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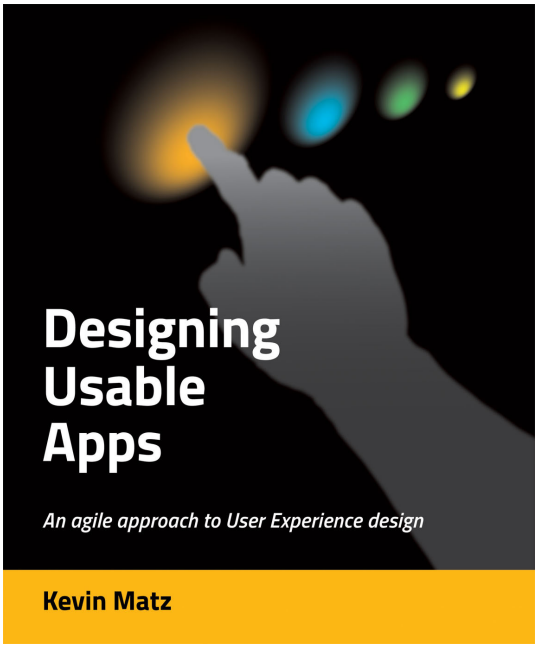
Designing Usable Apps

An agile approach to User Experience design



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Designing the visual appearance

Interaction design can be seen as specifying the *appearance* and the *behavior* of a system:

- The **appearance** (or **presentation)** describes what controls, content, and/or data are shown, how these elements are shown, and the overall general visual design.
- The **behavior** is how the user interface reacts and what the application or website does when you operate the controls or otherwise interact with the interface.

In this chapter, we'll examine designing the presentation of a user interface. Putting some effort into getting the presentation right is important for a lot of reasons.

The visual design of your product – the layout, colors, fonts, and so on – differentiates it from other products, and is one of the first things your users will notice when they encounter your product, so it contributes to users' first impressions. If your product looks professional, it will inspire more trust and confidence.

Beyond first impressions, the presentation of the user interface gives the user the means to discover and activate the functionality that your application or website provides. Functions might be activated by picking menu entries, clicking on icons in a toolbar, typing commands, directly manipulating visual objects (e.g., painting on a canvas in a paint program, or moving a spaceship in a game), or other means.

As we learned in Chapter 10, making your application's possible actions and functions *visible* is important, especially for new users who are learning how to use the application. For example, users looking for a search function will be able to find it if there is an appropriate icon in a toolbar, or a text box labelled *Search*, whereas if a search can only be activated by pressing a keystroke combination such as Ctrl-F7, it's quite likely that most users will never discover it. But there are trade-offs to consider. If your application provides a great number of functions, putting hundreds of confusing buttons or icons in several rows of toolbars might be overwhelming. Presenting these instead as items in cascading pull-down menus might clean up the clutter, and would give the user textual descriptions instead of icons to decipher – but it will take longer to navigate through menus to activate a function. And power users might want keyboard shortcuts so that they don't have to reach for the mouse.

Another aspect of appearance is the **layout** of screens or pages. The layout of elements and controls can be used to explicitly or implicitly communicate relationships between entities. For example, grouping a set of things together in one area of the page will give a visual clue that suggests that those things are logically related. And if there's a header over a block of text or a set of fields, you'd expect the all the things under that header to relate to what the header says. Careful attention to layout can make understanding your application easier, whereas sloppy and inconsistent layouts can cause unnecessary confusion.

Understanding how people process visual information

To better understand how to create effective screen and page designs, let's take a look at how people perceive and interpret visual information.

How do people scan and read pages?

Visual designers have long been interested in figuring out how to guide a reader's eyes across the printed page or computer screen. For example, artists creating posters use emphasis and positioning to draw your attention to a headline. Cartoonists carefully draw cartoons so that you notice the characters and read the speech bubbles in a certain order, and without this, the jokes might lose their impact.

By laying out elements on the page in certain ways, you can affect the order in which people will notice the elements and how long they will spend looking at them. For

software designers, if you know that people will tend to scan a page in a certain way, you can design your page to accommodate those usage patterns, by putting relevant information in the places where people are likely to look.

So, let's begin by examining how readers read text on a page.

If a reader is reading a book, such as a novel, where every page consists of rows of text (we'll assume there are no illustrations), then the reader will start by looking at the first word in the top-left corner of the page, scan across the line from left to right to read the words, and then skip to the beginning of the next line. The reader will again scan left to right to read the line, skip to the next line, and continue in this pattern until the bottom of the page is reached. (And, yes, in languages like Arabic and Hebrew, readers would read right-to-left instead.)

However, when the eye scans across a line of the text, it's not actually a smooth movement as you might expect. Rather than moving smoothly in a line, the eyes' focus instead jumps rapidly between spots on the page, called **fixation points**. These jumps are called **saccades**. The brain doesn't receive any visual information during saccades, but it's able to stitch together the images received at the fixation points, and the brain perceives it as "seeing in a line".

The area that you can see clearly at each fixation point — i.e., the area that you can focus on — is called your **foveal vision**, and that area is surprisingly small: it's only about two degrees of your visual field, or about twice the width of your thumb if you stick your thumb out at arm's length. Try holding your arm out straight and put your thumb on a paragraph of text on the page or on your screen right now. Look at your thumb, and without looking away, try to see how many words on the screen you can clearly distinguish around your thumb. Your area of focus is pretty limited; you're still able to perceive the rest of the screen in your peripheral vision, but you can't see those other parts of the screen clearly. You can only resolve text in the narrow area that you're focusing on.

For page layouts that are more complex and heterogeneous than solid blocks of text, it's more difficult to say exactly how readers' eyes will move across the page, and of course, it will differ for each reader, but we can try to make some generalizations.

Traditionally, visual designers have believed that when readers look at a complex document like a newspaper, they generally first get an overall impression by scanning the page in a Z-shaped pattern. They start in the upper-left corner, read the title of the newspaper across the top, and then, beginning at the upper-right corner, they gradually skim over the page in a roughly diagonal line until they reach the lower-left corner. Then they skim across to the right, ending in the lower-right corner. Then readers will go back and focus on whatever interests them.

