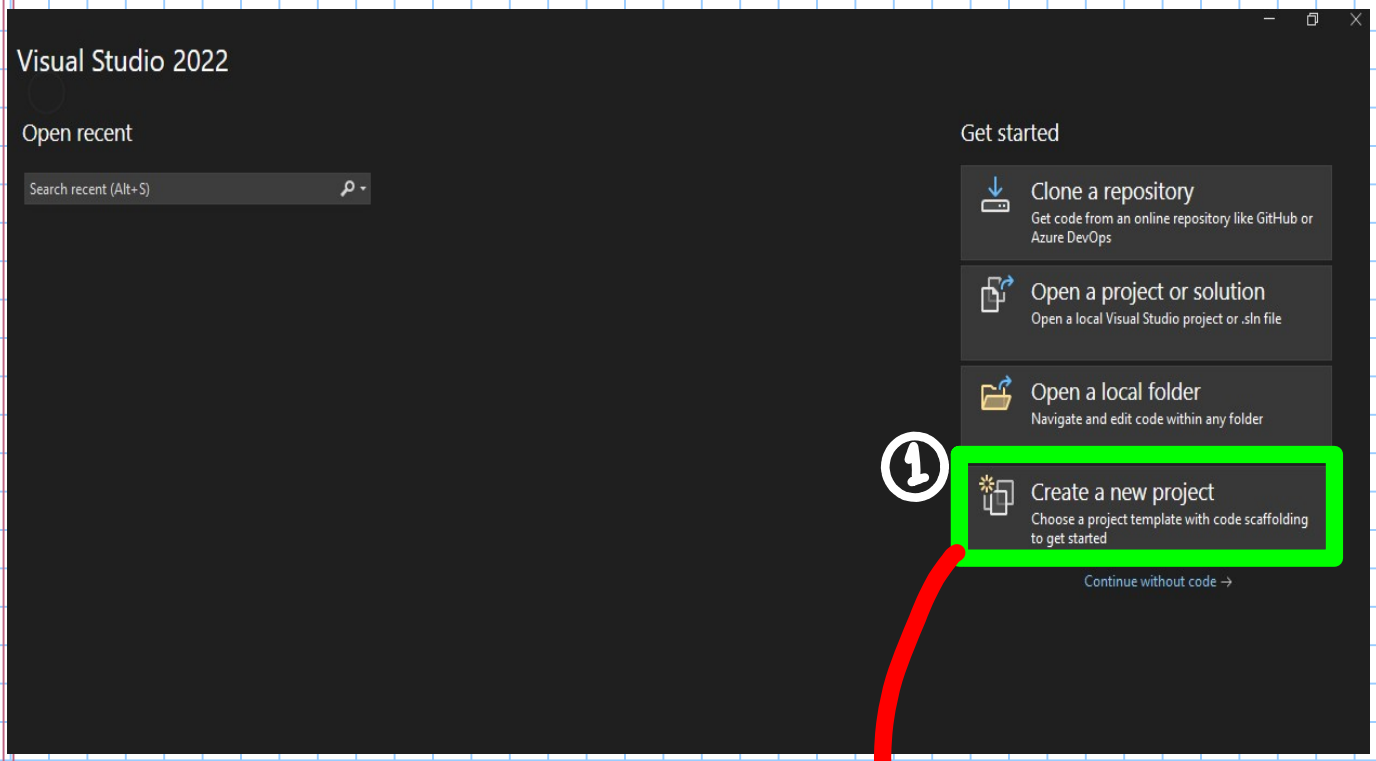
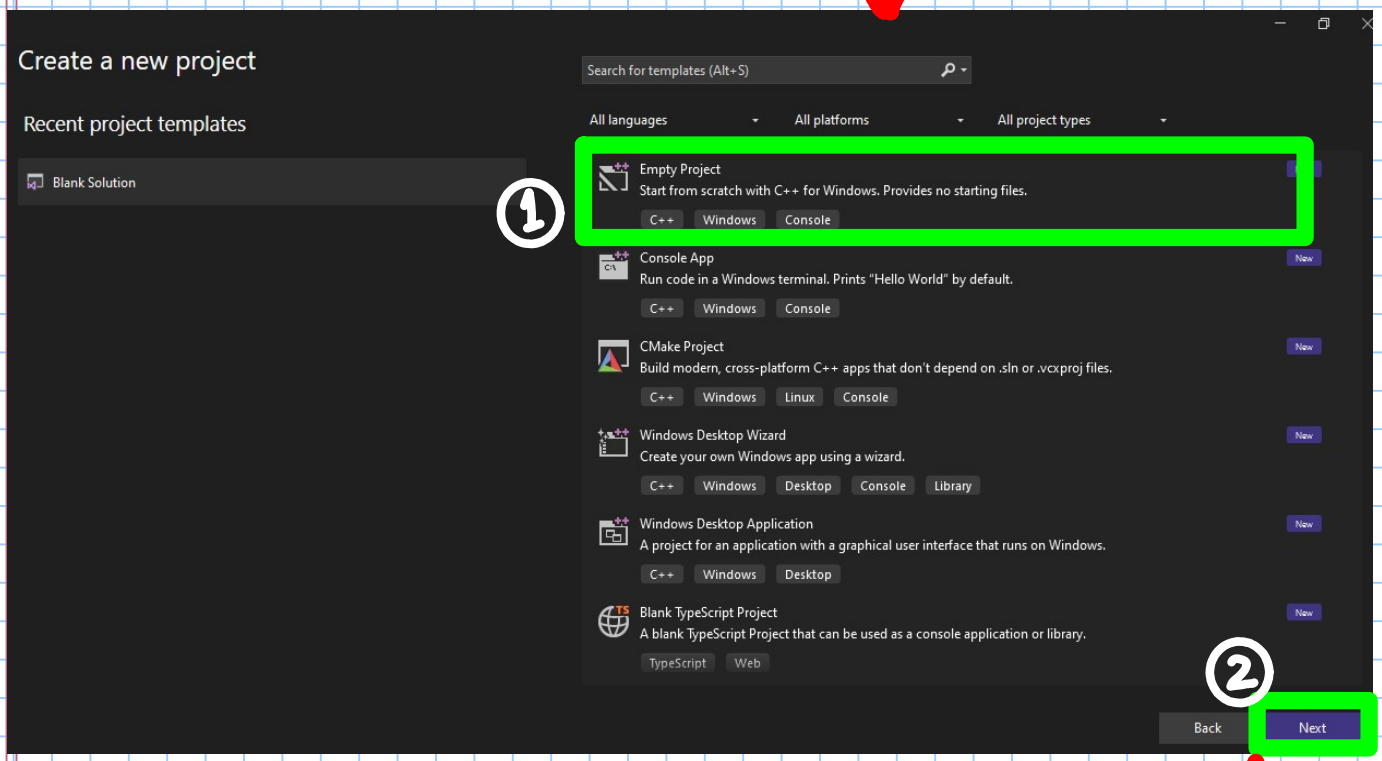
