**CO ASSIGMENT**

Name : Venkatesh G Dhongadi Division : C

USN : 2GI19CS175 Date : 02-10-2020

1. Write assembly language program for the following

D = A / B \* C

* For 3 address

DIV R1, A , B ; R1 🡨 M[A] / M[B]

MUL D , R1 , C ; M[D] 🡨 R1 \* M[C]

* For 2 address

LOAD R1 , A ; R1 🡨 M[A]

DIV R1 , B ; R1 🡨 R1 / M[B]

MUL R1 , C ; R1 🡨 R1 \* M[C]

LOAD D , R1 ; M[D] 🡨 R1

* For 1 address

LOAD A ; AC 🡨 M[A]

DIV D ; AC 🡨 AC / M[D]

MUL C ; AC 🡨 AC \* M[C]

LOAD D ; M[D] 🡨 AC

* For zero address

PUSH D ; TOS 🡨 D

PUSH B ; TOS 🡨 B

PUSH A ; TOS 🡨 A

DIV ; TOS 🡨 ( A / B )

PUSH C ; TOS 🡨 C

MUL ; TOS 🡨 C \* ( A / B )

POP D ; M[D] 🡨 TOS

1. A program consists of 100 instructions out of which 40 are the read instructions , 30 are computation instructions and remaining 30 are the write instructions. Assume total no of basic steps for each read , write and compute is 4 , 5 and 6 respectively and a processor clock rate is 2 GHz , calculate the time taken by the program to execute

* We have ,

T = (N X S)/ R

Given : time taken to read 40 instructions

T1 = ( 40 X 4 )/ 2 X 109

T1 = 80 X 10-9 seconds

Time taken for computation instructions

T2 = ( 30 X 5 ) / 2 X 109

T2 = 75 X 10-9  seconds

Time taken for writing instructons

T3 = ( 30 X 6 ) / 2 X 109

T3 = 90 X 10-9 seconds

Total time taken by the processor to execute all the 100 instructions is

T = T1 + T2 + T3

T = 80 X 10-9 + 75 X 10-9 + 90 X 10-9

T = 245 X 10-9 seconds

1. Assume that there are 5 bits to be used for the representation of the numbers. Perform the following operation and check whether overflow occurs or not
2. 11 – 14

11 0 1 0 1 1

-14 1 0 0 1 0

-3 1 1 1 0 1

Overflow does not occur

1. 8 + 9

8 0 1 0 0 0

+9 0 1 0 0 1

17 0 1 0 0 0 1

Overflow occurs

1. -16 + 8

-16 1 0 0 0 0

8 0 1 0 0 0

-8 1 1 0 0 0

Overflow does not occur

1. 7 + 8

7 0 0 1 1 1

+8 0 1 0 0 0

15 0 1 1 1 1

Overflow does not occur

1. Name the machines which use Big endian and little endian assigments

* IBM’s 370 mainframes , most RISC based computers , TCP/IP , and Motorola microprocessors use the Big endian approach

Intel processors (CPU’s ) and DEC alphas and atleast some programs that run on them are little endian

1. Write the addressing mode for the following instructions :
2. Add R1 , R2 ; register addressing mode
3. Move #%1011001 , R1 ; immediate addressing mode
4. SUB A , B ; absolute ( direct ) addressing mode
5. ADD 8 ( R2 ) , R1 ; index addressing mode