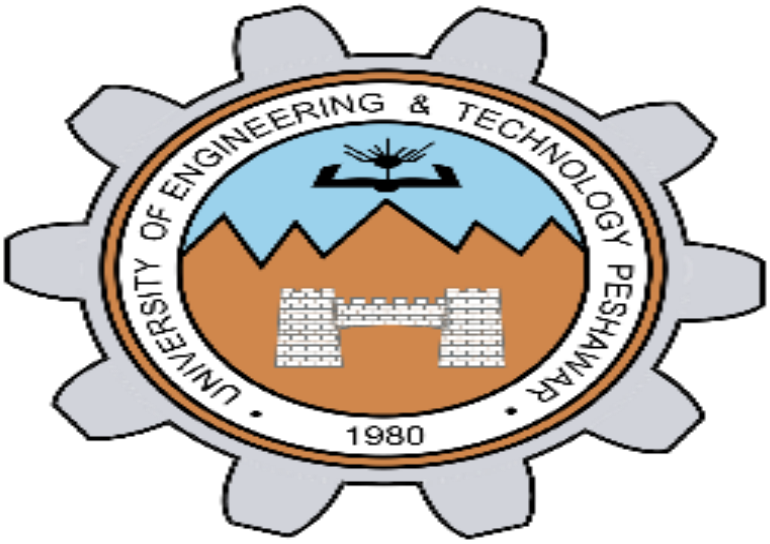
University of Engineering & Technology, Peshawar

DEPARTMENT OF COMPUTER SYSTEM ENGINEERING

Fall 2021



LAB 07

(CSE-304L)

Computer Organization and Architecture Lab

Submitted By: Anis Ahmad

Reg NO: 19PWCSE1770

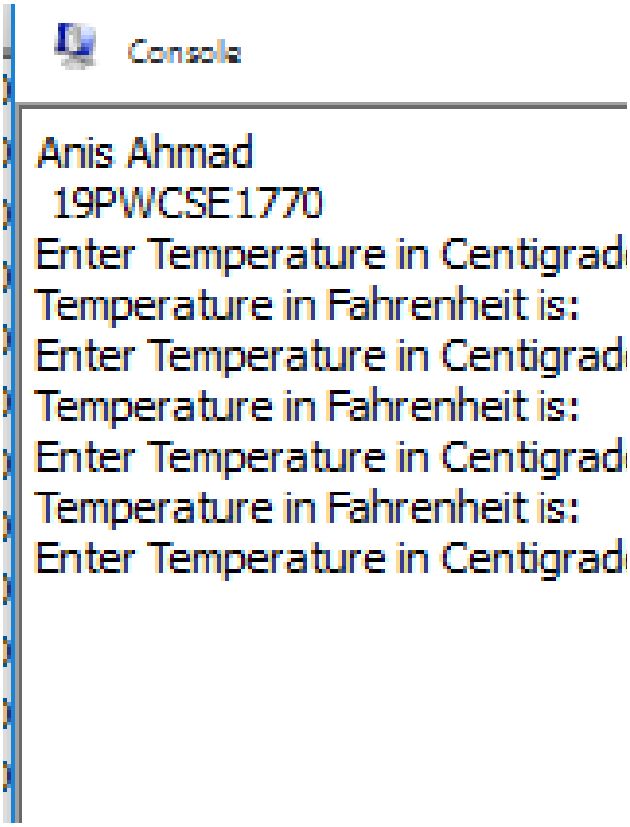
Submitted to: Dr. Ammad Khalil

09,Febuary 2022

Task1 : Write a program to convert Fahrenheit to Celsius using the formula below: Fahrenheit = Celsius * 9.0 / 5.0 + 32.0

```
.data
st: .asciiz "Anis Ahmad \n 19PWCSE1770 "
st1: .asciiz "\nEnter Temperature in Centigrade:
"
st2: .asciiz "Temperature in Fahrenheit is: \t"
.text
main:

la $a0, st
li $v0, 4
syscall



restart:
la $a0, st1
li $v0, 4
syscall
li $v0, 6
syscall
mov.s $f1, $f0

li.s $f8, 9.0
li.s $f9, 5.0
li.s $f10, 32.0

div.s $f2, $f8, $f9
mul.s $f3, $f1, $f2
add.s $f4, $f3, $f10


la $a0, st2
li $v0, 4
syscall


mov.s $f12, $f4
li $v0, 2
syscall
b restart
li $v0, 10
syscall
```

