Department of Computer Science
Faculty of Computing
UNIVERSITI TEKNOLOGI MALAYSIA

SUBJECT NAME: COMPUTER ORGANISATION AND ARCHITECTURE

SUBJECT CODE: SECR2033

SEMESTER: 2-2020/2021

LAB TITLE: PROGRAMMING 1: ASSEMBLY LANGUAGE FUNDAMENTALS

STUDENTS INFO:

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SECTION: **01**

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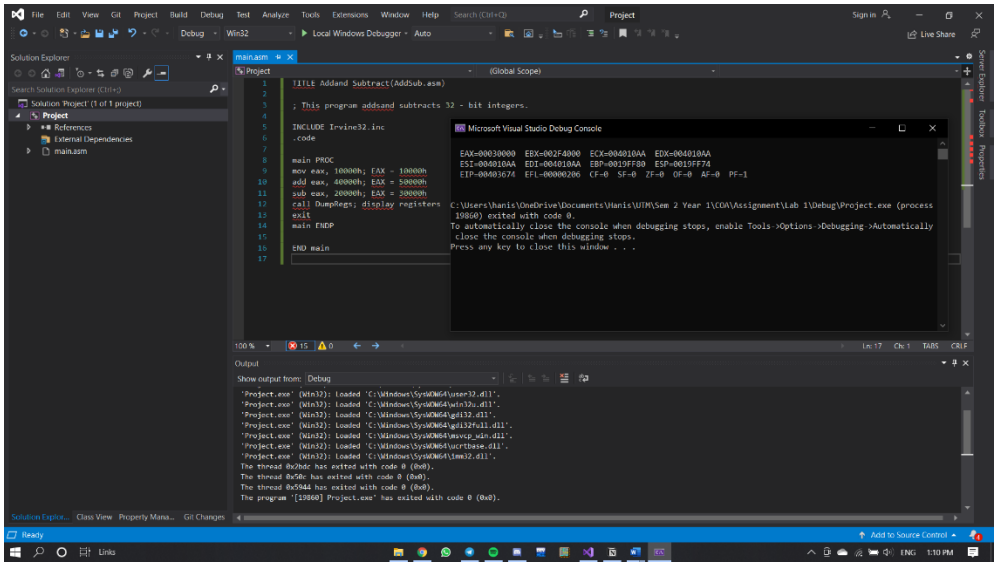
SUBMITTED DATE: 11 APRIL 2021

COMMENTS:

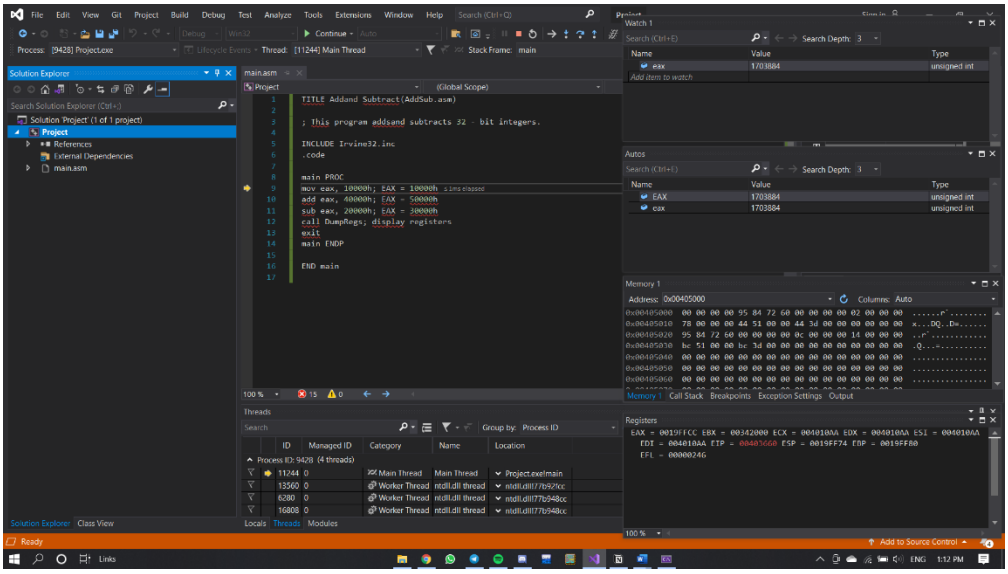
Lab 1 Submission

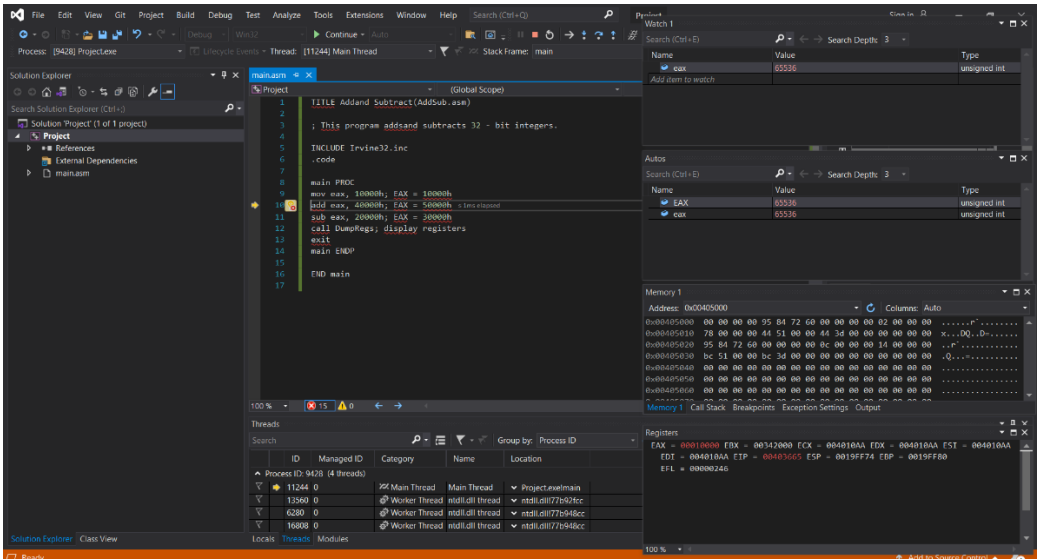
Part A

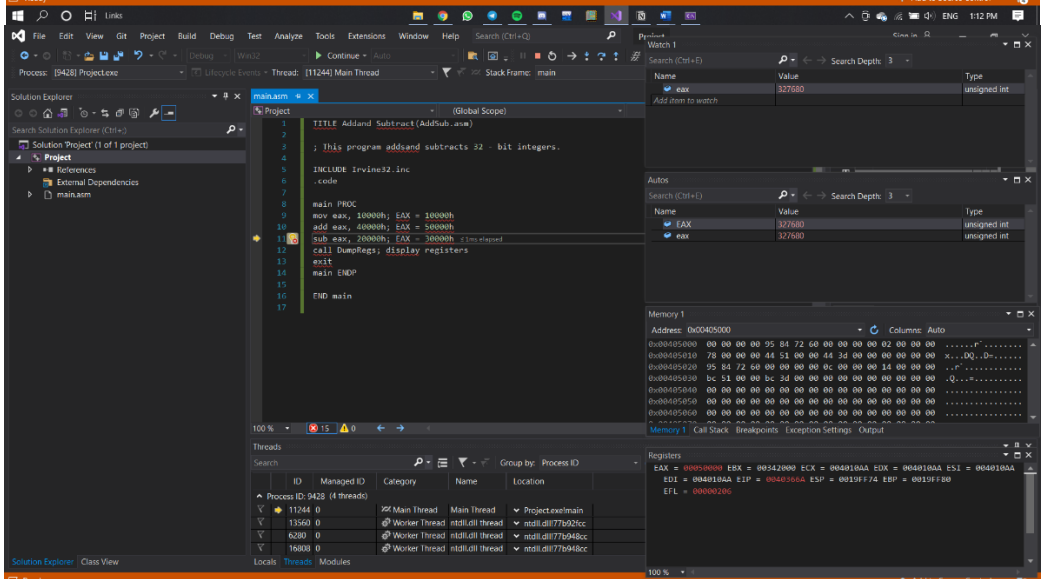
1. The output from dos prompt

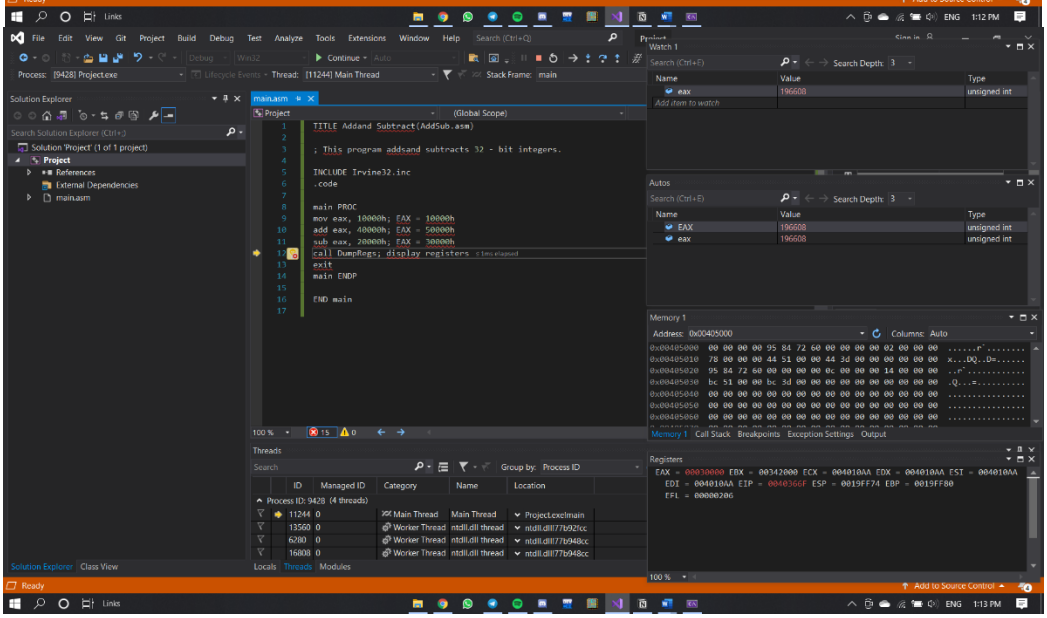


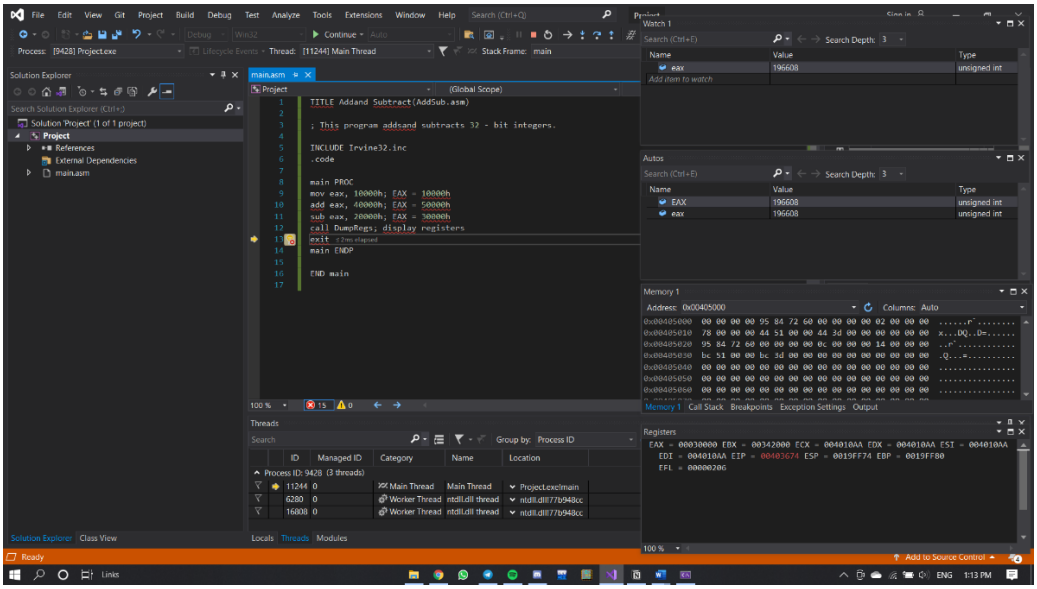
2. The 4 windows




TITLE Addand Subtract(AddSub.asm)
; This program addsand subtracts 32 - bit integers.
INCLUDE Irvine32.inc
.code
main PROC
mov eax, 10000h; EAX = 10000h
add eax, 40000h; EAX = 50000h
sub eax, 20000h; EAX = 30000h
call DumpRegs; display registers
exit
main ENDP
END main
EAX = 00010000 EBX = 00342000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 00403665 ESP = 0019FF74 EBP = 0019FF80
EFL = 00000246

