Computer Design

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Nothing’s *Really* Changed

We like to allow ourselves to be amazed by how far we tend to think computers have advanced over the last 50 years or 60 years, however what you see here next to me is, at its heart, the same machine you may have used 10 or 20 years ago.
Design “Breakthroughs”

These aren't HOW electronics and computers are designed, but more along the lines of how SMALL we can make them.

(1 inch = 25.4 million nm)
What’s Inside a Computer?

There are many components that are involved, including resistors, capacitors, integrated circuits, transformers, and the list goes on, but we would have no use for any of these items if it weren’t for the king of electronics: the transistor.

In this room, there are anywhere from 30 to 60 billion of them—12.26 billion being next to me.
Outdated Technology

You’re probably skeptical when I tell you that the computer in the lower right and the one next to me are essentially the same, but there’s really not many differences between them. They both use the same internal components, although the computer next to me has some “nifty” modern features.

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This one on the left, however, is different.
“Modern” Computing

The design of computers today come in a few different “flavors”- one for everyone. The first being cleanly manufactured and polished corporate-designed machines. These would be your iPhones, Microsoft Surface tablets, or laptop you buy in a store. They are the most popular and widespread. Not cost effective.

Second, there are your corporate-designed desktops like Mac Pro and Lenovo workstation devices. These incorporate pieces of the third flavor, but still come with that cleanly manufactured and polished look and feel. Widespread, but you might not see one everyday. Usually not cost effective.

Third, there is the homemade route. This involved picking your own parts and assembling them into a functioning device, which is what I have done here.
“Modern” Design?

Not including laptops, are they are completely custom designed from the bottom up in almost every case, modern day computers are manufactured in several pieces by many different companies. Businesses like HP, Microsoft, and Lenovo buy these parts in bulk from Intel, AMD, NVidia, Gigabyte, ASUS, (there’s WAY more, but these are some of the largest) and add their own signature touches, then turn around and sell them to you at a profit.
Summary: How They Work

Computers work in ONLY 1’s and 0’s, which you’ve probably heard before. These signals are sent in groups to a central processing area where they are “decoded”, executed, and returned to wherever they are required. Due to the complexity and high resolution of the monitors we use and information we process, graphics calculations for the screen often take place elsewhere. The CPU (Central Processing Unit) does the math required, and then hands it off to the GPU (Graphics Processing Unit) which tells your monitor what to show you. Between these parts are the motherboard which, as the name suggests, is in charge of all interactions between parts, and ultimately responsible for the execution of the instructions fed in the computer. So what does a “computer” really do? Computes information that it has been given, and feeds it back to you in a way that accomplishes a task, or relays information.
Building Your Own Computer!

Benefits:

1. Pay less or the same thing, or pay the same amount and get more.
2. Learn how a computer works and how to fix basic problems.
3. More satisfactory performance on the software end of the computer (no more “WHY IS THE COMPUTER SO SLOW” (trust me, I know you’ve said it).

It’s easy, I promise! If you’re interested in building your own please come and talk to me anytime or send me an email. I am always happy to help anyone interested in taking the leap.
Specifications of my PC (if you’re interested)

Intel i7 4960X (6 Core w/ Hyperthreading for 12 threads) @ 4.6 GHz (unlocked)

GTX 970 4GB Gigabyte 3x Windforce (2-Way SLI) GPUs

GA-X79-UP4 Motherboard

360mm Water Radiator

BitFenix Colossus Window (Red on Black)

Lots more (ask if interested)