

## Lecture 23: November 18, 2019

### Reading:

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1. Greetings and felicitations!
  - (a) No office hour on Friday; an office hour on Tuesday 11am–11:50am
2. Binary arithmetic; cover addition
3. Hexadecimal notation (base 16 numbers)
4. Bit operations: and (&), or (|), xor (^), not (~)
5. How computers represent numbers and characters
6. Getting to bits (and debugging using *gdb*)
  - (a) How to extract bits
  - (b) Debug program: forget to make bits printable [*bits1.c*]
  - (c) Debug program: get bits but in wrong order [*bits2.c*]
  - (d) Got it [*bits3.c*]