If Goldilocks were an interface and interaction design consultant, she might say that there are three possible outcomes in an interface: it can provide too much information, too little information, or it can be ‘just right’. Let me use a few stories to illustrate.

A recent New York Times article follows investors who are close to retirement and hopelessly addicted to tracking their investments. They watch the stock reports on TV all day, make trades via computer at all hours, and set their pagers to warn them of changes in their stock prices. They are deluged with information, from interfaces of all types, and they are often nervous wrecks. Why? Because their retirement funds hang in the balance.

A brand new multimillion dollar air traffic control tower at Miami International Airport will be partially demolished, before it is ever used. Engineers, worried about hurricane force winds, built massive struts to support the tower’s roof, and these struts are visual obstructions to air traffic controllers. An entire airplane can be obscured in the blind spot the struts create. It’s a clear case of poor user testing, and a clear case of ‘too little information’.

There are certainly a few interfaces these days that come pretty close to the ideal of being ‘just right’. They thoughtfully provide exactly the data needed by the user to support the current task—no more, and no less. Much more common, however, are the kind of designs that are the butt of the following joke.

The pilot of a small plane is hopelessly lost in a cloud bank. His passenger worriedly asks, ‘What can we do?’

The pilot responds, ‘I’ll fly a little lower and see if I can get my bearings.’ Just then a building comes into view below. The pilot yells to a man on the roof, ‘Where am I?’

‘About 150 feet above the ground, in an airplane!’ the man yells back. Upon hearing the answer, the pilot immediately locates the airfield and lands.

The bewildered passenger can’t restrain his curiosity. ‘How did you figure out where we were?’

‘Easy,’ answered the pilot. ‘That guy’s answers were completely accurate, but totally useless, so I knew he had to be a Microsoft software engineer. I quickly recognized the airfield at Redmond, Washington, and landed the plane.’
Information Overload

A businessperson may turn to a computer to answer the question ‘How’s my business doing?’ Too often, software designers answer with something that looks like this:

![Excel spreadsheet image]

when all the businessperson really wanted was this:

![Thumb up image]

Sometimes, but much more rarely than we might think, all those rows and columns in Filemaker Pro are helpful. But most of the time, they’re not. In fact, the sheer volume of information is often counterproductive. It’s too much for the average person to absorb.

In the example above, the excess comes in the form of data. It’s just as likely that our interfaces are excessive in their graphics, colors, preference settings, buttons, or even in their on-screen field labels, directions and help facilities.

We’ll return to some FileMaker designs again at the end. For the moment, let’s look at some more generic examples. We’ll look at the way time is conveyed, first in clocks and then in the progress dialog boxes of popular software tools.

‘Remarkably, all of the well-known computer interfaces...are designed as though their designers expect us to have cognitive abilities that experiment shows we do not possess.’

—Jef Raskin
Telling Time

‘Complex tasks may require complex interfaces, but that is no excuse for complicating simple tasks... Compare the difficulty of setting the time on your electronic four button wristwatch to that of completing the same task on a mechanical model. No matter how complex the overall system, there is no excuse for not keeping simple tasks simple.’—Jef Raskin

clocks

It used to be a simple question: ‘What time is it?’ And a simple device—a clock face—answered the question. It was easy to read from afar, and if you needed more precision, you simply looked more closely at the clock face.

The first digital readouts for clocks were used not because the greater precision they offered in measuring minutes and seconds was useful to their users, but because the digital mechanism was cheaper to build.

In this way, clocks followed a now hallowed tradition in technical design: make things easier for the designer, even if it ends up being harder for the user. And certainly many digital clocks are much more difficult to use than the clocks they replaced.

A subtler point of the digital vs. analog debate is the effect upon us when we receive information that is more precise than we need. There is something slightly manic in saying ‘11:58’ instead of ‘about noon’. The cumulative effect of these overly precise interfaces can be to add stress to our day. The same could be said of the way time is told by our computers.

