines or cells for the data. Just as graphic software defaults reflect the graphic roots of grid plotting paper, pen, and ink, ODS-formatted tables—because there now is software support—tend to be needlessly complicated with the grid from the spreadsheet software venue, which in turn was influenced by its hardcopy roots: a pad of paper worksheets with a preprinted grid for rows and columns.



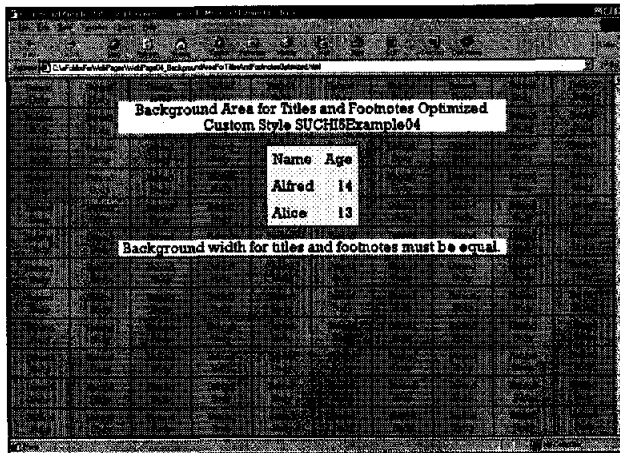
Here is the code to create this web page:

```
ods listing close; ods noresults;
ods html path = "&PATH" (url=none)
      body = "WebPage02.html"
      style = styles.SUCHI5Example02;
options reset=all;
proc print data= . . . ;
id name; var age; run;
ods html close; ods listing;
```

Getting Started with Image Imbedding

To work with images in ODS, we will primarily use these style parameters: backgroundimage=, preimage=, postimage=, prehtml=, posthtml=. Their meaning and use is obvious by comparing web page examples with code. The last two parameters involve HTML coding, but it is simple. They enable you to adjust the position and spacing when use of preimage= or postimage= does not suffice.

The first example is use of a background image. If the image is smaller than the web page, it fills the page with tiles, as shown below.



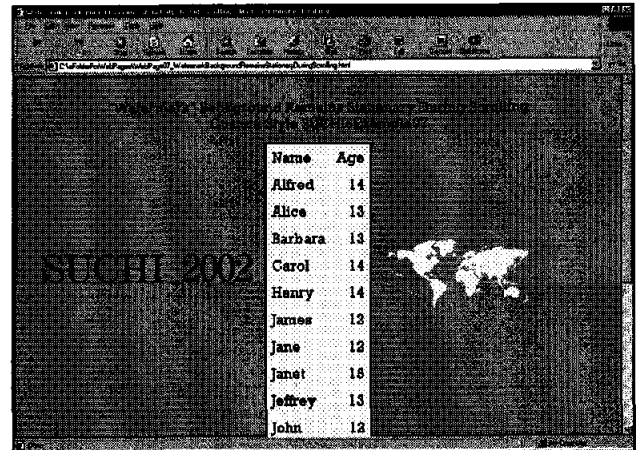
With ODS, titles and footnotes are displayed each in a table of their own, with a user-specifiable background colour. If you do not adjust the width, the result is a pair of peculiar looking bars across the full width of the web page. Here is the code to create the style for this web page:

```
proc template;
edit Styles.SUCHI5Example02
  as Styles.SUCHI5Example04;
style body / backgroundimage =
  "&IMGPATH.\ImageFileNameX.gif";
style SysTitleAndFooterContainer /
  outputwidth = 65%;
end; run;
```

I do not recommend a tiled background area. Tiling is typically used, however, to compose a less obtrusive background than that shown in the previous example, by using finely textured tiles—which I do not recommend either. The best background is a solid colour in high contrast with the foreground text colour.

However, if using a background, it can be useful to make it stay fixed during scrolling, and to make the title and footnote areas transparent. The fixed background is called a “watermark”.

By transparent, I mean that the text of the titles and footnotes are opaque, but their background areas, which were yellow in the above example, now permit the web page background to show through.



