Chapter 6: MAKE A COMPUTER PROTOTYPE

What Is a Computer Prototype?

A computer prototype is the translation of your paper prototype into marked up HTML files that can be viewed with Web browsers. It should encompass the breadth of your site and several strands representing the depth of the site. At this point you will still not be developing the entire site.

The computer prototype does not appear on the Web. You'll store the files off-line on one or more computers that will be used for testing, or on a non-Web server where they can be accessed as local files by several computers.

Why Should I Make a Computer Prototype?

You tested your design on paper to find any problems with the information structure as early in the process as possible. You feel reasonably confident that you have useful content and appropriate relationships between parts of that content.

Now it's time to mock up the design complete with interaction, HTML limitations (and possibilities), and graphics and other media. The next rounds of testing will uncover problems with the message design, technical design and interface design of your site.

Getting Started

Start from your paper prototype. Your computer prototype will include all the content from the last version of your paper prototype; the breadth of your site as represented in all the main "access" pages and the depth of your site as represented by several "strands" that lead all the way to specific information. Don't worry about adding more pages while you're creating the computer prototype -- work rapidly so that you'll have the time and energy to make changes after conducting some more tests.

Choose Standard Elements for Your Pages

Before you begin to translate the pages of your paper prototype directly to marked up HTML files that Web browsers can read, make some preliminary decisions about the standard elements that are going to appear on every page of your site.

Headers

The top of your page is an important place to put information to orient users to their location on the Web and their location within your site. If you decide that your standard page headers are going to be graphical, remember to use the <alt> parameter to insert text that will be seen instead of the graphic by the people who use non-graphical browsers or deliberately turn the graphics off in their browsers. At the
very least the header for your pages should identify your organization
and the name of the site.

Navigation

"Navigation" refers to the ways in which users move around within
hypertext documents like Web pages. Links from one page to another
are the basic form of navigation on the Web. Most Web browsers also
include navigation features for common operations users need,
including at least some form of the following:

- "Back" – return to the previous page in the sequence a user
  has followed most recently
- "Forward" – move to the next page in the sequence a user
  has followed most recently
- "Home" – move to the user's designated default page (often
  the user's own, or the main page of an organization)
- "Go to ..." and "Open ..." – jump to a page by typing in the
  URL (address) or by opening a local HTML file
- "Go" – jump directly to one of the pages in the sequence
  most recently followed by selecting from a list of page titles
- "Bookmark" – jump directly to a page in a list of URLs
  (Universal Resource Locators, or addresses) previously saved
  by the user

These basic operations will not cover all your users' needs, so you
have to create links directly on your pages for the specific navigation
that will make your site usable. As you select standard elements for
your computer prototype consider how users will get to your main page
conveniently from anywhere in your site, how they will return to major
access points within the site, and how they will get around inside long
documents (like phone lists). Users come to rely on navigation
features, so design them as standard components of your pages.

Getting to Your Main Page

Provide a link on every page that allows users to return to the main
page of your site. In addition to the convenience this link affords users
who arrived at your site via the main page, it ensures that visitors who
arrive via some specific page deep within your site will be able to get
access to pages other than the first one they see.

Returning to Important Access Points

Most sites include several major access points besides the main
page. Often these access points are pages with lists of links to other
pages in the site, but a long academic paper with embedded links to
graphics and secondary texts and related papers can also be thought of,
in its entirety, as an important access point. Every page linked from a
primary access point should include a link back to that access point, as
should any additional pages linked to those. When you offer links back
to important access points, users do not have to hunt through the titles
of recently visited pages or back up through page after page in order to
return to a page.

Getting Around Inside Long Pages

Even though you should take care to limit the length of pages, both
for the sake of making them load faster and in acknowledgment that
users do not like to scroll through long pages of information, sometimes
it only makes sense to create relatively long pages. Phone lists and
annotated menus are examples of information that should not be broken
into separate pages unless they are extremely long because each
separate page will have to download to the user's computer separately
and users will find it frustrating to load page after page looking for
what they want.

