

COMP2121 - Tutorial 2

1. Encode the following instructions into Atmel AVR machine code:

- a) `ldi r18, 127`
- b) `mov r18, r2`
- c) `lds r2, 0xABCD`

Refer to the AVR Instruction Set document on the course website (in the AVR Material section).

2. How many bits are needed to address:

- a) 16 32-bit general purpose registers?
- b) a memory space of 65536 bytes (assume byte addressing)?
- c) a memory space of 65536 32-bit words (assume byte addressing)?

3. What do the following letters in a typical status register stand for and how are they generated?

- a) Z
- b) C
- c) V
- d) N
- e) S

4. What is the main difference between the memory models of Princeton (von Neumann) and Harvard architectures?

5.

Memory address	Data
0x00000100	0xAF
0x00000101	0x1B
0x00000102	0xC2
0x00000103	0x05

Based on the above, what is the 32-bit word stored at the memory address 0x00000100 in a:

- a) big-endian machine?
- b) little-endian machine?

6. Can you design an 8-bit instruction format that can allow 4 2-operand instructions for a machine with 8 registers?