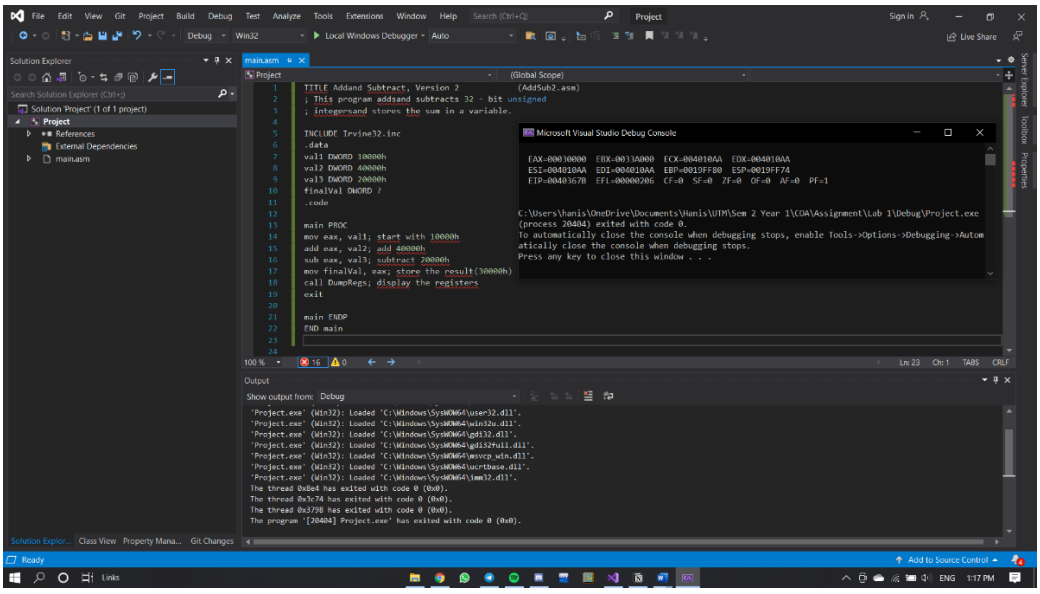

TITLE Addand Subtract(AddSub.asm)
; This program addsand subtracts 32 - bit integers.
INCLUDE Irvine32.inc
.code
main PROC
mov eax, 10000h; EAX = 10000h
add eax, 40000h; EAX = 50000h
sub eax, 20000h; EAX = 30000h
call DumpRegs; display registers
exit
main ENDP
END main
EAX = 00050000 EBX = 00342000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 0040366A ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206


TITLE Addand Subtract(AddSub.asm)
; This program addsand subtracts 32 - bit integers.
INCLUDE Irvine32.inc
.code
main PROC
mov eax, 10000h; EAX = 10000h
add eax, 40000h; EAX = 50000h
sub eax, 20000h; EAX = 30000h
call DumpRegs; display registers
exit
main ENDP
END main
EAX = 00030000 EBX = 00342000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 0040366F ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206