Here is the code to create the style for this web page:

```
proc template;
edit Styles.SUCHI5Example02
  as Styles.SUCHI5Example07;
style body /
  backgroundimage =
  "&IMGPATH.\SimpleImage.gif"
  watermark = ON;
style SysTitleAndFooterContainer /
  background = undef;
style systemtitle / background = undef;
style systemfooter / background = undef;
end;
run;
```

A background image too often is merely decorative, or an inessential add-on. However, it can be useful and appropriate to use a logo, or a consistent “frame” or backdrop, for every web page in a set. Also, this is an automatic way to deliver a message that you want to appear on every web page in a set.

The ODS style which provides this standard backdrop becomes the universally applied style for every web page in the set. When a specific web page needs some other ODS-template-enabled feature, that standard style serves as the parent style for PROC TEMPLATE code. It is used as in this statement:

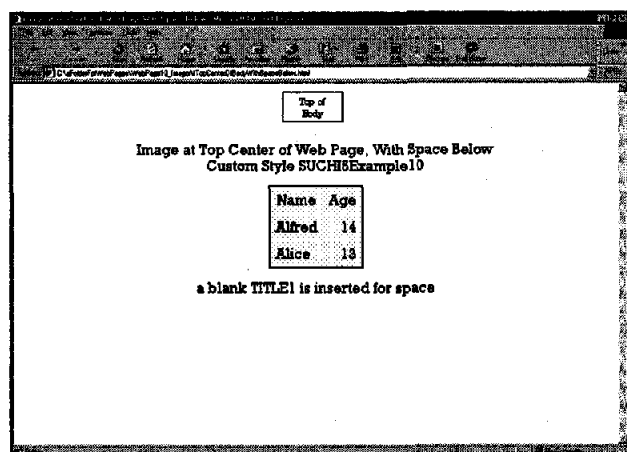
```
edit Styles.StandardBase as
  Styles.SpecialFeature;
```

Tip: You can make your SAS/GRAPH output transparent (i.e., with only the text and graphic elements opaque to the web page background) by specifying “GOPTIONS TRANSPARENCY;” and using the GIF driver.

Let’s move on to foreground images.

First, we will use a preimage for the web page body.

By default, it would be positioned in the upper left corner. But it can be centered, as in the example below. A blank TITLE1 is used to get some space between the image and the first real title line.



Here is the code to create this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example10;
style body /
preimage = "%IMGPATH.\ImageAtTopOfBody.gif"
prehtml = "<center>" ; /* center the image */
end;
run;

ods html path = "%PATH" (url=none)
body = "WebPage10.html"
style=styles.SUCHI5Example10;

title1 ' ' ; /* blank title */
title2 "Real Title";
proc print data= . . . ;
. . .
run;
ods html close;
```

How To Hide Preloaded Images for Use Later on Other Pages.

Use the same template code as above, with one change:

```
style body / prehtml =
"<IMG src='%IMGPATH.BigImage1.gif'
height=1 width=1 border=0>"
/* more image files here */
<IMG src='%IMGPATH.BigImageN.gif'
height=1 width=1 border=0>";
```

Use "border=0" to hide the visible box that would be drawn around the invisible image.

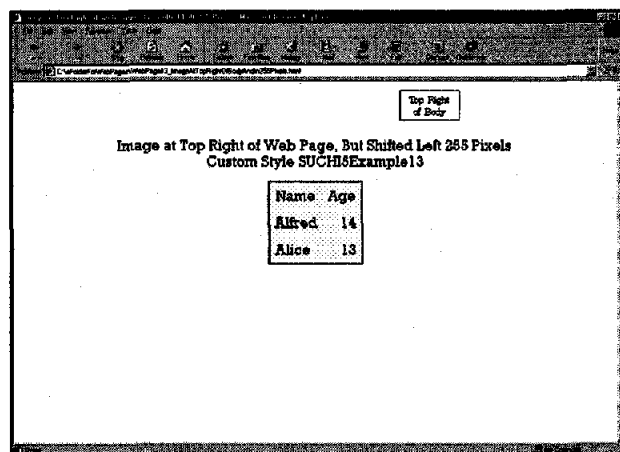
You can insert such IMG tags "by hand" in your HTML file after it has been built with anything in it that you want or need, and built by any means, not necessarily ODS. They should be placed after the BODY tag.

To do such post-processing, you should display the web page, click on View, then Source. That opens the HTML file with NotePad. You can edit the source. When you close it, NotePad will ask you, "Do you want to save the changes?" Click Yes. When the web page is refreshed, your changes take effect.

Now let's position the image above the titles, but toward the right end of the title block. It can be done by aligning the image in the upper right corner, and shifting it back to the left with a horizontal spacer.

It is an idiosyncrasy that an image aligned in the upper right corner of the web page reserves no vertical space at the top of the page. The solution for this problem is a TITLE1 to create a blank title with sufficient vertical space to force the first real title below the image.

Here is the result.

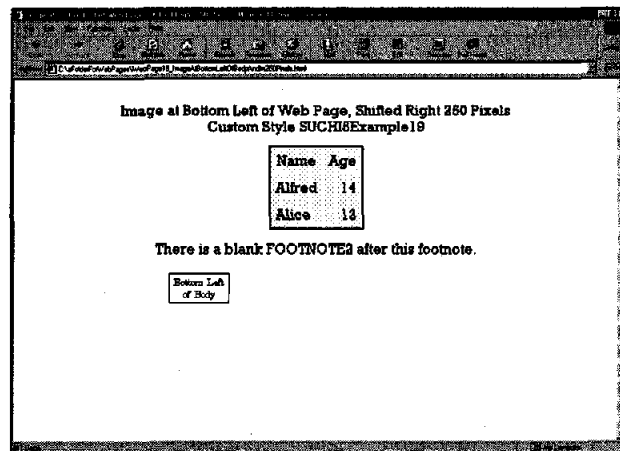


Here is the code to create this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example13;
style body / prehtml =
"<IMG src = %IMGPATH.\ImageAtTopRightOfBody.gif"
align='right' hspace=255 >";
end;
run;

ods html . . . style=styles.SUCHI5Example13;
title1 h = 1 cm ' ' ;
. . .
ods html close;
```

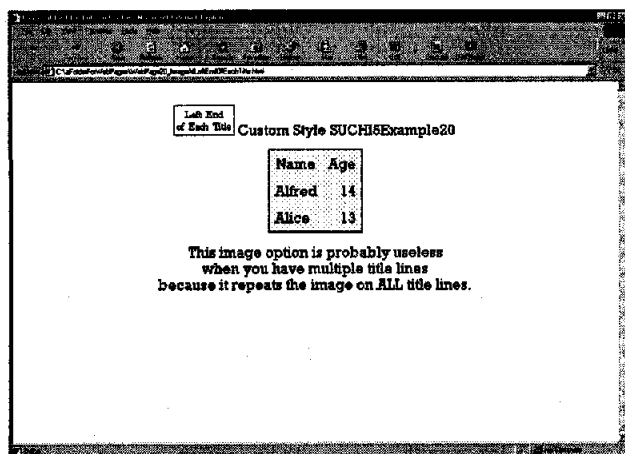
Here is the "converse" of the above example.



Here is the code to create this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example19;
style body / posthtml = "<IMG
src='%IMGPATH.ImageAtBottomLeftOfBody.gif'
align='left' hspace=250 >";
end;
run;
ods html . . . style=styles.SUCHI5Example19;
footnote1 "Real Footnote";
footnote2 ' ' ; /* blank footnote */
proc print . . . ;
run;
ods html close;
```

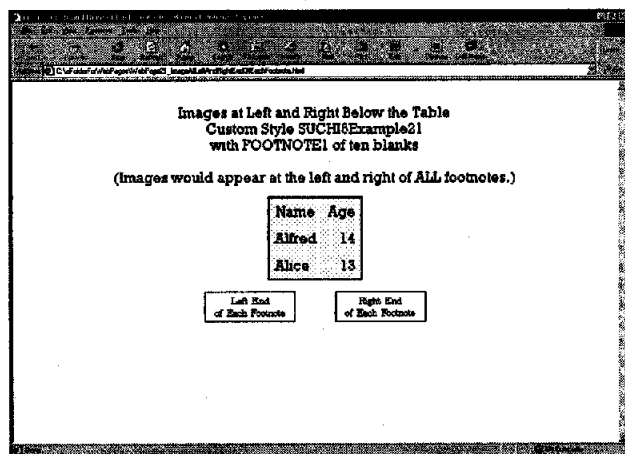
Also, it is possible to put an image in a title line, as shown below.



This is probably useless if you have multiple title lines, since the image repeats on every title line. Here is the code to create the style for this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example20;
style systemtitle / preimage =
"&IMGPATH.\ImageAtLeftEndOfEachTitle.gif";
end;
run;
```

And/or you can put images on the footnote line, as shown below. In fact, you don't even need any footnote text, as you can see.

