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Lab-10

Examples

Example 1 Code

```
Text.asm  ▢ ✕
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4  var1 DWORD 5
5  var2 DWORD 6
6
7  .code
8  main Proc
9
10
11  push var2
12  push var1
13  call AddTwo
14  exit
15  AddTwo PROC
16
17  push ebp
18  mov ebp, esp
19  mov eax, [ebp+12]
20  add eax, [ebp+8]
21  pop ebp
22  ret
23  AddTwo ENDP
24  call DumpRegs
25  exit
26  main ENDP
27  END main
```

Output

```
Text.asm  ▢ ✕
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4  var1 DWORD 5
5  var2 DWORD 6

Microsoft Visual Studio Debug Console
11
C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 52892) exited with code 0.
Press any key to close this window . . .
```

Example 2 with output

```
Text.asm  X
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4  var1 DWORD 5
5  var2 DWORD 6
6
7  y_param EQU [ebp+12]
8  x_param EQU [ebp+8]
9  .code
10 main Proc
11
12
13 push var2
14 push var1
15 call AddTwo
16 call WriteDec
17 exit
18 AddTwo PROC
19
20 push ebp
21 mov ebp, esp
22 mov eax, y_param
23 add eax, x_param
24 pop ebp
25 ret
26 AddTwo ENDP
27 call DumpRegs
28 exit
29 main ENDP
30 END main
```

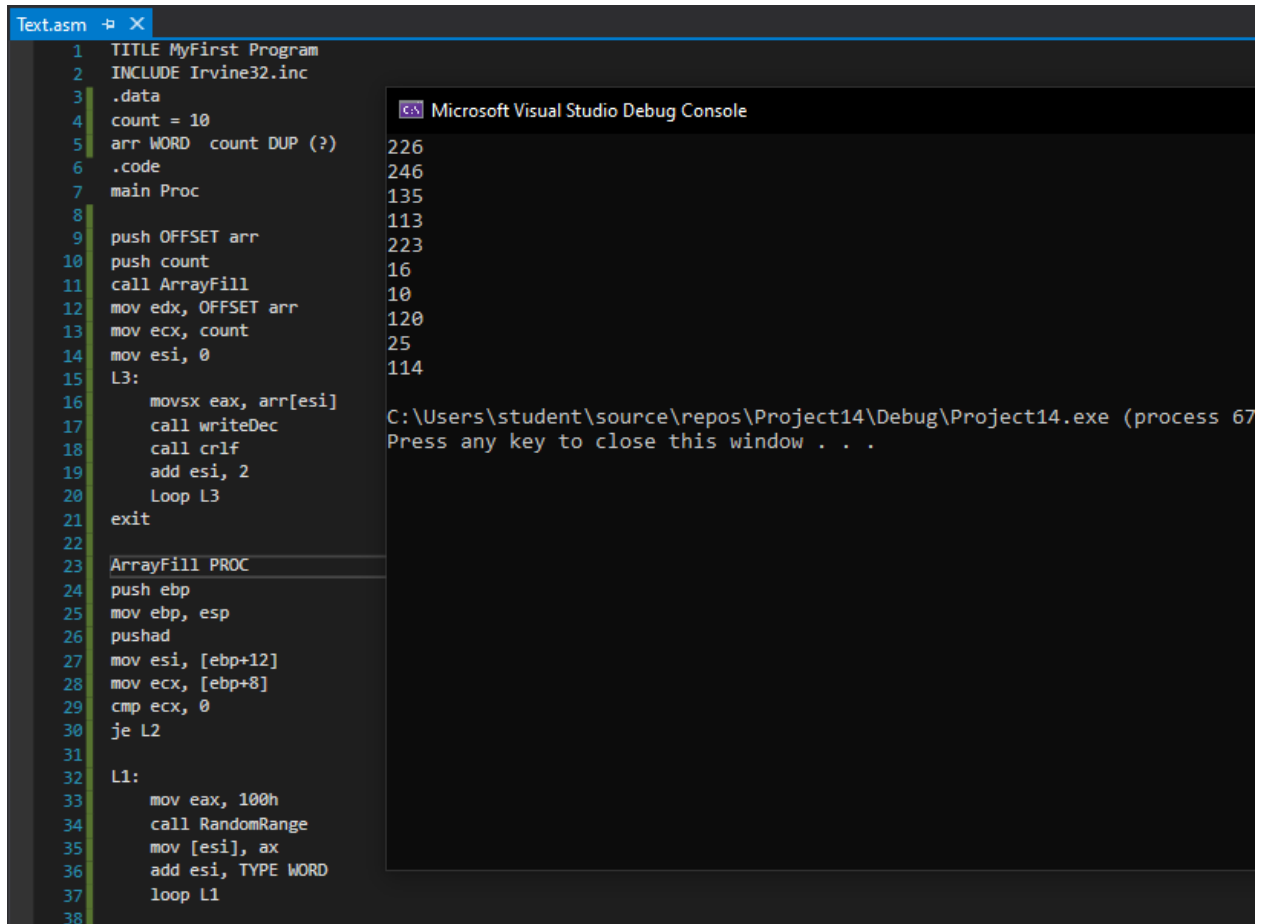
Microsoft Visual Studio Debug Console

```
11
C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 78792) exited with code 0.
Press any key to close this window . . .
```