Anything users will want to print conveniently may also be best
presented as single pages. You can offset some of the disadvantages of
long pages by providing internal links on the page so that users can
"jump around" to its major sections. Don't forget to provide links for
getting back to the top of such pages.
Footers

The bottom of each page is a good place to put several items of information that users may need periodically, but may not want to want to look at all the time. Among the elements to consider for footers are:

- date of the last update to the page
- credit for maintenance of the page
- email link to send comments to the person maintaining the site
- URL of this document (so that it will always appear on printed documents)
- copyright statement
- sponsorship notices if the site receives outside support.
Mock up a Visual Identity for Your Site

The "visual identity" of your site consists of all the visual components (text, images, colors, placement of elements) on your pages. Some components, like logo graphics or distinctive colors, contribute more forcefully to your visual identity than do "standard" Web components like bulleted lists and horizontal rules, but everything on the page affects the overall visual identity that users perceive. You can't tell how things will look together until you try them, and you can't always tell how they will affect your users until they see the whole "look," so pay attention to visual elements while you're building your computer prototype, and be prepared to change them!

Make Your Visual Identity Communicate to Your Audience That They Have Come to the Right Place

Consider the periodicals rack in any large bookstore. The range of visual styles on the covers of the magazines is usually tremendous. The video game magazines tend to be brightly colored and packed with images while the decorator's journals display muted colors and only a few carefully-chosen pictures. Some literary magazines have only text on the covers, and some of the magazines read by technical hobbyists have lots of text on the covers. You can usually tell a lot about what
the contents of the magazine will be, and whether or not it interests you, just by looking at the cover. The users of your site will do the same thing with your pages.

Most often the visual identity that appeals to your audience also communicates an image that reflects your organization. If you work for a large insurance company, you are liable to want to project a stable, trustworthy image. If you work for a start-up multimedia development company, you may give your site a very current, even off-beat "look." Ask yourself what the people in your target audience are looking for from you, and make the "cover" of your site communicate that they have found the right place.

Use Your Visual Identity to Help Users Orient Themselves

When all the pages in your site have a similar look based on your visual identity, users can tell that they are still looking at your information no matter how many links they follow from page to page. This is reassuring for the users, and it doesn't hurt your organization to have the message, “This information brought to you by ...” reinforced as people use your site.

Create Landmarks

People navigate hypertext environments like the Web in ways similar to those they use for getting around their physical environment.
One of the key strategies people use is to identify landmarks, or distinctive features in the environment. They remember these landmarks and use them to "anchor" other information about the environment (e.g., "My house is 2 blocks past the big green water tower as you're heading for the lake.") When people are lost they look for and return to familiar landmarks as a starting point for finding their way.

In a hypertext environment you can encourage users to remember landmark locations by giving those pages a distinctive look. You can also give users the ability to "jump" directly back to landmark locations by using links. An effective solution used by many designers is to miniaturize a distinctive graphical element from the landmark location and use this miniature graphic as a link back to that location on other pages. Remember to include consistent, distinctive ALT text (text specified within a graphical link as the alternative to display when the graphic cannot be shown) with these graphics that will make the landmarks and their links usable in non-graphical browsers.

**Design Your Identity to Work for Pages at Different Levels and Pages from Different Parts of the Organization**

**Different Levels**

The main page, or the one that users see when they follow the primary URL for your site, is a page that many of your users will see first, most of your users will end up on eventually, and some users will visit repeatedly (you hope). This page will establish your visual identity, so it may have a larger graphical image on it than you are willing to put on the other pages of your site. Plan this image so that a
smaller version of it, or a portion of it, can be used to carry the visual identity to other pages in the site.

**Different Parts of the Organization**

Many organizations are made up of semi-autonomous units that want their own identities to appear on their pages, even though they recognize that the entire site should be recognizable as belonging to the organization. Your visual identity should allow different units to incorporate their own elements smoothly without losing the recognizable "look" of your site.
Consider Visibility, Legibility, and Readability of Text on the Screen

Until now you have worried about whether or not the words you're using make sense to your users and appear in the right places. As you build your computer prototype you have to consider three ergonomic properties of text that contribute strongly to its usability for the reader: visibility, legibility, and readability.