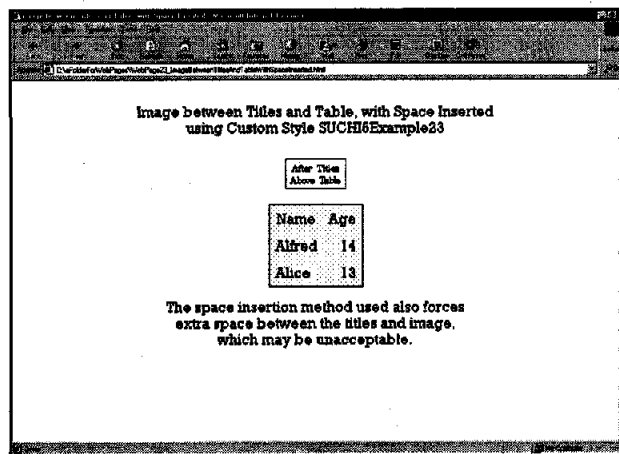


Here is the code to create this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example21;
style systemfooter /
preimage =
"&IMGPATH.\ImageAtLeftEndOfEachFootnote.gif"
postimage =
"&IMGPATH.\ImageAtRightEndOfEachFootnote.gif";
end;
run;

ods html ...
style=styles.SUCHI5Example21;
footnote6 ' ';
proc print ... ;
run;
ods html close;
```

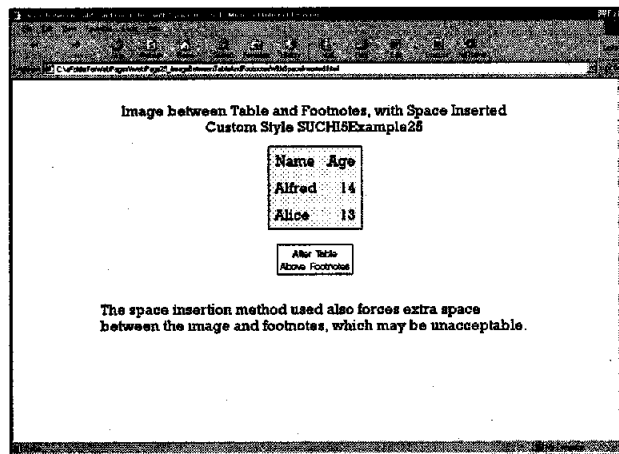
You can put the image between titles and the table, as shown below.



By default, the image would be placed too close to the table. Here is the code, which includes a space insertion of 20 pixels, to create the style for this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example23;
style table / prahtml = "<IMG
src='&IMGPATH.\ImageBetweenTitlesAndTable.gif'
align='bottom' vspace=20 >";
end;
run;
```

And here is an image between the table and the footnotes.

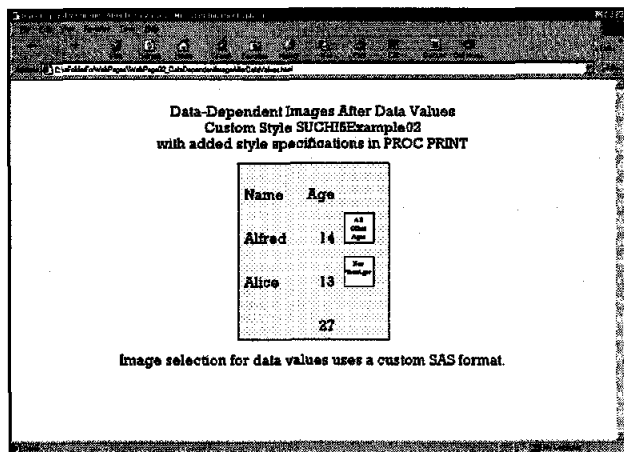


And the code to create the style for this web page:

```
proc template;
edit Styles.SUCHI5Example02
as Styles.SUCHI5Example25;
style SysTitleAndFooterContainer /
outputwidth = 72%;
/* squeeze the area to be able to use j=L with indent */
style table / posthtml = "<IMG src=
'&IMGPATH.\ImageBetweenTableAndFootnotes.gif'
align='top' vspace=25 >";
end;
run;
```

