Com = computer + communicator

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Most of this essay is not new. Most of what I describe already exists. I just want to record the design choices I would make if I were designing computing and communicating devices.

Early cars (1895 to 1930) had a great variety of controls, such as levers and joysticks, until they settled on some standards (steering wheel, gas pedal on the right and brake pedal on the left) so that anyone can get into any car and know how it works. Computers and communications have necessarily gone through an experimental stage. It isn't always clear what ways of doing things are going to be best until you try them for a while. Then you have to settle on some standards to make them usable without a lot of relearning. This essay is my standards preference.

I first saw and used windows (the kind on computers) in 1980 when I worked at Xerox PARC, several years before Microsoft learned about it. We even discussed whether “windows” was the right word, since they weren't transparent. My first reaction was horror: I saw that they allowed a computer user to reproduce a messy, disorganized desk. Some people apparently like having a messy desk, with piles of papers haphazardly everywhere, on top of each other; windows should suit them well. But I am a neatnik. I present what suits me.

One Device, Many Sizes

I envision a series of devices, all pretty much the same except for size. Each one is called a com; that's for computer plus communicator. They all deserve the same name because they all work the same way. There's the size that fits in your hand. We have been calling it a smartphone, but that's a poor name because phoning is just one of its capabilities, and not the most used capability. There's a slightly larger size that we've been calling a tablet. Both sizes have a touch screen, a microphone, a speaker, an orientation sensor, a camera, wifi, bluetooth, and cell communications. They are exactly the same device except for size. But at present, they don't work exactly the same way; even if you know how to use one, you may not know how to use the other. Different brands of smartphone and different brands of tablet don't work the same way. I would like them to work exactly the same way so I'll know how to work all of them just by learning to use one of them.

Moving up, there's a size that sits on your lap. We've been calling it a laptop computer. It has a keyboard and touch pad, so its screen may not be a touch screen. It may lack an orientation sensor. But otherwise it is the same device, and I would like it to work exactly the same way as the smaller devices. Moving up again, there's the size we've been calling a desk top computer. Then there are the sizes we call smart TVs. The smart TV size could have a touch screen, or it could have a keyboard and touch pad connected by bluetooth. It should be exactly the same device, and work in exactly the same way, as the smaller sizes.

All sizes are the same device, except that larger devices that are not handheld do not have an orientation sensor, and some devices have a touch screen while others have a keyboard and touch pad. There can be many sizes. The device has one name no matter what size it is, and I suggest “com”. The sizes can be distinguished by a measurement, for example, a 50cm com. Or the sizes can be given names, for example, a mini com.

In addition to the loudness and brightness controls, there are three special buttons or keys on a com. They are: the command key, the files key, and the landscape key.
Commands

Screen space is a scarce resource, and it is a shame to see it wasted on a clutter of menu items. On a com, there is no menu sitting permanently on the screen taking up space. In general, each program uses the entire screen. There is a command key, perhaps placed on both sides of the space key. When pressed, a menu of commands pops up. The commands depend on what program is currently running. When you select a command, either the command causes some action, or a submenu of commands pops up. Submenu commands can cause further submenus. Some commands have a letter or other character beside them; if so, the combination of command key and letter/character is a shortcut that causes the action without navigating the menus.

Files

Files are the way you organize your programs and documents. When the files key is pressed, the screen displays a list in either the text view or the icon view, your choice. There may be more items in the list than fit on the screen, in which case you scroll down to see the others. You can reorder the items. Each item has a name, a creation date/time, a last modification date/time, a size, and a type. The type is either a program, a document, or a file. If it is a file, selecting it displays its programs, documents, and files. You can create new files and delete old files. The file structure is your one and only information organization; there isn't a separate mail file structure, music file structure, photo file structure, and so on. Pressing the files key again returns to the screen as it was before you pressed the files key the previous time.

Programs

I don't remember when the word “app” was invented. It is short for “application”, but what is being applied to what? Before the word “app” we used the word “program”; I see no need to replace “program” with “app”, and I shall continue to use the word “program”. All programs should run on all coms (except that programs requiring an orientation sensor cannot run on large coms that don't have an orientation sensor).