Example 3 code

```
Text.asm  + X
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4  count = 10
5  arr WORD count DUP (?)
6  .code
7  main Proc
8
9  push OFFSET arr
10 push count
11 call ArrayFill
12 exit
13
14 ArrayFill PROC
15 push ebp
16 mov ebp, esp
17 pushad
18 mov esi, [ebp+12]
19 mov ecx, [ebp+8]
20 cmp ecx, 0
21 je L2
22
23 L1:
24     mov eax, 100h
25     call RandomRange
26     mov [esi], ax
27     add esi, TYPE WORD
28     loop L1
29
30 L2:
31     popad
32     pop ebp
33     ret 8
34 ArrayFill ENDP
35 call DumpRegs
36 exit
37 main ENDP
38 END main
```

Example 3 output



The screenshot displays the Microsoft Visual Studio interface. On the left, the 'Text.asm' file is open, showing assembly code. The code includes a title, includes Irvine32.inc, defines a data section with a count of 10 and an array, and a code section with a main procedure. The main procedure pushes the array offset and count, calls ArrayFill, moves the array offset to edx, moves the count to ecx, moves esi to 0, and enters a loop L3. Loop L3 moves the word at arr[esi] to eax, calls writeDec, calls crlf, increments esi by 2, and loops back to L3. After the loop, it calls exit. The ArrayFill procedure is also shown, pushing ebp, moving esp to ebp, pushingad, moving esi to [ebp+12], moving ecx to [ebp+8], comparing ecx to 0, jumping if equal to L2, and then entering loop L1. Loop L1 moves 100h to eax, calls RandomRange, moves the result to [esi], increments esi by TYPE WORD, and loops back to L1.

On the right, the 'Microsoft Visual Studio Debug Console' window is open, showing the output of the program. The output consists of a series of numbers: 226, 246, 135, 113, 223, 16, 10, 120, 25, 114. Below the numbers, the console shows the path to the executable: C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 67) and the message: Press any key to close this window . . .

```
1 TITLE MyFirst Program
2 INCLUDE Irvine32.inc
3 .data
4 count = 10
5 arr WORD count DUP (?)
6 .code
7 main Proc
8
9 push OFFSET arr
10 push count
11 call ArrayFill
12 mov edx, OFFSET arr
13 mov ecx, count
14 mov esi, 0
15 L3:
16     movsx eax, arr[esi]
17     call writeDec
18     call crlf
19     add esi, 2
20     loop L3
21 exit
22
23 ArrayFill PROC
24 push ebp
25 mov ebp, esp
26 pushad
27 mov esi, [ebp+12]
28 mov ecx, [ebp+8]
29 cmp ecx, 0
30 je L2
31
32 L1:
33     mov eax, 100h
34     call RandomRange
35     mov [esi], ax
36     add esi, TYPE WORD
37     loop L1
38
```

Microsoft Visual Studio Debug Console

226
246
135
113
223
16
10
120
25
114

C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 67)
Press any key to close this window . . .

