

### Challenge Questions

The FUNCTION subroutine featured in the sample code accepts two 16-bit values as parameters, and also returns a 16-bit value as its result. To complete the challenge for this lab, provide detailed answers to the following questions:

1. What type of operation does the FUNCTION subroutine perform on its two 16-bit inputs? How can you tell? Give a detailed description of the operation being performed by the FUNCTION subroutine.
  - a. The function in the subroutine performs addition on some data and records the value of the carry bit that may or may not result in that sum.
  - b. The program begins by loading constants into the X, Y, and Z registers. It does so by loading 8-bit values into the high and low registers of each. The function then sets the low bit of X as the value contained within register r18, referred to within the subroutine as A. On the same line, the function post increments the X register. This effectively moves the location at which X is pointing. In a similar manner the low bit from Y is stored into a register called B (r19) and Y is then post incremented. Function then sums A and B and stores the value into B. The value in the register called B is then stored out into memory at the location at which Z is pointing. It then post-increments the Z register. A very similar operation is now performed using the same A and B registers and the newly updated (post-incremented) addresses that X, Y, and Z now point to. This time around, it uses add with carry to track overflow. If the carry bit is NOT set, then the program exits and returns the value. If the carry bit is set then the Z register is set to the value \$01.
2. Currently, the two 16-bit inputs used in the sample code cause the “brcc EXIT” branch to be taken. Come up with two 16-bit values that would cause the branch NOT to be taken, therefore causing the “st Z, XH” instruction to be executed before the subroutine returns.
  - a. \$FFFF and \$FFFF
3. What is the purpose of the conditionally-executed instruction “st Z, XH”?
  - a. Possibly this will be used as a way to track when the sum results in a carry.