Finally, overly precise interfaces have a much greater chance of being wrong. In other words, their very precision asserts an accuracy that may not be warranted. When the clock on the wall says 5:01 when it’s really 4:58, employees who leave ‘at five’ can get in trouble.

progress bars and dialog boxes

Microsoft’s reputation for providing accurate but useless information was earned in part by dialog boxes like this one, to the right. It’s hard to imagine even the geekiest geek having any use for the fact that at this moment exactly 314496 bytes (no commas separate the thousands place) have been transferred.

The ‘Time remaining: 20 seconds’ text gives rise to the famous countdown effect. Spend some time in a Windows office and you’ll see it: workers transfixed by this dialog as they watch this line count down to zero. Imagine how much worker productivity is spent in this endeavor.
This dialog preserves the countdown effect, but simplifies the overall graphic impact. Users differ in their opinions of the graphic showing papers flying from one folder to another. The intent was to evoke some of ‘analog’ feel of the traditional clock face. Yet Microsoft engineers underestimated the ways that users would attempt to interpret this graphic. Following are some of the perfectly logical—but erroneous—conclusions users have drawn:

- The number of sheets of paper which fly across indicate the number of files copied.

- If a sheet of paper doesn’t make it all the way across, as when the progress bar completes with a sheet halfway between the two folders, the copy operation was incomplete.

- The copy operation is too slow, since the pages fly across at the same speed even after I bought my Pentium III 1 gigahertz.

Macintosh applications often fare no better. Take a look at this Claris Emailer progress dialog, with its incredibly useless measurements, accurate—or more often inaccurate—to a hundredth of a unit. Anyone who’s spent time mesmerized by this dialog knows that its accuracy can be wildly imprecise.

Let’s admit that there are those among us who revel in issues of throughput and latency. How can an interface satisfy these exotic longings while avoiding a ‘data dump’ on the more normal user?

One way is to allow guys with more prurient interests—they do seem usually to be men—to access the details through a disclosure triangle like the one in the lower left corner of this window. The tool is Transmit, an elegant Macintosh FTP client available as shareware.

A user who tires of all the detail can click the arrow labelled ‘Hide More Information’, and the extra stuff disappears. And a user who never clicks the arrow will be spared the details, since the default is to hide them from view.
Most of the time, even 99% of the time, a progress bar like this one is sufficient. It's from the installer for Apple's Airport wireless networking device. There's no 'countdown effect' since the text below the progress bar is relatively loose in its precision. The message 'Estimated Time Remaining: About a minute' is followed by one saying 'Estimated Time Remaining: Less than a minute'. That's it.

Surprisingly, that's enough. You'll have to look long and hard to find someone complain about the lack of precision of this text. That's because the progress bar itself works like the old analog clock face. If you study it as it progresses, you can make a good guess at the missing level of precision, just as you can with the hands of a clock.

More recent efforts from Microsoft, such as this Download Manager window from Internet Explorer 5 for Macintosh, take the simplification one step further. Why litter the desktop with multiple dialogs, when you can combine them in a single window?

Programmers like the ones at Microsoft have a lot more in common with the power user than the average. Like the power user, they're into throughput and latency. But they are slowly learning that when it comes to interface design, less is often more.

It's about time. But it's also about color, and buttons, and layout. Let's see how by examining some Filemaker Pro files.
Just the facts, Ma'am

Designing databases is about presenting data to people who need it. But how much data is enough? And how can a database designer move their client through a large volume of data without getting hopelessly lost? It’s a difficult task, but it’s not impossible.

The Makeover Segment

Two pairs of ‘Before and After’ shots will show how a few masterful FileMaker designers answered the challenge of database design by practicing restraint.

Mark Rubenstein of Metro Technologies kindly submitted the following pair of screen shots.

There is a great deal of information in this layout. Unfortunately, much of it is noise. Like static on a radio, the staggered misalignment of the fields and the colors obscure the real content.

And the large number of buttons on the layout carries an unintended message to the new user: this software is hard to use. That may or may not turn out to be true, but the first impression has been made.