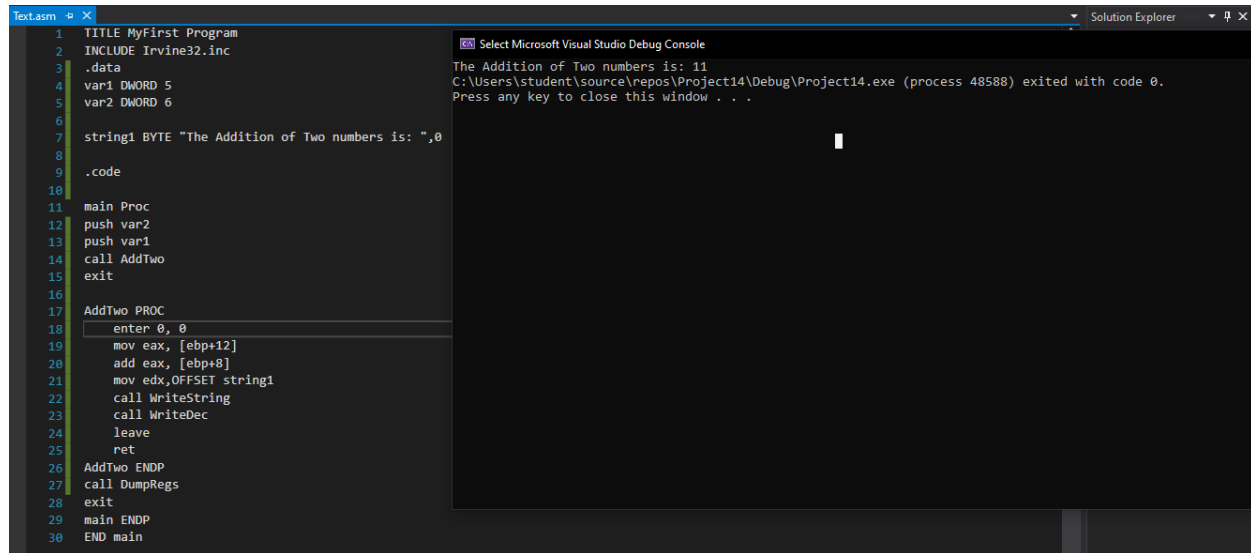
Example 4

```
Text.asm  + X
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4
5  .code
6  main Proc
7  call makeArray
8
9  exit
10
11 makeArray PROC
12     push ebp
13     mov ebp, esp
14     sub esp, 32
15     lea esi, [ebp-30]
16     mov ecx, 30
17
18     L1:
19         mov BYTE PTR [esi], '*'
20         inc esi
21         loop L1
22         add esp, 32
23         pop ebp
24         ret
25     makeArray ENDP
26 call DumpRegs
27 exit
28 main ENDP
29 END main
```

Example 5

```
Text.asm  ▢  ×
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4
5  .code
6  main Proc
7  call MySub
8
9  exit
10
11  MySub PROC
12      push ebp
13      mov ebp, esp
14      sub esp, 8
15      mov DWORD PTR [ebp-4], 10 ; first value
16      mov DWORD PTR [ebp-8], 20 ; second value
17      mov esp, ebp
18      pop ebp
19      ret
20  MySub ENDP
21  call DumpRegs
22  exit
23  main ENDP
24  END main
```

Example 6 with output



The screenshot shows the Visual Studio IDE with two windows. The left window, titled 'Text.asm', displays assembly code for a program named 'MyFirst Program'. The code includes Irvine32.inc, defines two DWORD variables (var1=5, var2=6), and a string 'The Addition of Two numbers is: ',0. The main procedure calls 'AddTwo' and then 'DumpRegs'. The 'AddTwo' procedure uses 'enter' to set up a stack frame, moves the address of string1 to edx, calls 'WriteString' and 'WriteDec', and then returns. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program: 'The Addition of Two numbers is: 11'. Below this, it states 'C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 48588) exited with code 0. Press any key to close this window . . .'. The console also shows a cursor on a new line.

```
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4  var1 DWORD 5
5  var2 DWORD 6
6
7  string1 BYTE "The Addition of Two numbers is: ",0
8
9  .code
10
11 main Proc
12 push var2
13 push var1
14 call AddTwo
15 exit
16
17 AddTwo PROC
18     enter 0, 0
19     mov eax, [ebp+12]
20     add eax, [ebp+8]
21     mov edx, OFFSET string1
22     call WriteString
23     call WriteDec
24     leave
25     ret
26 AddTwo ENDP
27 call DumpRegs
28 exit
29 main ENDP
30 END main
```

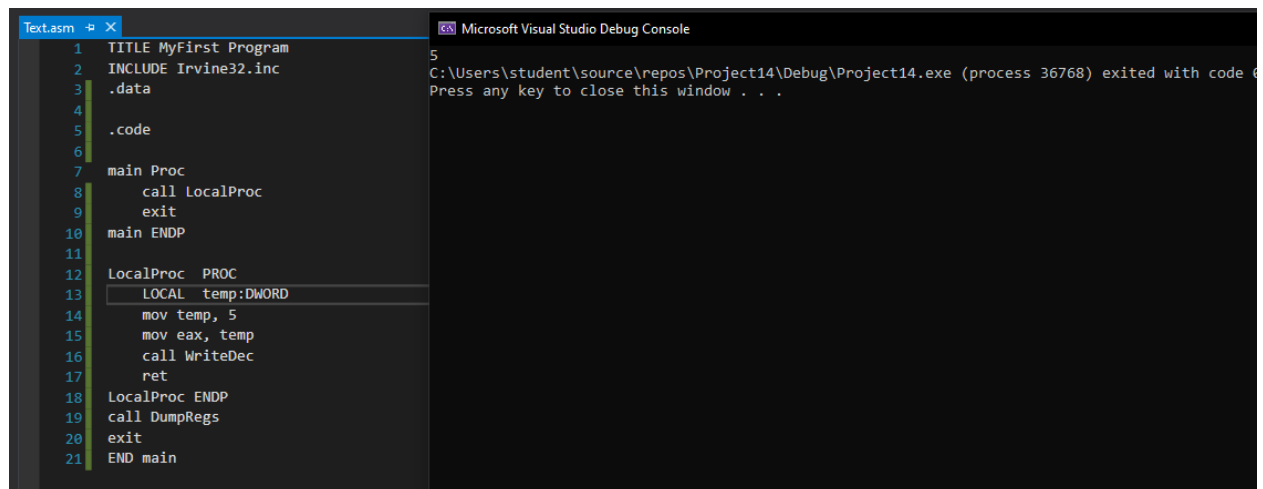
Select Microsoft Visual Studio Debug Console

The Addition of Two numbers is: 11

C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 48588) exited with code 0.

Press any key to close this window . . .

Example 7 with output



The screenshot shows the Visual Studio IDE with two windows. The left window, titled 'Text.asm', displays assembly code for a program named 'MyFirst Program'. The code includes Irvine32.inc, defines a LOCAL DWORD variable 'temp', and sets it to 5. The main procedure calls 'LocalProc' and then 'DumpRegs'. The 'LocalProc' procedure moves the value of 'temp' to 'eax' and calls 'WriteDec'. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program: '5'. Below this, it states 'C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 36768) exited with code 0. Press any key to close this window . . .'. The console also shows a cursor on a new line.

```
1  TITLE MyFirst Program
2  INCLUDE Irvine32.inc
3  .data
4
5  .code
6
7  main Proc
8      call LocalProc
9      exit
10 main ENDP
11
12 LocalProc PROC
13     LOCAL temp:DWORD
14     mov temp, 5
15     mov eax, temp
16     call WriteDec
17     ret
18 LocalProc ENDP
19 call DumpRegs
20 exit
21 END main
```

