

## Midterm Review

CSE 102

## Logistics and Style

- Date and Time
  - March 20, in class, lecture room (Lopata 509)
  - 2:40pm to 4pm, starting right at 2:40!
- Questions
  - Question 1 will be a collection of short answer things (e.g., true/false, fill in the blank, quick definition)
  - Questions 2 through N will be longer (going more in depth on a particular subject)
- One-page handwritten “cheat sheet” is allowed
  - 8.5 x 11 sheet, front and back, whatever you want to include (content-wise)

## Programming When Time Matters

- Simple delays
  - Advantages and disadvantages
- Delta time
  - When it really matters
  - Advantages and disadvantages
  - How to program

## Input and Output

- Digital Output
  - What is it, how do you program it
- Digital Input
  - What is it, how do you program it
  - Debouncing a button
- Analog Output
  - What is pulse-width modulation, how to program
- Analog Input
  - Linear calibration, scaling, units, ranges
  - Simple filtering

## Information Representation

- Number systems
  - Binary, 2's complement, hex - conversions
  - Fixed point - Q notation
  - Floating point - definitions
- Text representations
  - ASCII (if you need ASCII table, I will provide it)
  - UTF (-8, -16, -32)
- Images
  - What is a pixel
  - How do we represent color

## Basic Machine

- Fetch-decode-execute cycle
- Instruction set architecture of AVR
  - Registers
  - Instructions
  - Memory
- AVR assembly language (I will provide docs)
  - Basic operations, addressing modes
  - Conditional branching
  - Array indexing
- Relationship between C and assembly
  - Implications of AVR being an 8-bit architecture

### Practicalities

- How to use development environment
- Commonly used library functionality
  - Controlling pins (in and out)
  - Printing to attached PC
  - Timing
- Details of Arduino's C language
  - Standard data types
  - Similarities and differences relative to Java
  - Bit-level and logical manipulation

### Schedule next two weeks

- Have a great break week!
- Monday
  - Skills lecture on command line interface
  - Open lab time to work on assignment
  - I have office hours during and after lab
- Tuesday - Ben has consulting hours
- Wednesday
  - Assignment due in lab
  - I have office hours after lab
- Thursday - Ben has consulting hours
- Friday - Midterm exam in lecture room