Visibility

Visibility is the degree to which the text may actually be seen. Of course you wouldn't intentionally put invisible text on your Web pages, but a surprising number of designers do so unintentionally. The visibility of text relies primarily on high contrast between the letters and the ground against which they are to be seen. Text can disappear on Web pages when the background color a designer chooses does not have good contrast with the color of the text and the contrast between colors can change from one platform to another so designers may not know that their text isn't visible to some users. Keep the contrast between text and background high; black on white or light gray is the best contrast for computer screens.

Legibility

Legibility is the degree to which individual letter forms may be distinguished from others and from the ground on which they appear. Even though the letters may be visible, they will not necessarily be legible. Most computer displays are subject to legibility problems because their resolution is relatively low compared to paper (computer displays are generally 72 dots per inch while common laser printing is 300 dots per inch and commercial book printing is >1000 dots per inch).

Background images cause the biggest legibility problems on Web pages that we've seen. Every pixel in a background image has the potential to interfere with the users' perception of letter forms displayed over that image, and the problem is exacerbated when the contrast between the background and the text is low. One in every twelve men and one in every 165 women have a color vision disability. Don't add to the problems some of your users already face reading the computer screen.
screen by forcing them to pick out letters from a busy background, as shown below. If you use background images at all, they should be very low contrast, with high contrast between the image and your text.

Very small text tends to "break up" on screen because there are only a limited number of pixels available to display each letter. Some browsers accept tags which set the point size of text at a fixed percentage smaller than the default size that a user has selected. Such tags can be useful for subordinating information (copyright notices, links for nonessential navigation) that you don't want competing with your primary content. Use them cautiously though, since you don't know whether a user's default setting will cause your smaller text to appear at 9 points or less, where most fonts become illegible on the screen.

Readability

Readability is the degree to which the text may be scanned effectively during normal reading. Line length and the distance between lines of text (or leading) are two primary factors affecting readability. Relatively short lines of text (approximately 40 - 60 characters) are recommended for best readability and more distance between lines is recommended for situations in which line lengths must be longer than 60 characters. You will not be able to control some aspects of readability on the Web because line length and leading both depend on the Web browser and the window size a reader has selected. You can create readable text by breaking up large blocks of text into smaller visual units, and allowing users some flexibility in the appearance of the text.

Break the Text up Visually

Use blank lines between paragraphs and horizontal rules between sections of documents or lists to break up large blocks of text. Use embedded lists when possible, and include "Back to the top" links periodically in long pages of text. You won't be able to stop people from resizing a window on a large screen until it displays 70 - 80 characters across, but by breaking text up in various ways you can avoid having them read several hundred lines of text at 70 - 80 characters per line.
Restrict the Use of "Graphical Text"

Don't put lots of text into image files in order to control how it appears on the user's screen. This recommendation may seem paradoxical; if line length and leading may be used to improve readability, then why not use a lot of graphical text so that you can be sure it appears correctly? The main reason to restrict graphical text is that images take longer to download than does plain text; in trying to improve readability you don't want to lose your audience because they get tired of waiting for the page to appear. Another reason to use text with HTML tags is that your users will then have the choice to adjust the display for their own comfort. Some browsers now support very complex specifications for fonts and font sizes, but use these with caution since they restrict the users' ability to view your pages according to their own preferences.

Control the Content of Your Pages, Not the Exact Appearance

HTML (Hypertext Markup Language) specifies the structure of documents. The tags you insert into a text file mark headings, lists, insertion points for graphics, and other elements of structure. The Web browser, a computer program that retrieves and displays Web files, interprets HTML tags according to its own set of parameters. White space between paragraphs, indenting of bulleted lists, and other specifics of how a file's structure will be translated to the computer screen vary from one browser to the next. Users can also set preferences for fonts, colors, window size, and other aspects of the way their browsers will display your pages. The Web was designed this way so that many people using different computers could look at the same file and see a reasonable display of its contents. The design of the Web itself guarantees that you will not be able to control the appearance of your pages for everyone who sees them.
What you can control in Web design are the words, images, and other elements your pages will contain, and the order in which they will appear. Spend most of your design time on these elements. Use the simplest page design that will work. Much of the effort you pour into adjusting and controlling the appearance of your pages is wasted unless you are certain, or you intend to demand, that your audience use only one browser on only one platform.