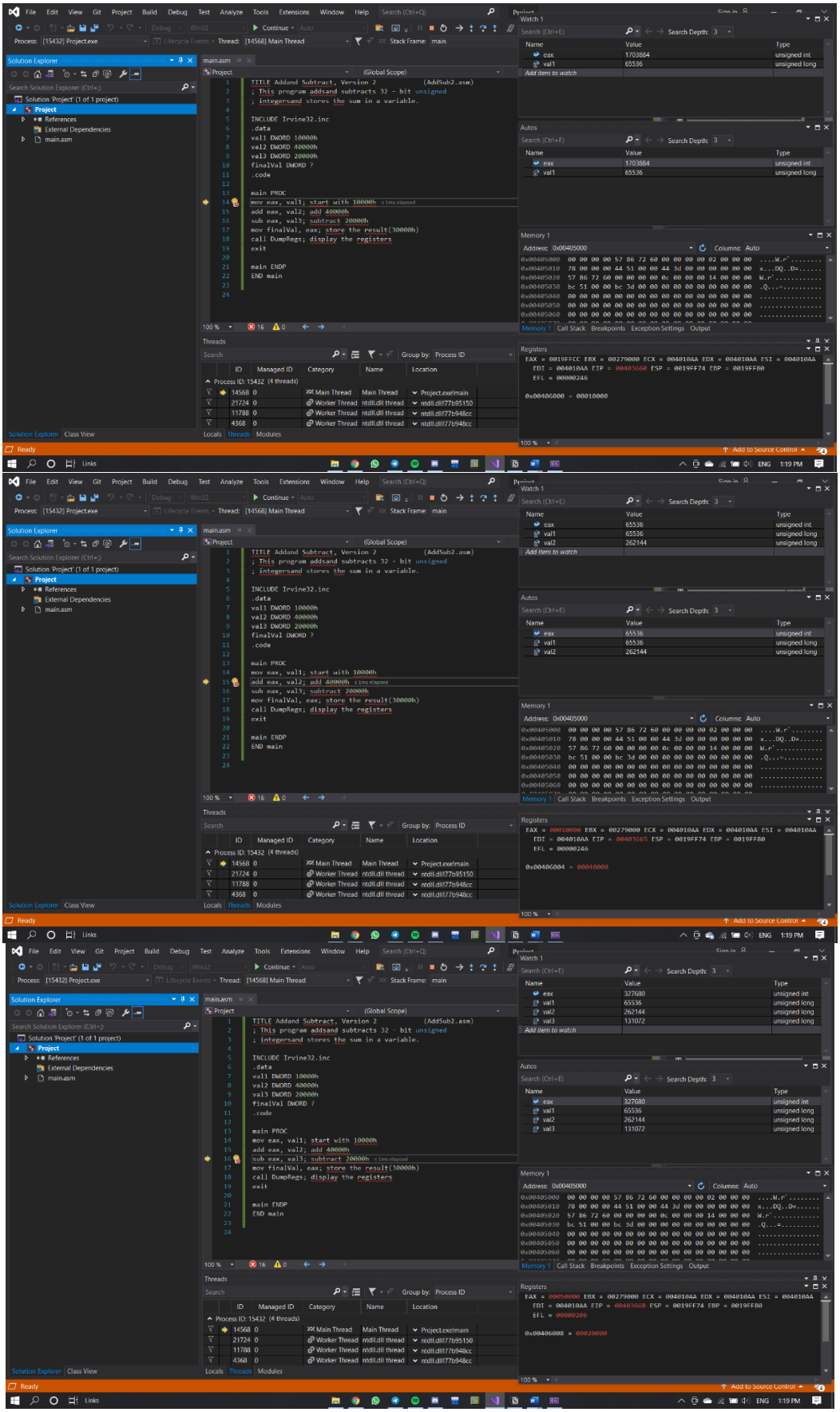


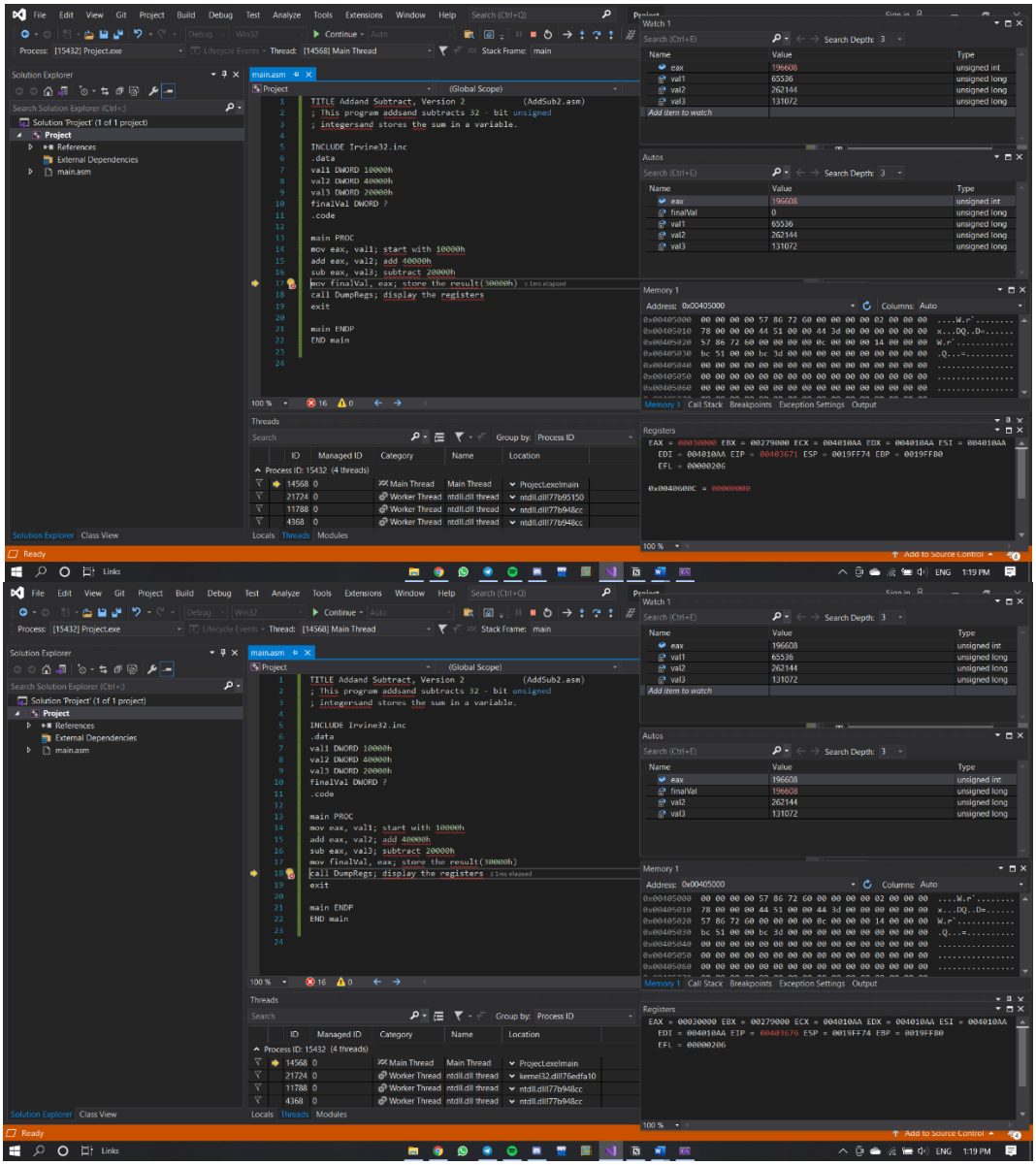
Part B

1. The output from dos prompt



2. The 4 windows





Part C

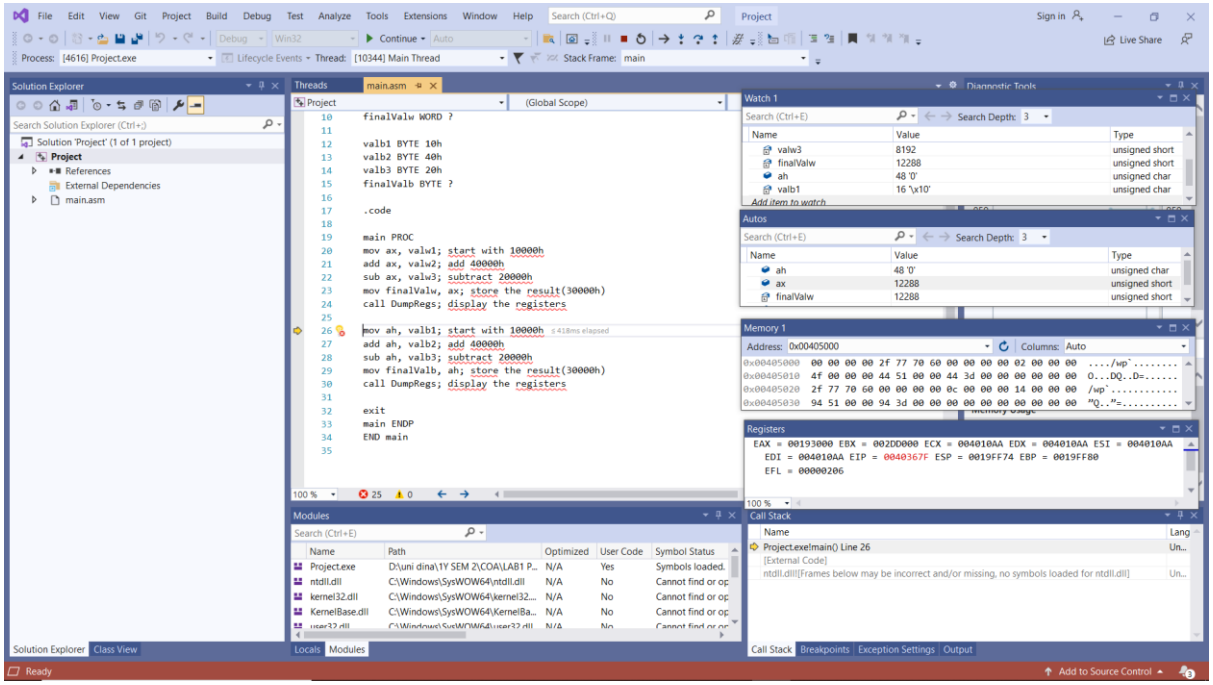
Screen shot for each part

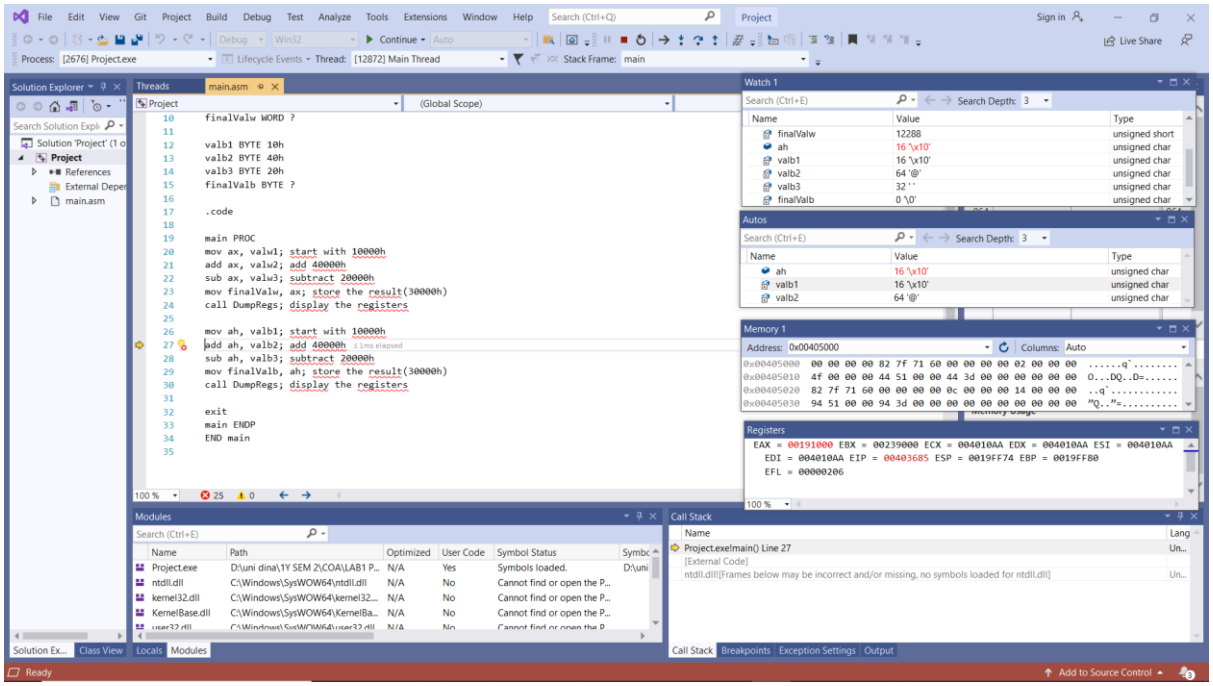
3. The output from dos prompt

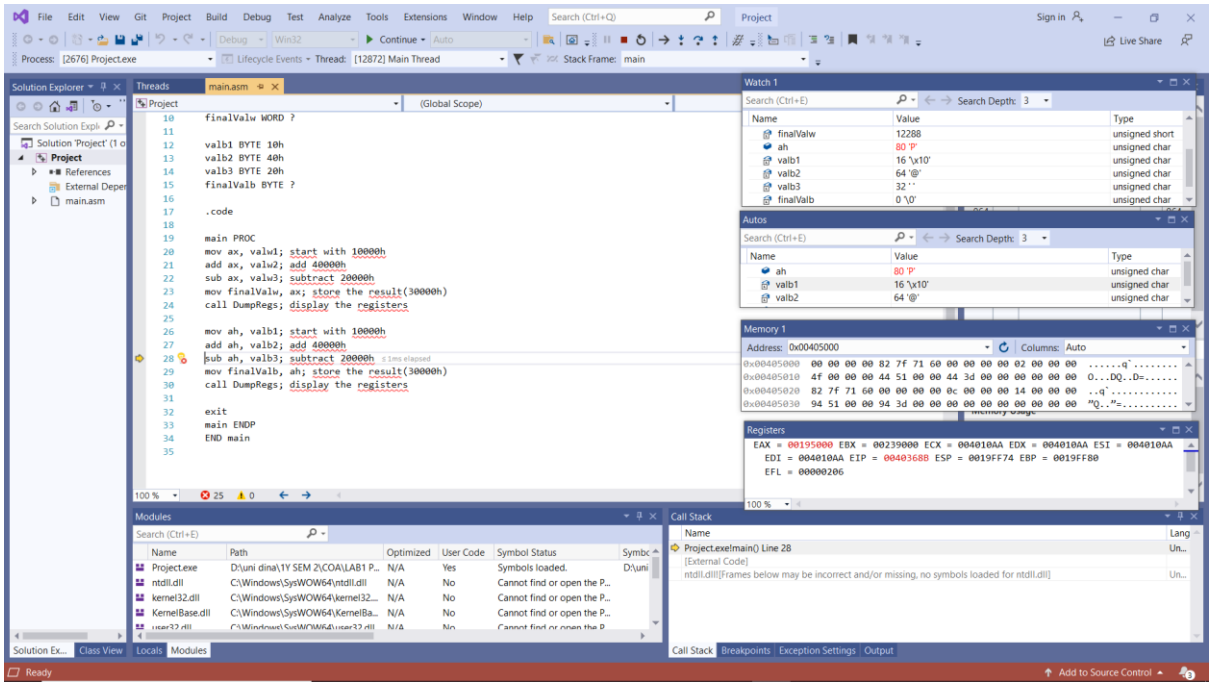
Microsoft Visual Studio Debug Console

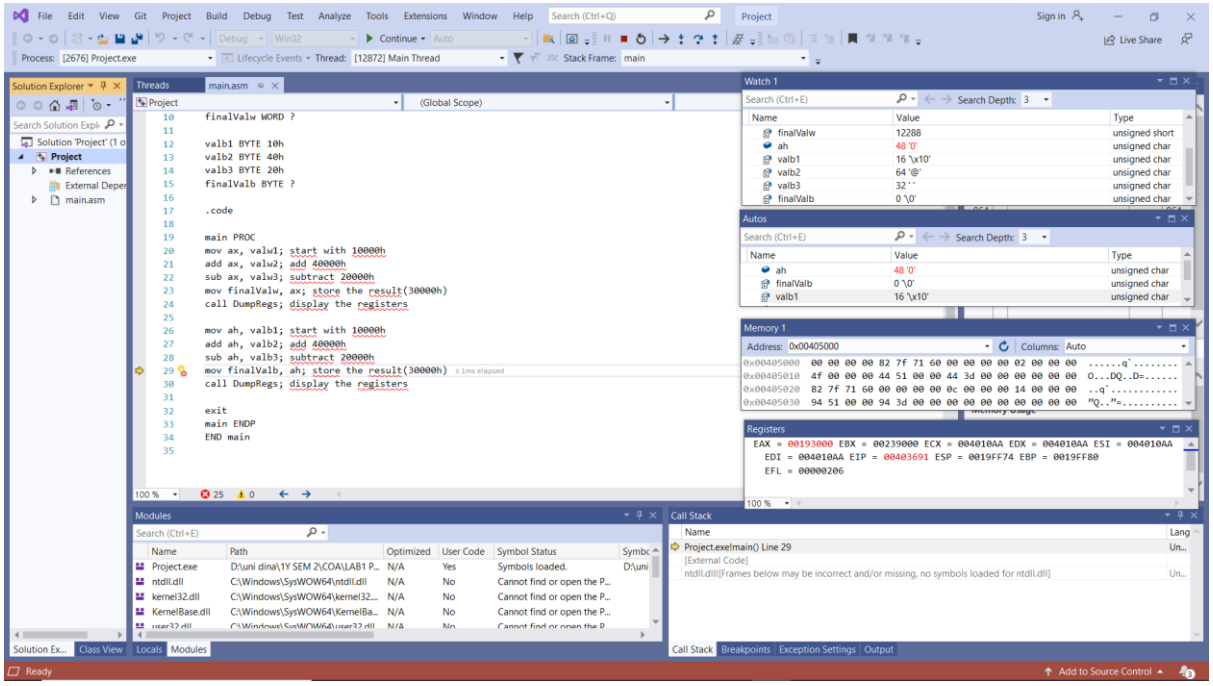
```
EAX=00193000  EBX=003C1000  ECX=004010AA  EDX=004010AA
ESI=004010AA  EDI=004010AA  EBP=0019FF80  ESP=0019FF74
EIP=0040367F  EFL=00000206  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=1


EAX=00193000  EBX=003C1000  ECX=004010AA  EDX=004010AA
ESI=004010AA  EDI=004010AA  EBP=0019FF80  ESP=0019FF74
EIP=0040369C  EFL=00000206  CF=0  SF=0  ZF=0  OF=0  AF=0  PF=1


D:\uni dina\1Y SEM 2\COA\LAB1 PART C\Debug\Project.exe (process 21980) exited with code 0.
Press any key to close this window . . .
```

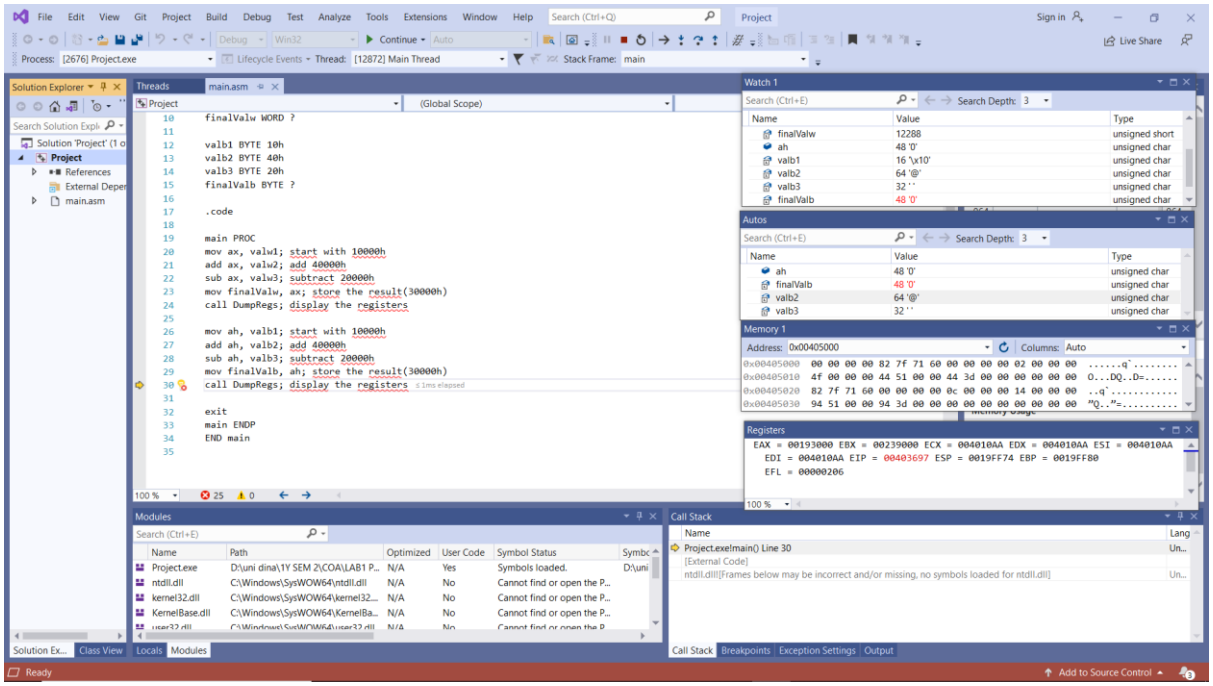
4. The 4 windows






File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search (Ctrl+Q)
Project
Sign in
Live Share
Debug
Win32
Continue
Process: [2676] Project.exe
Lifecycle Events
