

HWS

1.

| Variable | Address | Data |
|----------|------------|------|
| Cat | 0x0065A200 | C7h |
| Dog | 0x0065A201 | 34h |
| Dog | 0x0065A202 | 12h |
| Cat | 0x0065A203 | E1h |
| Cat | 0x0065A204 | D1h |
| Cat | 0x0065A205 | C1h |
| Cat | 0x0065A206 | A1h |
| Cat | 0x0065A207 | 22h |
| Cat | 0x0065A208 | 00h |
| Cat | 0x0065A209 | 00h |
| Cat | 0x0065A20A | 00h |

File Edit View Project Build Debug Test Analyze Tools ... Project
Extensions Window Help

Debug Win32 Continue Live Share

Process: [9952] Project.exe Lifecycle Events

Registers

```
EAX = 00001C2F EBX = 00243000 ECX = 00401005 EDX = 00401005 ESI = 00401005 EDI = 00401005  
EIP = 00401015 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0
```

Moves.asm

```
5  
6 TITLE Addressing Modes  
7 INCLUDE Irvine32.inc  
8 .data  
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax          ≤ 1ms elapsed  
17     mov edi, OFFSET beta  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha
```

No issues found

Autos

Search (Ctrl+E) Search Depth: 3

| Name | Value | Type |
|------|-------|------|
|------|-------|------|

Call Stack

| Name | Lang |
|--|-------|
| Project.exe!main() Line 16 | Un... |
| [External Code] | |
| ntdll.dll![Frames below may be incorrect and/or missin...] | Un... |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

File Edit View Project Build Debug Test Analyze Tools ... Project
Extensions Window Help

Process: [9952] Project.exe

Registers

```
EAX = 00001C2F EBX = 00243000 ECX = 00001C2F EDX = 00401005 ESI = 00401005 EDI = 00401005  
EIP = 00401017 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0
```

100 %

Moves.asm

```
5  
6 TITLE Addressing Modes  
7 INCLUDE Irvine32.inc  
8 .data  
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta    ⏵ 1ms elapsed  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha
```

No issues found

Ln: 17 Ch: 1 TABS CRLF

Autos

| Name | Value | Type |
|------|-------|------|
|------|-------|------|

Call Stack

| Name | Lang |
|---|-------|
| Project.exe!main() Line 17 [External Code] | Un... |
| ntdll.dll![Frames below may be incorrect and/or missin... Un... | Un... |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control

100% 3:08 PM 2/17/2020

Solution Explorer Team Explorer

Screenshot of Microsoft Visual Studio 2019 showing assembly code execution.

Registers

```
EAX = 00001C2F EBX = 00243000 ECX = 00001C2F EDX = 00401005 ESI = 00401005 EDI = 00404008  
EIP = 0040101C ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0  
  
0x00404010 = C58BAABB
```

Moves.asm

```
5  
6 TITLE Addressing Modes  
7 INCLUDE Irvine32.inc  
8 .data  
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov[gamma], eax      ≤ 1ms elapsed  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha
```

