COAL Lab 10

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Task 1:

```
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; Task 1

INCLUDE Irvine32.inc

.data
    num1 DWORD 3h
    num2 DWORD 2h
    num3 DWORD 5h
    product DWORD ?
    msg BYTE "The product of three numbers is: ", 0
.code
    main PROC
        PUSH num1
        PUSH num2
        PUSH num3
        call ThreeProd
        mov product, eax
        exit
    main ENDP

    ThreeProd PROC
        PUSH ebp
        mov ebp, esp
        mov eax, 0
        mov ebx, 0
        mov eax, [ebp + 8]
        mov ebx, [ebp + 12]
        mul ebx
        mov ebx, [ebp + 16]
        mul ebx
        mov esp, ebp
        mov edx, OFFSET msg
        call WriteString
        call WriteDec
        call Crlf
        call DumpRegs
        POP ebp
        ret 12
    ThreeProd ENDP
    END main
```

```
Microsoft Visual Studio Debug Console
The product of three numbers is: 30

  EAX=0000001E  EBX=00000003  ECX=0104100A  EDX=01046010
  ESI=0104100A  EDI=0104100A  EBP=007EFD10  ESP=007EFD10
  EIP=010436B8  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0
```

Task 2:

```
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; Task 2

INCLUDE Irvine32.inc

.data
    array WORD 23, 434, 3, 45, 23, 45, 67, 45, 78, 56
    msg BYTE "Minimum element is: ", 0
.code
    main PROC
        PUSH OFFSET array
        call MinArray
        call Crlf
        call DumpRegs
        exit
    main ENDP

    MinArray PROC
        PUSH ebp
        mov ebp, esp
        mov esi, [ebp + 8]
        mov ecx, 0
        mov ebx, 0
        mov ecx, 9
        mov eax, 0
        mov ax, [esi]
        add esi, 2
        L1:
            cmp ax, [esi]
            jl here
            mov bx, ax
            mov ax, [esi]
            mov [esi], bx
        here:
            add esi, 2
        LOOP L1
        mov edx, OFFSET msg
        call WriteString
        call WriteDec
        POP ebp
        ret 4
    MinArray ENDP
    END main
```

```
Microsoft Visual Studio Debug Console
Minimum element is: 3

  EAX=00000003  EBX=00000017  ECX=00000000  EDX=01056014
  ESI=01056014  EDI=0105100A  EBP=007DFA14  ESP=007DFA04
  EIP=01053674  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0
```

Task 3:

```
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; Task 3

INCLUDE IRVINE32.INC

.data
    array word 24,434,3,45,23,45,67,45,78,56,54,98,5,1,65,34,232,8,565,88
    message byte "The maximum element in array is: ",0

.code
main proc
    push offset array
    call MaxArray
    call dumpregs
    exit
main endp

MaxArray proc
    push ebp
    mov ebp,esp
    mov esi,[ebp+8]
    mov ecx,0
    mov ebx,0
    mov ecx,19
    mov eax,0
    mov ax,[esi]
    add esi,2
    l1:
    cmp ax,[esi]
    ja here
    mov bx,ax
    mov ax,[esi]
    mov [esi],bx
    here:
    add esi,2
    loop l1
    mov edx,offset message
    call writestring
    call writedec
    pop ebp
    ret 4
MaxArray endp
end main
```

```
C:\WINDOWS\system32\cmd.exe
The maximum element in array is: 565
  EAX=00000235  EBX=000001B2  ECX=00000000  EDX=00BF6028
  ESI=00BF6028  EDI=00BF10AF  EBP=00B3FA10  ESP=00B3FA04
  EIP=00BF366F  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0


Press any key to continue . . .
```

Task 4:

```
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; Task 4

INCLUDE IRVINE32.INC
.data
    message byte "Enter an integer: ",0
    message2 byte "The square of that number is: ",0
.code
main proc
    call LocalSquare
    call dumpregs
    exit
main endp

LocalSquare PROC
    Enter 1,0
    mov eax,0
    mov edx,offset message
    call writestring
    call readint
    mov [ebp-4],eax
    mov edx,offset message2
    call writestring
    mul eax
    call writedec
    leave
    ret
LocalSquare endp
end main
```

```
C:\WINDOWS\system32\cmd.exe
Enter an integer: 3
The square of that number is: 9
  EAX=00000009  EBX=00D35000  ECX=007310AF  EDX=00000000
  ESI=007310AF  EDI=007310AF  EBP=00F5FB08  ESP=00F5FAFC
  EIP=0073366A  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0

Press any key to continue . . .
```

Task 5:

```
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; Task 5

INCLUDE IRVINE32.INC
.data
message byte "Enter the integer you want the factorial of: ",0
message2 byte "The factorial is: ",0
var dword ?
.code
main proc
    mov edx,offset message
    call writestring
    mov eax,0
    call readdec
    mov var,eax
    mov ebx,0
    mov ebx,eax
    dec ebx
    call fact
    mov edx,offset message2
    call writestring
    call writedec
    call dumpregs
    exit
main endp

fact proc
    enter 0,0
    cmp eax,0
    je h1
    cmp ebx,0
    je here
    mul ebx
    dec ebx
    call fact
    jmp here
    h1:
    mov eax,1
    here:
    leave
    ret
fact endp
end main
```

```
C:\WINDOWS\system32\cmd.exe
Enter the integer you want the factorial of: 5
The factorial is: 120
  EAX=00000078  EBX=00000000  ECX=009E10AF  EDX=009E602E
  ESI=009E10AF  EDI=009E10AF  EBP=009BFAD0  ESP=009BFAC4
  EIP=009E369A  EFL=00000202  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=0

Press any key to continue . . .
```

Lab Exercise:

```
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INCLUDE Irvine32.inc

.data
    x DWORD 5
    y DWORD 6
.code
    main PROC
        mov eax, x
        call WriteDec
        mov al, " "
        call WriteChar
        mov eax, y
        call WriteDec
        call Crlf
        PUSH x
        PUSH OFFSET y
        call change
        mov eax, x
        call WriteDec
        mov al, " "
        call WriteChar
        mov eax, y
        call WriteDec
        call Crlf
        exit
    main ENDP

    change PROC
        PUSH ebp
        mov ebp, esp
        mov DWORD PTR [ebp + 12], 10
        mov eax, DWORD PTR [ebp + 8]
        mov DWORD PTR [eax], 14
        mov eax, DWORD PTR [ebp + 12]
        call WriteDec
        mov al, " "
        call WriteChar
        mov eax, DWORD PTR [ebp + 8]
        mov eax, DWORD PTR [eax]
        call WriteDec
        call Crlf
        mov esp, ebp
        POP ebp
        ret 8
    change ENDP
    END main
```

```
C:\WINDOWS\system32\cmd.exe
5 6
10 14
5 14
Press any key to continue . . .
```