Images can be imbedded in various parts of a table. You can put an image to the left of (before) the contents of every cell, and/or to the right of (after) the contents of every cell, and/or behind the contents of every cell. You can put an image before and/or after and/or behind the table column headings. You can put an image before and/or after and/or behind an ID column heading. You can put an image before and/or after

and/or behind ID values. You can put an image before and/or after and/or behind data values in table columns or table cells. These five types of image applications all require some special coding to get things to look as you like. If you have an interest in any of those cases, send me an email request for a solution. Below you can see an important variation on just one possibility from the extravaganza of possibilities that I worked on. It is the use of data-dependent images for table data.



The little box after Age value 13 says, "New Teenager, and the little box after Age value 14 says, "All other ages". In a more realistic application, you might use different icons to flag different values or value ranges. Here is the code to create the web page:

```
proc format;
value ageing 13 =
  "<IMG src = '&IMGPATH.\NewTeenager.gif'
    hspace=15 >"
    other =
  "<IMG src = '&IMGPATH.\AllOtherAges.gif'
    hspace=15 >"; run;
ods html . . . style=styles.SUCHI5Example02;
proc print . . .
  style(total) = [just=right posthtml =
    "<IMG src = '&IMGPATH.\Space50BY50.gif'
      hspace=15 >"];
id name /
  style(header) = [just=left
    postimage = _undef_ posthtml =
    "<IMG src = '&IMGPATH.\Space8BY50.gif'>"]
  style(data) = [just=left
    postimage = _undef_ posthtml =
    "<IMG src = '&IMGPATH.\Space8BY50.gif'>"];
var age /
  style(header) = [just=right posthtml =
    "<IMG src = '&IMGPATH.\Space50BY50.gif'
      hspace=15 >"]
  style(data) = [just=right posthtml = ageing.];
run;
ods html close;
```

The base style is still the base established for the first example shown, the table with no images imbedded anywhere in the web page. All the heavy work has been done by using the STYLE option available in PROC PRINT since Release 8.2.

Why all of these other complications? Well, as soon as you insert an image anywhere in the cells of a table, be it in a column heading, a row header, a data cell, etc., the situation gets complicated by the need to preserve expected common alignments of values all the way down each column, and the expected common height of cells all the way across each row. There is not space here to show you what happens, but I suggest that back at your office you create the web page, but omit all the PROC PRINT style code except that which uses the ageing. format. If you restore the PROC PRINT style options one at a time, you will better understand their respective effects. On your ODS HTML statement you

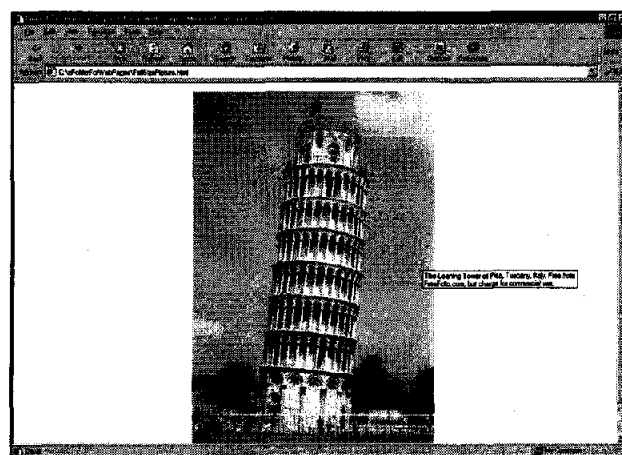
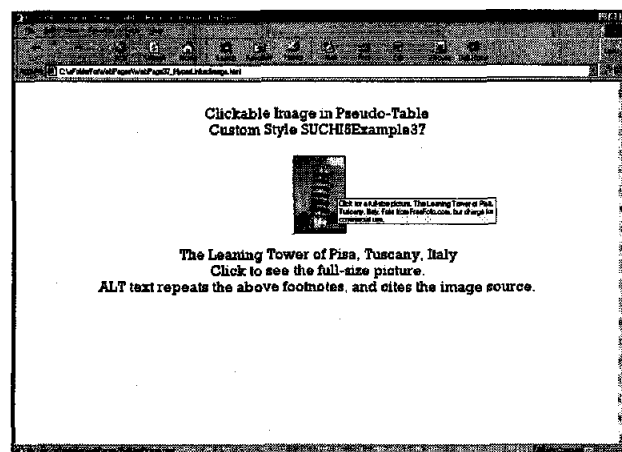
can use Styles.Default. (Use of the ODS default, instead of the custom style used here, will not cause any problem or diminish the value of your experiment. You can create both of the space filler GIFs. The code for 50BY50 was shown earlier.) If you do the suggested exercise, you will see why the amendments had to be done.

Delivery of Full-Size Images Only Upon Demand

It is essential to make wise use of the limited live space on web pages, and to minimize download time. Web pages may include images that a web viewer may not be interested in, or that other web viewers are content to see at reduced size. Rather than forcibly present the full image, a predecessor web page can present a thumbnail image. Clicking on the thumbnail links to a display of the full image.

The thumbnail may be a size-restricted version of the full-size image file that is downloaded, or a cropped version of that image file. If the thumbnail is just a size-restricted version, then the click brings up the full image instantly; if a different file, then the click triggers a download and delay. By "size-restricted" I mean the HTML IMG tag HEIGHT and WIDTH parameters are used to determine display size, rather than the natural pixel-count dimensions of the image.

Here is a pair of thumbnail-linked web pages.



ALT Text. The popped-up boxes of text where I rested my mouse are "ALT text". You can create ALT text for your images with ODS, and/or with SAS/GRAPH. When working with already finished images, your own or downloaded ones, you have another option. In the exercise where I explained how to do image editing with MS Word, there is a point in the process—when you bring up the Picture and Size tabs—that a Web tab is also available to which you can click if you wish to assign "Alternative text" for the image. Please see Reference 2 for a fuller discussion of ALT text, and why to use it.

Here is code to create the first web page in two different ways.

Option 1. Using a custom thumbnail image, which could be a cropped version of the full image, not just a reduced version.

```
ods html . . . /* Custom Thumbnail Preview */
  body = "ThumbnailImage1.html"
  style = styles.SUCHI5Example37;
/* titles and footnotes here */
proc print data=fakedata noobs label;
var fakevar / style(data) = [just=right
  posthtml =
  "<a href='&PATH.\FullSizePicture.html'>
    <IMG src='&IMGPATH.\PisaThumbnail.jpg'
      alt='...' > </a>"]; run;
ods html close;
```

Option 2. Use the full-size image file, but reduce its display area on the web page with HTML controls for HEIGHT and WIDTH.

```
ods html . . . /* Reduce Image for Thumbnail Preview */
  body = "ThumbnailImage2.html"
  style = styles.SUCHI5Example37;
/* titles and footnotes here */
proc print data=fakedata noobs label;
var fakevar / style(data) = [just=right
  posthtml =
  "<a href='&PATH.\FullSizePicture.html'>
    <IMG src='&IMGPATH.\PisaFullSizePicture.jpg'
      height=125 width=83 alt='...' > </a>"]; run;
ods html close;
```

Here is the code to create the second web page:

```
ods html . . . /* Full-Size View */
  body = "FullSizePicture.html"
  style=styles.SUCHI5PisaPhoto;
title1; footnote1; /* NO "hard" text on the page */
proc print data=fakedata noobs label;
var fakevar; run;
ods html close;
```

Here is the code to create the "fake data":

```
data fakedata;
length fakevar $ 1; label fakevar = '00'X;
fakevar = ' '; run;
```