Output:


Console
Anis Ahmad
19PWCSE1770
Enter Temperature in Centigrad
Temperature in Fahrenheit is:
Enter Temperature in Centigrad
Temperature in Fahrenheit is:
Enter Temperature in Centigrad
Temperature in Fahrenheit is:
Enter Temperature in Centigrad

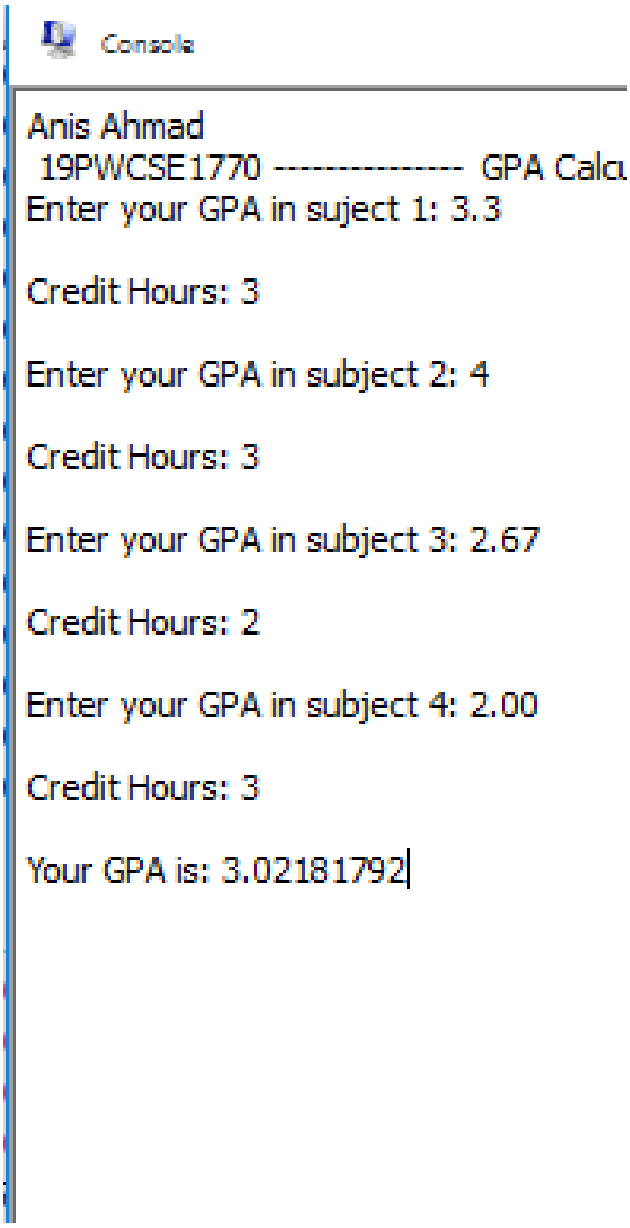
Task2 : This exercise will familiarize you with floating point multiplication and division instructions. In this part you have to write a complete ‘UET Peshawar GPA calculator” program.

```
.data
   st: .asciiz "Anis Ahmad \n 19PWCSE1770 "
   str: .asciiz"----------  GPA Calculator ---------
-------"
   str1: .asciiz"\nEnter your GPA in suject 1: "
   str2: .asciiz"\nCredit Hours: "
   str3: .asciiz"\nEnter your GPA in subject 2: "
   str4: .asciiz"\nEnter your GPA in subject 3: "
   str5: .asciiz"\nEnter your GPA in subject 4: "
   str6: .asciiz"\nYour GPA is: "
.text

main:
    la $a0, st
    li $v0, 4
    syscall



   la $a0,str  #Load str to a0
   li $v0,4    #Print str
   syscall     #syscall

   la $a0,str1 #Load str1 to a0
   li $v0,4    #Print str
   syscall     #syscall


   li $v0,6    #Take floating point input
   syscall     #syscall
   mov.s $f2,$f0   #GPA of sub1

   la $a0,str2 #Load str2 to a0
   li $v0,4    #Print str
   syscall     #syscall

   li $v0,6    #Take floating point input
   syscall     #syscall
   mov.s           $f1, $f0 # CH of sub1

   la $a0,str3 #Load str3 to a0
   li $v0,4    #Print str
   syscall     #syscall

   li $v0,6    #Take floating point input
   syscall     #syscall
   mov.s $f4,$f0   #GPA of sub2
```

```
la $a0,str2 #Load str2 to a0
li $v0,4    #Print str
syscall     #syscall

li $v0,6    #Take floating point input
syscall     #syscall
mov.s           $f3, $f0 # CH of sub2

la $a0,str4 #Load str4 to a0
li $v0,4    #Print str
syscall     #syscall

li $v0,6    #Take floating point input
syscall     #syscall
mov.s $f6,$f0   #GPA of sub3

la $a0,str2 #Load str2 to a0
li $v0,4    #Print str
syscall     #syscall

li $v0,6    #Take floating point input
syscall     #syscall
mov.s           $f5, $f0 # CH of sub3

la $a0,str5 #Load str5 to a0
li $v0,4    #Print str
syscall     #syscall

    li $v0,6    #Take floating point input
    syscall     #syscall
    mov.s $f8,$f0   #GPA of sub4

    la $a0,str2 #Load str2 to a0
    li $v0,4    #Print str
    syscall     #syscall

    li $v0,6    #Take floating point input
    syscall     #syscall
    mov.s           $f7, $f0 # CH of sub4

    add.s $f9,$f1,$f3
    add.s $f9,$f9,$f5
    add.s $f9,$f9,$f7     #Total Credit hours
(denom)

    mul.s $f12,$f2,$f1
    li.s $f10,0.0
    add.s $f10,$f10,$f12    #f10=GPA1*CH1

    mul.s $f12,$f4,$f3
    add.s $f10,$f10,$f12

    mul.s $f12,$f6,$f5
    add.s $f10,$f10,$f12

    mul.s $f12,$f8,$f7
    add.s $f10,$f10,$f12    #Nom
```

```
div.s $f12,$f10,$f9     #Result

la $a0,str6 #Load str6 to a0
li $v0,4    #Print str
syscall     #syscall

li $v0,2    #Print the result
syscall     #syscall

li $v0,10   #Terminate the Program
syscall     #syscall
```

OUTPUT:


Console
Anis Ahmad
19PWCSE1770 ---------- GPA Calcu
Enter your GPA in suject 1: 3.3
Credit Hours: 3
Enter your GPA in subject 2: 4
Credit Hours: 3
Enter your GPA in subject 3: 2.67
Credit Hours: 2
Enter your GPA in subject 4: 2.00
Credit Hours: 3
Your GPA is: 3.02181792

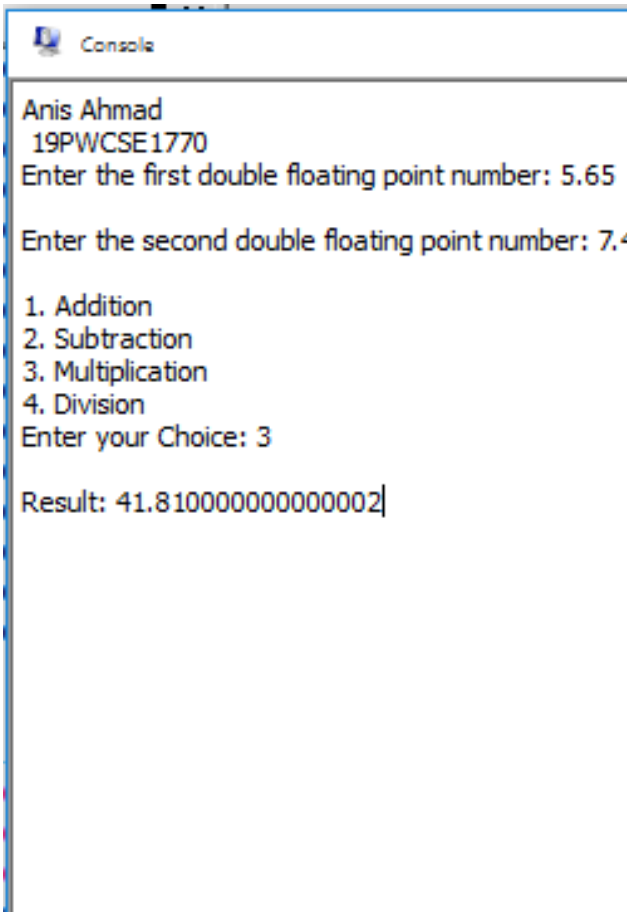
Task3 : Design a calculator that can perform addition, subtraction, multiplication and division using double floating point numbers.

```
.data
   st: .asciiz "Anis Ahmad \n 19PWCSE1770 "
   str: .asciiz"\nEnter the first double floating point number: "
   str1: .asciiz"\nEnter the second double floating point number: "
   str2: .asciiz"\n1. Addition"
   str3: .asciiz"\n2. Subtraction"
   str4: .asciiz"\n3. Multiplication"
   str5: .asciiz"\n4. Division"
   str6: .asciiz"\nEnter your Choice: "
   str7: .asciiz"\nResult: "
   str8: .asciiz"\nInvalid Choice"
.text

main:

   la $a0, st
   li $v0, 4
   syscall

   la $a0,str  #Load str to a0
   li $v0,4    #Print str
   syscall     #syscall

   li $v0,7    #Take double floating point input
   syscall     #syscall
   mov.d $f2,$f0   #move input to f2

   la $a0,str1 #Load str1 to a0
   li $v0,4    #Print str
   syscall     #syscall

   li $v0,7    #Take double floating point input
   syscall     #syscall
   mov.d $f4,$f0   #move input to f4

   la $a0,str2 #Load str2 to a0
   li $v0,4    #Print str
   syscall     #syscall

   la $a0,str3 #Load str3 to a0
   li $v0,4    #Print str
   syscall     #syscall

   la $a0,str4 #Load str4 to a0
   li $v0,4    #Print str
```

```
    syscall    #syscall

    la $a0,str5 #Load str5 to a0
    li $v0,4    #Print str
    syscall    #syscall

    la $a0,str6 #Load str6 to a0
    li $v0,4    #Print str
    syscall    #syscall

    li $v0,5    #Take integer input
    syscall    #syscall
    move        $t0, $v0        # Choice

    li $t1,1    #t1 = 1
    li $t2,2    #t2 = 2
    li $t3,3    #t3 = 3
    li $t4,4    #t4 = 4

    beq    $t0, $t1, Add   #Branch to Add if t0 == t1
    beq $t0, $t2, Sub   #Branch to Sub if t0 == t2
    beq $t0, $t3, Mul   #Branch to Mul if t0 == t3
    beq $t0, $t4, Div   #Branch to Div if t0 == t4
    j Invalid       #Jump to Invalid

Add:
    la $a0,str7 #Load str7 to a0
    li $v0,4    #Print str
    syscall    #syscall

    add.d $f12,$f2,$f4  #Add the two numbers
    li $v0,3    #Print the result
    syscall    #syscall

    j exit  #Jump to exit
Sub:
    la $a0,str7 #Load str7 to a0
    li $v0,4    #Print str
    syscall    #syscall

    sub.d $f12,$f2,$f4  #Subtract the two numbers
    li $v0,3    #Print the result
    syscall    #syscall

    j exit  #Jump to exit
Mul:
    la $a0,str7 #Load str7 to a0
    li $v0,4    #Print str
    syscall    #syscall

    mul.d $f12,$f2,$f4  #Multiply the two numbers
    li $v0,3    #Print the result
    syscall    #syscall

    j exit  #Jump to exit
```

```
Div:
    la $a0,str7 #Load str7 to a0
    li $v0,4    #Print str
    syscall     #syscall

    div.d $f12,$f2,$f4  #Divide the two numbers
    li $v0,3    #Print the result
    syscall     #syscall

    j exit  #Jump to exit
Invalid:
    la $a0,str8 #Load str8 to a0
    li $v0,4    #Print str
    syscall     #syscall
exit:
    li $v0,10   #Terminate the Program
    syscall     #syscall
```

Output:


Console
Anis Ahmad
19PWCSE1770
Enter the first double floating point number: 5.65
Enter the second double floating point number: 7.
1. Addition
2. Subtraction
3. Multiplication
4. Division
Enter your Choice: 3
Result: 41.810000000000002