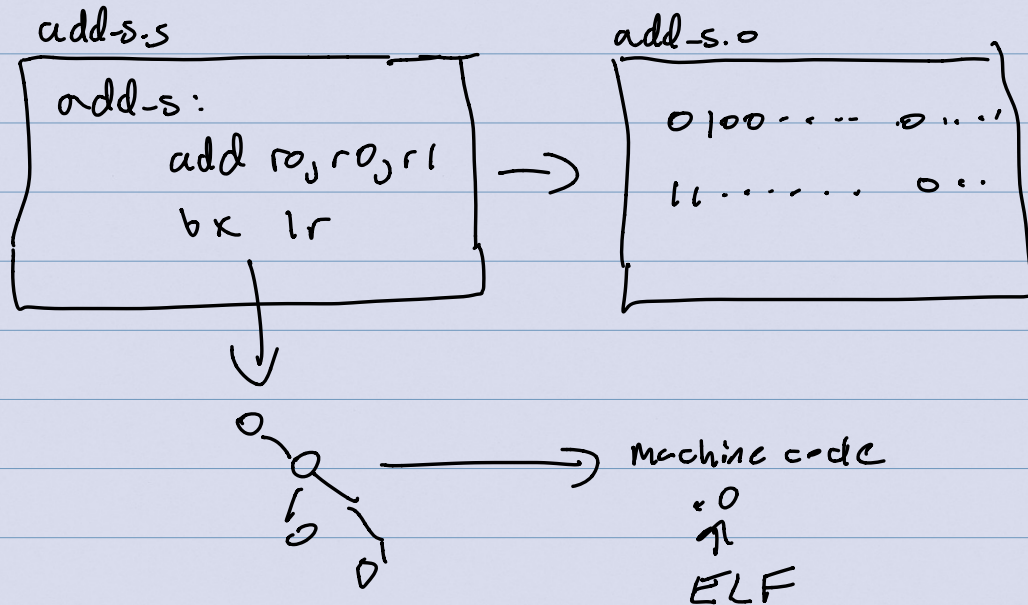


Project03 Grading, makeup points I want to get
up to 50% back
Project04 - ARM Assembler

Instruction Set Formats \leftrightarrow machine code

armasm

as/gas



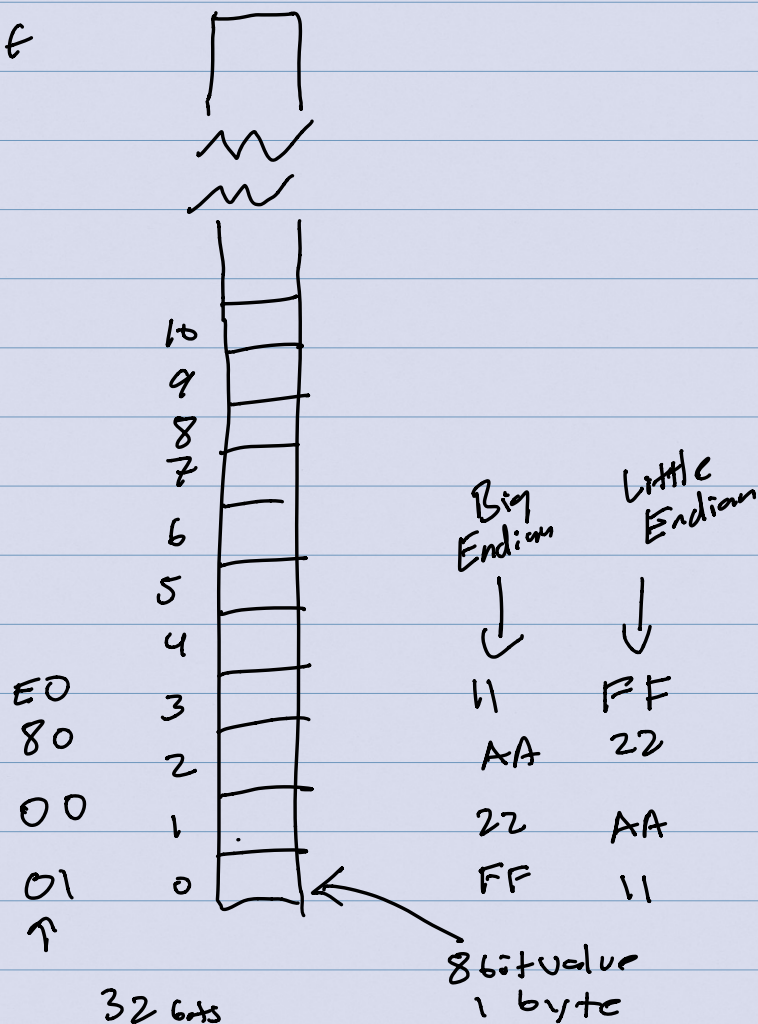
Linux commands
file
objdump objdump -D

ARM v7 Reference

gdb

Memory \rightarrow byte addressable

Memory
is array of
bytes



32 bits

`uint32_t x = 0xFF22AA11`

big end little end

1 byte

Byte ordering or byte order
network byte order

ARM Instructions

Data Processing (add/sub)

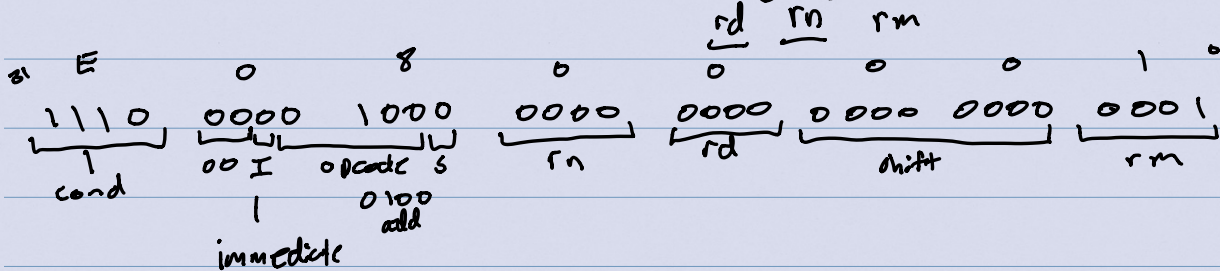
Memory (ldr/str)

Control (Branches) - b, bl, beq ...

b✓

0x E0 80 00 01

add r_0, r_0, r_1



↓ ↓ ↓ ↓

SUB r2, r3, #5 data processing

opcode rd rn imm

0010

data processing

\downarrow
 [cond dpl opcode rn rd imm 16]
 [1110 0010 0100 0011 0010 0000 0000 0101]
 [E 2 4 3 2 0 0 5]

max 2-5:

$$\text{comp } r0, r1 \quad \Leftarrow$$
$$b \geq \max_{2 \leq i \leq n} a_i$$

max ro,rl

max2-end:

bx lr ←

$rn\ rm$
 $cmp\ r0, r1$
 $E\ 150\ 0001$

1110	0001	0101	0000	0000	0000	0000	0001
E	$dp\ 1$	$op\ 0001\ 1$	rn	rd	$shift$		rm
cond	000	1010	1	0	0	0	0

$bx\ 16 \rightarrow 14$
 $E\ 12F\ FF\ 1E$

E	1	2	P	P	P	1	E
1110	0001	0010	1111	1111	1111	0001	1110
\uparrow							rn
							E
							$r14 \rightarrow 1r$