Name: Id#

COE 306, Term 161

Introduction to Embedded Systems

Quiz# 2 Solution

 Date: Thursday, Oct. 20, 2016

# **Q1.** Consider the C code given below:

**volatile** **static** **int** Array[10] = {10,20,30,40,50,60,70,80,90,100};

**int** Temp;

 **for** (**int** i=0; i<9; i++)

 **if** (Array[i]<Array[i+1]){

 Temp = Array[i];

 Array[i] = Array[i+1];

 Array[i+1] = Temp;

 }

 Implement the given C code using minimum number of ARM assembly instructions.

#  mov r1, #0 ; i=0

#  adr r2, Array

# FOR

#  ldr r4, [r2, r1, lsl #2] ; r4=Array[i]

#  add r3, r1, #1 ; r3=i+1

#  ldr r0, [r2, r3, lsl #2] ; r0=Array[i+1]

#  cmp r4, r0 ; if (Array[i]<Array[i+1])

#  strlt r0, [r2, r1, lsl #2] ; swap Array[i] with

#  strlt r4, [r2, r3, lsl #2] ; Array[i+1]

#  mov r1, r3 ; i=i+1

#  cmp r3, #9 ; i<9

#  bne FOR

# Array DCD 10,20,30,40,50,60,70,80,90,100

# **Q2.** Determine the content of register 0x27 after executing the following PIC16F assembly code:

MOVLW 0x9D

MOVWF 0x25

MOVLW 8

MOVWF 0x26

CLRF 0x27

NEXT BTFSC 0x25, 0

INCF 0x27, f

RRF 0x25, f

DECFSZ 0x26

GOTO NEXT

This program counts the number of 1's in register 0x25 and stores the result in register 0x27. Thus, the content of register 0x27 is 5.