A pseudo-table is used. It consists of one blank as the data, with an invisible heading. Here is code to create the styles for the web pages:

```
%MakeStdStyle(
  StyleName=SUCHI5Example37, /* for the full-size photo */
  TableHeadingSize = 1,
  TableDataSize = 1,
  WebPageBackgroundRGBcolor = CXFFFF00,
  TableRGBcolor = CXFFFF00,
  TableFrame = VOID, TableSpacing = 0)
run;

proc template; /* for the thumbnail */
edit Styles.SUCHI5Example37
  as Styles.SUCHI5PisaPhoto;
style body / prehtml = "<center>
  <IMG src='&IMGPATH.\PisaFullSizePicture.jpg'
    alt='...' >";
end;
run;
```

You may request the %MakeStdStyle macro code via email. Here are the functions of the macro parameter selections. The pseudo-table is designed to minimize space use and to make all *unwanted* parts of the table invisible in the context. Fonts for column heading and data are set to the minimum. All colours of anything that might show are set to the web page background colour (RGB Yellow). All grid or frame elements are set to null or zero width. For Option 2, the thumbnail image is laid inside the pseudo-table, with nothing else visible. The full-size image sits, horizontally centered on its web page, above the tiny invisible

pseudo-table—maximizing web page live space available for the image. If you want ODS to create the HTML file for you, it is necessary to execute some SAS (tabular or graphic) PROC inside an ODS HTML code block. Hence, a pseudo-table or pseudo-graph must be created.

How To Imbed Images in Your SAS Graphs

In the web page below, the SUGI 28 logo has been imbedded. I hyperlinked the logo to www.sas.com, and supplied ALT text for it saying, "Logo of SUGI 28. Here linked to the SAS web site."

The pie chart, rather than being based on real data, is contrived to be a sample colour chart.

The pie really should be shifted to the right to balance the picture, but my effort is focused on showing how to imbed the image.

The key graphic programming tool for this is the SAS/GRAPH Annotate facility. I will not try to explain all of the Annotate code. Please see documentation and/or SAS Help, if needed.

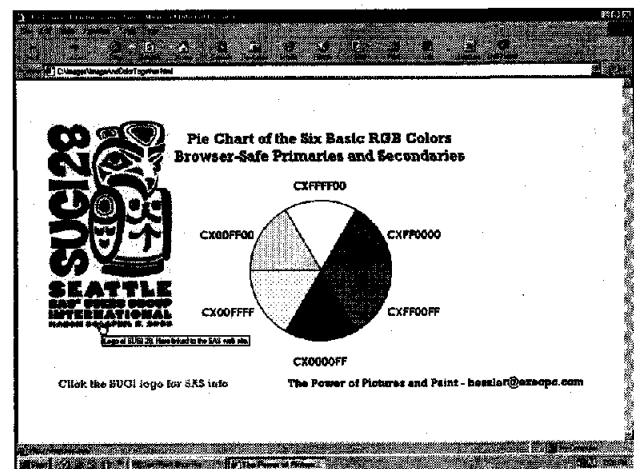
The White bar that is (invisibly) annotated behind the image is used simply as a means to make the image clickable. The HTML Annotate variable defines the hyperlink with HREF= and ALT text with ALT=.

The HTML variable is not yet supported by the IMAGE Annotate function. (Maybe it will be supported in a future release of SAS/GRAPH.) The Annotate IMAGE function requires you to identify the image file with the IMGPATH variable. For the IMAGE function, the (optional) Annotate STYLE variable is either TILE (the default) or FIT, as used here.

When you use FIT, if you under-allocate or over-allocate space for the image, it will shrink or stretch to fit. If the ratio of the dimensions of your allocation does not match the ratio of the dimensions of your source image, the result will be distorted. I rested my mouse on browser display of the original image, and pressed the right mouse button to see the properties of the image. Knowing those pixel counts for horizontal and vertical, I was able to size the target area correctly.

(When you specify TILE, the image is laid out like tiles, but starting at top left and sweeping across and down, to fill the allocated space. Of course, if the image is too big, you will not see tiles. It may just be truncated in one or the other direction, or both.)

The Annotate WHEN variable is set to 'B', so that the image is laid down in the graphic area BEFORE the graph is drawn. In this way, you can use an image as a background. You could instead overlay the graph, if that were your design objective, by setting WHEN to 'A', to have the image laid down in the graphic area AFTER the graph is drawn.



