Course Name:	**Microprocessors and Peripherals (2UXC404)**	**Semester:**	**IV**
Date of Performance:	17-02-2021	**Batch No:**	B2
Faculty Name:	KCS	**Roll No:**	1912052
Faculty Sign & Date:		**Grade/Marks :**	___/25

Experiment No: 3

Title: Multiplication of 32 bit numbers

Aim and Objective of the Experiment:

Aim: Write an 8086 based ALP to

1. Multiply two 32 bit numbers stored in the data segment and store the result back in the data segment.

Objectives:

To study basic instructions and addressing modes of 8086. Understand assembler directives and concept of data and code segment

This experiment covers following instructions groups.

a) Data transfer
b) Arithmetic (Multiply instructions)

COs to be achieved:

CO 2. Develop 8086 based assembly language programs for various applications.

Useful links

NASM Assembler
https://www.tutorialspoint.com/compile_assembly_online.php

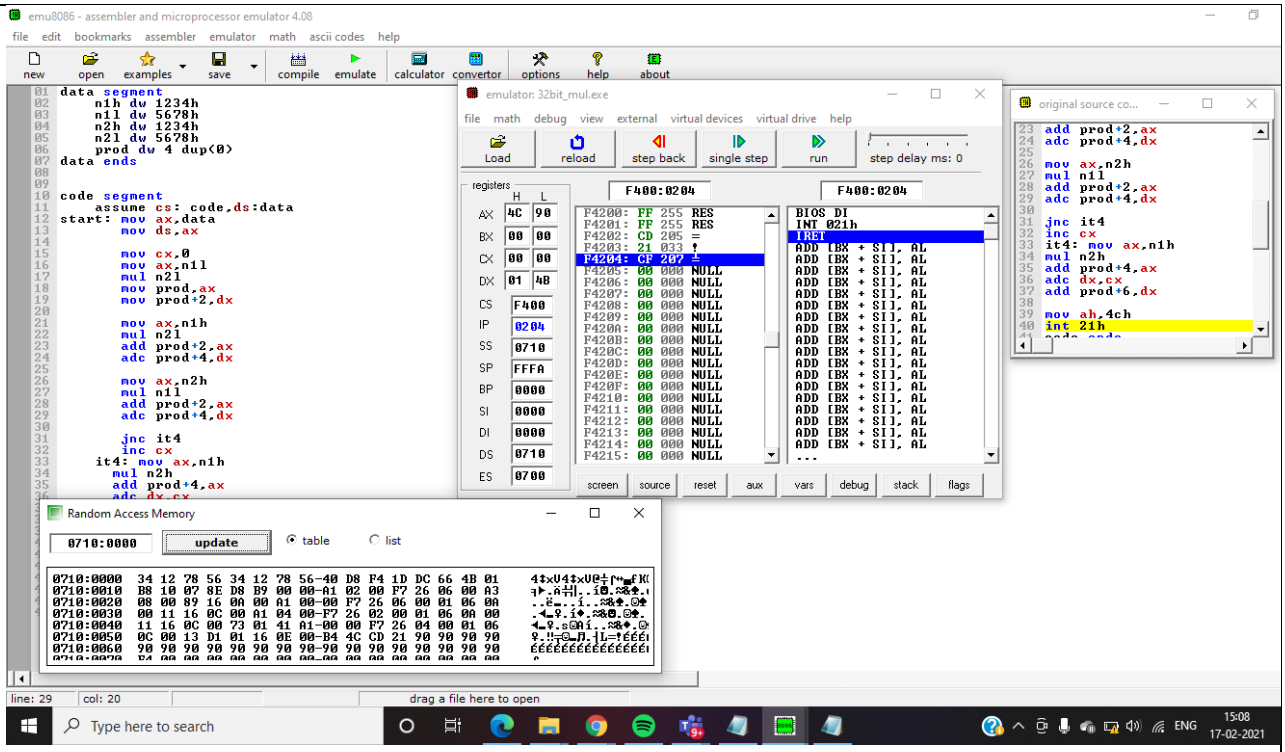
MASM/TASM Assembler

Work to be done

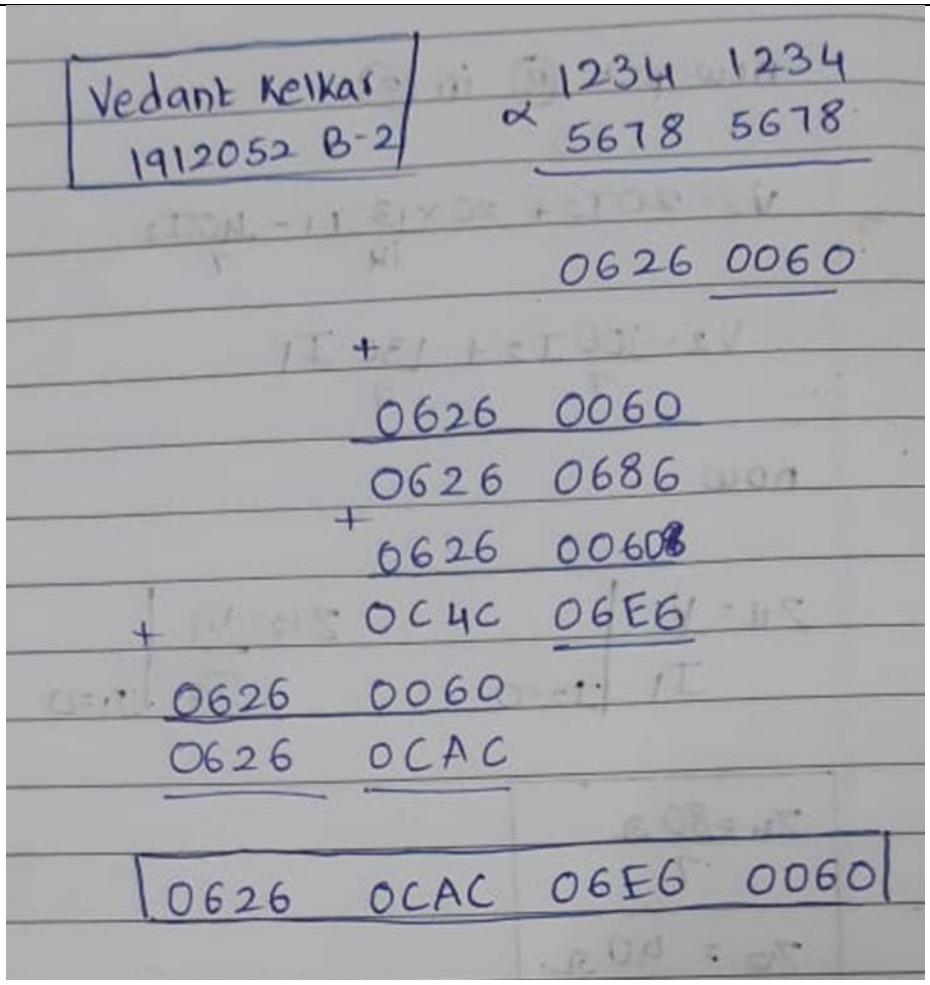
1. Upload image of handwritten algorithm/flowchart and lst file of the program and output screenshots . Also upload results for post lab questions.

```
data segment
   n1h dw 1234h
   n1l dw 5678h
   n2h dw 1234h
   n2l dw 5678h
   prod dw 4 dup(0)
data ends
```

```
code segment
   assume cs: code,ds:data
start: mov ax,data
       mov ds,ax

       mov cx,0
       mov ax,n1l
       mul n2l
       mov prod,ax
       mov prod+2,dx

       mov ax,n1h
       mul n2l
       add prod+2,ax
       adc prod+4,dx

       mov ax,n2h
       mul n1l
       add prod+2,ax
       adc prod+4,dx

       jnc it4
       inc cx
    it4: mov ax,n1h
      mul n2h
      add prod+4,ax
      adc dx,cx
      add prod+6,dx

      mov ah,4ch
      int 21h
      code ends
end start
```

