

Text

What is a Computer Program?

Section 21.3

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What is a Computer Program?

A computer program is a series of instructions to the processor of a computer. When you run a computer program, the instructions contained in the program are loaded into memory and then read by the processor. The processor performs each instruction in turn while the program runs.

Think of a computer program a bit like a shopping list. When you write the shopping list, it's a list of things you need to buy at the supermarket. When you're at the supermarket, you go through the list item by item, picking up each item in turn and placing it into your shopping basket.

Programming Languages

Computer programs aren't written in plain English like a shopping list would be: they're written in a programming language. Computers can't understand English, but - technically - they also can't understand programming languages. Programming languages exist for the benefit of humans, making it easier for us to write computer programs and provide computers with instructions. Before a processor can understand the code that you've written, it must first be converted to a format that the processor understands. If you recall, the processor only understands binary, meaning all code that is 'native' to the processor is pure binary. But we humans don't understand binary intuitively: if we had to write every instruction out in binary, it would take a very long time and probably contain a lot more bugs!

Compiled vs Interpreted

Depending on the programming language used, the process of converting that code into something the processor can understand is either 'compiling' or 'interpreting' that code.

When a programming language is compiled, it's converted into machine code and then saved that way as an executable file. When a programming language is interpreted, the code is converted and executed at the time the user runs the program, and those converted instructions are not saved. Programs written in interpreted languages are often just text files with the code in them. To execute a computer program written in an interpreted language, you have to feed the text file into the programming language's interpreter.

Computer programs that have been compiled are faster to execute because the conversion process has already happened. The downside is that you have to compile a version of the program for every different processor architecture. If you wanted to run a program compiled for an intel x86_64 processor on an intel x86 processor, it would fail. Computer programs that are interpreted aren't limited by the processor architecture, but they are slower to execute because every time you run the program, that conversion process has to take place.

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