The Complete Guide To:

How to Build a Computer from Scratch.

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Lesson 1:

Hardware Basics

Building a computer from scratch gives you the perfect machine for your needs, but it can be daunting the first time around. In this edition of Lifehacker Night School, we'll be taking you through the buying, building, and installation process step-by-step. Today, we're going to start with a little computer hardware basics.

While you could just go to the store and buy a Dell, you might find that you're happier with a custom-built machine. Building a PC from the ground up means it's perfectly crafted to fit your needs, whether you're a hardcore gamer, video editor extraordinaire, or you're just trying to build a low- or high-powered home theater PC. In some instances, you may save some money, and in all instances you'll have accomplished a project that you'll benefit from for years—a pretty great feeling in and of itself. That said, building is much more time consuming than buying, and your first time through, it can be daunting. This week's Night School series will walk you through building your first (or second, or third) computer from start to finish.

Today, we'll be talking about the first step in any computer build: brainstorming what kind of machine you're looking to make and what that means for your hardware.

The Types of Machines and their Ballpark Costs

Much like we did in our original spec-crafting feature, the the first thing you need to do is come up with a very, very rough idea of what kind of performance you want from your machine. The easiest way to do that is to split builds it up into three general categories:

- **Low Performance**: If you're looking for a simple PC for web browsing, email checking, or video watching, a low performance machine is probably the way to go. These machines are small, don't draw a lot of power, and are usually pretty quiet, which is great (though they obviously sacrifice performance for those perks). Nettops, home theater PCs, and (on a more extreme level) home servers also fit into this category. Most custom-built low performance machines range from $200 to $400.
- **Middle of the Road**: This is a great option for the majority of users, especially since you can stretch the machine's power and your budget to fit almost any scenario. Middle of the road machines will sit in a smaller computer tower, with enough power to play some games and run more than a few programs at once. If you're looking for a multipurpose computer that won't break the bank, this is where you want to go. Middle of the road machines can vary quite a bit in price, but in general they range from $300 to $700.
- **High Performance**: These are the big guns. Generally, users with high performance computers are doing things that are more resource-intensive: converting and editing large amounts of video, playing the latest and greatest games at high settings, running other operating systems in virtual machines, and so on. Be prepared to shell out a bit of cash, use a lot of electricity, and devote a lot of space to this machine. Again, there's a good range here, but typically a high performance machine will cost anywhere from $700 to infinity and beyond.

The Parts That Make Up a Computer (and What They Do)

Every fully functioning computer is made of the same basic components, and in this section, we'll walk through the basic hardware you'll need for your first build. We're still just talking about "things to consider" here—we'll get down to the nitty-gritty of picking out specific parts in the next lesson. Here, we just want to point out what the important components are, and which ones are the most important for certain builds.

The Processor

The Processor (CPU) is the "brain" of your computer, the thing that carries out the tasks you give it. Better CPUs can perform more tasks at once, and perform them faster. That said, not everyone actually takes advantage of their processor's full speed, so the high-end models are only really crucial if you're performing intensive tasks like gaming, video editing, video conversion, or compiling code. It's also one of the most expensive parts of a machine, so if you aren't performing these types of tasks, you don't necessarily need to worry about buying the latest and greatest.

The Motherboard

The motherboard connects all the other components to one another, and is the physical base upon which you build everything else. It contains a lot of your machine's core features, like the number of USB ports, the number of expansion cards you can put in (such as video, sound, and Wi-Fi), and also determines how big your computer will be. Which motherboard you pick will depend on whether you build a low, medium, or high performance machine and how advanced of a user you are.

The Case

The case holds all of your computer's parts together. For the *most* part, a case is less about features that affect how your computer runs and more about features that affect *you* and your home—that is, how quiet it is, how large it is, and of course, how it looks in your office. Still, it's an important consideration that is dependent on your other choices, so you might want to think about what you want in terms of a case before moving on to the shopping step.

The RAM

RAM, or Random Access Memory, is like your computer's short-term memory. It stores data your computer needs quick access to to help your programs run faster, and help you run more programs at one time. Thus, if you run a lot of programs at once, you'll want a computer with more RAM. If you use virtual machines, you'll want even more RAM, since it has to run its own programs in addition to yours.

The Graphics Card

The Graphics card, or GPU, is a processor specifically designed to handle graphics. It's what you hook your monitor up to, and it's what draws your desktop and your windows on the screen. Some motherboards come with a GPU already integrated, which is enough to manage your desktop, but not enough for watching high definition video or playing 3D games. For those, you'll need a dedicated graphics card, since it can do the legwork needed to draw those complex images.