MSP430 Assembler Code Template for use with TI Code Composer Studio

.cdecls C,LIST, "msp430.h" ; Include device header file

.data
result1: .space 2
result2: .space 2

.text ; Assemble into program memory
.retain ; Override ELF conditional linking
; and retain current section
.retainrefs ; Additionally retain any sections
; that have references to current
; section

RESET mov.w #&_STACK_END, SP ; Initialize stackpointer
StopWDT mov.w #WDPW&WDTHOLD&WDTCTL ; Stop watchdog timer

; Main loop here
mov.w #1111000001000011, R12 ; prepare subroutine input
call #NoOfOnes
mov.w R11, &result1
mov.w #1111111111111111, R12 ; prepare subroutine input
call #NoOfOnes
mov.w R11, &result2

loop: jmp loop

; Subroutine: NoOfOnes
; Counts the number of ones in the binary representation of a number
; Input R12: (not modified)
; Output R11:
; Local variable R10: modified, not preserved

NoOfOnes:

mov.w #0000000000000001, R10 ; R10 holds bit for testing, start with the lsb
mov.w #0, R11 ; R11 holds sum of set bits in the number

MoreBits:

bit.w R10, R12 ; test the bit
jnc BitNotSet ; if bit is not set then go to label NotSet
inc.w R11 ; if you are here then bit is set, increase sum of bits

BitNotSet:

rla.w R10 ; if you are here then bit is not set
jnz MoreBits ; move the bit to test to left by one position
ret ; loop is exited when R11 becomes zero and there are
; no more bits to test

Stack Pointer definition

.global __STACK_END
.sect  .stack

;--------------------------------------------------------------------------
;
; Interrupt Vectors
;
;--------------------------------------------------------------------------
.sect  " reset" ; MSP430 RESET Vector
.short  RESET