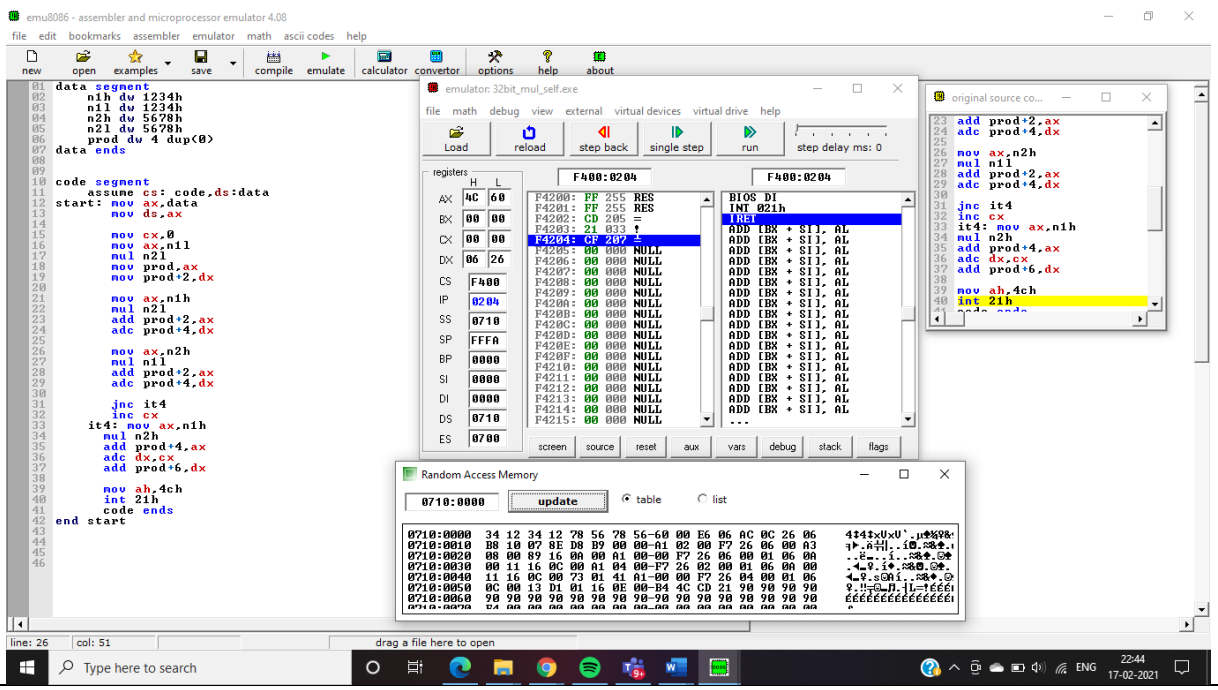

emu8086 - assembler and microprocessor emulator 4.08
emulator: 32bit_mul.exe
original source co...
Random Access Memory
Type here to search
ENG
15:08
17-02-2021

HW




```
data segment
   n1h dw 1234h
   n1l dw 1234h
   n2h dw 5678h
   n2l dw 5678h
   prod dw 4 dup(0)
data ends


code segment
   assume cs: code,ds:data
start: mov ax,data
      mov ds,ax

      mov cx,0
      mov ax,n1l
      mul n2l
      mov prod,ax
      mov prod+2,dx

      mov ax,n1h
```

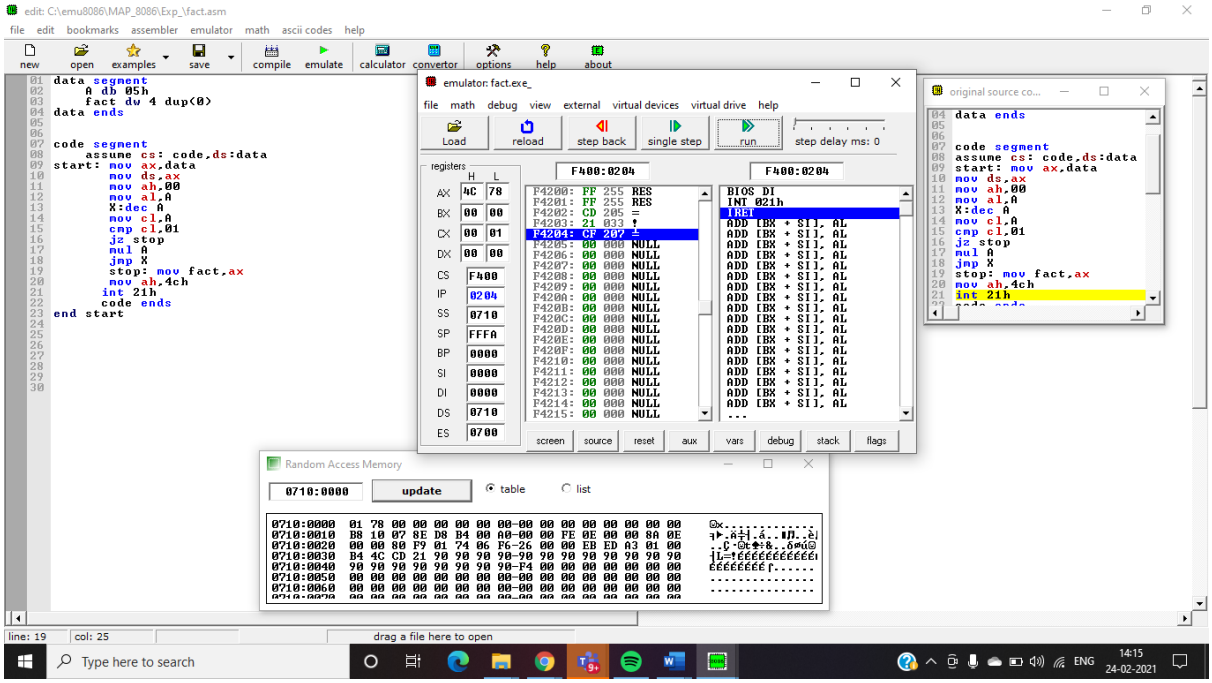
```
      mul n2l
      add prod+2,ax
      adc prod+4,dx

      mov ax,n2h
      mul n1l
      add prod+2,ax
      adc prod+4,dx

      jnc it4
      inc cx
   it4: mov ax,n1h
     mul n2h
     add prod+4,ax
     adc dx,cx
     add prod+6,dx

     mov ah,4ch
     int 21h
     code ends
end start
```



Post Lab Subjective/Objective type Questions:

Q.1 Write an 8086 based ALP to find the factorial of a number in data segment and store the result back in data segment

```
data segment
    A db 05h
    fact dw 4 dup(0)
data ends


code segment
   assume cs: code,ds:data
start: mov ax,data
       mov ds,ax
       mov ah,00
       mov al,A
       X:dec A
       mov cl,A
       cmp cl,01
       jz stop
       mul A
       jmp X
       stop: mov fact,ax
       mov ah,4ch
      int 21h
      code ends
end start
```



Q.2. What is the output of the following instruction?

AX = 37D7H, BH = 151 decimal
DIV BH

Remainder will be stored in AH
Quotient in AL
AH=65H=10 decimal
AL=5EH=94 decimal

Q.3 What is the difference between MUL and IMUL? Explain with example

MUL Multipl byte or word (unsigned)
MUL,Integer multiply byte or word (signed)

Conclusion:

Wrote 8086 program to multiply two 32 bit numbers stored in the data segment and store the result back in the data segment.

Signature of faculty in-charge with Date: