Expected / Projected / Actual Class Progression

Week 1 - 2/1

- Syllabus
- What's already assigned
- Install
- Questions
- Recording

Week 2 - 2/6 2/8

- Tuesday's Recording
- Thursday's Recording
- Apple Silicon
- Windows
- Intel Mac - get the distro, get QEMU, follow instructions for Windows except use your plain old terminal instead of WSL.
- Binary
- Powers of 2 up to 216
- Signed and Unsigned Integers
- 1's Complement and 2's Complement
- Registers
    - Integer Registers w & x
    - Why Have Registers
        * Speed of Processors Relative to RAM
    - *Up to this point was Tuesday 2/6. Thursday's class follows.*
    - Special Registers
        * Program Counter - pc
        * Stack Pointer - sp

Week 3 - 2/13 2/15

- Tuesday's Recording
- Thursday's Recording

- Floating Point Registers **h**, s, d, v & q
  - h are half floats - not used much - are least significant half of s's
  - s are single precision values - least significant half of d's
  - d are double precision values - are least significant half of v's
  - v's are a vector of something
  - q's are a single 128 bit value
- Floating Point Construction
  - Floats / Doubles are approximations
  - Normalized scientific notation
    * Sign
    * Exponent
    * Mantissa
  - Single Precision - how above are implemented
  - Double Precision - how above are implemented
- Why Have Registers (Continued)
  - Steps Needed to Execute an Instruction
  - Pipelined Execution
- Aside:
  - Bit fields in C/C++
  - Unions in C/C++
- **Above this was covered Tuesday. Below this covered Thursday.**
- Special Registers (other than the *really* special registers)
  - Frame Pointer - x29
  - Link Register - x30
- How linking works - what is an object file
- Assembly Language!
  - `bl` branch with link (x30)
  - `ret` return (uses x30)
  - `and` bitwise and
  - `cbnz` compare and branch if non-zero
  - `cmp` compare (is actually a subtraction)

- `b` unconditional branch
- `.p2align` power of 2 alignment
- `.text` what comes next is code
- `.global` add "I have _____" to object file TOC
- `str`, `stp`, `ldr`, `ldp` store to memory, load from memory
- `beq` branch if the previous `cmp` is zero
- `add` add two registers together and store result in a register
- `mov` copy a value into a register
- `.end` nothing else should come after this
- `.asciz` put an ASCII string with null terminator into memory

Week 4 - 2/20 2/22

- 2/20/2024
- 2/22/2024
- **Tuesday**
  - Assembly Language
  - File descriptors
  - system calls using CRT vs making them directly
- **Thursday**
  - Assembly Language
  - Going if, for, while, continue, break

Week 5 - 2/27 2/29

- **Tuesday**
  - Review
  - 2/27/2024
  - All essays graded. 17 P1 left to grade - been quite sick so progress has been slow
  - Discuss essay
  - Common biggest error seen so far in P1 is calling write assuming that x0 through x7 are not corrupted.
    * Demonstrate `regs` a program designed to drive this point home.

- P2 is assigned
- Go over P2
- `nm` demonstrated to demonstrate the "toc" i.e. the symbol table showing "have" and "need"
- demonstrate running `as` directly
- demonstrate running `cpp` directly
- demonstrate asking c++ to leave behind a .S file
- began discussion of structs

- **Thursday**
  - Review
  - P1 almost done grading
  - malloc() - how it works
  - free() - how it works
  - **brief** introduction to virtual memory
    * history - none, fixed, static relocation, dynamic relocation (segmentation)
    * paging
    * linear page tables
  - P2 questions

Week 6 - 3/12 3/14

Week 7 - 3/19 3/21

Week 8 - 3/26 3/28

Week 9 - 4/2 4/4

Week 10 - 4/9 4/11

Week 11 - 4/16 4/18

Week 12 - 4/23 4/25

Week 13 - 4/30 5/2

Week 14 - 5/7 5/9