Thread: [12872] Main Thread
Stack Frame: main
Solution Explorer
Search Solution Explorer
Solution 'Project' (1 project)
Project
References
External Dependencies
main.asm
Threads
main.asm
Project
(Global Scope)
10 finalValw WORD ?
11
12 valb1 BYTE 10h
13 valb2 BYTE 40h
14 valb3 BYTE 20h
15 finalValb BYTE ?
16
17 .code
18
19 main PROC
20 mov ax, valw1; start with 10000h
21 add ax, valw2; add 40000h
22 sub ax, valw3; subtract 20000h
23 mov finalValw, ax; store the result(30000h)
24 call DumpRegs; display the registers
25
26 mov ah, valb1; start with 10000h
27 add ah, valb2; add 40000h
28 sub ah, valb3; subtract 20000h ≤ 1ms elapsed
29 mov finalValb, ah; store the result(30000h)
30 call DumpRegs; display the registers
31
32 exit
33 main ENDP
34 END main
35
100 %
25
0
Watch 1
Search (Ctrl+E)
Search Depth: 3
Name Value Type
finalValw 12288 unsigned short
ah 80 'P' unsigned char
valb1 16 '\x10' unsigned char
valb2 64 '@' unsigned char
valb3 32 ' ' unsigned char
finalValb 0 '\0' unsigned char
Autos
Search (Ctrl+E)
Search Depth: 3
Name Value Type
ah 80 'P' unsigned char
valb1 16 '\x10' unsigned char
valb2 64 '@' unsigned char
Memory 1
Address: 0x00405000