Call Stack

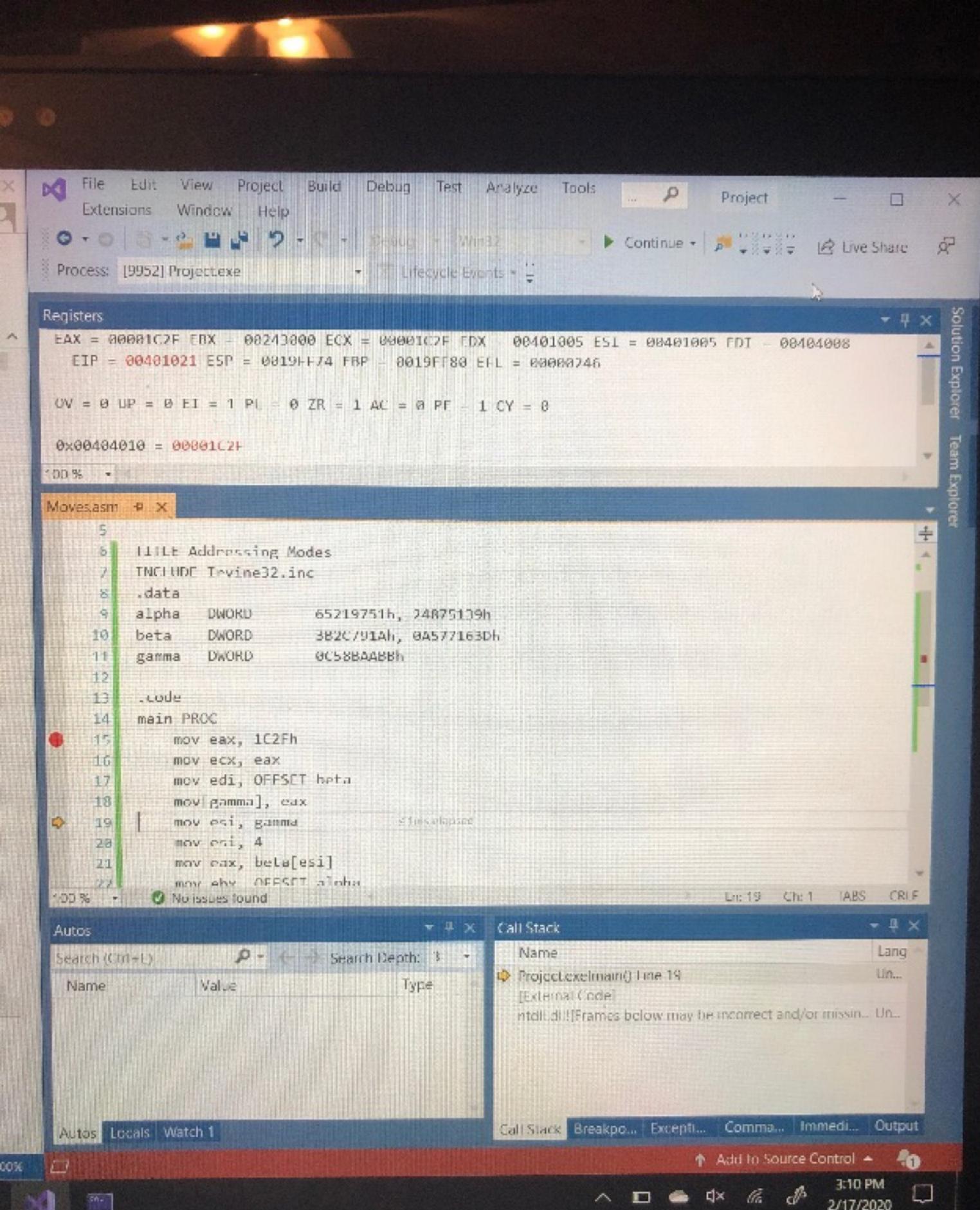
| Name | Lang |
|---|-------|
| Project.exe!main() Line 18 | Un... |
| [External Code] | |
| ntdll.dll![Frames below may be incorrect and/or missin... Un... | |

Autos

| Name | Type |
|------|------|
| | |

Search (Ctrl+E) Search Depth: 3

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File Edit View Project Build Debug Test Analyze Tools ... Project

Extensions Window Help

Debug Win32 Continue Live Share

Process: [9952] Project.exe Lifecycle Events

Registers

```
EAX = 00001C2F EBX = 00243000 ECX = 00001C2F EDX = 00401005 ESI = 00001C2F EDI = 00404008  
EIP = 00401027 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0
```

Solution Explorer Team Explorer

Moves.asm

```
5  
6 TITLE Addressing Modes  
7 INCLUDE Irvine32.inc  
8 .data  
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4           ; 1ms elapsed  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha
```

No issues found

Autos

| Name | Value | Type |
|------|-------|------|
| | | |

Call Stack

| Name | Lang |
|---|-------|
| Project.exe!main() Line 20 [External Code] | Un... |
| ntdll.dll![Frames below may be incorrect and/or missin... Un... | Un... |

Locals Watch 1

Add to Source Control 3:10 PM 2/17/2020

DELL

DELL

File Edit View Project Build Debug Test Analyze Tools Project Process: [9952] Project.exe Lifecycle Events

Registers

```
|EAX = 00001C2F EBX = 00243000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00404008  
EIP = 0040102C ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0  
  
0x0040400C = A577163D
```

Solution Explorer Team Explorer

Moves.asm

```
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]    ⏵ 1ms elapsed  
22     mov ebx, OFFSET alpha  
23     mov eax, [ebx]  
24     mov eax, 4[ebx]  
25     mov eax, 4[ebx][esi]  
26 exit
```

No issues found

Call Stack

```
Name  
Project.exe!main() Line 21  
[External Code]  
ntdll.dll![Frames below may be incorrect and/or missin... Un...
```

Autos

| Name | Value | Type |
|------|-------|------|
|------|-------|------|

Locals

Watch 1

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control

3:11 PM 2/17/2020

File Edit View Project Build Debug Test Analyze Tools ... Project

Extensions Window Help

Debug Win32 Continue Live Share

Process: [9952] Project.exe Lifecycle Events

Registers

EAX = A577163D EBX = 00243000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00404008
EIP = 00401032 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246

OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0

100 %

Moves.asm

```
9 alpha    DWORD      65219751h, 24875139h
10 beta     DWORD      3B2C791Ah, 0A577163Dh
11 gamma    DWORD      0C58BAABBh
12
13 .code
14 main PROC
15     mov eax, 1C2Fh
16     mov ecx, eax
17     mov edi, OFFSET beta
18     mov[gamma], eax
19     mov esi, gamma
20     mov esi, 4
21     mov eax, beta[esi]
22     mov ebx, OFFSET alpha      ≤ 1ms elapsed
23     mov eax, [ebx]
24     mov eax, 4[ebx]
25     mov eax, 4[ebx][esi]
26 exit
```

No issues found

Call Stack

| Name | Lang |
|---|-------|
| Project.exe!main() Line 22 | Un... |
| [External Code] | |
| ntdll.dll![Frames below may be incorrect and/or missin... Un... | |

Autos

Search (Ctrl+E) Search Depth: 3

| Name | Type |
|------|------|
| | |

Locals Watch 1

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control

3:11 PM 2/17/2020

Solution Explorer Team Explorer

Solution Explorer Team Explorer

Registers

EAX = A577163D EBX = 00404000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00404008
EIP = 00401037 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246

OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0

0x00404000 = 65219751

100 %

Moves.asm

```
9 alpha    DWORD      65219751h, 24875139h
10 beta     DWORD      3B2C791Ah, 0A577163Dh
11 gamma    DWORD      0C58BAABBh
12
13 .code
14 main PROC
15     mov eax, 1C2Fh
16     mov ecx, eax
17     mov edi, OFFSET beta
18     mov[gamma], eax
19     mov esi, gamma
20     mov esi, 4
21     mov eax, beta[esi]
22     mov ebx, OFFSET alpha
23     mov eax, [ebx]           ≤ 1ms elapsed
24     mov eax, 4[ebx]
25     mov eax, 4[ebx][esi]
26     exit
Ln: 23 Ch: 1 TABS CRLF
```

100 % No issues found

Autos

| Name | Value | Type |
|------|-------|------|
|------|-------|------|

Call Stack

| Name | Lang |
|---|-------|
| Project.exe!main() Line 23 | Un... |
| [External Code] | |
| ntdll.dll![Frames below may be incorrect and/or missin... Un... | |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

100% Add to Source Control 3:12 PM 2/17/2020

File Edit View Project Build Debug Test Analyze Tools ... Project

Extensions Window Help

Process: [9952] Project.exe

Registers

```
EAX = 65219751 EBX = 00404000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00404008  
EIP = 00401039 ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246  
  
OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0  
  
0x00404004 = 24875139
```

Solution Explorer Team Explorer

Moves.asm

```
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
.code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha  
23     mov eax, [ebx]  
24     mov eax, 4[ebx]           ≤ 1ms elapsed  
25     mov eax, 4[ebx][esi]  
26 exit  
Ln: 24 Ch: 1 TABS CRLF
```

No issues found

Autos

| Name | Value | Type |
|---------------------------------------|-------|------|
| Search (Ctrl+E) ↗ ← → Search Depth: 3 | | |

Call Stack

| Name | Lang |
|--|-------|
| Project.exemain() Line 24 | Un... |
| [External Code] | Un... |
| ntdll.dll![Frames below may be incorrect and/or missin...] | Un... |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control ↑ 3:12 PM 2/17/2020

File Edit View Project Build Debug Test Analyze Tools ... Project

Extensions Window Help

Process: [9952] Project.exe

Registers

```
EAX = 24875139 EBX = 00404000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00404008  
EIP = 0040103C ESP = 0019FF74 EBP = 0019FF80 EFL = 00000246
```

OV = 0 UP = 0 EI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0

0x00404008 = 3B2C791A

100 %

Moves.asm

```
9 alpha DWORD 65219751h, 24875139h  
10 beta DWORD 3B2C791Ah, 0A577163Dh  
11 gamma DWORD 0C58BAABBh  
12  
.code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov[gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha  
23     mov eax, [ebx]  
24     mov eax, 4[ebx]  
25     mov eax, 4[ebx][esi]    ≤ 1ms elapsed  
26  
exit  
No issues found
```

Ln: 25 Ch: 1 TABS CRLF

Autos

| Name | Type |
|------|------|
| | |

Call Stack

| Name | Lang |
|--|-------|
| Project.exemain() Line 25 | Un... |
| [External Code] | |
| ntdll.dll!Frames below may be incorrect and/or missin... | Un... |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control ↑ 3:12 PM 2/17/2020

Solution Explorer Team Explorer

File Edit View Project Build Debug Test Analyze Tools ... Project

Extensions Window Help

Debug - Win32 Continue Live Share

Process: [9952] Project.exe Lifecycle Events

Registers

```
EAX = 3B2C791A EBX = 00404000 ECX = 00001C2F EDX = 00401005 ESI = 00000004 EDI = 00101008  
ESP = 00401040 EBP = 00101074 EFL = 00000246  
  
OV = 0 UP = 0 FI = 1 PL = 0 ZR = 1 AC = 0 PE = 1 CY = 0
```

100 %

Moves.asm

```
9 alpha DWORD 652197511, 24675129h  
10 beta DWORD 3B2C791Ah, 845771640h  
11 gamma DWORD 0C58BAABBh  
12  
13 .code  
14 main PROC  
15     mov eax, 1C2Fh  
16     mov ecx, eax  
17     mov edi, OFFSET beta  
18     mov [gamma], eax  
19     mov esi, gamma  
20     mov esi, 4  
21     mov eax, beta[esi]  
22     mov ebx, OFFSET alpha  
23     mov eax, [ebx]  
24     mov eax, 4[ebx]  
25     mov eax, 4[ebx][esi]  
26 exit 0h  
100 % No issues found
```

Ln: 26 Ch: 1 TABS CRLF

Autos

Search (Ctrl+E) Search Depth: 3

| Name | Type |
|------|------|
| | |

Call Stack

| Name | Lang |
|--|-------|
| Project.exe!main() Line 26 [External Code] | Un... |
| ntdll.dll!Frames below may be incorrect and/or missin... | Un... |

Call Stack Breakpo... Excepti... Comma... Immedi... Output

Add to Source Control 3:13 PM 2/17/2020

| Variable | Address | Data |
|----------|------------|------|
| Cat | 0x0065A200 | C7h |
| Dog | 0x0065A201 | 34h |
| Dog | 0x0065A202 | 12h |
| Cat | 0x0065A203 | E1h |
| Cat | 0x0065A204 | D1h |
| Cat | 0x0065A205 | C1h |
| Cat | 0x0065A206 | A1h |
| Cat | 0x0065A207 | 22h |
| Cat | 0x0065A208 | 00h |
| Cat | 0x0065A209 | 00h |
| Cat | 0x0065A20A | 00h |

2. mov edi, offset beta ; 0x00404010 = C59BAAB3
 mov [gamma], eax ; 0x00404010 = 00001CAF
 MOV esi, 4 ; 0x0040400C = A577163D
 mov ebx, offset alpha ; 0x00404000 = 65219751
 mov eax, [ebx] ; 0x00404004 = 34875139
 mov eax, 4[ebx] ; 0x00404008 = 3B27C791A

The screenshot shows the Microsoft Visual Studio IDE interface. The main window displays an assembly language file named 'Moves.asm'. The code implements a program that adds three arrays (Array1, Array2, and Array3) element-wise and prints the result. The arrays are defined in the .data section, and the addition logic is implemented in the .code section using the AX register.

```
.386
.model flat,stdcall
.stack 4096
ExitProcess PROTO, dwExitCode:dword

;TITLE Addressing Modes
INCLUDE Irvine32.inc

.data
Array1 WORD 0001h, 0002h, 0003h, 0004h, 0005h, 0006h, 0007h, 0008h, 0009h, 000Ah
Array2 WORD 0005h, 0006h, 0004h, 0007h, 0003h, 0008h, 0002h, 0008h, 0001h, 000Ah
Array3 WORD 10 DUP (?)

.code
main PROC
    mov eax, 0

    mov ax, Array1+2
    add ax, Array2+2
    mov Array3, ax
    call WriteHex
    call Crlf

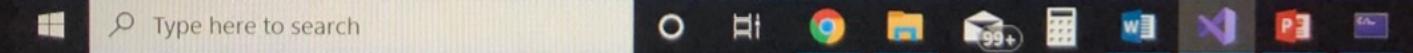
    mov ax, Array1+6
    add ax, Array2+6
    mov Array3, ax
    call WriteHex
    call Crlf

    mov ax, Array1+10
    add ax, Array2+10
    mov Array3, ax
    call WriteHex
    call Crlf

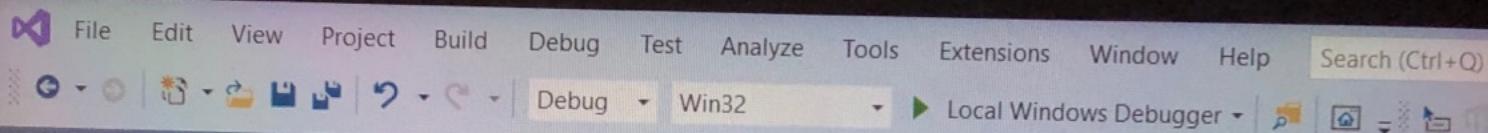
    mov ax, Array1+14
    add ax, Array2+14
    mov Array3, ax
    call WriteHex

    exit
main ENDP

```



DELL



Moves.asm

```
16      mov ax, Array1+2
17      add ax, Array2+2
18      mov Array3, ax
19      call WriteHex
20      call Crlf
21
22
23      mov ax, Array1+6
24      add ax, Array2+6
25      mov Array3, ax
26      call WriteHex
27      call Crlf
28
29      mov ax, Array1+10
30      add ax, Array2+10
31      mov Array3, ax
32      call WriteHex
33      call Crlf
34
35      mov ax, Array1+14
36      add ax, Array2+14
37      mov Array3, ax
38      call WriteHex
39      call Crlf
40
41      mov ax, Array1+18
42      add ax, Array2+18
43      mov Array3, ax
44      call WriteHex
45      call Crlf
46
47      exit
48  main ENDP
49 END main
```

100 %

No issues found

Error List

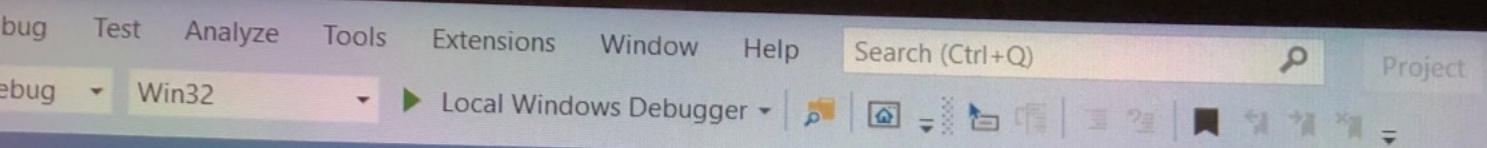
Output

Ready



Type here to search





Microsoft Visual Studio Debug Console

```
00000008  
0000000B  
0000000E  
00000010  
00000014
```

```
C:\Irvine\Project32_VS2017\Project32_VS2017\Debug\Project.exe (process 14988) ex  
To automatically close the console when debugging stops, enable Tools->Options->  
le when debugging stops.
```

```
Press any key to close this window . . .
```



```
3 .stack 4096
4 ExitProcess PROTO, dwExitCode:dword
5
6 ;TITLE Addressing Modes
7 INCLUDE Irvine32.inc
8 .data
9
10 .code
11 main PROC
12     call ReadInt
13     mov ecx, eax
14     mov eax, 0
15     mov ebx, 0
16
17 L1:
18     add ebx, 2
19     add eax, ebx
20     loop L1
21
22     call WriteInt
23     call C-1t
24
25     exit
26 main ENDP
27 END main
```

Microsoft Visual Studio Debug Console

7
+56

```
C:\Irvine\Project32_VS2017\Project32_VS2017\Debug\Project32_VS2017.exe
To automatically close the console when debugging stops, enable
Press any key to close this window . . .
```

Printed On

Output

```
Show output from: Debug  
'Project.exe' (Win32): Loaded 'C:\Windows\System32\kernel32.dll'  
'Project.exe' (Win32): Loaded 'C:\Windows\System32\user32.dll'  
The thread 0x4498 has exited with code 0 (0x0).  
The thread 0x3694 has exited with code 0 (0x0).  
The thread 0x3908 has exited with code 0 (0x0).  
The program '[13108] Project.exe' has exited with code 0 (0x0).
```

