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.