However, if there is something particularly flashy or eye-catching on the page — a large color photo, or a bold, interesting headline — the reader will probably look at that first, or perhaps the reader may begin a Z-shaped scan, but interrupt it to look at the interesting bits. Someone specifically looking for some particular detail will also probably search through the page in a different pattern than someone who is just browsing.

To better understand how people look at visual information, researchers have conducted eye-tracking studies using specialized cameras and software that can identify what a user is looking at on a screen. The software can then play back the **scanpath** — the series of fixations and saccades — to show what areas of the screen the participant has looked at and how long they have spent gazing at each fixation point. While the scanpaths of individual users can vary quite a bit, if you ask a number of users to look at the same webpage or screen, you can combine all of the scanpaths to create aggregate **heatmap** diagrams that show where users, on average, spend the most time looking.

Probably the most detailed and best-documented eye-tracking studies are those included in the book *Eyetracking Web Usability* (Nielsen and Pernice, 2009). They discovered some interesting findings:

- For most websites, rather than following the traditional Z-shaped scanning pattern, most users follow a roughly F-shaped pattern. They read across the top, and then go down the page and read lines (or partial lines) of text left to right. But users are, in general, more likely to read complete paragraphs or lines of text near the top of the screen, whereas they tend to lose interest and just briefly scan the text near the bottom of the page. And then, upon reaching the bottom of the screen, users often apparently make an additional quick scan down the left-hand edge of the page (especially if there is a sidebar with links). The upper-left corner receives the most attention, and the lower-right corner receives the least.

- Graphics, and especially photographic images, will attract attention, but only when they are a relevant and integral part of the content. People seems to be able to quickly judge whether images are just decorative stock photos, and such superficial photos get very little attention after the first glance. A majority of users pretty much completely ignore banner ads on websites; when there was a banner ad at the top of the webpage, most users started their F-shaped scans below the ads, where the content begins.

- Users tend to ignore elements that are repeated on multiple pages. Once they've seen the logo or navigation bar at the top of the page, they don't look there again unless they need to.

Something that I haven't seen discussed in eye-tracking studies is the degree of focus of the viewer's eyes. I personally find that I sometimes scan pages by slightly defocusing

my eyes, which makes the page look a little blurry, but enables you to perceive the whole layout at once, somewhat like viewing the page from ten feet away. I don't believe that eye-tracking equipment can detect the degree of focus, only the direction of gaze.

Let's now turn to examining some of the key principles that explain how people interpret visual elements and layouts. A key set of such principles are the *Gestalt Laws of Perception*.

The Gestalt Laws of Perception

The **Gestalt Laws of Perception** help explain how humans perceive and make sense of visual information. As user interface designers, the laws are interesting to us because we can exploit them to create visual layouts and representations that help communicate concepts and relationships that exist in our underlying conceptual model for the application.

Gestalt (pronounced *ge-SHTALT*) is a German word that means roughly means "shape", "form", "essence", or "whole". Gestalt psychology is based on the idea that, when the human mind perceives the world, it seeks to recognize some kind of structure or order. Specifically, the **Gestalt effect** suggests that, when we are presented with a complex visual image, our minds attempt to recognize coherent, whole forms, rather than individually perceiving all of the smaller constituent parts that make up the image.

That might sound pretty heavy and abstract, so let's take a closer look to understand what this really means.

Max Wertheimer's paper *Laws of Organization in Perceptual Forms* (1923) stated a number of principles or "laws" that describe how the mind tends to perceive visual information:

Law of Prägnanz

The basic law, from which the others are derived, is the *Law of Prägnanz*. *Prägnanz* might be roughly and imperfectly translated as *conciseness* or *simplicity*.

The Law of Prägnanz is a bit like Occam's Razor. **Occam's Razor** states that the simplest explanations for a state of affairs tend to be more likely to be correct than complicated and convoluted explanations that rely on unproven assumptions or special conditions. (For example, "an alien stole my homework" is probably an unlikely excuse for why an assignment wasn't handed in, whereas "I just didn't do my homework" is a simpler and

likelier explanation, as it doesn't presume the existence of extraterrestrials.)

The Law of Prägnanz says that when the mind tries to interpret a visual scene, it will try to interpret it in the simplest, most concise, and most easily recognizable way. In particular, the mind will try to perceive the scene as a whole rather than as a sum of parts. For example, when you see the following illustration…

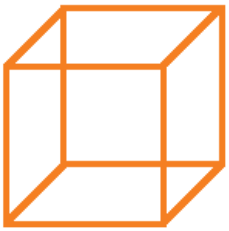

Figure 13-1

…you probably recognize it as a cube. You don't think of it as twelve separate lines, nor do you think of it as four parallel horizontal lines, four parallel vertical lines, and four parallel diagonal lines.

In trying to explain how the mind tries to perceive complex scenes, Wertheimer elucidated the following additional laws that contribute to the Law of Prägnanz. We'll examine each one, using examples relevant to user interface design.

Law of proximity

Items that are located close together tend to be perceived as being a single group. The items in that group are considered to be distinct and different from items located further away.

For example, in the following image, we seem to perceive three separate groups:

Figure 13-2

And in the following image, some of these dots appear to be arranged in rows, and

others in columns.

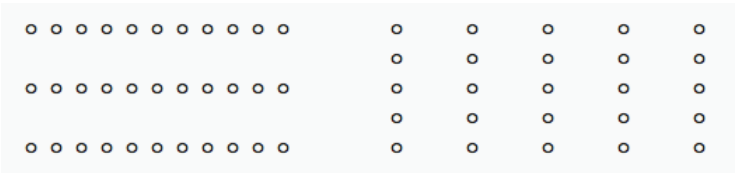

Figure 13-3

It's due to their *proximity*. The distance between the dots making up each row or column is less than the distance between a dot in one row or column and the nearest dot in the next row or column.

Applying the law of proximity to user interface design, consider this data-entry form:

Figure 13-4

Conceptually, each label matches up with a corresponding text-entry field. And yet the labels are so far away from the text-entry fields that the labels appear to form their own group, and the fields appear to form another group. The connection between each label and its corresponding field isn't as obvious as it could be. One way to fix this is to move the labels and fields closer together so that we're emphasizing the horizontal pairs of labels and fields rather than the two columns:

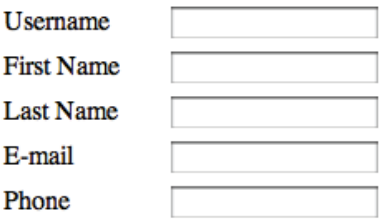

Figure 13-5

Law of similarity

Visual items that share some property or attribute are perceived as belonging together, whereas items with differing properties or attributes are perceived as belonging to different groups.

For example, in the following image, you can probably detect three groups, even though the items in those groups aren't in proximity to each other. (Note that the triangles are red, the circles are green, and the squares are grey.)

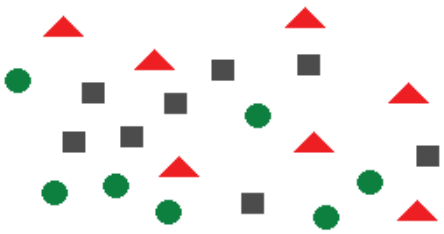

Figure 13-6

This is the law of similarity at work with two attributes: shape and color. The red triangles are easily detectable as a grouping because they share the same shape and color. The red triangles are distinguishable from the green circles and the grey squares because those items differ in those two attributes.

An example from UI design comes from file managers in operating systems: Usually, all of the files of the same type (like MP3 files) are decorated with the same icon, to provide a visual indication that those files share something in common. In the following example on a Mac, the icons aren't different enough that you can instantly tell that they're different (they all have the same basic "curled page" shape and they all have a bit of blue in them), so the effect is not quite as strong as it could be:

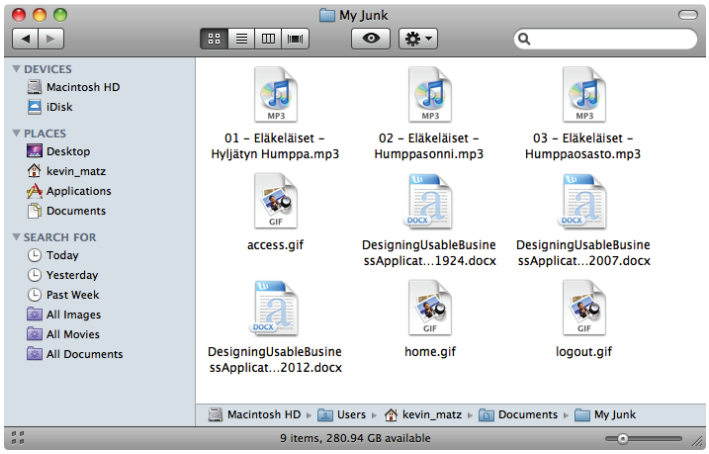

FIGURE 13-7

However, in the next image, the "highlighting" decoration on selected items easily differentiates the group of selected items from the group of unselected items:

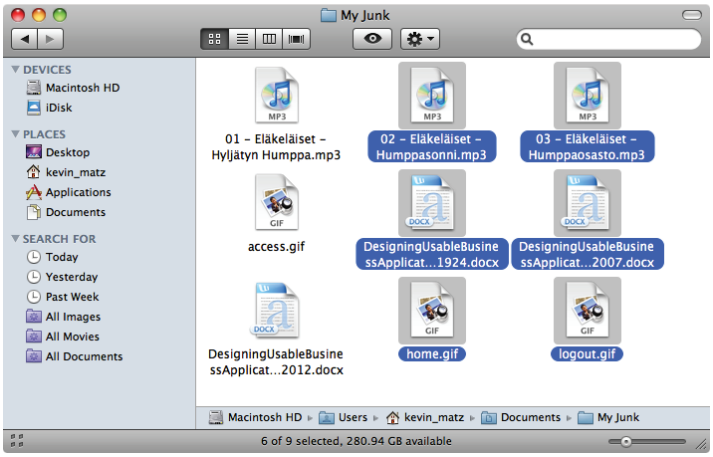

FIGURE 13-8

Returning to the data-entry form example, if we wanted to improve the form without moving the groups closer together, we could also try making the pairings more explicit by making sure that each label and field share an attribute, like the background color:

Username	
First Name	
Last Name	
E-mail	
Phone	

Figure 13-9

Law of continuation

Visual items that appear to be a continuation of a preceding sequence or line of similar items are perceived as belonging together. As well, once your eye begins following the line or sequence, it will continue doing so until something else catches your attention. For example, the icons on this Eclipse splash screen are arranged to a form a curve that your eye is likely to follow:

Figure 13-10

Law of closure

Lines (or visual elements that are repeated to form lines) are more likely to be perceived together as a common visual unit if they appear to form the outline or "closure" of a surface or shape, even if that outline is not complete. The mind fills in any gaps in incomplete shapes, to achieve closure in the form of a familiar shape.

In the following classic example, we perceive the image to be a circle, even though part of the circle is missing:

Figure 13-11

Our minds fill in the missing gap because the explanation "it's a circle with a small piece missing" is simpler and more satisfying to grasp than the explanation "it's an arc spanning about 320 degrees".

This law might be applied to logos and other decorative artwork that might appear on webpages or splash screens to catch the user's attention. Incomplete or cropped shapes and forms can create visual interest, because the mind has to do a bit of work to fill in the missing information to visualize the complete shape. For example, the logo in Figure 13-12 crops a geometric flower shape, and it's somewhat eye-catching because you have to mentally complete the pattern to achieve closure.

Figure 13-12

Law of common fate

Visual elements moving together in the same direction simultaneously tend to be perceived as a group.

For example, in Microsoft Windows or Mac OS, if you select a number of icons and then drag-and-drop them, partially-transparent copies of all of the selected icons move together as a group:

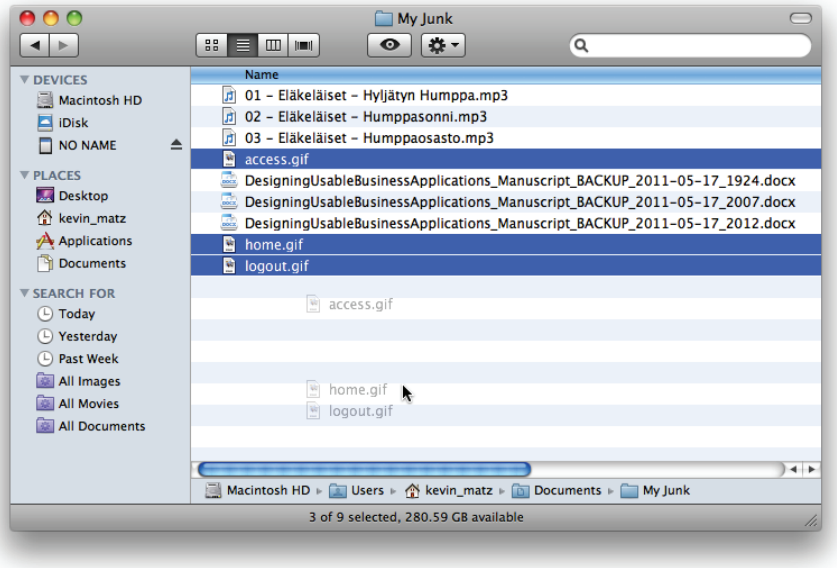

FIGURE 13-13

Law of good continuation (or "good Gestalt")

Line segments that are smooth continuations of each other are perceived as the same line, even in the case of intersections of multiple line segments.

For example, when you see this figure...

FIGURE 13-14

...you probably perceive it as the two straight lines crossing:

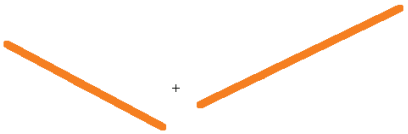

FIGURE 13-15

You are unlikely to perceive it as two angles meeting, even though that is a possibility as well:

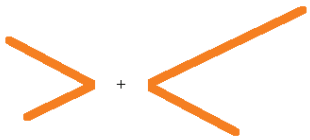

Figure 13-16

Your mind knows from experience that the "two straight lines crossing" is more plausible.

Admittedly, I can't think of a good application of this law to UI design, but I've included it for completeness.

Beyond Wertheimer's laws, additional related laws have been proposed, such as:

Law of common region (Palmer, 1992)

Visual items situated together in demarcated (bordered) regions are perceived as belonging together.

For example, Figure 13-17 shows a *Print* dialog from Microsoft Word. The various controls are grouped together and contained in frames. It's clear that all of the controls within the *Copies* frame belong together and relate to controlling the number of copies.

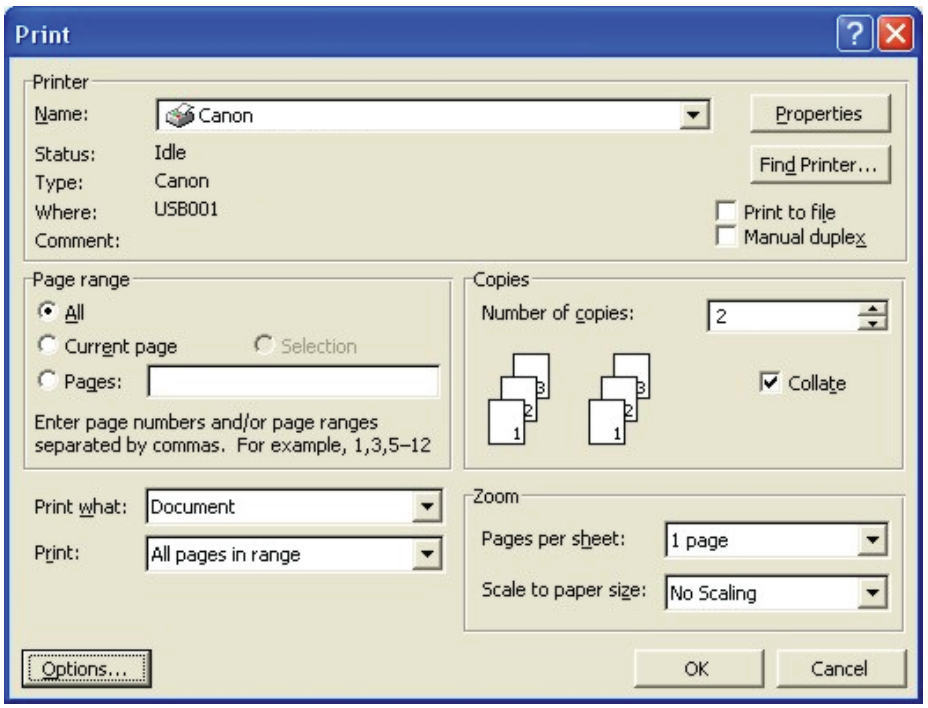

FIGURE 13-17

Law of synchrony (Palmer and Levitin, 1998)

Visual items that change at the same time will tend to be perceived as belonging together as a unit.

Law of connected elements (Palmer and Rock, 1994)

If items are joined together to form a compound item, that compound item will tend to be perceived as a single object.

Summary

The Gestalt Laws of Perception help us understand how people interpret visual designs. In designing user interfaces, applying these laws can often help us to reinforce our underlying conceptual models. For example, we can intentionally group related fields together on the screen to indicate that they are related, or use similar icons or other decorations to provide visual clues that certain objects belong to a certain class.

Visual attributes

Visual elements are the things you put on your page or screen. For a software application, this can include user interface controls such as icons, buttons, text fields, checkboxes, drop-down lists, menus, and so on. But it can also include text, images, and organizational or decorative elements like borders, lines, and separators.

Visual attributes are *properties* of visual elements — in other words, the different ways that you can *style* the visual elements on the page.

In designing the visual style for your application or website, you'll need to decide on a system of arrangement of visual elements, combined with a consistent way of styling those elements using visual attributes.

Elements with similar function and meaning should usually be styled the same way. But you can also selectively use attributes to create *contrast*. **Contrast** is an intentional and immediately recognizable visual difference between two elements. Contrast is eye-catching and can be selectively employed to highlight or draw attention to a particular element, or to provide clues that two elements are different in some conceptual way.

Here are some of the main visual attributes you need to be aware of:

Size

The most instantly noticeable visual attribute of all is **size**. We can't help but notice when one element is bigger than another, and, all other things being equal, our eyes will usually be drawn towards the biggest thing on a page first. So size can be intentionally used to draw attention to something.

