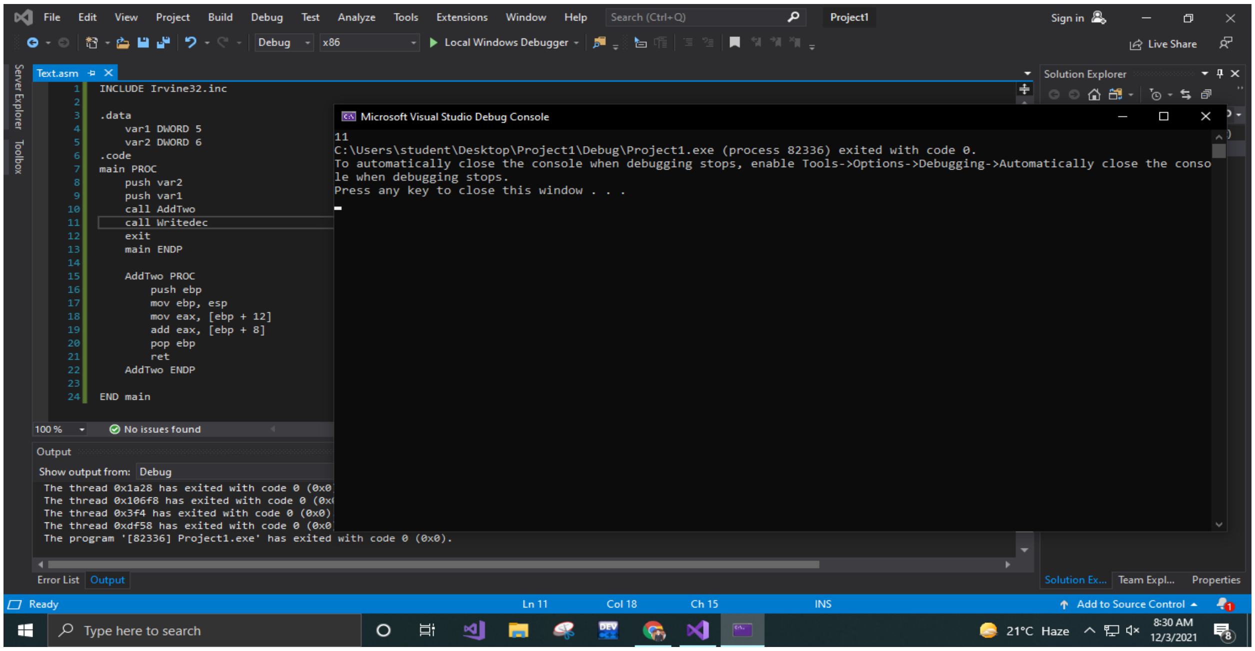
COAL LAB TASK 10

MOHAMMAD BASIL ALI KHAN

20K-0477

Example#01:



```
INCLUDE Irvine32.inc

.data
    var1 DWORD 5
    var2 DWORD 6
.code
main PROC
    push var2
    push var1
    call AddTwo
    call Writedec
    exit
    main ENDP

    AddTwo PROC
        push ebp
        mov ebp, esp
        mov eax, [ebp + 12]
        add eax, [ebp + 8]
        pop ebp
        ret
    AddTwo ENDP

END main
```

Microsoft Visual Studio Debug Console

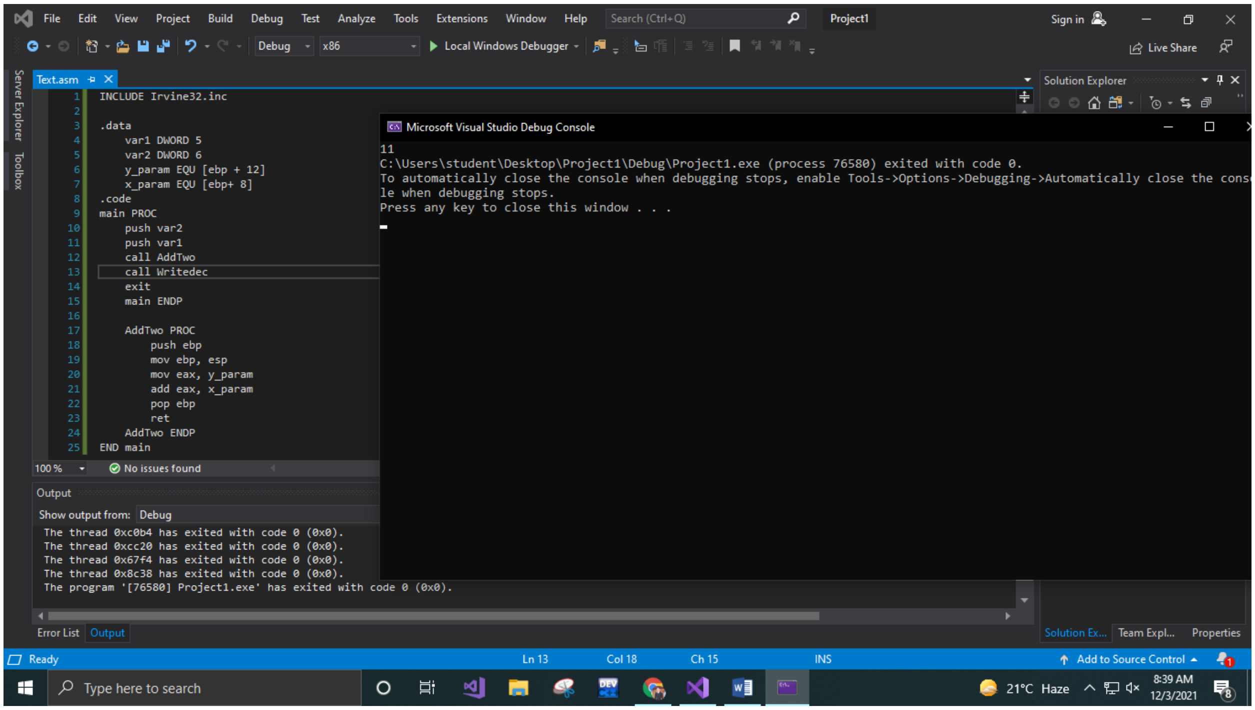
```
11
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 82336) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Output

Show output from: Debug

```
The thread 0x1a28 has exited with code 0 (0x0
The thread 0x106f8 has exited with code 0 (0x
The thread 0x3f4 has exited with code 0 (0x0)
The thread 0xdf58 has exited with code 0 (0x0
The program '[82336] Project1.exe' has exited with code 0 (0x0).
```

Example#02:



```
INCLUDE Irvine32.inc

.data
    var1 DWORD 5
    var2 DWORD 6
    y_param EQU [ebp + 12]
    x_param EQU [ebp+ 8]
.code
main PROC
    push var2
    push var1
    call AddTwo
    call Writedec
    exit
    main ENDP

    AddTwo PROC
        push ebp
        mov ebp, esp
        mov eax, y_param
        add eax, x_param
        pop ebp
        ret
    AddTwo ENDP
END main
```

Microsoft Visual Studio Debug Console

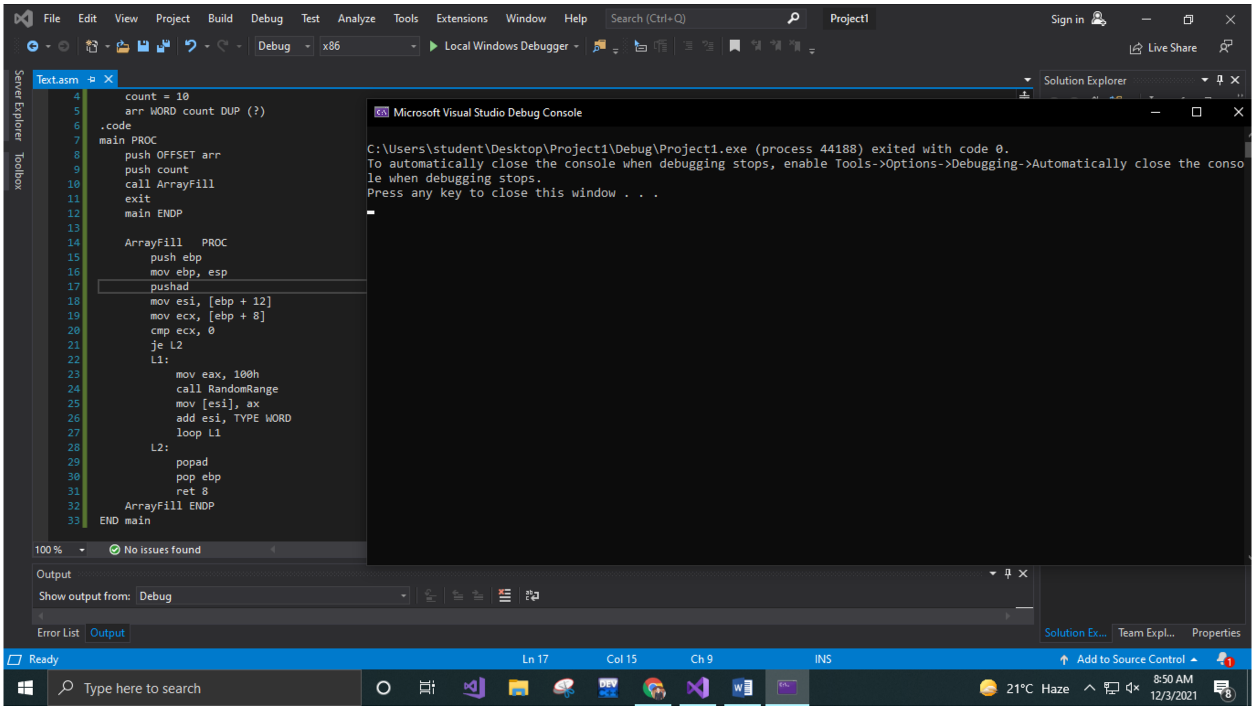
```
11
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 76580) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the cons
le when debugging stops.
Press any key to close this window . . .
```

Output

Show output from: Debug

```
The thread 0xc0b4 has exited with code 0 (0x0).
The thread 0xcc20 has exited with code 0 (0x0).
The thread 0x67f4 has exited with code 0 (0x0).
The thread 0x8c38 has exited with code 0 (0x0).
The program '[76580] Project1.exe' has exited with code 0 (0x0).
```

Example#03:

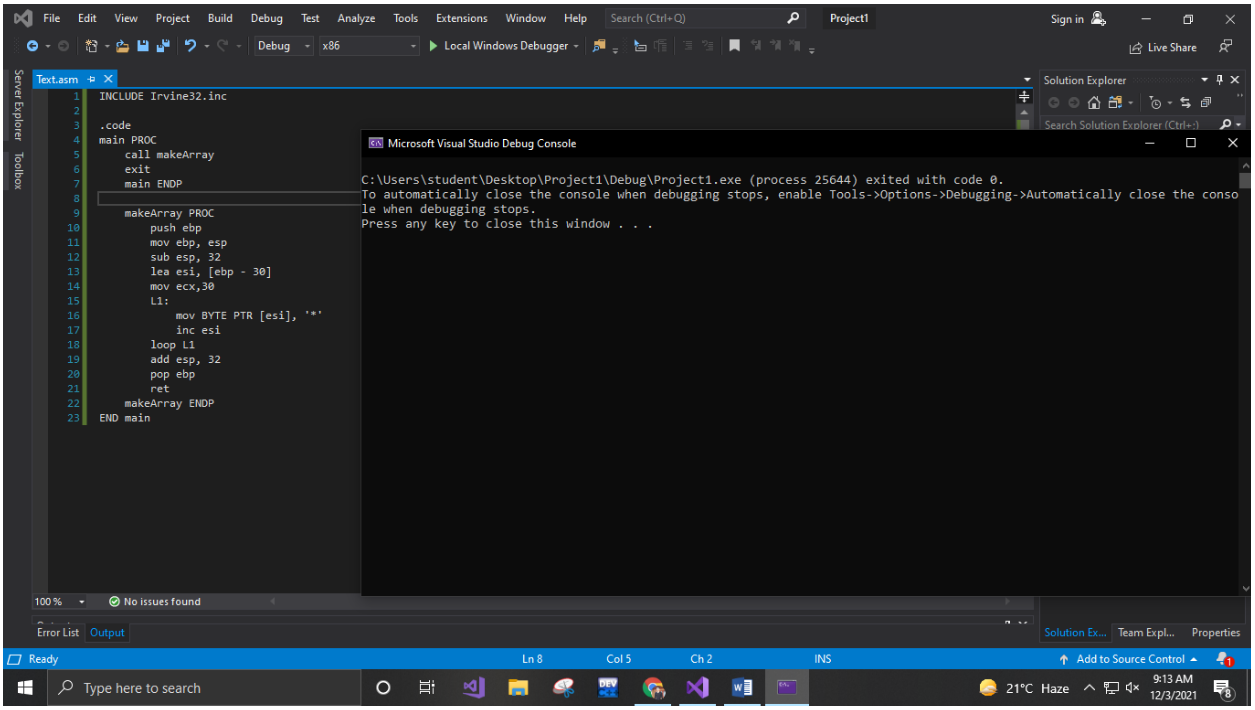


```
    count = 10
    arr WORD count DUP (?)
.code
main PROC
    push OFFSET arr
    push count
    call ArrayFill
    exit
    main ENDP

    ArrayFill   PROC
        push ebp
        mov ebp, esp
        pushad
        mov esi, [ebp + 12]
        mov ecx, [ebp + 8]
        cmp ecx, 0
        je L2
        L1:
            mov eax, 100h
            call RandomRange
            mov [esi], ax
            add esi, TYPE WORD
            loop L1
        L2:
            popad
            pop ebp
            ret 8
    ArrayFill ENDP
END main
```

Microsoft Visual Studio Debug Console

```
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 44188) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Example#04:

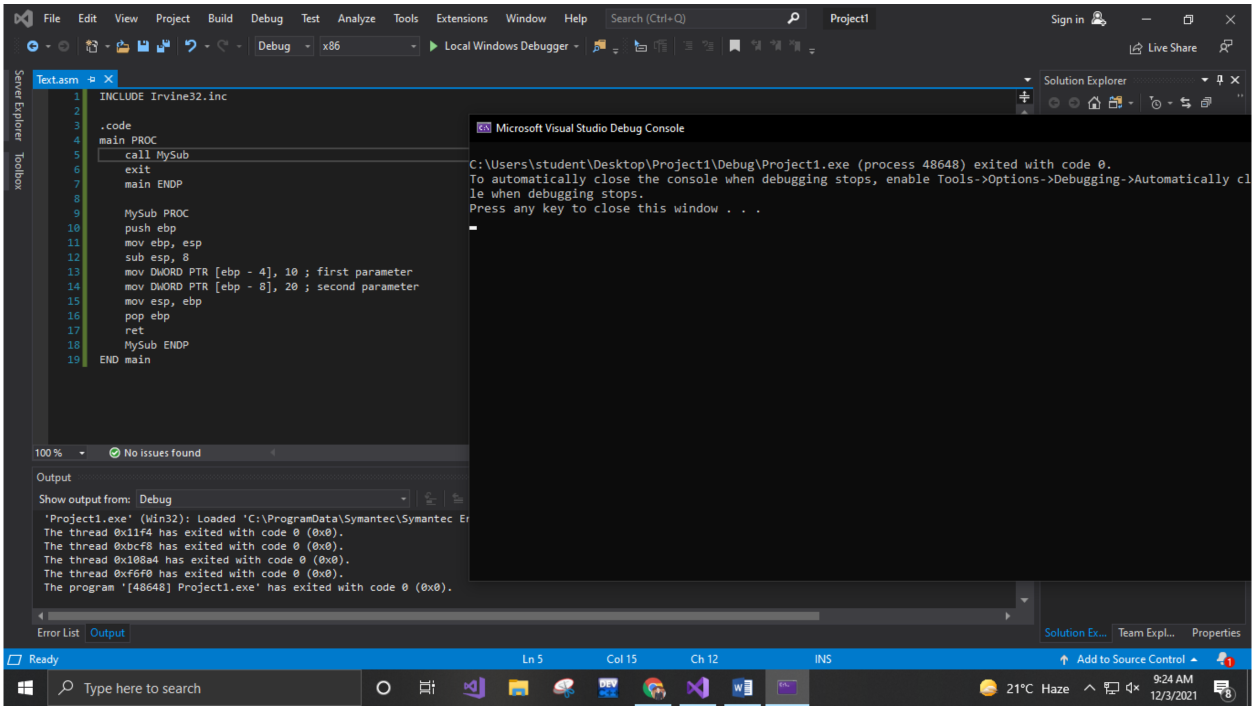


```
INCLUDE Irvine32.inc

.code
main PROC
    call makeArray
    exit
    main ENDP

    makeArray PROC
        push ebp
        mov ebp, esp
        sub esp, 32
        lea esi, [ebp - 30]
        mov ecx,30
        L1:
            mov BYTE PTR [esi], '*'
            inc esi
        loop L1
        add esp, 32
        pop ebp
        ret
    makeArray ENDP
END main
```

Microsoft Visual Studio Debug Console

```
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 25644) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Example#05:



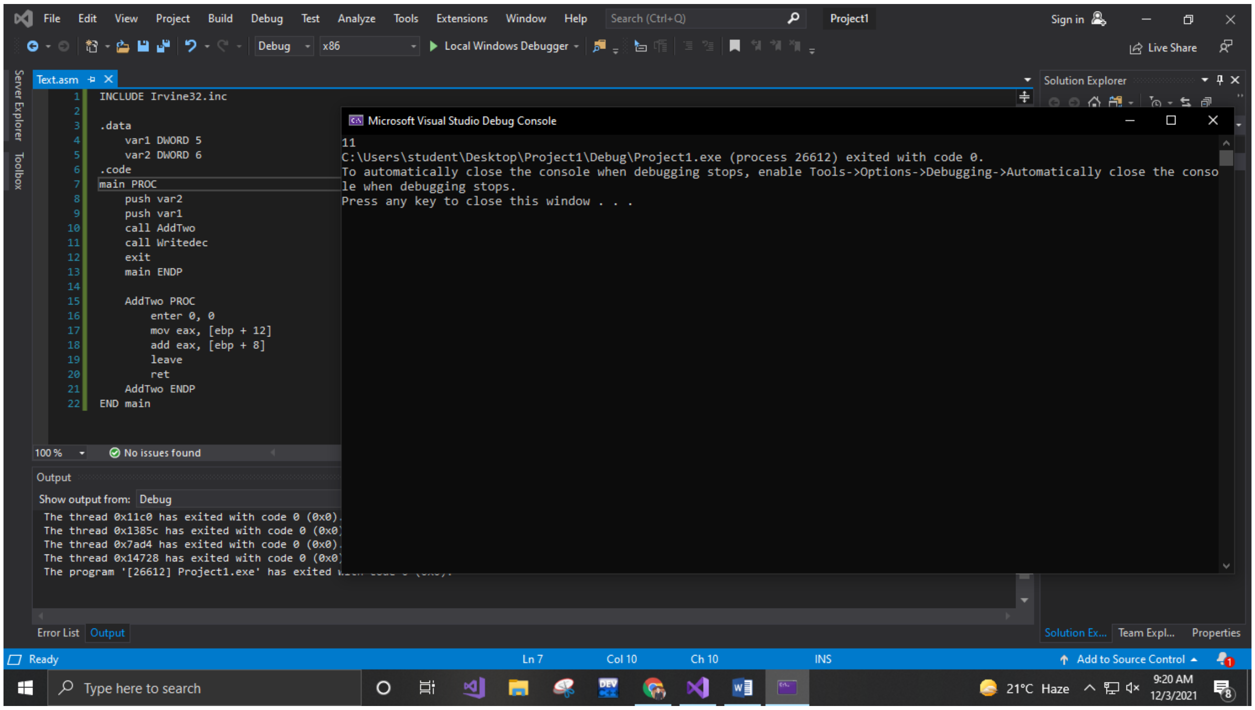
```
INCLUDE Irvine32.inc

.code
main PROC
    call MySub
    exit
    main ENDP

    MySub PROC
    push ebp
    mov ebp, esp
    sub esp, 8
    mov DWORD PTR [ebp - 4], 10 ; first parameter
    mov DWORD PTR [ebp - 8], 20 ; second parameter
    mov esp, ebp
    pop ebp
    ret
    MySub ENDP
END main
```

```
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 48648) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically cl
le when debugging stops.
Press any key to close this window . . .
```

Show output from: Debug

```
'Project1.exe' (Win32): Loaded 'C:\ProgramData\Symantec\Symantec Er
The thread 0x11f4 has exited with code 0 (0x0).
The thread 0xbcf8 has exited with code 0 (0x0).
The thread 0x108a4 has exited with code 0 (0x0).
The thread 0xf6f0 has exited with code 0 (0x0).
The program '[48648] Project1.exe' has exited with code 0 (0x0).
```

Example#06:



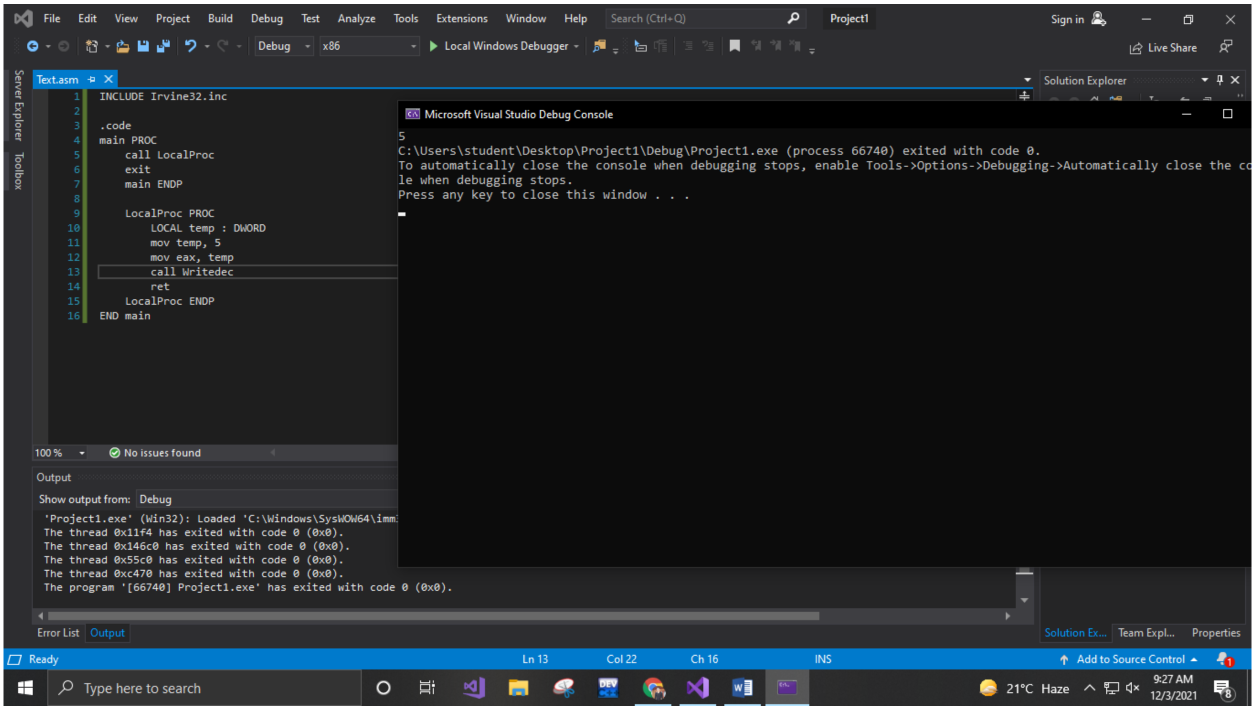
```
INCLUDE Irvine32.inc

.data
    var1 DWORD 5
    var2 DWORD 6
.code
main PROC
    push var2
    push var1
    call AddTwo
    call Writedec
    exit
    main ENDP

    AddTwo PROC
        enter 0, 0
        mov eax, [ebp + 12]
        add eax, [ebp + 8]
        leave
        ret
    AddTwo ENDP
END main
```

```
11
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 26612) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Show output from: Debug

```
The thread 0x11c0 has exited with code 0 (0x0).
The thread 0x1385c has exited with code 0 (0x0)
The thread 0x7ad4 has exited with code 0 (0x0).
The thread 0x14728 has exited with code 0 (0x0)
The program '[26612] Project1.exe' has exited with code 0 (0x0).
```

Example#07:



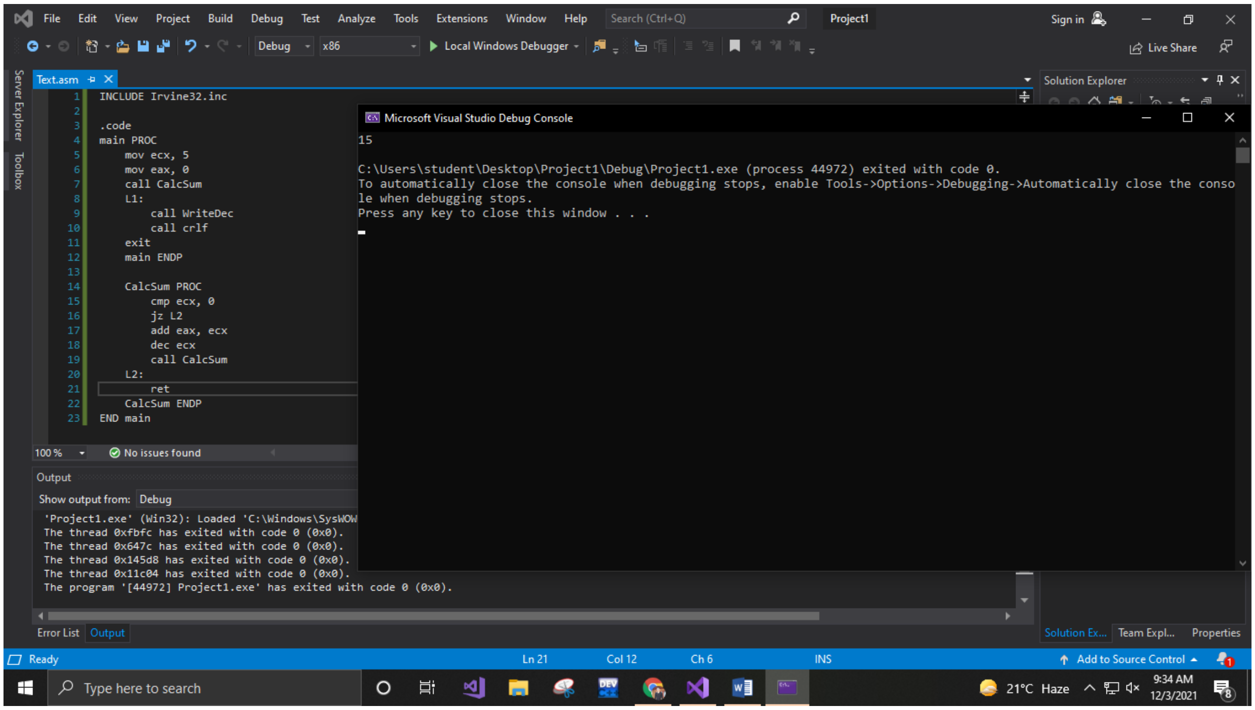
```
INCLUDE Irvine32.inc

.code
main PROC
    call LocalProc
    exit
    main ENDP

    LocalProc PROC
        LOCAL temp : DWORD
        mov temp, 5
        mov eax, temp
        call Writedec
        ret
    LocalProc ENDP
END main
```

```
5
C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 66740) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the c
le when debugging stops.
Press any key to close this window . . .
```

Show output from: Debug

```
'Project1.exe' (Win32): Loaded 'C:\Windows\SysWOW64\imm
The thread 0x11f4 has exited with code 0 (0x0).
The thread 0x146c0 has exited with code 0 (0x0).
The thread 0x55c0 has exited with code 0 (0x0).
The thread 0xc470 has exited with code 0 (0x0).
The program '[66740] Project1.exe' has exited with code 0 (0x0).
```

Example#08:



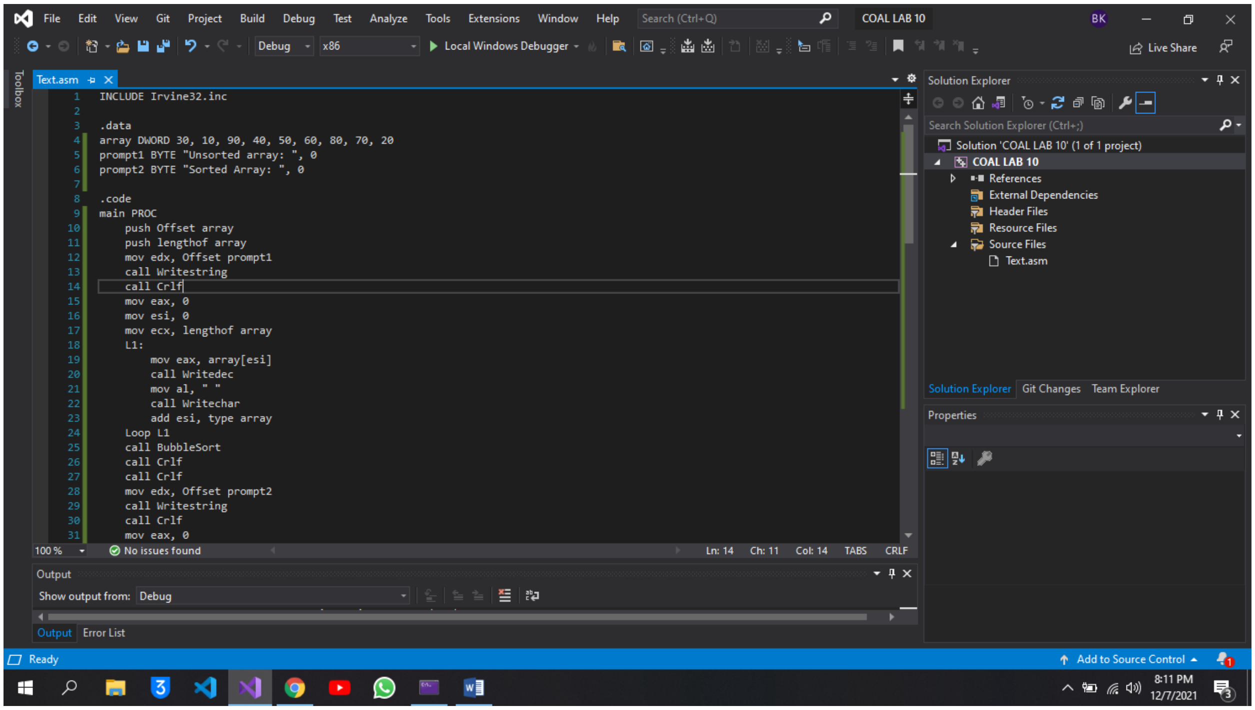
```
INCLUDE Irvine32.inc

.code
main PROC
    mov ecx, 5
    mov eax, 0
    call CalcSum
    L1:
        call WriteDec
        call crlf
    exit
    main ENDP

    CalcSum PROC
        cmp ecx, 0
        jz L2
        add eax, ecx
        dec ecx
        call CalcSum
    L2:
        ret
    CalcSum ENDP
END main
```

```
15

C:\Users\student\Desktop\Project1\Debug\Project1.exe (process 44972) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

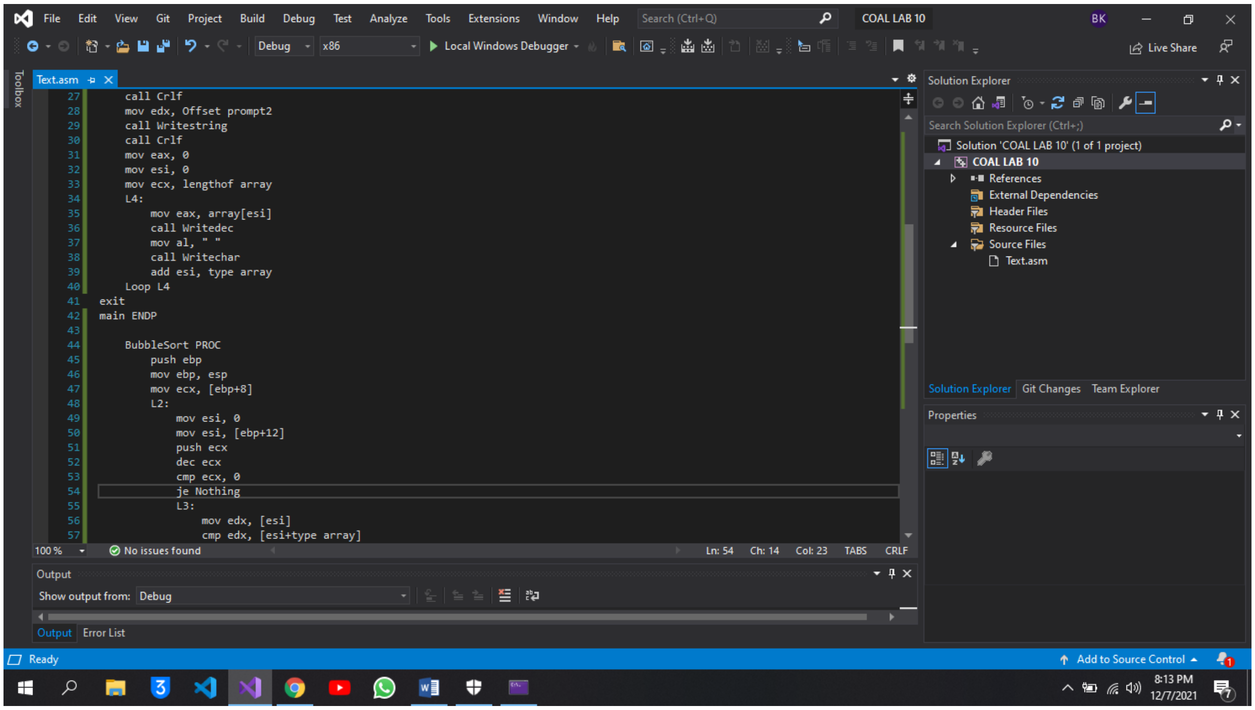
Show output from: Debug

```
'Project1.exe' (Win32): Loaded 'C:\Windows\SysWOW
The thread 0xfbfc has exited with code 0 (0x0).
The thread 0x647c has exited with code 0 (0x0).
The thread 0x145d8 has exited with code 0 (0x0).
The thread 0x11c04 has exited with code 0 (0x0).
The program '[44972] Project1.exe' has exited with code 0 (0x0).
```

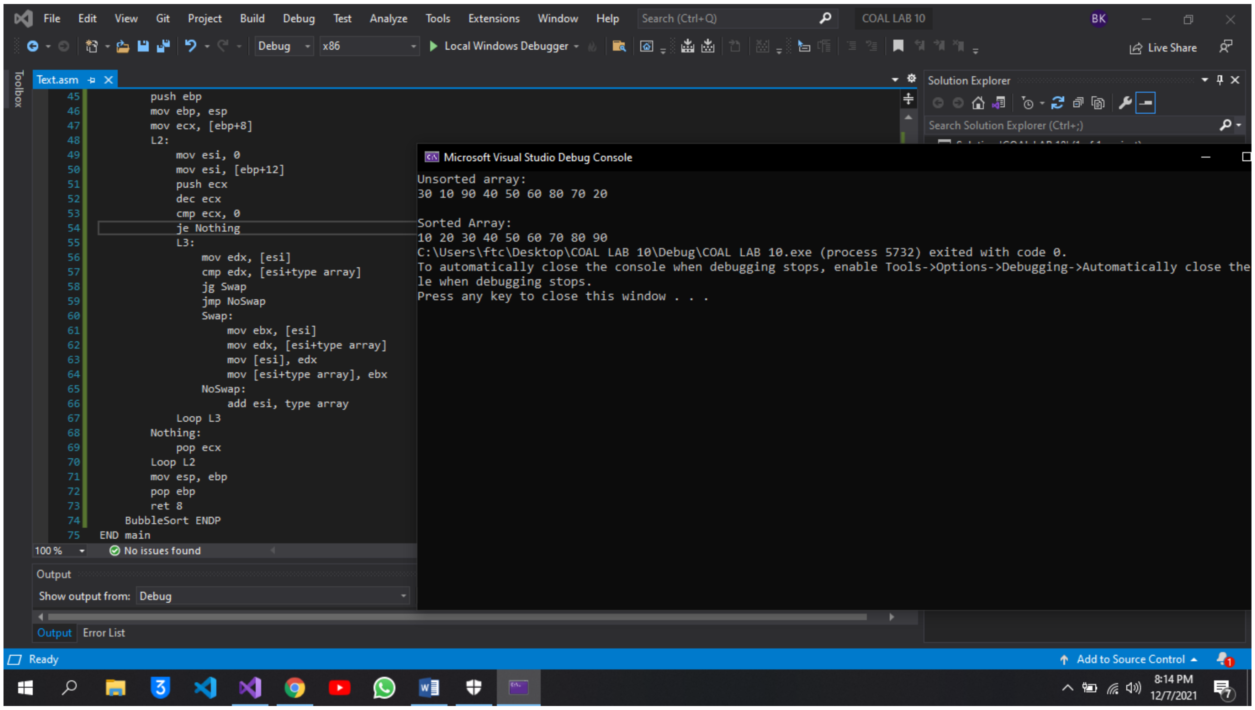
Task#01:



```
INCLUDE Irvine32.inc

.data
array DWORD 30, 10, 90, 40, 50, 60, 80, 70, 20
prompt1 BYTE "Unsorted array: ", 0
prompt2 BYTE "Sorted Array: ", 0

.code
main PROC
    push Offset array
    push lengthof array
    mov edx, Offset prompt1
    call Writestring
    call Crlf
    mov eax, 0
    mov esi, 0
    mov ecx, lengthof array
    L1:
        mov eax, array[esi]
        call Writedec
        mov al, " "
        call Writechar
        add esi, type array
    Loop L1
    call BubbleSort
    call Crlf
    call Crlf
    mov edx, Offset prompt2
    call Writestring
    call Crlf
    mov eax, 0
```



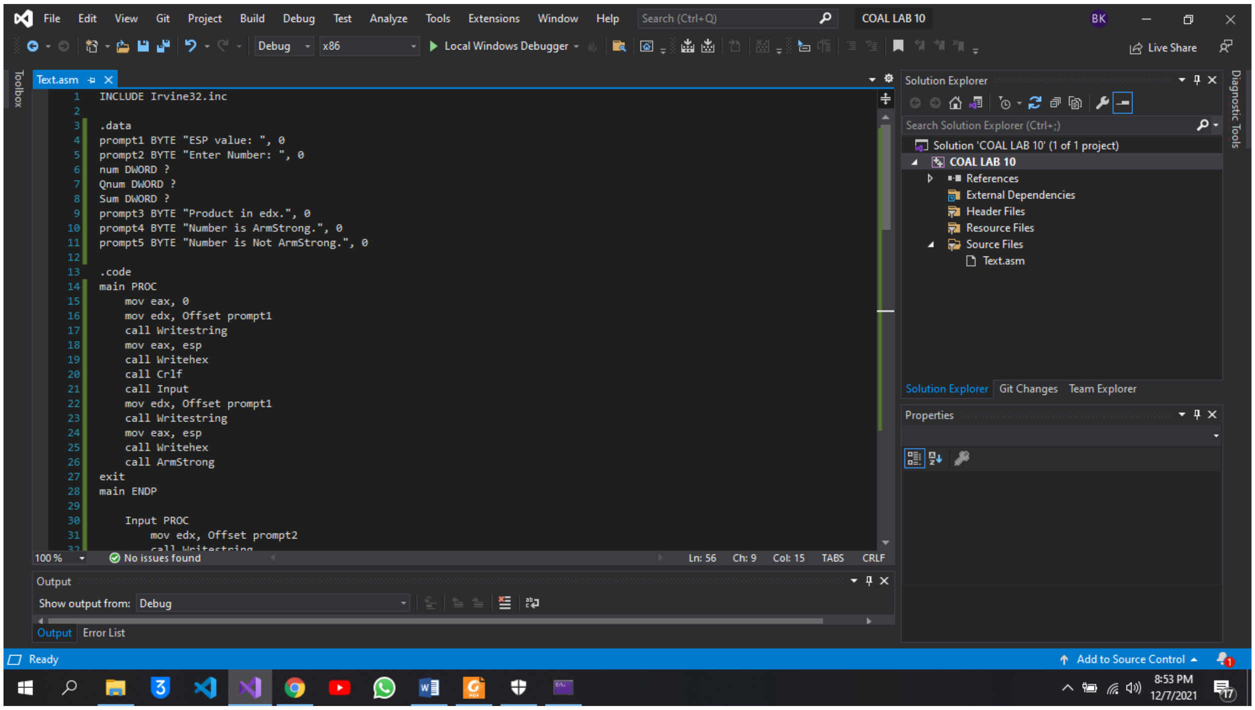
```
    call Crlf
    mov edx, Offset prompt2
    call Writestring
    call Crlf
    mov eax, 0
    mov esi, 0
    mov ecx, lengthof array
    L4:
        mov eax, array[esi]
        call Writedec
        mov al, " "
        call Writechar
        add esi, type array
    Loop L4
exit
main ENDP

    BubbleSort PROC
        push ebp
        mov ebp, esp
        mov ecx, [ebp+8]
        L2:
            mov esi, 0
            mov esi, [ebp+12]
            push ecx
            dec ecx
            cmp ecx, 0
            je Nothing
            L3:
                mov edx, [esi]
                cmp edx, [esi+type array]
```



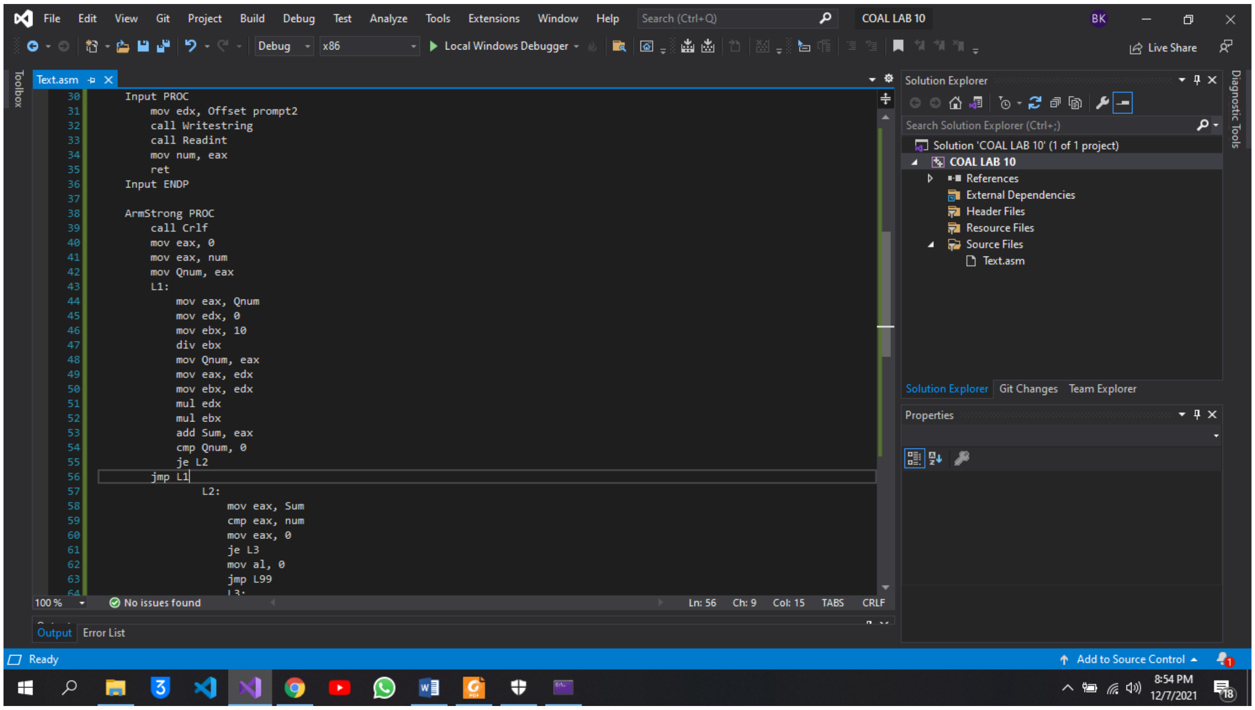
```
        push ebp
        mov ebp, esp
        mov ecx, [ebp+8]
        L2:
            mov esi, 0
            mov esi, [ebp+12]
            push ecx
            dec ecx
            cmp ecx, 0
            je Nothing
            L3:
                mov edx, [esi]
                cmp edx, [esi+type array]
                jg Swap
                jmp NoSwap
                Swap:
                    mov ebx, [esi]
                    mov edx, [esi+type array]
                    mov [esi], edx
                    mov [esi+type array], ebx
                NoSwap:
                    add esi, type array
            Loop L3
        Nothing:
            pop ecx
        Loop L2
        mov esp, ebp
        pop ebp
        ret 8
    BubbleSort ENDP
END main
```

```
Unsorted array:
30 10 90 40 50 60 80 70 20

Sorted Array:
10 20 30 40 50 60 70 80 90
C:\Users\ftc\Desktop\COAL LAB 10\Debug\COAL LAB 10.exe (process 5732) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the
le when debugging stops.
Press any key to close this window . . .
```

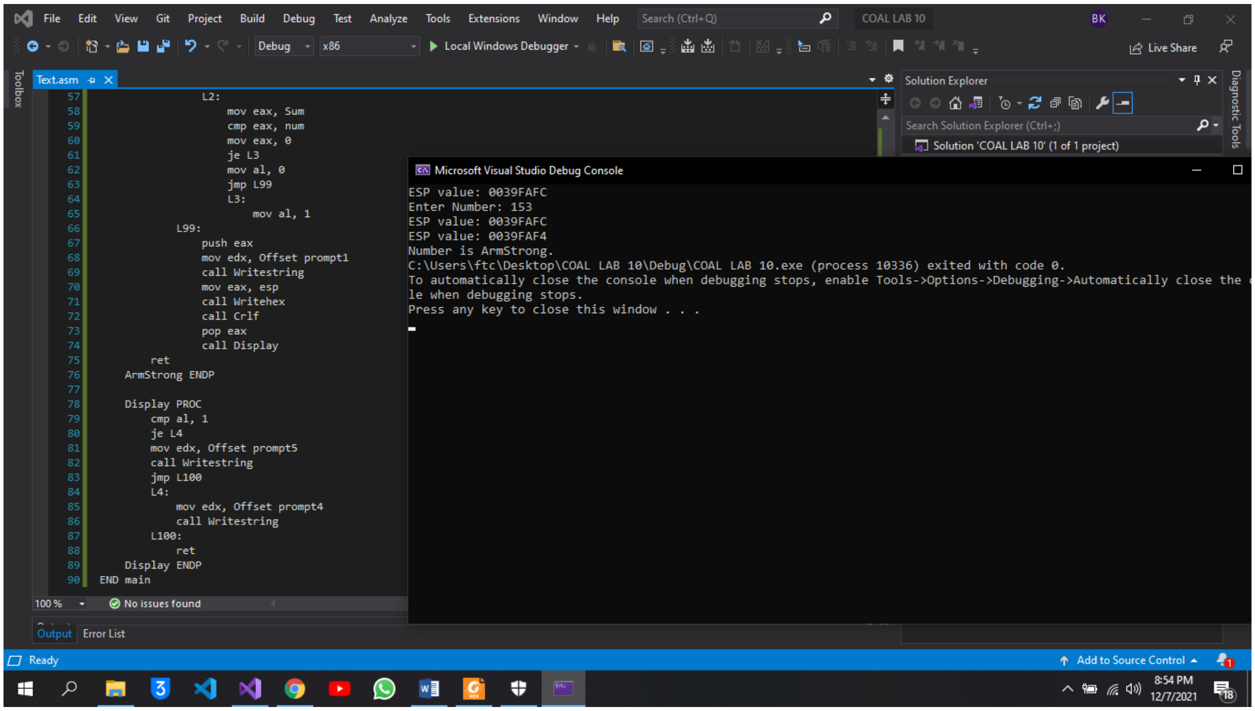
Task#02:



```
INCLUDE Irvine32.inc

.data
prompt1 BYTE "ESP value: ", 0
prompt2 BYTE "Enter Number: ", 0
num DWORD ?
Qnum DWORD ?
Sum DWORD ?
prompt3 BYTE "Product in edx.", 0
prompt4 BYTE "Number is ArmStrong.", 0
prompt5 BYTE "Number is Not ArmStrong.", 0

.code
main PROC
    mov eax, 0
    mov edx, Offset prompt1
    call Writestring
    mov eax, esp
    call Writehex
    call Crlf
    call Input
    mov edx, Offset prompt1
    call Writestring
    mov eax, esp
    call Writehex
    call ArmStrong
exit
main ENDP

    Input PROC
        mov edx, Offset prompt2
        call Writestring
```



```
    Input PROC
        mov edx, Offset prompt2
        call Writestring
        call Readint
        mov num, eax
        ret
    Input ENDP

    ArmStrong PROC
        call Crlf
        mov eax, 0
        mov eax, num
        mov Qnum, eax
        L1:
            mov eax, Qnum
            mov edx, 0
            mov ebx, 10
            div ebx
            mov Qnum, eax
            mov eax, edx
            mov ebx, edx
            mul edx
            mul ebx
            add Sum, eax
            cmp Qnum, 0
            je L2
        jmp L1
                L2:
                    mov eax, Sum
                    cmp eax, num
                    mov eax, 0
                    je L3
                    mov al, 0
                    jmp L99
```

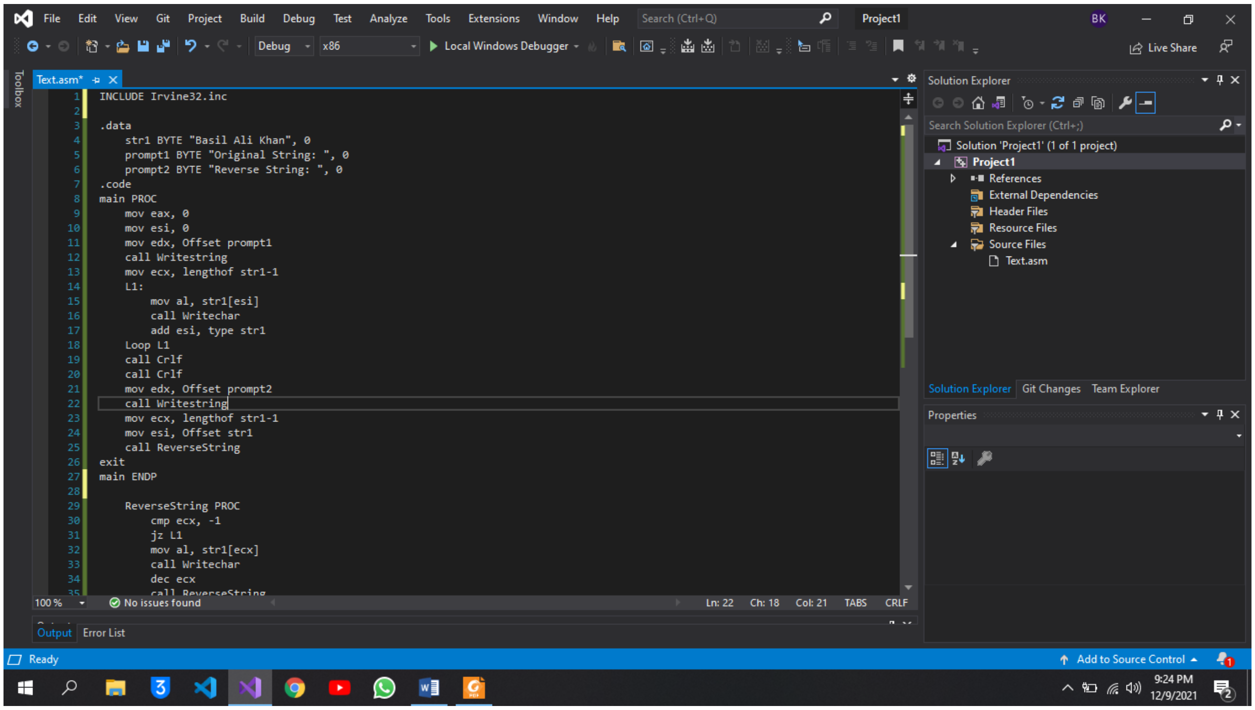


```
                L2:
                    mov eax, Sum
                    cmp eax, num
                    mov eax, 0
                    je L3
                    mov al, 0
                    jmp L99
                    L3:
                        mov al, 1
            L99:
                push eax
                mov edx, Offset prompt1
                call Writestring
                mov eax, esp
                call Writehex
                call Crlf
                pop eax
                call Display
        ret
    ArmStrong ENDP

    Display PROC
        cmp al, 1
        je L4
        mov edx, Offset prompt5
        call Writestring
        jmp L100
        L4:
            mov edx, Offset prompt4
            call Writestring
        L100:
            ret
    Display ENDP
END main
```

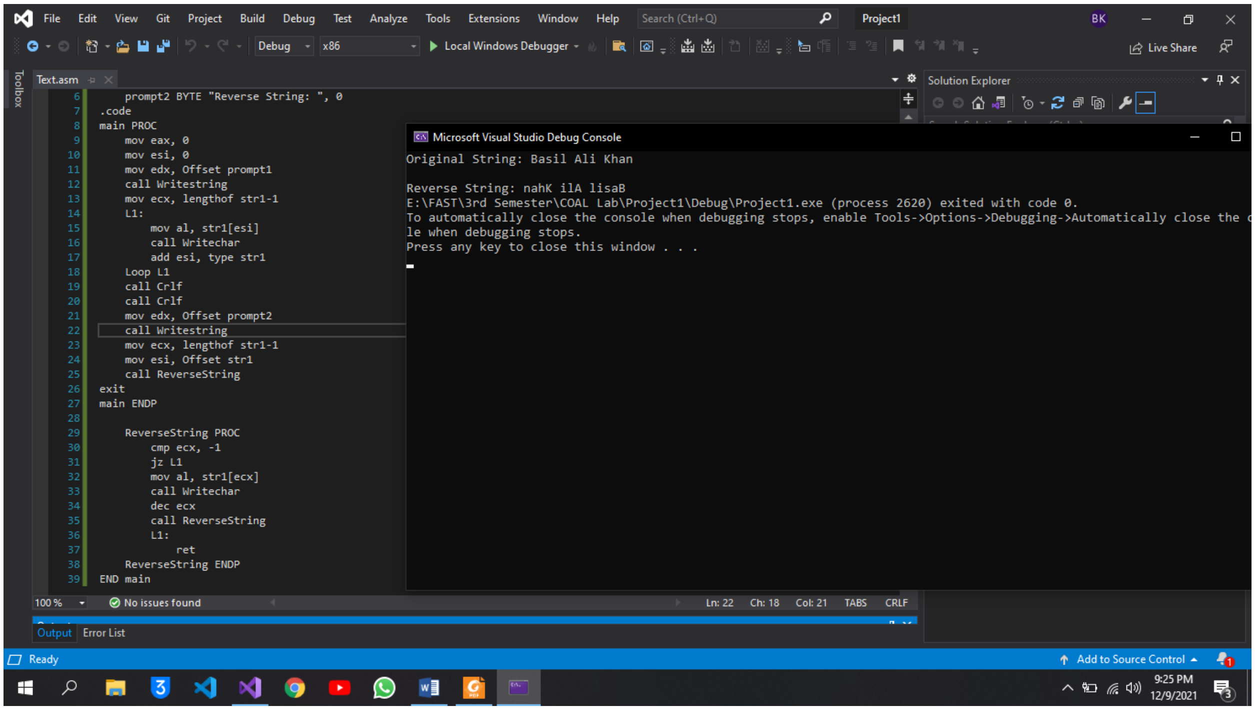
Microsoft Visual Studio Debug Console

```
ESP value: 0039FAFC
Enter Number: 153
ESP value: 0039FAFC
ESP value: 0039FAF4
Number is ArmStrong.
C:\Users\ftc\Desktop\COAL LAB 10\Debug\COAL LAB 10.exe (process 10336) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the 
le when debugging stops.
Press any key to close this window . . .
```

Task#03:



```
INCLUDE Irvine32.inc

.data
    str1 BYTE "Basil Ali Khan", 0
    prompt1 BYTE "Original String: ", 0
    prompt2 BYTE "Reverse String: ", 0
.code
main PROC
    mov eax, 0
    mov esi, 0
    mov edx, Offset prompt1
    call Writestring
    mov ecx, lengthof str1-1
    L1:
        mov al, str1[esi]
        call Writechar
        add esi, type str1
    Loop L1
    call Crlf
    call Crlf
    mov edx, Offset prompt2
    call Writestring
    mov ecx, lengthof str1-1
    mov esi, Offset str1
    call ReverseString
exit
main ENDP

    ReverseString PROC
        cmp ecx, -1
        jz L1
        mov al, str1[ecx]
        call Writechar
        dec ecx
```

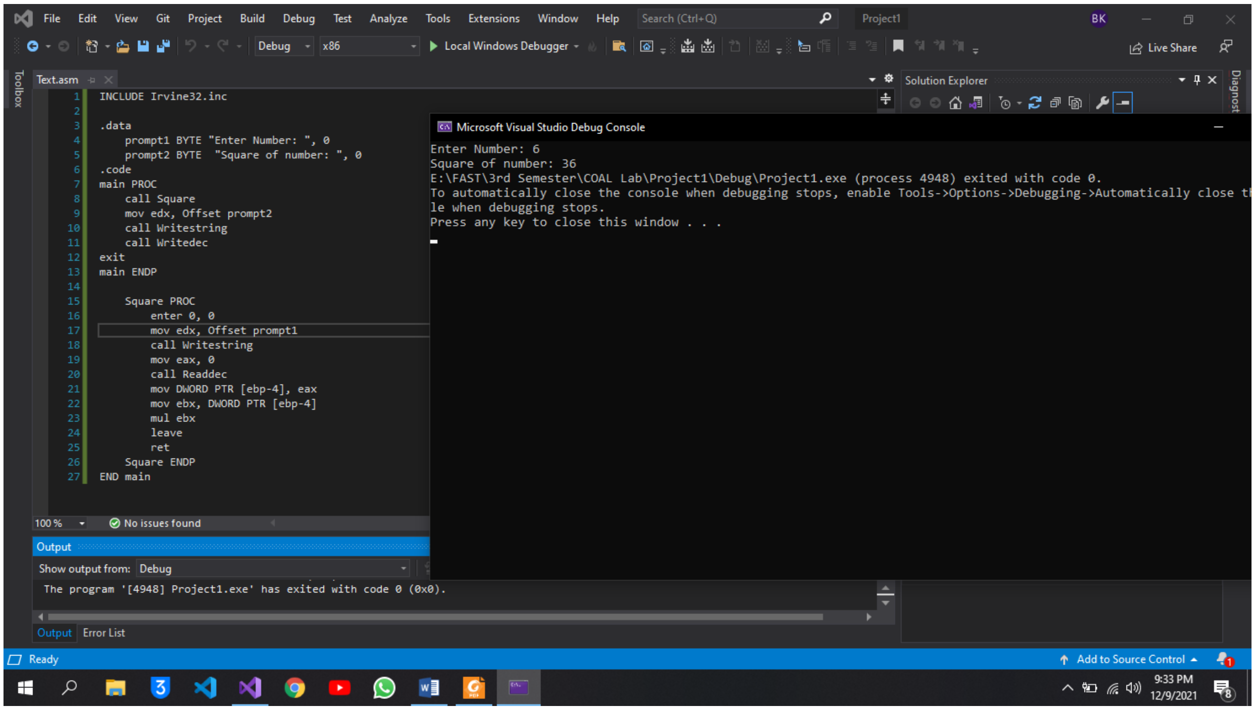


```
    prompt2 BYTE "Reverse String: ", 0
.code
main PROC
    mov eax, 0
    mov esi, 0
    mov edx, Offset prompt1
    call Writestring
    mov ecx, lengthof str1-1
    L1:
        mov al, str1[esi]
        call Writechar
        add esi, type str1
    Loop L1
    call Crlf
    call Crlf
    mov edx, Offset prompt2
    call Writestring
    mov ecx, lengthof str1-1
    mov esi, Offset str1
    call ReverseString
exit
main ENDP

    ReverseString PROC
        cmp ecx, -1
        jz L1
        mov al, str1[ecx]
        call Writechar
        dec ecx
        call ReverseString
        L1:
            ret
    ReverseString ENDP
END main
```

Microsoft Visual Studio Debug Console

```
Original String: Basil Ali Khan

Reverse String: nahK ilA lisaB
E:\FAST\3rd Semester\COAL Lab\Project1\Debug\Project1.exe (process 2620) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the c
le when debugging stops.
Press any key to close this window . . .
```

Task#04:

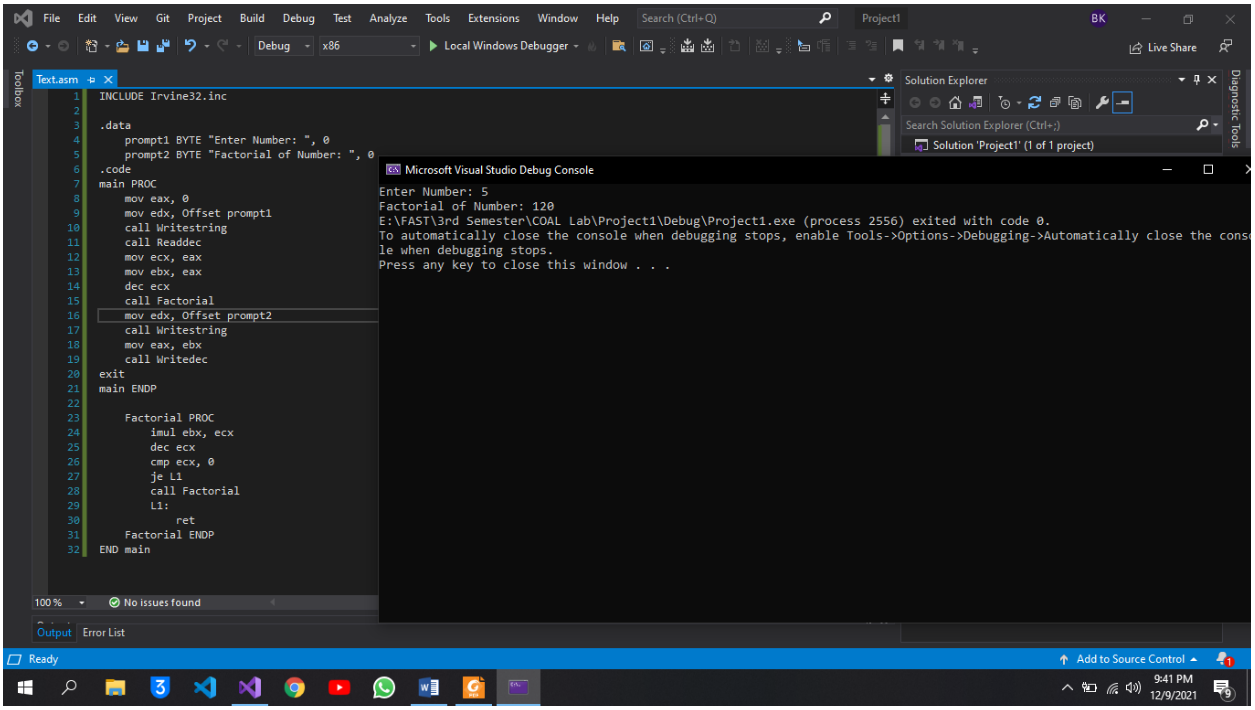


```
INCLUDE Irvine32.inc

.data
    prompt1 BYTE "Enter Number: ", 0
    prompt2 BYTE  "Square of number: ", 0
.code
main PROC
    call Square
    mov edx, Offset prompt2
    call Writestring
    call Writedec
exit
main ENDP

    Square PROC
        enter 0, 0
        mov edx, Offset prompt1
        call Writestring
        mov eax, 0
        call Readdec
        mov DWORD PTR [ebp-4], eax
        mov ebx, DWORD PTR [ebp-4]
        mul ebx
        leave
        ret
    Square ENDP
END main
```

```
Enter Number: 6
Square of number: 36
E:\FAST\3rd Semester\COAL Lab\Project1\Debug\Project1.exe (process 4948) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close t
le when debugging stops.
Press any key to close this window . . .
```

```
The program '[4948] Project1.exe' has exited with code 0 (0x0).
```

Task#05:



```
INCLUDE Irvine32.inc

.data
    prompt1 BYTE "Enter Number: ", 0
    prompt2 BYTE "Factorial of Number: ", 0
.code
main PROC
    mov eax, 0
    mov edx, Offset prompt1
    call Writestring
    call Readdec
    mov ecx, eax
    mov ebx, eax
    dec ecx
    call Factorial
    mov edx, Offset prompt2
    call Writestring
    mov eax, ebx
    call Writedec
exit
main ENDP

    Factorial PROC
        imul ebx, ecx
        dec ecx
        cmp ecx, 0
        je L1
        call Factorial
        L1:
            ret
    Factorial ENDP
END main
```

```
Enter Number: 5
Factorial of Number: 120
E:\FAST\3rd Semester\COAL Lab\Project1\Debug\Project1.exe (process 2556) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the cons
le when debugging stops.
Press any key to close this window . . .
```

Task#06:

Not able to understand how to do it.