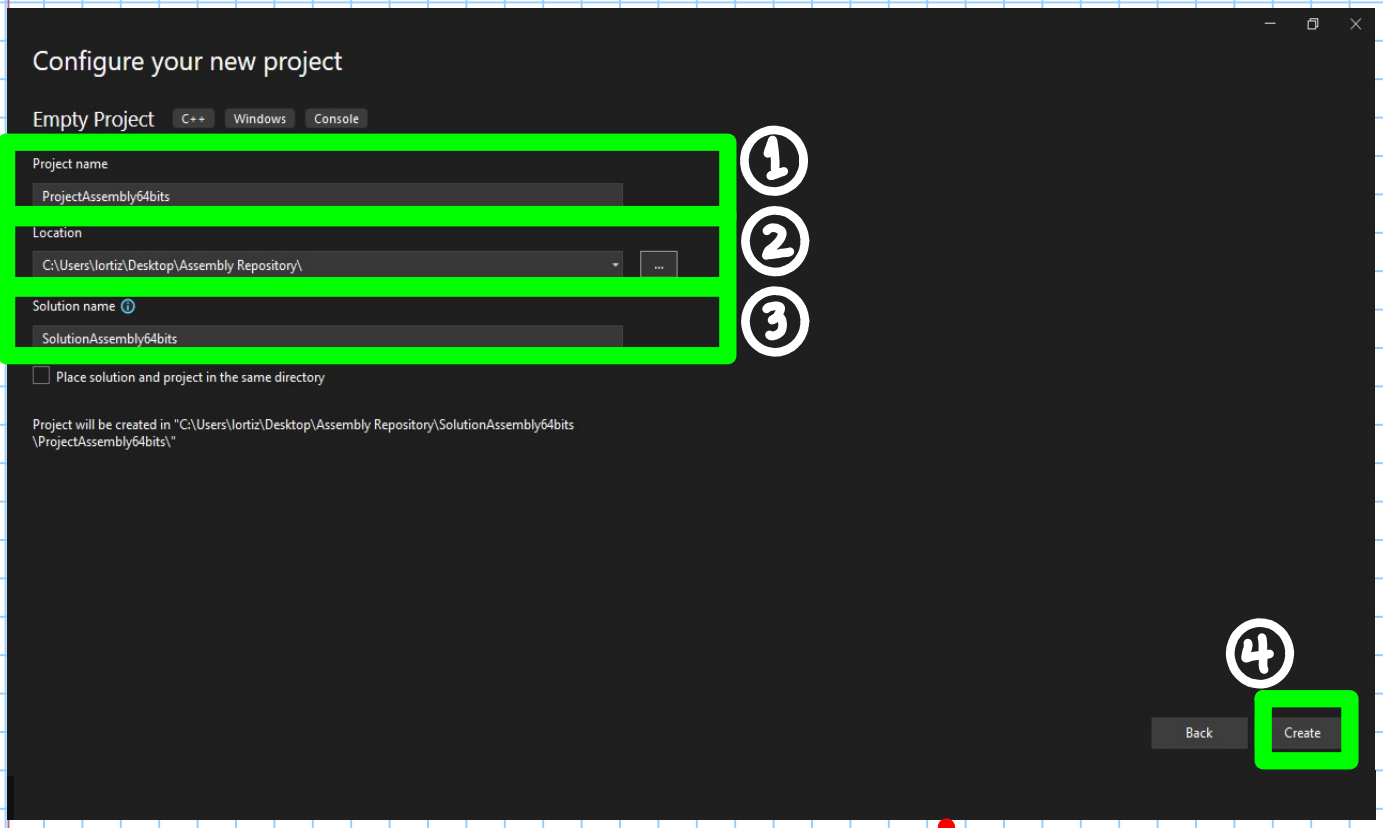
How to construct