Information that belongs together—such as the Man’s and Woman’s information—is scattered throughout the layout, rather than grouped in one place. The color coding seems to group certain fields, but is somewhat random as well.
That won't stop the user from trying to make sense of these colors anyway, just as they try to make sense of the flying sheets of paper in the Windows copy dialog box. They'll wonder why the income field, the pet information and the vendor button are all the same shade of pink. Unfortunately, there's no logical connection among these items.

If you squint at the Before layout, the colors and the jagged alignment overwhelm the information. In the portals at the bottom of the screen, the actual data, in normal text style, almost disappears against the weight of the bold field labels and colors.

Now squint at the After layout. The data is still visible. What changed?

Mark has rigorously aligned and grouped the data in logical ways. He's drastically restrained the use of color, and he's moved some information off the layout completely through the use of folder tabs. All this makes for a much more readable layout.

Mark practiced restraint in the use of fonts as well. While the Before shot features Helvetica (a poor screen font) in bold, italic and ALL CAPS styles and in multiple point sizes and multiple colors, Mark has stuck with Geneva in the same style and size throughout. His field labels are set on a grey background, while the data is set on white. All of this restrains the design and lets the information come forward.

Note that Mark's redesign removed elements rather than adding new ones. In this case, less is definitely more.

“A design is finished, not when there is nothing left to add, but when there is nothing left to take away.”

—Antoine de Saint Exupery
The next set of Before and After shots are brought to us courtesy of Rosemary Tietge of the Harvard University Press. The Before shot was developed at Harvard, and isn’t half bad.

Fields are strongly aligned, using a left alignment. This is generally the best alignment to use, since English is written left to right. Notice how the Views column on the left hand side of the layout, which uses a center alignment, is more difficult to read. The eye can’t find the beginning of the word with as much ease as it can with a left alignment.

Take the squint test with this layout, and you’ll probably notice the blue buttons scattered through the middle of the layout. The color of buttons is related to the file structure in a way that is definitely not random. But the contrast of these deep blue buttons overwhelms the data.

Rosemary’s goal in her redesign was to improve on a design that was pretty good to start with. It’s still a work in progress, but she’s made great strides as you can see in the After shot. Once again, restraint was the watchword.

Rosemary switched the font throughout to Verdana, Microsoft’s web font and one of the most readable screen typefaces. She improved the alignment by making sure that both right and left edges of fields and labels lined up whenever possible.

The Views rectangle has been replaced by folder tabs which, unlike the Views design, are familiar to most users and don’t require training in their use. This repetition of elements from other software, such as
the operating system, is another form of restraint. Why reinvent the wheel? If there’s a device that users are already familiar with, re-use it. Rosemary has backed off on the blue buttons, turning them grey. As Edward Tufte is fond of saying, the eye is a high resolution device and doesn’t need more than a small hint that a button is clickable. Rosemary provides a subtle 3-D effect to indicate the clickability of the button.

FileMaker Pro features a Find Mode for searching for records. When you enter Find Mode by choosing a menu item or typing a keyboard equivalent, the fields blank out and you can type search information into them. Pressing Return on the keyboard finds records that match.

This special mode is a kind of hidden information that can cause problems with users who don’t understand it. When you enter Find Mode, the window appears much like it does when you are entering a new record. And since the record you were just looking at disappears, it may be harder to remember exactly what you were looking for.

The Quick Finds along the bottom of the screen avoid many of the problems of Find Mode. Clicking in one of the fields displays a pop up list of, for instance, all the authors in the database. Selecting a name and clicking ‘Go’ takes you to that record.

As you use Quick Finds, your previous choices remain in the fields, so that redoing a search is as easy as clicking ‘Go’ again.

FileMaker Pro offers a similar function called ReFind. However, it is even more buried in the interface than Find Mode is, and most users never discover it.
Good design is restrained in its display of information, but not so restrained that useful information is completely hidden from the user. Rosemary's Quick Finds put useful information close at hand, instead of hiding it behind menus and special modes.