Here is the code to create this web page:

```

data piedata;
infile cards;
input @1 RGBcolor $8. @10 PieValue 1.;
cards;
CXFF0000 1
CXFFFF00 1
CX00FF00 1
CX00FFFF 1
CX0000FF 1
CXFF00FF 1
;
run;

```

```

data logoanno;
length function $ 8 imgpath html $ 200;
retain xsys ysys '3' when 'B';
function='move';
x=0; y=23.56;
output;
function='bar';
x=22.67; y=100;
style='solid'; color='CXFFFFFF';
html='href="http://www.sas.com" alt="Logo of SUGI 28. Here linked to ..."';
output;
function='move';
x=0; y=23.56;
output;
function='image';
x=22.67; y=100;
imgpath="%Folder%\sugi28logo.gif";
style='fit';
output;
run;

```

```

goptions reset=all;
ods html path="%Folder" (url=none)
style=Styles.our style gtitle gfootnote
body="ImageAndColorTogether.html"
(title="The Power of Pictures and Paint");
goptions device=gif transparency;
goptions xpixels=900 ypixels=450;
goptions ftext='Verdana' htext=5 PCT;
proc gchart data=piedata anno=logoanno;
pattern1 v=psolid c=CXFF0000;
pattern2 v=psolid c=CXFFFF00;
pattern3 v=psolid c=CX00FF00;
pattern4 v=psolid c=CX00FFFF;
pattern5 v=psolid c=CX0000FF;
pattern6 v=psolid c=CXFF00FF;
/* titles and footnotes go here */
pie RGBcolor /
sumvar=PieValue noheading coutline=CX000000
midpoints='CXFF0000' 'CXFFFF00' 'CX00FF00'
'CX00FFFF' 'CX0000FF' 'CXFF00FF'
slice=outside value=none percent=none;
run;
quit;
ods html close;

```

Acknowledgements

My thanks to Chris Noto for explaining how to imbed an image in a graph, and to all the people who have aided me in other ways.

Notices

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Related Work By the Author

1. "Easy, Elegant, and Effective SAS Graphs: Inform and Influence with Your Data", elsewhere in these *MWSUG 2003 Proceedings*.
2. "Web Communication Effectiveness: Design and Methods to Get the Best Out of ODS, SAS, and SAS/GRAPH", elsewhere in these *MWSUG 2003 Proceedings*.
3. With Francesca Pierri, "Your Graphs and Tables at Their Best on the Web with ODS", *VIEWS 2001 Proceedings*, United Kingdom SAS Users Group (London, UK), 2001. (Also in *SUCHI 2001 Proceedings* and *SUGI 27 Proceedings*.)

Author Information

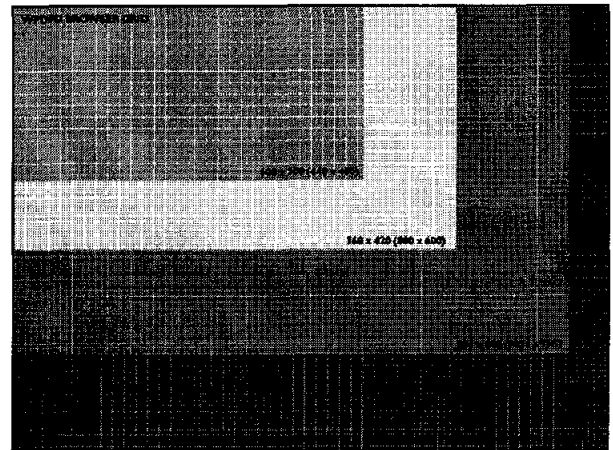
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Dr. LeRoy Bessler has special interests in: Software-Intelligent application development, which yields SAS solutions that are reliable, reusable, maintainable, and extendable; and communication-effective design and construction of reports, tables, graphs, maps, spreadsheets, and web pages. Since 1978, he has used SAS on mainframes, Windows, and Unix. LeRoy has presented to SAS and other Information Technology users in business, government, non-profits, and academe, throughout the United States and overseas.

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Appendix. Grids to Measure Web Page Live Space

At www.wpdfd.com/browsergrid.htm:



At robertcharlton.dial.pipex.com/06notes/061.htm:

