What Is a Program?

A *program* is a sequence of instructions that specifies how to perform a computation. All programs consist of combinations of the following processes:

Input: Get data from the keyboard, a file, the network, or some other device.

Output: Display data on the screen, save it in a file, send it over the network, etc.

Math: Perform basic mathematical operations like addition and multiplication.

Conditional execution: Check for certain conditions and run the appropriate code.

Repetition: Perform some action repeatedly, usually with some variation.

Every program, no matter how complicated, is made up of instructions that look like these. Programming is *the process of breaking a large, complex task into smaller and smaller subtasks until the subtasks are simple enough to be performed with one of these basic instructions.*

What is "Programming"

To "program" means to design with imagination and forethought the combination of **inputs**, **outputs**, **math**, **conditional execution**, and **repetition** involved in the sequence of steps you need to do to produce the program or programmatic solution you need.

Programming happens in your head, on paper, on a whiteboard, or in discussions with a group of programmers. Programming is a mental activity all about design and imagination.

How is "coding" different than "programming"

To "code" means to take the program or programmatic solution you designed in your **natural language**, like English, and convert it to a **formal language**, which is a programming language.

Don't code anything until you've designed the **program** in your mind, on paper, or out loud.

How to create programs and programmatic solutions

1. Figure out what the problem is asking **in English**. If you don't know what the problem is asking, it's **too soon** to start working on a solution.
2. Figure out the solution, the programmatic sequence of steps, in your mind or on paper. This is the programming part. It's in your head!
3. Using your **natural language**, design out the sequence of steps involved with any inputs, outputs, math, conditional execution, or repetition that the program needs to do.
4. Finally, you can start converting the programmatic solution you've designed in your mind into the **formal language** that is your programming language with all of its data types, syntax, statements, and expressions