Name: Id#

COE 306, Term 171

Introduction to Embedded Systems

Quiz# 2 Solution

 Date: Tuesday, Oct. 24, 2017

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

**volatile** **static** **int** Array[10] = {75,20,50,40,55,60,10,85,100,90};

**int** Max=Array[0];

**int** Min=Array[0];

 **for** (**int** i=1; i<10; i++)

 **if** (Array[i]<Min)

 Min = Array[i];

 **else if** (Array[i] > Max)

 Max = Array[i];

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

#  adr r0, Array

#  ldr r1, [r0] ; min

#  ldr r2, [r0] ; max

#  mov r3, #1 ; i=1

# ForLoop

#  ldr r4, [r0, r3, lsl #2] ; get Array[i]

#  cmp r4, r1 ; if (Array[i]<Min)

#  movlt r1, r4 ; Min = Array[i]

#  blt Skip

#  cmp r4, r2 ; if (Array[i]>Max)

#  movgt r2, r4 ; Max = Array[i];

# Skip

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

#  cmp r3, #9 ; i<10

#  bne ForLoop

# Array DCD 75,20,50,40,55,60,10,85,100,90

#

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

MOVLW 0xA7

MOVWF 0x25

MOVLW 4

MOVWF 0x26

CLRF 0x27

 NEXT MOVF 0x25, w

ANDLW 3

ADDWF 0x27, f

RRF 0x25, f

RRF 0x25, f

DECFSZ 0x26

GOTO NEXT

This code scans the content of register 0x25 as a group of 2-bits and adds them up and stores the sum in register 0x27. So, the content of register 0x27 is 3+1+2+2=8.