Columns: Auto
0x00405000 00 00 00 00 82 7f 71 60 00 00 00 00 02 00 00 00 ......q`........
0x00405010 4f 00 00 00 44 51 00 00 44 3d 00 00 00 00 00 00 O...DQ..D=......
0x00405020 82 7f 71 60 00 00 00 00 0c 00 00 00 14 00 00 00 ..q`............
0x00405030 94 51 00 00 94 3d 00 00 00 00 00 00 00 00 00 00 "Q..".=..........
Registers
EAX = 00195000 EBX = 00239000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 0040368B ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206
100 %
Modules
Search (Ctrl+E)
Name Path Optimized User Code Symbol Status Symbol
Project.exe D:\uni dina\1Y SEM 2\COA\LAB1 P... N/A Yes Symbols loaded. D:\uni
ntdll.dll C:\Windows\SysWOW64\ntdll.dll N/A No Cannot find or open the P...
kernel32.dll C:\Windows\SysWOW64\kernel32.... N/A No Cannot find or open the P...
KernelBase.dll C:\Windows\SysWOW64\KernelBa... N/A No Cannot find or open the P...
Call Stack
Name Lang
Project.exe!main() Line 28 Un...
[External Code]
ntdll.dll![Frames below may be incorrect and/or missing, no symbols loaded for ntdll.dll] Un...
Solution Ex...
Class View
Locals
Modules
Call Stack
Breakpoints
Exception Settings
Output
Ready
Add to Source Control