a 64 bits(x64) program

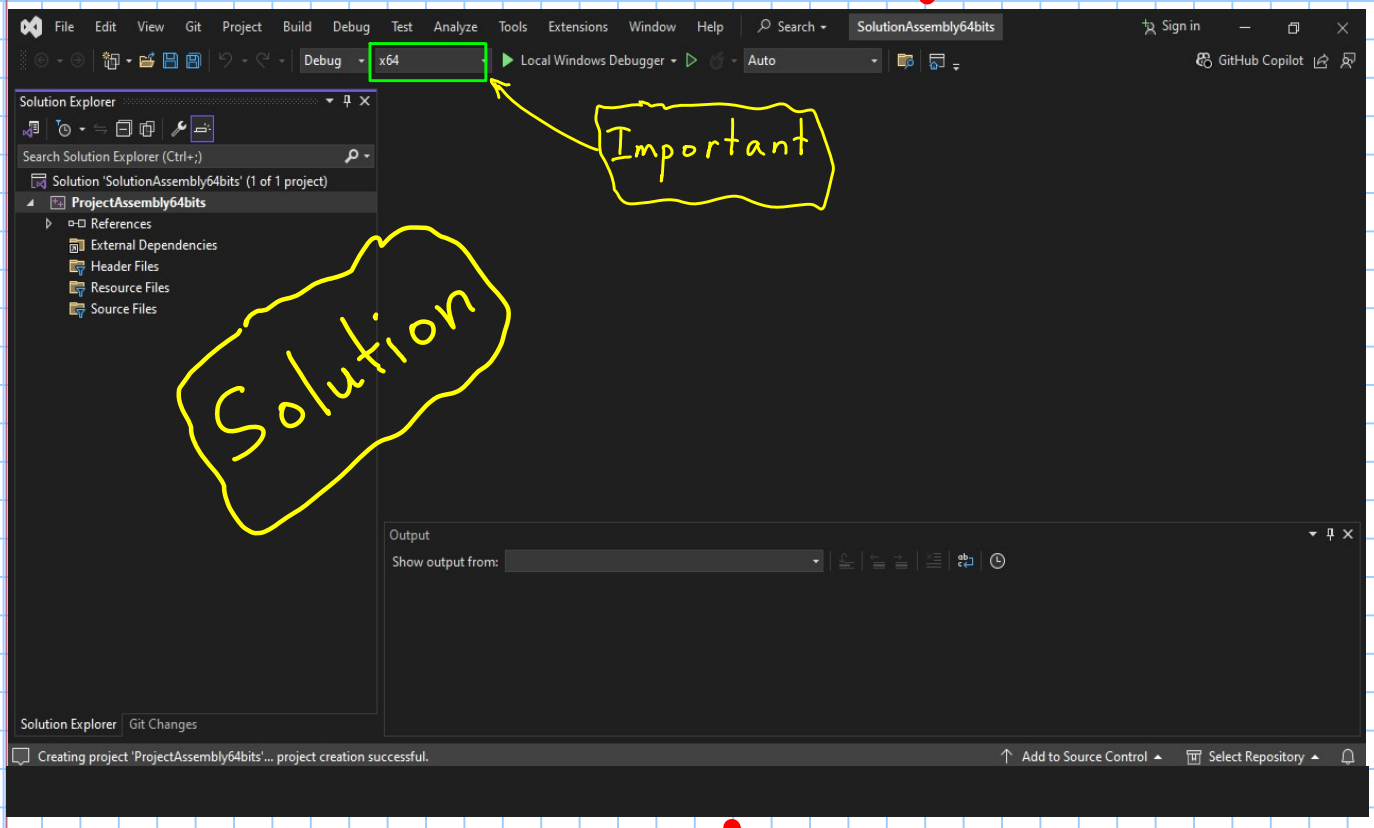
