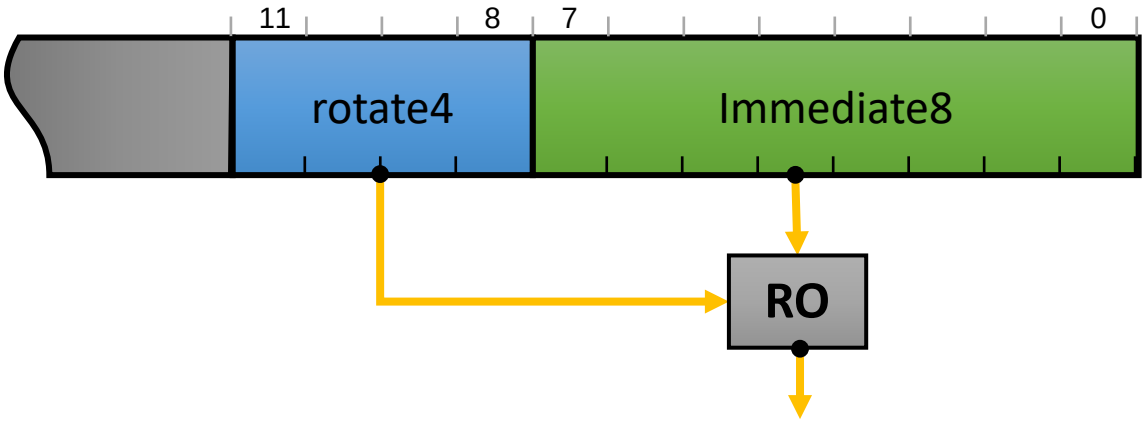
Clarification on MOV and MVN instructions with immediate values

Below is some clarifications concerning MOV and MVN instructions with immediate values

The following comments apply to MOV r0, #immediate value1 and MVN r0, #immediate value2

- You can't fit an arbitrary 32-bit value into a 32-bit instruction word
- MOV and MVN instructions have 12 bits of space for values in their instruction word
- This is arranged as a four-bit rotate value and an eight-bit immediate value



Examples of valid instructions

a) MOV r7, #0x8C, 4
- 0x8C = 1000 1100B (B : Binary)
- Rotate Right by 4 bits becomes
- 1100 0000 0000 0000 0000 0000 0000 1000B
- r7 contains 0xC0000008

b) MVN r7, #0x8C, 4
- 0x8C = 1000 1100B (B : Binary)
- Negate it becomes 1111 1111 1111 1111 1111 1111 0111 0011B
- = 0xFFFFFF73
- Rotate Right by 4 => r7 = 0x3FFFFFF7

Examples of invalid instructions

a) MOV r7, #0x7D8
- Error Message :
  Immediate 0x000007D8 cannot be represented by 0-255 and a rotation
- 0x7D8 in binary is 1111 1011 000B
- Note that the underlined portion 1 1 1 1 1 0 1 1 (0xFB) can fit into 8 bits but this requires a shift left of 3 bits.
- The amount of shift must be an even number.
- Hence it is not possible to represent it by the MOV instruction.

b) MVN r7, #0xFF00FF00
- Error Message :
  Immediate 0xFF00FF00 cannot be represented by 0-255 and a rotation
- 0xFF00FF00 in binary is 1111 1111 0000 0000 1111 1111 0000 0000B
- Note that the underlined portion 1111 1111 0000 0000 1111 1111 cannot fit into 8 bits
- Hence it is not possible to represent it by the MVN instruction.

Error in LAM lesson

Week 5 1st assessment

System put (b) as correct answer which is wrong, There is no correct answer listed in the solution set.

The correct answer is “cannot be represented by 0-255 with even rotation”.

However, please put b as answer to help you to move on. Sorry. It is too late to change the system now.

2. What is stored in r3 after MVN r3, #0xFF00FF00?
    a. 0x00000000
    b. 0x00FF00FF
    c. 0xFF00FF00
    d. 0xFFFFFFFF