The rule of thumb to keep in mind for most audiences is this: if a choice doesn't appear in a "standard" size window when the page is first displayed, the choice may as well not be there. Users do not like to scroll and they don't choose links that they don't see. This is especially true for novice or infrequent computer users and for people who aren't

Remember, "Out of Sight, out of Mind"

The same Web page from the Oxford English Dictionary. Top browser window is 640x480 pixel resolution. Bottom browser is 1024x768 pixels, and the user prefers to view this page in a different font.
sure they’re on the right track to find what they’re looking for, but many Web users exhibit a marked reluctance to scroll past the first screen of a Web page. Once users find content that answers their questions or grabs their attention, they will often scroll through a page or wait for a graphic to display, but in general they behave as though pages did not extend beyond the standard window.

Do your best to fit the information on all your access pages (typically the top levels of your site) into a standard browser window on a 14-inch display using the default preferences that come with several browsers.

Create a Robust Design

A robust design is one that will work reasonably well for everyone who visits it. You may have seen pages with notifications reading, "This page optimized for XYZ browser. Download the software now!" Your analysis of the needs of your audience has probably already alerted you to the fact that people do not want to spend their time downloading software that they may not even be able to run. Your audience wants your information, and they want it as rapidly and conveniently as they can get it. Don't place obstacles in their path by using features that require your users to spend all their time configuring helper applications or installing new versions of their browser.


Create and Test Template Files to Use for the Prototype

Once you have decided on standard page elements and visual identity, make a template page from which you will construct the rest of the prototype pages. You may have a "top level" template, a "second level" template, and so on. Templates save time and ensure that all the information will be identical on all the pages of the prototype. Be sure to test the template on several browsers and computer platforms before you build your prototype – few activities are less fun (and more prone to error) than correcting typographical errors in multiple files.

In the future, cascading style sheets will be the preferable way to achieve this "template" goal. HTML will be superceded by XML (Extensible Markup Language). XML will allow designers to separate the data of documents and the styles or appearance of the information. XSL (Extensible Style Language) will make it possible for the same data to be rendered differently according to different styles. For example, a style could be created for PDA's with very small screens; another for TV displays; another for screen readers for visually impaired users; etc. This is very good news for designers, and will make maintenance of Web sites much easier and will help achieve greater consistency among pages which use the same styles.
Begin a Style Guide for Your Site

In the last chapter you began recording design decisions during the creation of your paper prototype. Now you should begin a style guide for your site using those records as a starting point. A style guide is a collection of all the design and technical conventions you will follow for making your Web files. By this time your style guide should already contain guidelines for:

- standard page headers
- standard page footers
- visual identity elements
- optimum page length for major access pages
- consistent wording for parts of the organization and parts of the Web site.

The style guide you create now will evolve. Parts of it will inevitably change as you test the prototype. You start assembling it now so that everyone working on the prototype follows the same guidelines, and so that the effort of creating it later on in the project is not overwhelming. The IUB Web design team published their provisional style guide to the Web early in the project and modified it throughout testing of the computer prototype. Eventually they revised it into its present form, but it will continue to evolve along with the site. A style guide pays for itself by saving design teams hours of discussion as they revisit design issues that turn out to have been resolved earlier, and as they streamline the creation of new pages after the site is published.
Create the Pages of the Prototype

Working from the tested template files, create an HTML file for each page of your final paper prototype. If you follow the tentative style guide as you work you can have multiple members of the team creating files at one time and be sure that they are consistent when they're done. Don't publish this prototype to the Web yet. Using search facilities of many kinds people can discover your prototype pages very easily and browse them, or get misinformation from them, or form poor opinions of them, long before you are ready to show them to the world. You will also save time and energy revising your files when you do not have to publish and republish them after every change.

Check the Prototype Yourself

Check the prototype page by page looking for typographical errors and elements that don't follow your guidelines. When there are multiple people on the team it's a good idea to have them check each other's pages so they don't miss their own mistakes through familiarity. If you have one person on the team who can sit down and check all the pages just before user test sessions begin, it can be very helpful since one person can spot inconsistencies between pages better than multiple checkers can.