

## COAL LAB 8

Questions:

### Task#1

Write a program that takes four input integers from the user. Then compare and display a message whether these integers are equal or not.

### Task#2

Use cmp and jumps to find the first non-zero value in the given array:

```
intArr SWORD 0, 0, 0, 150, 120, 35, -12, 66, 4, 0
```

Task#3 Implement the following given code in Assembly and Consider var = 5 , edx = var+1 and counter value from array initialized in task#2.

```
if ( var < ecx ) AND (ecx >= edx) then
```

```
x = 0
```

```
else
```

```
x = 1
```

Task#4 Implement the following given code in Assembly and consider var = 0.

```
while ( var <= 10)
```

```
if (var < 5)
```

```
Print "Hello"
```

```
else
```

```
Print "World"
```

```
var = var + 1
```

```
end while
```

### Task#5

Write a program for sequential search. Take an input from the user and find if it occurs in the following array:

```
arr WORD 10, 4, 7, 14, 299, 156, 3, 19, 29, 300, 20
```

#### Task#6

Write a program for bubble sort on this array.

arr WORD 10, 4, 7, 14, 299, 156, 3, 19, 29, 300, 20

#### Task#7

Write a program to print weekday based on given number.

#### Task#8

Write a program to check whether a character is alphabet or not.

#### Q1

Code:

```
INCLUDE Irvine32.inc

.data
arr DWORD 4 DUP(?)

str1 BYTE "Enter integer: " , 0
str2 BYTE "Intergers are equal" , 0
str3 BYTE "Intergers are not equal" , 0

.code
main PROC
mov eax , 0
mov ecx , 4
mov esi , offset arr

;taking input from the user
L1:
mov edx , offset str1
call Writestring
call Readint
mov [esi] , eax
add esi , 4
loop L1

;comparing values
mov eax , 0
mov esi , offset arr
mov eax , [esi]
mov ecx , 3

L2:
add esi , 4
cmp eax , [esi] ; if euqal then ZF = 1
jnz L3 ; if ZF = 0 jump to L3
loop L2

mov edx , offset str2
```

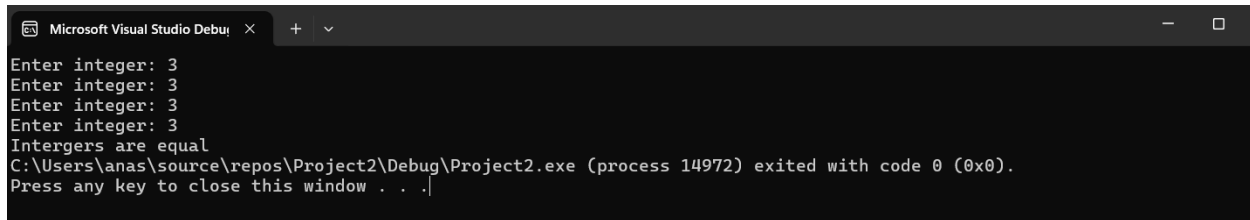
```

call Writestring
exit

L3:
mov edx , offset str3
call Writestring
exit

call Dumpregs
exit
main ENDP
END main

```



```

Microsoft Visual Studio Debug
Enter integer: 3
Enter integer: 3
Enter integer: 3
Enter integer: 3
Integers are equal
C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 14972) exited with code 0 (0x0).
Press any key to close this window . . .

```

## Q2

Code:

```

INCLUDE Irvine32.inc

.data
intArr SWORD 0, 0, 0, 150, 120, 35, -12, 66, 4, 0

.code
main PROC
mov eax , 0
mov ecx , LENGTHOF intArr
mov esi , 0
mov ax , intArr[esi]

L1:
add esi , 2
cmp ax , intArr[esi] ;
jnz L2 ; jump to L3 if ZF = 0
loop L1
exit

L2:
mov ax , intArr[esi]
call Writeint

call Dumpregs
exit
main ENDP
END main

```

```
Microsoft Visual Studio Debug Console
+150
EAX=00000096 EBX=007DD000 ECX=00000008 EDX=004810AA
ESI=00000006 EDI=004810AA EBP=0058FCC0 ESP=0058FCB4
EIP=0048369C EFL=00000202 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=0

C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 4212) exited with code 0 (0x0).
Press any key to close this window . . .
```

### Q3

#### Code:

```
INCLUDE Irvine32.inc

.data
var DWORD 5
x DWORD ?

.code
main PROC
mov ecx , 10 ; from task 2

cmp var , ecx
jb L1
mov x , 1
mov eax , x
call Writeint
exit

L1:
inc var
mov edx , var
cmp ecx , edx
jae L2
mov x , 1
mov eax , x
call Writeint
exit

L2:
mov x , 0
mov eax , x
call Writeint

call Dumpregs
exit
main ENDP
END main
```

```
Microsoft Visual Studio Debug Console
+0
EAX=00000000 EBX=010BC000 ECX=0000000A EDX=00000006
ESI=00B610AA EDI=00B610AA EBP=012FFD6C ESP=012FFD60
EIP=00B636CC EFL=00000202 CF=0 SF=0 ZF=0 OF=0 AF=0 PF=0

C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 3540) exited with code 0 (0x0).
Press any key to close this window . . .
```

Q4

Code:

```
INCLUDE Irvine32.inc

.data
var DWORD 0
str1 BYTE "Hello" , 0
str2 BYTE "World" , 0

.code
main PROC
mov eax , 0
;mov ecx , 10 ; set the counter for while loop

L1:
cmp var , 10
jbe L2
exit

L2:
cmp var , 5
jb L3
mov edx , offset str2
call Writestring
call crlf
inc var
jmp L1

L3:
mov edx , offset str1
call Writestring
call crlf
inc var
jmp L1

call Dumpregs
exit
main ENDP
END main
```

```
Microsoft Visual Studio Debug Console
Hello
Hello
Hello
Hello
Hello
Hello
World
World
World
World
World
World
World
C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 27252) exited with code 0 (0x0).
Press any key to close this window . . .
```

Q5

Code:

```
INCLUDE Irvine32.inc

.data
arr WORD 10, 4, 7, 14, 299, 156, 3, 19, 29, 300, 20
str1 BYTE "Enter the number you want to find in the array: " , 0
str2 BYTE "Value found" , 0
str3 BYTE "Value not found" , 0

.code
main PROC
mov eax , 0
mov edx , offset str1
call Writestring
call Readint

mov ecx , LENGTHOF arr
mov esi , 0

L1:
movzx ebx , arr[esi * TYPE WORD]
cmp eax , ebx
je found
inc esi
loop L1
mov edx , offset str3
call Writestring
exit

found:
mov edx , offset str2
call Writestring
exit

call Dumpregs
exit
main ENDP
END main
```

```
Microsoft Visual Studio Debug Console
Enter the number you want to find in the array: 299
Value found
C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 31776) exited with code 0 (0x0).
Press any key to close this window . . .
```

Q6

```
INCLUDE Irvine32.inc

.data
arr WORD 10, 4, 7, 14, 299, 156, 3, 19, 29, 300, 20

arrSize = ($ - arr) / 2

.code
main PROC
    mov eax , 0
    mov ecx , LENGTHOF arr

    mov esi , 0

outerloop:
    dec ecx
    jz endSort
    mov esi , 0

innerloop:
    mov ax , arr[esi]
    mov bx , arr[esi+2]
    cmp ax , bx
    jle noswap
    ;swapping
    mov arr[esi] , bx
    mov arr[esi+2] , ax

noswap:
    add esi , 2
    cmp esi, (arrSize - 1) * 2 ; to check kahi hm end pr tou nhi phooch gai
    jl innerloop

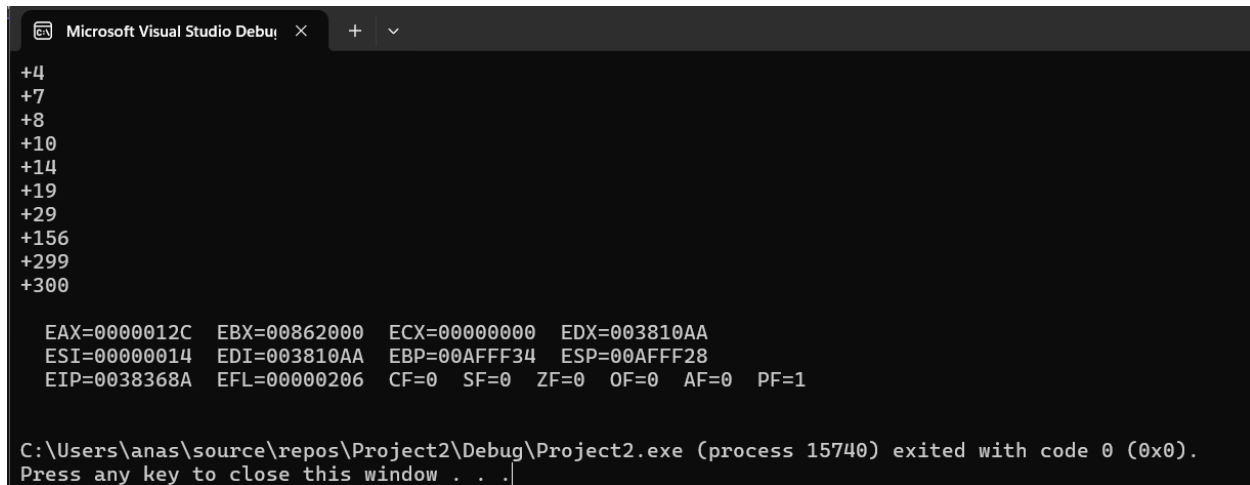
    jmp outerloop

    mov ecx , arrSize
    mov esi , 0

endSort:
    mov ax , arr[esi]
    call Writeint
    call crlf
    add esi , 2
    loop endSort

    call Dumpregs
    exit
```

```
main ENDP
END main
```



The screenshot shows the Microsoft Visual Studio Debugger interface. The assembly window displays instructions at memory addresses +4 through +300. The CPU registers window shows the following values: EAX=0000012C, EBX=00862000, ECX=00000000, EDX=003810AA, ESI=00000014, EDI=003810AA, EBP=00AFFF34, ESP=00AFFF28, EIP=0038368A, EFL=00000206, CF=0, SF=0, ZF=0, OF=0, AF=0, PF=1. The status bar at the bottom indicates that the process C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 15740) exited with code 0 (0x0).

```
Microsoft Visual Studio Debug
+4
+7
+8
+10
+14
+19
+29
+156
+299
+300

EAX=0000012C  EBX=00862000  ECX=00000000  EDX=003810AA
ESI=00000014  EDI=003810AA  EBP=00AFFF34  ESP=00AFFF28
EIP=0038368A  EFL=00000206  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=1

C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 15740) exited with code 0 (0x0).
Press any key to close this window . . .
```

Q7

Code:

```
INCLUDE Irvine32.inc

.data
weekdays BYTE "Sunday", 0, "Monday", 0, "Tuesday", 0, "Wednesday", 0, "Thursday",
0, "Friday", 0, "Saturday", 0
str1 BYTE "Enter the number(1-7): " ,0
invalid BYTE "Invalid Input"

.code
main PROC
mov eax , 0
mov edx , offset str1 ;
call Writestring
call Readint

cmp eax , 1
jb InValid
cmp eax , 7
ja InValid

dec eax
mov ecx , 0
mov ebx , eax

findWeekday:
mov al , weekdays[ecx]
cmp al , 0
je CheckIndex
inc ecx
jmp findWeekday

checkIndex:
cmp ebx, 0
je printWeekday
dec ebx
```



```

inc ecx
jmp findWeekday

printWeekday:
mov edx, OFFSET weekdays[ecx]
call WriteString
call Crlf
exit

Invalid:
mov edx, OFFSET invalid
call WriteString
call Crlf

call Dumpregs
exit
main ENDP
END main

```

```

Microsoft Visual Studio Debug Console
Enter the number(1-7): 1
Sunday
C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 21520) exited with code 0 (0x0).

```

Q8

Code:

```

INCLUDE Irvine32.inc

.data
str1 BYTE "Enter the character: " , 0
str2 BYTE "This is not a character" , 0
str3 BYTE "This is a character" , 0

.code
main PROC
call clrscr
mov eax , 0
mov edx , offset str1
call Writestring
call Readchar ; stored in al
call Writechar
call crlf

mov al , al

cmp al , 'A'
jl isnotAlpha
cmp al , 'Z'
jle isAlpha

isAlpha:
mov edx , offset str3
call Writestring
exit

```

```
isnotAlpha:  
mov edx , offset str2  
call Writestring  
  
call Dumpregs  
exit  
main ENDP  
END main
```



The screenshot shows a dark-themed window titled "Microsoft Visual Studio Debug Console". The text inside the console is as follows:

```
Enter the character: a  
This is a character  
C:\Users\anas\source\repos\Project2\Debug\Project2.exe (process 18988) exited with code 0 (0x0)
```