Professor: So what happens inside the computer when you quick record a sound with EarSketch? I want to walk through a few basics of computer architecture and then explain exactly what’s happening. under the hood.

So let’s talk about processes and memory first. Now I want to talk first about the CPU which is also known as the Central Processing Unit. This is the brain of the computer—it’s what executes the instructions. And those instructions can be instructions embedded in a program like your web browser, or like Photoshop or Word. Or they can be instructions in a script that you wrote yourself with EarSketch.

The other really important thing is memory. It’s also known as RAM—Random Access Memory. This is temporary storage for things like data—like audio files. Or instructions like the programs that the CPU—the instructions—that it has to execute. But it’s temporary storage which means when you quit a program, when you turn off your computer, that information that’s stored in the memory can disappear.

So we also need something called Secondary Storage—something like a hard disk drive. And this is more long-term storage—where you want to store something that will last for days or weeks or months or years after you turn a computer off and turn it back on again as well.

Finally, we need to think about Input—how signals or data are getting into a computer—things like a microphone or a keyboard or a mouse, and also things like Output—how data or signals are getting out of a computer—things like a screen or speakers.

So now that we’ve looked at all that, let’s see how this all relates to using the Quick Record feature in EarSketch to add a file to your EarSketch sound browser.

The first thing you do is you press the record button. And when that happens, you have microphone input—data coming in from the microphone on your computer going through the CPU getting stored as sound data in memory, in your RAM.

Then let’s say you want to play it. You want to hear what it sounds like before you decide whether you want to keep it or not. So you hit the PLAY button in that Quick Record dialog box. Well, at that point, the sound data in your memory goes back through the CPU and from there goes to your speakers so that you can hear it.

Finally, what happens if you like the sound that you recorded? You decide you want to keep it. You press the UPLOAD button to save it to your account on EarSketch. Well what happens then is a little bit more complex.

The first thing that happens is the sound data in the memory goes to the CPU and it gets converted into something call a WAV file, a standard audio file format. But it’s still stored in memory—it’s still temporary storage. To make that permanent, that WAV file in memory goes back through the CPU and goes across the internet all the way over to the EarSketch server. And the EarSketch server at that point—it’s CPU, the CPU on the server’s computer—receives that WAV file. It stores it, first, in the server memory and then it commits it to its own secondary storage—its hard disk on the server. And that is where it is stored in the long term.

In that way, no matter what web browser you’re using, no matter what computer you’re using, wherever you log into EarSketch you have access to that sound file that you saved. You simply ask the server to pull it from its secondary storage and send it back to you over the internet.