University of Illinois at Urbana-Champaign
Dept. of Electrical and Computer Engineering

ECE 220: Computer Systems & Programming

High-Level Languages

Programming Means Translating a Task into Instructions

Programming means **translating**
◦ **from a task specification**
  (in human language)
◦ **into instructions**
  (from an ISA).

As you already know,
◦ some of this process can be automated
◦ (done by computers),
◦ such as turning assembly language into bits.

Few Programmers Write Instructions (Assembly Code)
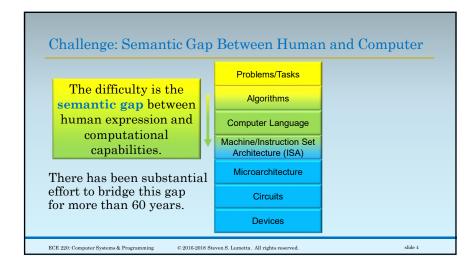
In ECE120, you learned
how to design a computer.

But computer **instructions are quite
simple** (add two numbers, copy some bits).

**Not many programmers
use them directly**.

Challenge: Semantic Gap Between Human and Computer

The difficulty is the **semantic gap** between human expression and computational capabilities.

There has been substantial effort to bridge this gap for more than 60 years.

Problems/Tasks
Algorithms
Computer Language
Machine/Instruction Set Architecture (ISA)
Microarchitecture
Circuits
Devices