What is a computer?

- Before 1950: a person who does calculations (see movie Hidden Figures)
- A fancy calculator
- An electronic device that can store, retrieve, and process data
- A universal machine
  - A machine that follows instructions
  - A computer can do anything that it is instructed to do
- What are some things computers are fundamentally incapable of doing?
  - Break the laws of physics
  - What else?
  - There are basically no agreed upon limits to what computers can do.
- Because computers follow instructions, any process that can be encoded as instructions can be done by a computer.
  - Computers can even write instructions for other computers, so long as they have the instructions to do so.
  - Computers can learn

Computers are taking over bit by bit

- Are there any jobs that a computer or robot will not be able to do?
- Example of google translate:
  - Google used to employ lots of linguists to develop language translation programs.
  - But then machine learning programs got so good that it was possible to teach a program how to translate between languages by showing it the same text in multiple languages
  - Now Google translate is mostly handled by programs that taught themselves how to translate, and not by programs that are being written by linguists.
  - Some linguists out of work.
- Computers using machine learning programs can read x-rays better than a radiologist.

We need students and teachers who understand computers

- “Computer literacy” is an unfortunate buzzword if it is taken to mean “understanding computers”
- Yes students need to be able to use computers
- But to actually be able to control computers, rather than be controlled by them – that takes someone who can write code.