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search (Ctrl+Q)
Project
Sign in
Live Share
Debug
Win32
Continue
Process: [2676] Project.exe
Lifecycle Events
Thread: [12872] Main Thread
Stack Frame: main
Solution Explorer
Search Solution Explorer
Solution 'Project' (1 project)
Project
References
External Dependencies
main.asm
Threads
main.asm
Project
(Global Scope)
10 finalValw WORD ?
11
12 valb1 BYTE 10h
13 valb2 BYTE 40h
14 valb3 BYTE 20h
15 finalValb BYTE ?
16
17 .code
18
19 main PROC
20 mov ax, valw1; start with 10000h
21 add ax, valw2; add 40000h
22 sub ax, valw3; subtract 20000h
23 mov finalValw, ax; store the result(30000h)
24 call DumpRegs; display the registers
25
26 mov ah, valb1; start with 10000h
27 add ah, valb2; add 40000h
28 sub ah, valb3; subtract 20000h
29 mov finalValb, ah; store the result(30000h) ≤ 1ms elapsed
30 call DumpRegs; display the registers
31
32 exit
33 main ENDP
34 END main
35
100 %
25
0
Watch 1
Search (Ctrl+E)
Search Depth: 3
Name Value Type
finalValw 12288 unsigned short
ah 48 '0' unsigned char
valb1 16 '\x10' unsigned char
valb2 64 '@' unsigned char
valb3 32 ' ' unsigned char
finalValb 0 '\0' unsigned char
Autos
Search (Ctrl+E)
Search Depth: 3
Name Value Type
ah 48 '0' unsigned char
finalValb 0 '\0' unsigned char
valb1 16 '\x10' unsigned char
Memory 1
Address: 0x00405000
Columns: Auto
0x00405000 00 00 00 00 82 7f 71 60 00 00 00 00 02 00 00 00 ......q`........
0x00405010 4f 00 00 00 44 51 00 00 44 3d 00 00 00 00 00 00 O...DQ..D=......
0x00405020 82 7f 71 60 00 00 00 00 0c 00 00 00 14 00 00 00 ..q`............
0x00405030 94 51 00 00 94 3d 00 00 00 00 00 00 00 00 00 00 "Q..".=..........
Registers
EAX = 00193000 EBX = 00239000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 00403691 ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206
100 %
Modules
Search (Ctrl+E)
Name Path Optimized User Code Symbol Status Symbol
Project.exe D:\uni dina\1Y SEM 2\COA\LAB1 P... N/A Yes Symbols loaded. D:\uni
ntdll.dll C:\Windows\SysWOW64\ntdll.dll N/A No Cannot find or open the P...
kernel32.dll C:\Windows\SysWOW64\kernel32.... N/A No Cannot find or open the P...
KernelBase.dll C:\Windows\SysWOW64\KernelBa... N/A No Cannot find or open the P...
Call Stack
Name Lang
Project.exe!main() Line 29 Un...
[External Code]
ntdll.dll![Frames below may be incorrect and/or missing, no symbols loaded for ntdll.dll] Un...
Solution Ex...
Class View
Locals
Modules
Call Stack
Breakpoints
Exception Settings
Output
Ready
Add to Source Control