One of the programs that runs on all coms is the programming system used to program all the programs that run on coms (including itself): ProTem (I named it that in 1987 when I first conceived it). The correspondence between ProTem and com concepts is not accidental: ProTem's dictionaries are a com's files; ProTem's programs are a com's programs; ProTem's data are a com's documents.

Documents

There aren't different kinds of documents, such as an email document, a text document, a video, and so on. There is just one kind of document for all purposes, and it can have any combination of text, diagrams, photos, videos, sounds, links, buttons, and perhaps other things. A website is just a document. A document is either fluid or rigid. A fluid document can be edited and copied. A rigid document can neither be edited nor copied. A newly created document is fluid. When a fluid document is copied, you choose whether the copy is fluid or rigid. (With current technology, I don't think it is possible to make documents rigid, but I am describing my ideal.)

To see the desirability of this attribute, consider the following story. A musician creates a musical document, editing it until the musician is satisfied with it, and offers it for sale. When someone buys it, the musician makes a rigid copy of it, and sends this rigid copy to the buyer. The musician made the copy rigid for two reasons. The document is the music the way the musician wants it heard, so
the musician doesn't want the buyer to edit it. The musician also doesn't want the buyer to make copies for all their friends, or for sale. The buyer can send it to one friend, but then the buyer doesn't still have it, just like a physical object. In current computers, when you send something by email, you are sending a copy; you still have what you sent. The proposal here is that when you send something, you don't still have what you sent. If you want to keep what you are sending, you have to make a copy, and that requires the document to be fluid.

You don't “save” a document; saving is automatic. If you don't like the changes you have made, you can “undo” them.

**Landscape**

Movable, resizable, overlapping windows make a messy and confusing workspace. Windows are too small and they get buried. There are no windows on a com. A document has the entire screen. When that is too small, as it usually is, scrolling reveals the rest of the document.

Imagine a landscape of rectangular fields. The landscape is how a com organizes currently active programs and documents, each of which has its own field. At any moment, the screen is coincident with one of the fields; the other fields cannot currently be seen. There is a field to the left of the screen, a field above the screen, a field to the right of the screen, a field below the screen, a field diagonally above-right, and in all directions, and more fields beyond them. Different programs may be running in different fields, and different documents may be in different fields. You can move your screen to any field, or to say the same thing differently, you can move the landscape so that any field is showing on the screen.

When you press the landscape key, you see the landscape in miniature. Each field is just large enough to be recognizable. If that size does not allow the whole landscape to fit on the screen, the landscape can be scrolled in any direction. The fields can be moved around to change the order. New fields can be added and old ones deleted. A field can be selected to become the screen. Pressing the landscape key again returns to the screen as it was before you pressed the landscape key the previous time.

In general, each field has one document. But sometimes there is a reason to subdivide a field into rectangular subfields, with a different document or program in each subfield, and each subfield is separately scrollable. The screen displays one field, which may be more than one subfield. Then the command key shows the menu of commands appropriate to the subfield where the cursor is located.

**Gestures**

On a touch screen, you can select something by touching it, and you can move it by dragging your finger from its location to where you want it. On a touch pad, moving a finger moves a small arrow, called the cursor, on the screen, and pressing the touch pad selects whatever is at the cursor. You can move something by moving the cursor to where it is, then pressing and holding the touch pad while dragging the cursor to where you want it, then releasing the touch pad. A single finger gesture can also be used for selecting a region of the screen or drawing a line.

On a touch screen or touch pad, two fingers are used for scrolling. You can scroll in any direction; the screen image moves in the same direction as your two fingers. Rotating two fingers around a central point rotates the screen image. Spreading two fingers enlarges the screen image (zooms in), and moving two fingers toward each other shrinks the screen image (zooms out).
On a touch screen or touch pad, three fingers are used for changing fields in the landscape. Moving three fingers to the left pulls the entire landscape to the left, so that the screen shows the field that was previously to the right of the screen. And similarly for any other direction.

**Conclusion**

What I like best may not be what other people like best. What people say they like may not be what works best. That's why washing machines have a dazzling array of selling features: in the store they look great, but at home you find that most of them aren't useful. All I can do is say what I like and think is best.

[other essays]