Lots and Lots of Helpful Directions

It may not be obvious that one of the ways a good designer practices restraint is by not including lots of on-screen help with instructions on using the interface. The following is an excerpt from the book *Humane Interface*, by Jef Raskin, one of the original designers of the Macintosh. He is speaking of the ticket vending machines in the San Francisco Bay Area Rapid Transit stations.

‘...Another indication that the new machines are badly designed is the bright, colorful, large numbers “1, 2, 3, 4” and the big arrows presumably placed to guide you. If the front of the machine were well laid out, you wouldn’t need crutches. The numbers do not help tremendously anyway, because you must remember what step you are executing (way, step 2) while you put in your money ($5), knowing that you only want to get a $3 ticket so you must hit the correction button in the next step (step 3), keeping in mind that you’ll want to count your change ($2) that will come in the form of quarters (eight of them). Hurry! You can hear the 7:06 train coming! What step were you on?

When you find a computer interface that requires bright colors and myriad explanatory legends to guide you, you can guess that the design has gone astray.’

—Jef Raskin

Mr. Raskin proposes a better design which reduces 6 steps to 2. How many fewer machines would be necessary to serve the public if the task could be done three times as fast?

Starting From Scratch

Redesigns like Mark’s and Rosemary’s give us plenty of chances to practice restraint. But you can only go so far when overhauling an existing interface. Let’s look at a project designed from the start with the goal of restraint.

This next window is borrowed from the JobFile, a traffic manager built by Small Company for the advertising firm Turkel Schwartz & Partners of Coconut Grove, Florida.

Traffic management in an ad agency is a very complex job. A single job may involve dozens of people performing dozens of tasks in a specific order, and a firm like Turkel Schwartz may have dozens of jobs open at once. An interface that brings clarity to traffic management is a godsend.
The progress bar in the upper right provides the job's status at a glance. It's a great example of what we call *meta-data*: a summary of complex data which is usually shown in detail elsewhere in the interface.

The raised panel in the upper left, with the job name at the top ('Royal Order of the Fork') and the pending task in the lower right corner (Art Direction), is called the Job Panel. It is repeated in at least a dozen places throughout the interface, whenever a job is mentioned.

Wherever it appears, it functions identically. Clicking on the Finder icon reveals the job folder, or creates it if it hasn't been opened yet. Clicking on the client's name (Advertising & Marketing International Network) opens the client's record.

This repetition of elements across an interface is itself a way of reducing the total information the user must deal with. Once again, re-use is a way or practicing restraint.

The middle column of the task schedule is labelled Due/Done. If the task is not yet completed, the due date is displayed. As soon as a task is marked as done, this field shows the completion date, in bold.

Of course, the database has stored the original due date for the task. No data is lost from the column. But the information that is unlikely to be of further use to the traffic manager—that is, the due date of a completed task—is replaced by more useful information.

A job at an ad agency often is based on elements of an older job. the new job may share copy or graphics with the old job, or may be part of the same campaign. The older jobs are called reference jobs in this interface, and can be reached by clicking on the folder icons below the right edge of the progress bar.
Goal-Oriented Design

The goal of the JobFile was to allow this advertising firm to access and use an intricate assemblage of information in a way that was clear and manageable. That goal is a typical one in database design. And it's a goal that is served well by the practice of restraint in every phase of the design process.

Restraint means showing users only that data which is useful to them at any moment, and making it easy to get to the data the user may need in the next moment. A designer can only do this after studying closely the users' goals.

This is our specialty at Small Company. If we can be of assistance to you in the areas of interface and interaction design, please contact us at info@SmallCo.net.

Further Reading...

Two books have been quoted in this paper:

*The Lunatics are Running the Asylum*, by Alan Cooper
*Humane Interface*, by Jef Raskin

I recommend them both. Mr. Raskin's book is an academic and philosophical discussion of future directions in interface and interaction design. Mr. Cooper's book is targetted at the lay reader as well as the design professional.

Any writing by the following authors is recommended:

Edward Tufte
Donald Norman

While not strictly dealing with software, these authors may also be of interest:

Antoine de Saint Exupery
Christopher Alexander

*Albert Harum-Alvarez, Small Company*

*July 2000*