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
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Continue
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Process: [2676] Project.exe
Lifecycle Events
Thread: [12872] Main Thread
Stack Frame: main
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Search Solution Explorer
Solution 'Project' (1 of 1 project)
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main.asm
Threads
main.asm
Project
(Global Scope)
10 finalValw WORD ?
11
12 valb1 BYTE 10h
13 valb2 BYTE 40h
14 valb3 BYTE 20h
15 finalValb BYTE ?
16
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18
19 main PROC
20 mov ax, valw1; start with 10000h
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22 sub ax, valw3; subtract 20000h
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24 call DumpRegs; display the registers
25
26 mov ah, valb1; start with 10000h
27 add ah, valb2; add 40000h
28 sub ah, valb3; subtract 20000h
29 mov finalValb, ah; store the result(30000h)
30 call DumpRegs; display the registers ≤ 1ms elapsed
31
32 exit
33 main ENDP
34 END main
35
100 %
25
0
Watch 1
Search (Ctrl+E)
Search Depth: 3
Name Value Type
finalValw 12288 unsigned short
ah 48 '0' unsigned char
valb1 16 '\x10' unsigned char
valb2 64 '@' unsigned char
valb3 32 ' ' unsigned char
finalValb 48 '0' unsigned char
Autos
Search (Ctrl+E)
Search Depth: 3
Name Value Type
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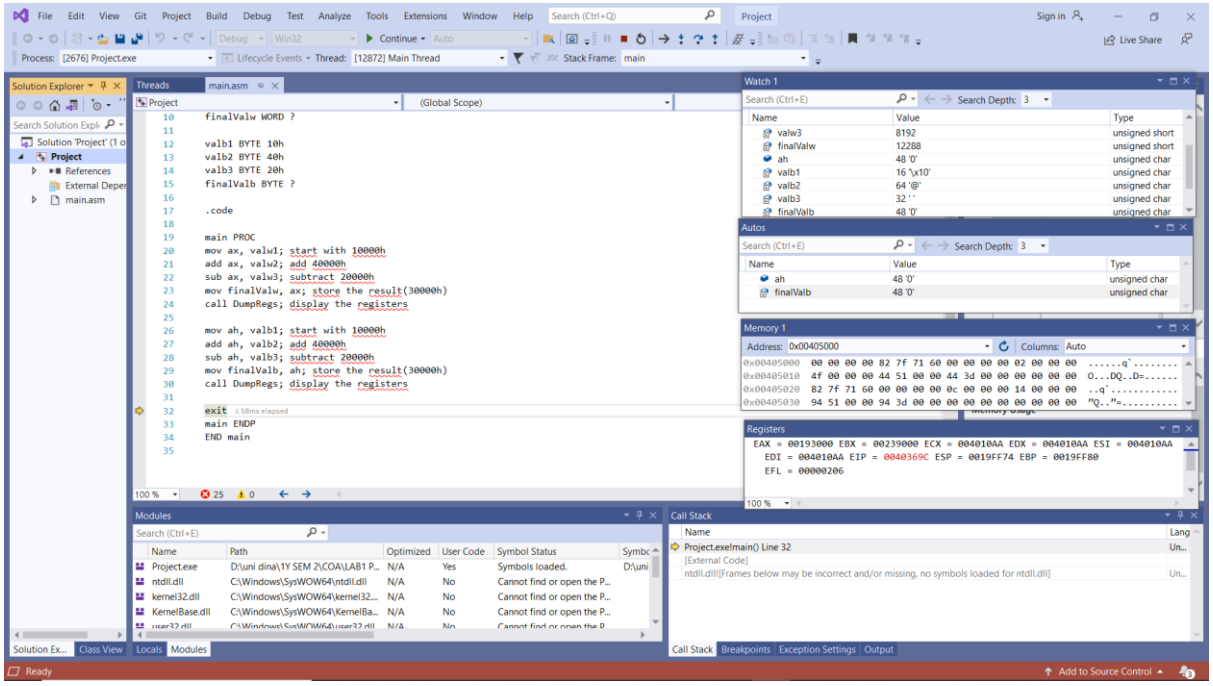
finalValb 48 '0' unsigned char
valb2 64 '@' unsigned char
valb3 32 ' ' unsigned char
Memory 1
Address: 0x00405000
Columns: Auto
0x00405000 00 00 00 00 82 7f 71 60 00 00 00 00 02 00 00 00 ......q`........
0x00405010 4f 00 00 00 44 51 00 00 44 3d 00 00 00 00 00 00 O...DQ..D=......
0x00405020 82 7f 71 60 00 00 00 00 0c 00 00 00 14 00 00 00 ..q`............
0x00405030 94 51 00 00 94 3d 00 00 00 00 00 00 00 00 00 00 "Q..".=..........
Registers
EAX = 00193000 EBX = 00239000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 00403697 ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206
100 %
Modules
Search (Ctrl+E)
Name Path Optimized User Code Symbol Status Symbc
Project.exe D:\uni dina\1Y SEM 2\COA\LAB1 P... N/A Yes Symbols loaded. D:\uni
ntdll.dll C:\Windows\SysWOW64\ntdll.dll N/A No Cannot find or open the P...
kernel32.dll C:\Windows\SysWOW64\kernel32.... N/A No Cannot find or open the P...
KernelBase.dll C:\Windows\SysWOW64\KernelBa... N/A No Cannot find or open the P...
Call Stack
Name Lang
Project.exe!main() Line 30 Un...
[External Code]
ntdll.dll![Frames below may be incorrect and/or missing, no symbols loaded for ntdll.dll] Un...
Solution Ex...
Class View
Locals
Modules
Call Stack
Breakpoints
Exception Settings
Output
Ready
Add to Source Control


File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search (Ctrl+Q)
Project
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Process: [2676] Project.exe
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Thread: [12872] Main Thread
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Search Solution Explorer
Solution 'Project' (1 of 1 project)
Project
References
External Dependencies
main.asm
Threads
main.asm
Project
(Global Scope)
10 finalValw WORD ?
11
12 valb1 BYTE 10h
13 valb2 BYTE 40h
14 valb3 BYTE 20h
15 finalValb BYTE ?
16
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18
19 main PROC
20 mov ax, valw1; start with 10000h
21 add ax, valw2; add 40000h
22 sub ax, valw3; subtract 20000h
23 mov finalValw, ax; store the result(30000h)
24 call DumpRegs; display the registers
25
26 mov ah, valb1; start with 10000h
27 add ah, valb2; add 40000h
28 sub ah, valb3; subtract 20000h
29 mov finalValb, ah; store the result(30000h)
30 call DumpRegs; display the registers
31
32 exit ≤ 58ms elapsed
33 main ENDP
34 END main
35
100 %
25
0
Watch 1
Search (Ctrl+E)
Search Depth: 3
Name Value Type
valw3 8192 unsigned short
finalValw 12288 unsigned short
ah 48 '0' unsigned char
valb1 16 '\x10' unsigned char
valb2 64 '@' unsigned char
valb3 32 ' ' unsigned char
finalValb 48 '0' unsigned char
Autos
Search (Ctrl+E)
Search Depth: 3
Name Value Type
ah 48 '0' unsigned char
finalValb 48 '0' unsigned char
Memory 1
Address: 0x00405000
Columns: Auto
0x00405000 00 00 00 00 82 7f 71 60 00 00 00 00 02 00 00 00 ......q`........
0x00405010 4f 00 00 00 44 51 00 00 44 3d 00 00 00 00 00 00 O...DQ..D=......
0x00405020 82 7f 71 60 00 00 00 00 0c 00 00 00 14 00 00 00 ..q`............
0x00405030 94 51 00 00 94 3d 00 00 00 00 00 00 00 00 00 00 "Q..".=..........
Registers
EAX = 00193000 EBX = 00239000 ECX = 004010AA EDX = 004010AA ESI = 004010AA
EDI = 004010AA EIP = 0040369C ESP = 0019FF74 EBP = 0019FF80
EFL = 00000206
100 %
Modules
Search (Ctrl+E)
Name Path Optimized User Code Symbol Status Symbc
Project.exe D:\uni dina\1Y SEM 2\COA\LAB1 P... N/A Yes Symbols loaded. D:\uni
ntdll.dll C:\Windows\SysWOW64\ntdll.dll N/A No Cannot find or open the P...
kernel32.dll C:\Windows\SysWOW64\kernel32.... N/A No Cannot find or open the P...
KernelBase.dll C:\Windows\SysWOW64\KernelBa... N/A No Cannot find or open the P...
Call Stack
Name Lang
Project.exe!main() Line 32 Un...
[External Code]
ntdll.dll![Frames below may be incorrect and/or missing, no symbols loaded for ntdll.dll] Un...
Solution Ex...
Class View
Locals
Modules
Call Stack
Breakpoints
Exception Settings
Output
Ready
Add to Source Control