

Problem 1

- a) P is set; PC = x5004;
- b) N is set; PC = x500A;

Problem 2

- a)x3010
- b)xBEEF
- c)x3012

Problem 3

X5004: 0001 0100 1010 0001 ; AND R2, R2, #1  
X5006: 0000 0011 1111 1010 ; BRp x5001

Problem 4

- a) The branch instruction at x3009 branches to x300B (since it adds 1 to PC) when the zero condition code is set based on the value of R1 after the instruction at x3008 is executed. So when R1 is zero, the increment instruction at x300A is skipped and when R1 is not zero, R7 is incremented by 1. So the code actually counts the number of non-zeros rather than zeros.
- b) We can set a breakpoint at x300B and check if the value of R7 is updated correctly each time we read a new element, such as if R7 is added by 1 when we read a new zero in the sequence.  
We can also debug the program by single-stepping or setting a watch point.

Problem 5

R0: x1200  
R1: x30F3  
R2: xE2F0  
R3: x9876

Problem 6

d.

Problem 7

- a). x4000: LEA R1,#9  
x4001: JMP R1

The instruction sequence is equivalent to unconditional branch to the instruction located at x400A.

- b). Yes. BRnzp x400A.  
In binary: 0000 1110 0000 1001