For example, book designers have for centuries used **dropcaps** — like in the "E" in the paragraph below — to help direct the eye to the beginning of long blocks of text (which are not always visually exciting):

Em ium accatibus acea sin consedi doluptur, totat fuga. Uga. La sumqui quostrunt offic testiis es ne nobitibus ni nobisquiant illa aut placere doluptus, opta distium inum quia aboreptae init excesed quibear chicitate ne nus etur rem ea aut iumquatem sitatii ssequae es am quatio ma sa venis doluptatur sitam, officaeribus expliquid ut explia nam ape mi, inctur ad molorum fugitas eatatur? Qui ratiat delita pelitiandis que ni occae. Aximil et ut quis quam, nobist, quias si vidi ate con con corecabo. Ut omniasp erorepudit ditat est lab ipsam aute nimi, nobit, apid min nestem. Duciatur animus, quam, cumet offic te repudi tet vel ipsanda dolenes dolum non cum num quia volut volorep taspell amendae conse nonseque dolorrorpori volupti onecaep erorro offici blam re, venim elibus dolupta porrorum vit autas dolut est dunt, odit, ut in evenisita quiae. Abor sitaes moluptatem iligendandae quae. Et apiendandis sim et am andam il eos sam quis a de solore, quiatur? Qui ratiat delita pelitiandis que ni occae. Aximil et ut quis quam.

Figure 13-18

If an element is bigger than other surrounding elements, the contrast in relative size makes the bigger element visually dominant, meaning that the bigger element tends to be perceived as being more important than the nearby smaller elements.

For example, here, despite not being able to see the contents of the panels, we would generally assume that the big center panel is the most important on the basis of its size:

Figure 13-19

The relative size of elements can be used to communicate the intended relative importance of those elements. So if you expect that certain features will be used more frequently, you might make the buttons for those features larger than the buttons for lesser-used features, or devote more screen real estate to the parts of the screen related to those features.

Users may also have their own expectations for what is important and not, and they could be annoyed if seemingly irrelevant things are taking up too much screen real estate. For example, a time-and-date clock in the corner of an accounting program should be small because, while convenient, it has little to do with the main task of the application. However, in a "chyron" system for overlaying graphics onto live television broadcasts, a time clock can be important for synchronization, and so making it large and

prominent would be justifiable.

Size contrasts can also be used as a highlighting technique. For example, in this particular view of the Mac OS dock, the currently selected item is biggest:

Figure 13-20

Color

After size, **color** is generally regarded as the next most immediately noticeable attribute. Color, when applied carefully and appropriately, can be used to attract attention and guide the eye. Color can also work very well for suggesting importance: brighter, more intense colors tend to suggest more importance and urgency than duller, muted colors.

Color can also be used to suggest similarities and differences. Elements sharing identical colors are perceived as belonging to the same group, whereas elements with contrasting colors are perceived as belonging to different groups.

Colors can also have implied meanings, and if your product will be used internationally, care should be taken when choosing colors, as the implied meanings of colors can vary between different cultures. For instance, in Western countries, red is often used for signalling "danger" or "stop", whereas in China, red can connote happiness and good fortune.

Shape

We can perceive and differentiate the outlines of shapes very easily. We can quite rapidly tell the difference between squares, circles, and triangles.

You can draw attention to one object if it has a different outline shape than the objects surrounding it – for example, a round or a pointy angular shape in a sea of boxes:

Figure 13-21

And as we saw earlier in Figure 13-7, the icons in the Mac Finder window all had very similar general outline shapes and colorings, which made it more difficult to quickly tell the difference between them.

Direction and angularity

Page layouts are often arranged using a grid system that helps keep things aligned. Elements like text, lines, or graphics that are set at an angle create **visual tension** by breaking the traditional rules of grid alignment. Traditional design wisdom says that angular elements are perceived as being unconventional and edgy, so conservative, respectable business applications like banking websites will generally tend to avoid them, but they are often suitable in contexts such as entertainment and game applications.

Weight

Weight refers to the thickness of lines:

Figure 13-22

When applied to text, weight refers to the thickness of the lines of the letterforms. Bold text has a heavier weight — more "heft" — than regular text. Many typefaces are available in families, where the letterforms have the same basic shapes but have different weights. Most famous is Helvetica:

Figure 13-23

Using the same typeface but using different weights can create contrast:

Figure 13-24

Text styling

Apart from size and weight, further attributes for text are stylistic variations and decorations like italics and underlining.

Texture

Texture refers to the appearance of the surfaces of elements so that, if they were actually touchable, might feel rough, or smooth, or concave or convex, etc. Panels and buttons might look like they're made of shiny brushed metal, or illuminated plastic, or semi-transparent glass; a page background might look like paper or wood. The so-called "Web 2.0" look relies a lot on illumination, reflections, gradients, and shading effects to create a more sophisticated, "photorealistic" texture that stands out more than simple blocks of plain colors.

In the following illustration, on the left, buttons from Mac OS and Windows 7 are shown; these look like raised, convex, clear plastic buttons that look very pressable. In the center, a scrollbar from Java Swing's (old) Metal look-and-feel has a grippy tactile texture that makes you want to touch it and drag it up and down. On the right is an example of a novelty background texture for websites (courtesy of *allfreebackgrounds.com*).

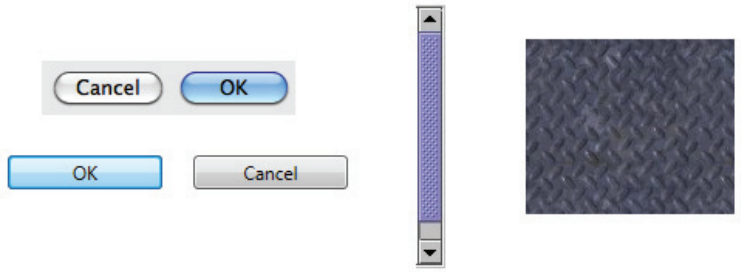

Figure 13-25

Textures can give your user interface a unique look-and-feel, but for business applications, you probably don't want to get too carried away; it's usually best to stick to more conservative styling. Novelty textures, like UI components appearing to be carved out of wood or stone, might help give an immersive ambiance to a game, however.

Note that graphic designers also use the word *texture* to refer to the overall visual effect of a block of text. If you look at a block of text and squint or defocus your eyes until you can no longer distinguish the actual words, you may see a texture emerge. If you were to imagine that the text were raised off the page, and you could close your eyes and rub your fingertip over it, then a block of text set in Times New Roman (upper left) would probably feel different to the touch than a block set in Helvetica (upper right), or Times New Roman Italic (lower left), or Gill Sans Regular (lower right):

Enihilluptas acesece rchillabo. Nam, volupturem. Itae vid moloris tibusda que et abo. Agnatem eum excerias qui dipsand ucipsamus alitatia alictibus non remqui odi ullaci consequi ullorest audic te veligniminus ducia nis solorehendam verum sundaerat facia delesto tatium volor re mos pa quis eliquo quatus audis que poreium etur, con con exped untest, il il minusantiam endi dolupit que porporum est laborio esti odit volum sitatur aut ut vel etus del inciende nullenim audit, sunt aut quam, id ut prae consed magni incillit haribusapis ut vollicit qui coquilla.

Enihilluptas acesece rchillabo. Nam, volupturem. Itae vid moloris tibusda que et abo. Agnatem eum excerias qui dipsand ucipsamus alitatia alictibus non remqui odi ullaci consequi ullorest audic te veligniminus ducia nis solorehendam verum sundaerat facia delesto tatium volor re mos pa quis eliquo quatus audis que poreium etur, con con exped untest, il il minusantiam endi dolupit que porporum est laborio esti odit volum sitatur aut ut vel etus del inciende nullenim audit, sunt aut quam, id ut prae consed magni incil-

Enihilluptas acesece rchillabo. Nam, volupturem. Itae vid moloris tibusda que et abo. Agnatem eum excerias qui dipsand ucipsamus alitatia alictibus non remqui odi ullaci consequi ullorest audic te veligniminus ducia nis solorehendam verum sundaerat facia delesto tatium volor re mos pa quis eliquo quatus audis que poreium etur, con con exped untest, il il minusantiam endi dolupit que porporum est laborio esti odit volum sitatur aut ut vel etus del inciende nullenim audit, sunt aut quam, id ut prae consed magni incillit haribusapis ut vollicit qui coquilla.

Enihilluptas acesece rchillabo. Nam, volupturem. Itae vid moloris tibusda que et abo. Agnatem eum excerias qui dipsand ucipsamus alitatia alictibus non remqui odi ullaci consequi ullorest audic te veligniminus ducia nis solorehendam verum sundaerat facia delesto tatium volor re mos pa quis eliquo quatus audis que poreium etur, con con exped untest, il il minusantiam endi dolupit que porporum est laborio esti odit volum sitatur aut ut vel etus del inciende nullenim audit, sunt aut quam, id ut prae consed magni incillit haribusapis ut vollicit qui coquilla. Ik ben verpleegster uit

Figure 13-26

Surrounding space

Humans place value on **space**, and things that take up more space than necessary tend to be perceived as being important and valuable. Surrounding space can thus be one of the most effective attributes for creating contrast. If an element is in a region that's tightly packed with other elements, it will not stand out. But if that element is surrounded by generous whitespace, we'll tend to believe it must be either special or valuable to deserve all that space.

How to build a visual hierarchy to express relationships between page elements

The underlying structure of a page's layout can be understood as a **visual hierarchy**, where some visual elements on the page are conceptually *subordinate* to others. The visual hierarchy helps guide the user's eye through the page, and aids users in interpreting the content of the page by giving clues to the relationships amongst the elements.

Take this sample webpage for example:

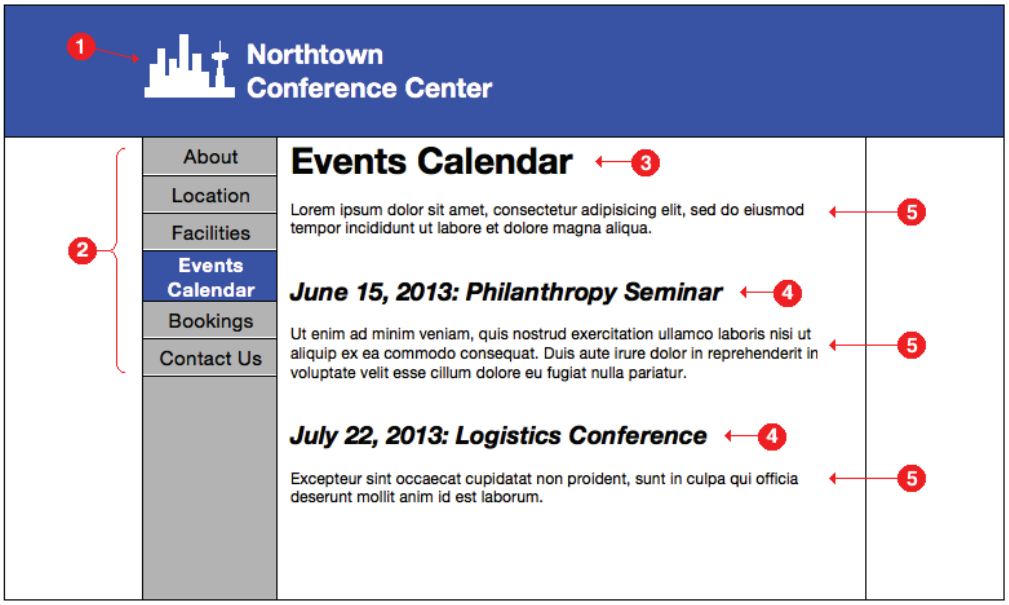

Figure 13-27

The banner (1) is the highest element in the hierarchy of this page. The banner, and the logo within the banner, tell the viewer that everything on the page is associated with the site named in the logo. Everything below the banner and logo are subordinate to these elements.

The navigation bar (2) on the left-hand side of the page comes second in the visual hierarchy.

The main content panel's heading, "Events Calendar" (3), which describes the contents that follow, forms the third element in the visual hierarchy.

The two subheadings (4) are subordinate to the main heading, so they come next in the visual hierarchy.

Finally, the sections of body text (5) are subordinate to their respective headings. These come last in the visual hierarchy.

When scanning the page, the viewer's eye will tend to look first at the banner, then move to either the navigation sidebar or the main heading. While the viewer may read the content under the main heading from top to bottom, it is likely that the viewer's eye will be caught by the subheadings first, and then the viewer's eye may go back to read the body text.

Why is the viewer likely to scan the page in this way? The visual hierarchy has been intentionally designed to express the relationships between the elements on the page, and the elements' relative importance, and this has been achieved through:

- the choice of visual *attributes* of the elements on the page, and
- the relative *positioning* of the elements.

Let's now take a closer look at using attributes and positioning to create a visual hierarchy.

Attributes

Visual attributes, as we've explored previously in this chapter, are the general stylistic properties of visual elements on the page, such as size, shape, color, texture, and direction.

Visual elements that are either conceptually similar, belong to the same category, or have equal importance, should generally share the same attributes, whereas elements that are

intended to be different should have one or more contrasting attributes.

Most crucially for creating a visual hierarchy, if one element is intended to be stronger than or superior to another element, then the attributes of the elements should be chosen to reflect that fact. For example, if you have a list or a menu, then all of the entries belong to the same class or category of elements, and so they should be styled consistently with the same attributes. But the heading that sits atop the list serves a different function. It describes or summarizes the contents of the list or menu, and so it should be styled with contrasting attributes that emphasize its dominance. The heading might be larger or bolder, or it may take a different typeface or color.

Contrast is weak when the elements being contrasted are only slightly different. When two elements differ only slightly, it can often look like the difference is accidental. Strong contrast is produced when the differences are clearly intentional. To create intentional contrast between two elements, the general guideline is to make sure that the elements differ in at least *two* ways. In other words, at least *two attributes* should be different between the elements. As surrounding space is considered to be an attribute as well, leaving a gap of whitespace between two elements can count as one of the differences.

Figure 13-28 demonstrates some examples of weak contrast and strong contrast between a heading and a list of items:

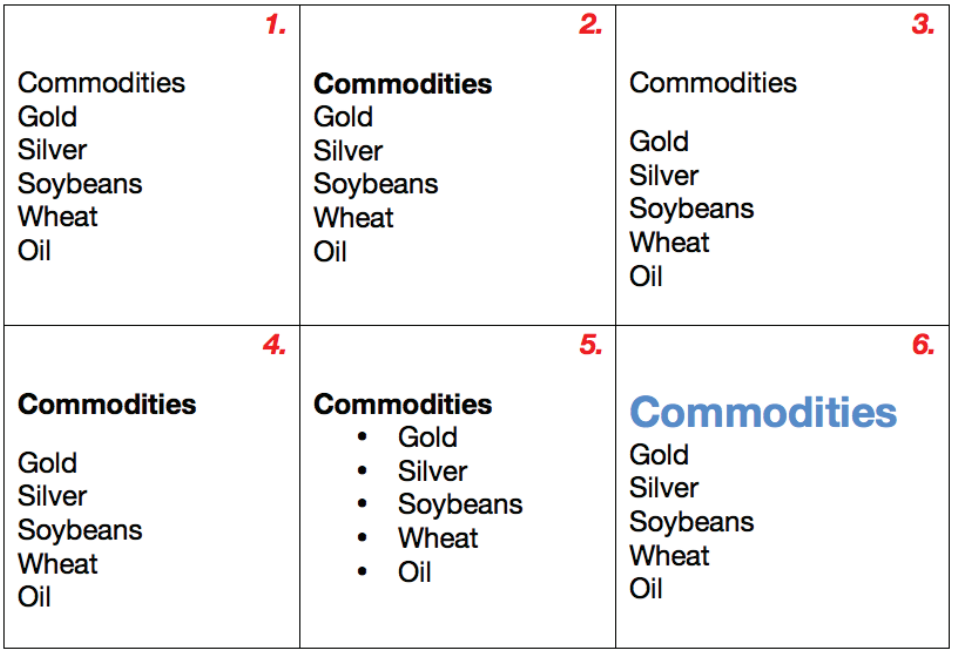

Figure 13-28

In example (1), there are no differences between the heading "Commodities" and the entries in the list, so it is not visually distinguishable as a heading at all.

Example (2) is better — the heading is in bold type — but the difference still does not stand out strongly.

Example (3) places a gap between the heading and the list. While this is also better than (1), it is still not satisfying, as the heading is set in the same type as the list entries.

Examples (4) through (6) illustrate how using two differences produces much stronger visual contrast. Example (4) uses a gap and sets the heading in bold type. Example (5) sets the heading in bold type and uses indented bullets to offset the list from the heading. Example (6) increases the size of the heading's font and sets the heading in a different color.

The latter three examples communicate the relationship between the heading and the list entries much more effectively than do the first three examples, and illustrate how size and space can be used to help indicate the relationship between the items.

Positioning

In the English-speaking world, and in other left-to-right languages, we read from left to right and from top to bottom. What is at the top of the page is considered to be more important than what is at the bottom of the page, and, to a lesser extent, things on the left in a row of things are perceived to come first. (In right-to-left languages like Arabic and Hebrew, the right-to-left direction is reversed.)

Thus, the top-left corner of the page is where the eye begins when scanning the page, and so the most important element in the visual hierarchy is usually placed there.

If we have two visual elements A and B, we should ensure that A is positioned either above, or to the left of, element B, when we want to show that:

- Element A is more important than element B; or,
- Element B is a subelement of A; or,
- Element B depends on, logically follows from, or derives from, element A; or,
- Element A is the cause and B is the effect; or
- Element B naturally comes after A in a logical sequence or enumeration.

As an example, let's take one example of poor design that I've encountered recently. One system had a screen for editing customer details that looked roughly like this:

Figure 13-29

Users were expected to enter a value in the *Customer Number* field and then click *Retrieve*. The other fields on the screen would then be populated with the data on file for that particular customer.

The above design is poor because the relationship between the customer number and the remaining fields is not communicated by the visual design.

The data on this screen is dependent on the customer number, because the customer number is the identifying piece of information, or **key**, for a customer record. If the user enters a new customer number and clicks *Retrieve*, the data corresponding to that new customer number will be loaded and presented.

But because the user will start reading the screen from the top left, the user might assume that the last name and first name are identifying the customer record. Additionally, the fact that the user is expected to locate the *Customer Number* field first is troubling; it is buried deep in the screen, and there are no visual cues that it is the most important element upon which the others are dependent. If it is the identifying field upon which the other fields depend, then it should be situated in a place that better communicates its importance: the upper left, where the user begins scanning the screen.