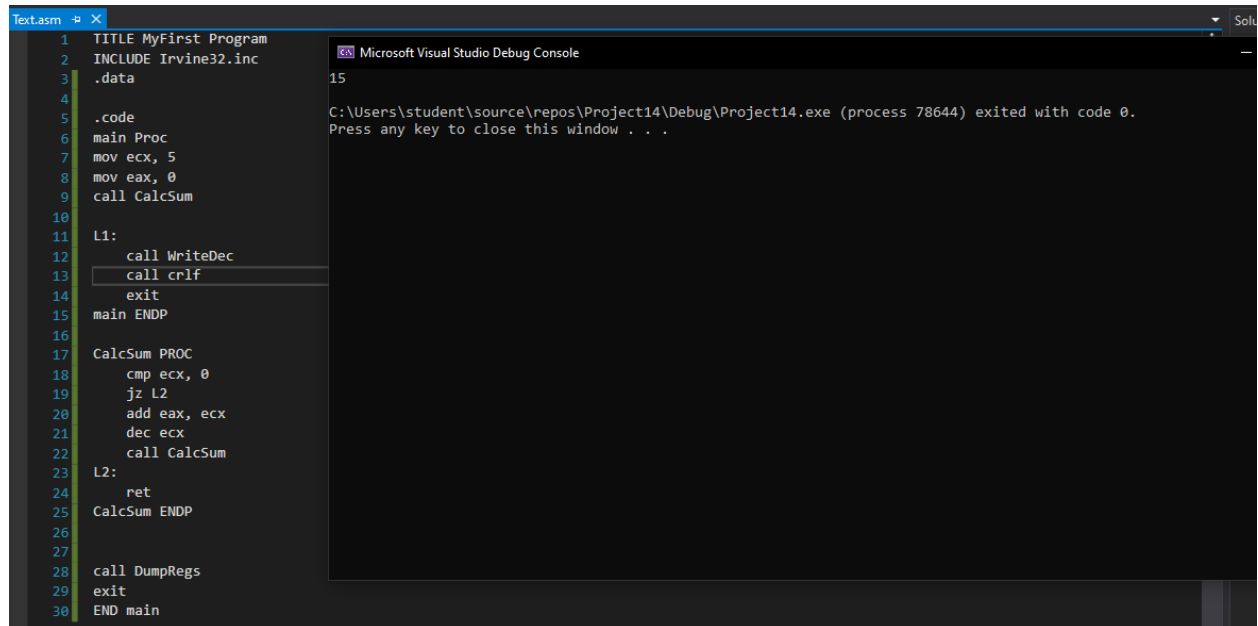
Microsoft Visual Studio Debug Console

5

C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 36768) exited with code 0.

Press any key to close this window . . .

Example 8 with output



The screenshot shows a Visual Studio IDE with two windows. The left window, titled 'Text.asm', contains assembly code for a program named 'MyFirst Program'. The code includes Irvine32.inc, defines a .data section, and a .code section. The main procedure calls CalcSum, which is a recursive function that calculates the sum of numbers from 0 to 5. The main procedure also calls WriteDec to display the result, followed by a newline and exit. The right window, titled 'Microsoft Visual Studio Debug Console', shows the output of the program: the number 15, followed by a message indicating the program exited with code 0 and a prompt to press any key to close the window.

```
1 TITLE MyFirst Program
2 INCLUDE Irvine32.inc
3 .data
4
5 .code
6 main Proc
7     mov ecx, 5
8     mov eax, 0
9     call CalcSum
10
11 L1:
12     call WriteDec
13     call crlf
14     exit
15 main ENDP
16
17 CalcSum PROC
18     cmp ecx, 0
19     jz L2
20     add eax, ecx
21     dec ecx
22     call CalcSum
23 L2:
24     ret
25 CalcSum ENDP
26
27 call DumpRegs
28 exit
29 END main
```

Microsoft Visual Studio Debug Console

15

C:\Users\student\source\repos\Project14\Debug\Project14.exe (process 78644) exited with code 0.
Press any key to close this window . . .