1 Activity 1

As a class, we’ll brainstorm together about what sorts of features that C (or similar languages, like Java) gives you. We’ll go as low-level as we can with that list. This represents the “high” level of the computer.

At the “low” level of the computer, we have four basic features:

- Wires that carry voltages; high voltage means 1 (or true); low voltage means 0 (or false).
- Logic gates take voltages as input, and produce output voltage. These can implement the basic logic operations: AND, OR, NOT.
- A “clock” ticks regularly, keeping time. Each “clock tick” allows us to perform one simple calculation with our logic gates.
- Memory cells can save information from one clock tick to the next.

As a group, get together and brainstorm what sorts of “middle” features a computer might need to get from the “low” level to the “high” level. Remember, there are no wrong answers - we’re just brainstorming!

Try approaching this from both directions. For instance, start at the “high” level, and see if you can break things down into simpler pieces. For instance, the statement \( a = b + c \); might be broken down into two reads, an add, and a write. Also, try working up from the bottom: what sort of simple logic circuits might you build by linking lots and lots of AND/OR/NOT gates together? How might you do a complex calculation, which has lots of steps? How might you implement an array of memory, and read/write the memory inside it?

You do not have to figure out how any of this works. (That’s what we’ll be studying in this course!) Instead, let’s just brainstorm a list of interesting things that we might need to invent...and through the semester, we’ll invent them together.