And the fact that the user has to jump from the *Customer Number* field up to the *Retrieve* button is poor design as well. There are no cues that this is how the interaction flow is supposed to work; because we read from left-to-right and from top-to-bottom, jumping from below to above is counterintuitive. The button should be moved so that there is a left-to-right or top-to-bottom flow from the *Customer Number* field to the *Retrieve* button.

Thus, one possibility for an improved layout might be something like the following:

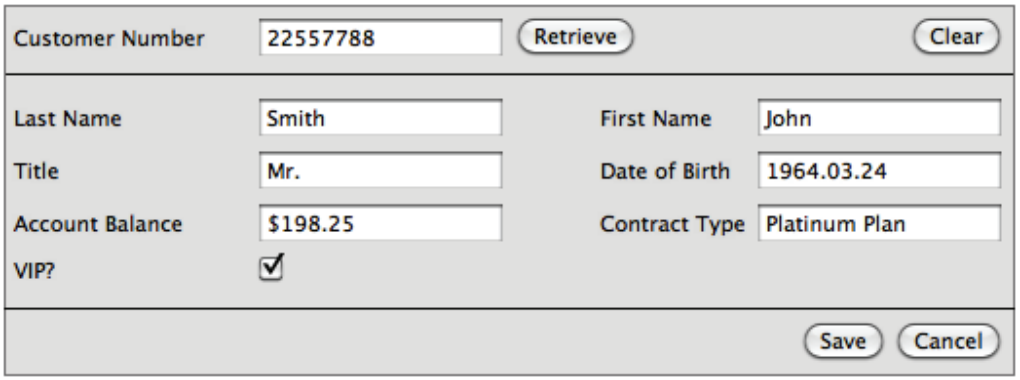

Figure 13-30

In this design, it is clearer that the details are dependent upon the chosen customer number. There is a left-to-right flow from the *Customer Number* field to the *Retrieve* button, and there is a top-to-bottom and left-to-right flow that leads towards the finalizing *Save* and *Cancel* buttons.

Practical aspects of visual hierarchy for user interface design

While you may not necessarily explicitly design a visual hierarchy when creating a page composition, an awareness of the general concept of the visual hierarchy and an understanding of how relationships between elements can be expressed can help you produce better designs.

In large project teams, you can try to ensure some degree of visual design consistency throughout your product by creating a style guide that defines the general look-and-feel of the interface in terms of a visual hierarchy. (Style guides will be discussed in Chapter 15.) Writing a style guide is not always easy; it's not always possible to completely document everything that makes up a consistent set of visual designs. But by specifying guidelines or rules for the styles and positioning of headings and other visual elements, and by providing page layout templates and examples, a style guide can help communicate your design intentions to the project team.

Making visual designs look good

Graphic designers often say that aesthetically-pleasing creative works possess **unity**, meaning that everything simply just fits together coherently:

- All the elements on the page appear to belong there;
- There are no unnecessary or extraneous elements; and
- All the elements are arranged in such a way that they appear to belong together.

To achieve unity in your page layouts, keep the following principles in mind:

- **Consistency and continuity**: Visual elements like fonts, colors, rules, icons, and decorations should be used consistently across the composition.

  The same visual style and layout scheme should be repeated across all pages on a website, or across all screens and dialogs in a desktop application, and ideally, this consistency should be maintained across your organization's entire product line.

- **Coherence**: The design should make sense conceptually. Elements should be positioned and styled to reflect their positions in the visual hierarchy of the page. Elements with similar functions and similar importance should be styled with similar attributes (size, color, font, weight); elements that are of the same general type but which differ in importance should share certain attributes but vary others.

  For example, if your design has three levels of headings, they should usually share the same typeface, but the more-important levels of headings should use visual attributes such as a larger type size or a thicker weight to express their relative importance.

- **Simplicity, restraint, and minimalism**: While you do want to make your pages look interesting and eye-catching, this is better achieved with a simple and elegant design rather than one cluttered with unnecessary and excessive decorations and distractions.

- **Balance and dominance**: You want to use the space on the page effectively and attractively. For example, If your page is tightly packed with content on one side, but the other side is empty, your page will look lopsided:

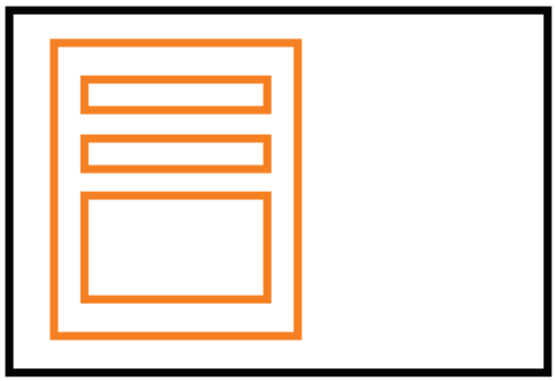

Figure 13-31

This page looks like it is going to tip over to one side!

This doesn't necessarily mean that all pages have to be symmetrical, however. Asymmetrical designs tend to look more interesting — graphic designers call this effect **dynamic tension**. Even though an asymmetrical design might have a dominant feature, like a large, eye-catching panel on the left-hand side, the design could still achieve balance by positioning additional elements on the right-hand side:

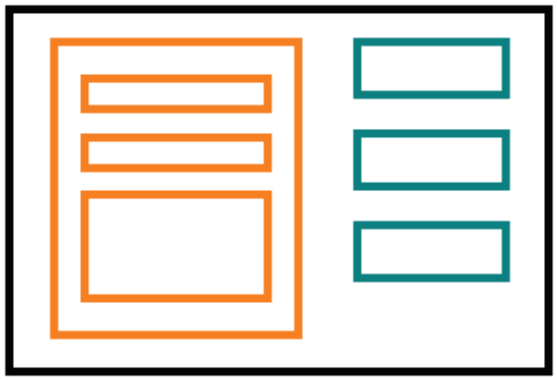

Figure 13-32

- **"Good Gestalt"**: You should be able to perceive the design as a coherent whole, rather than a chaotic mish-mash or mosaic of elements.

A design that expresses unity has order and organization to it. You want the viewer to feel that there was an intelligent designer behind the work, and that the designer

deliberately and intentionally chose and produced that particular design. The alternative is for the viewer to suspect that the design was slapped together haphazardly or by accident – and you don't want that!