Note Title

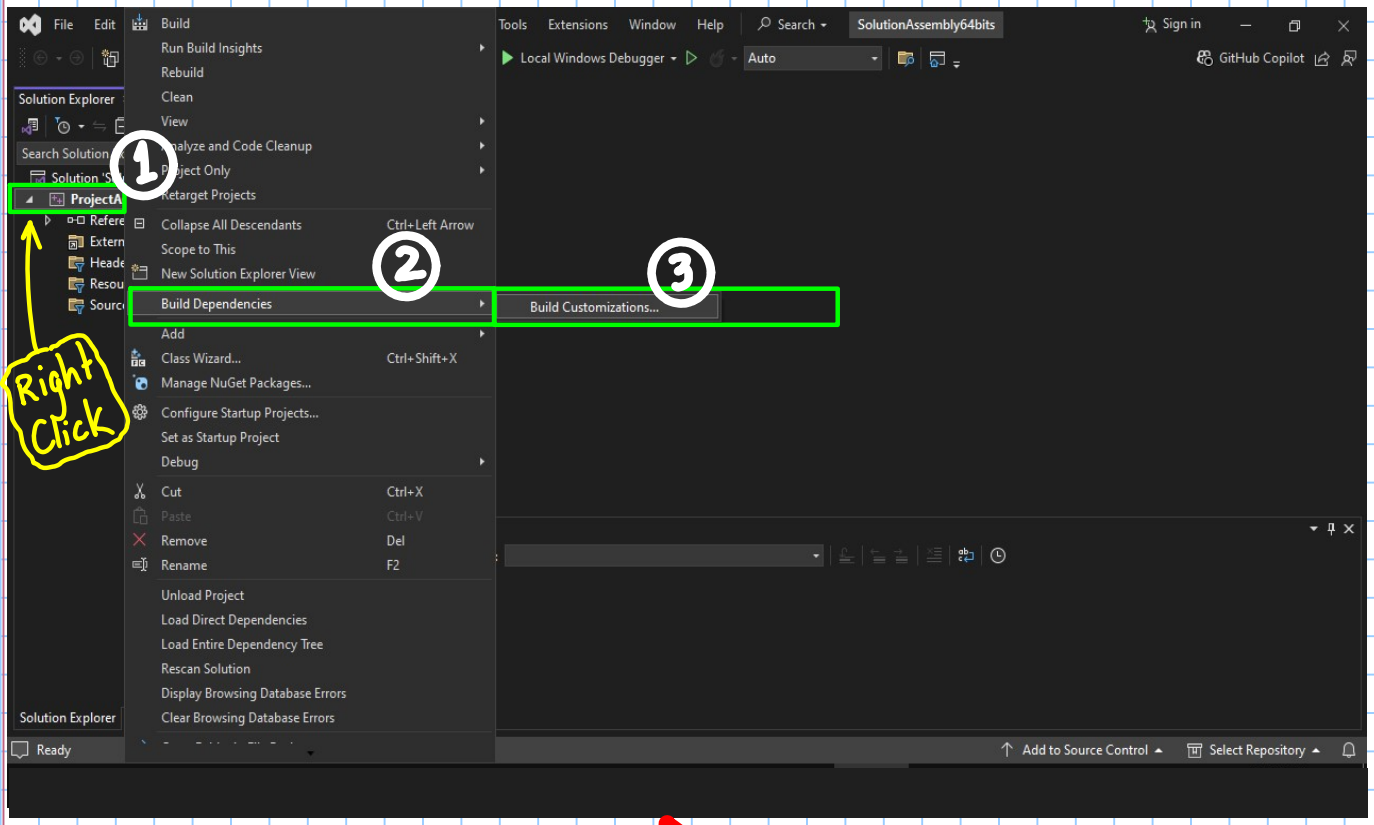
Prof. L.Ortiz

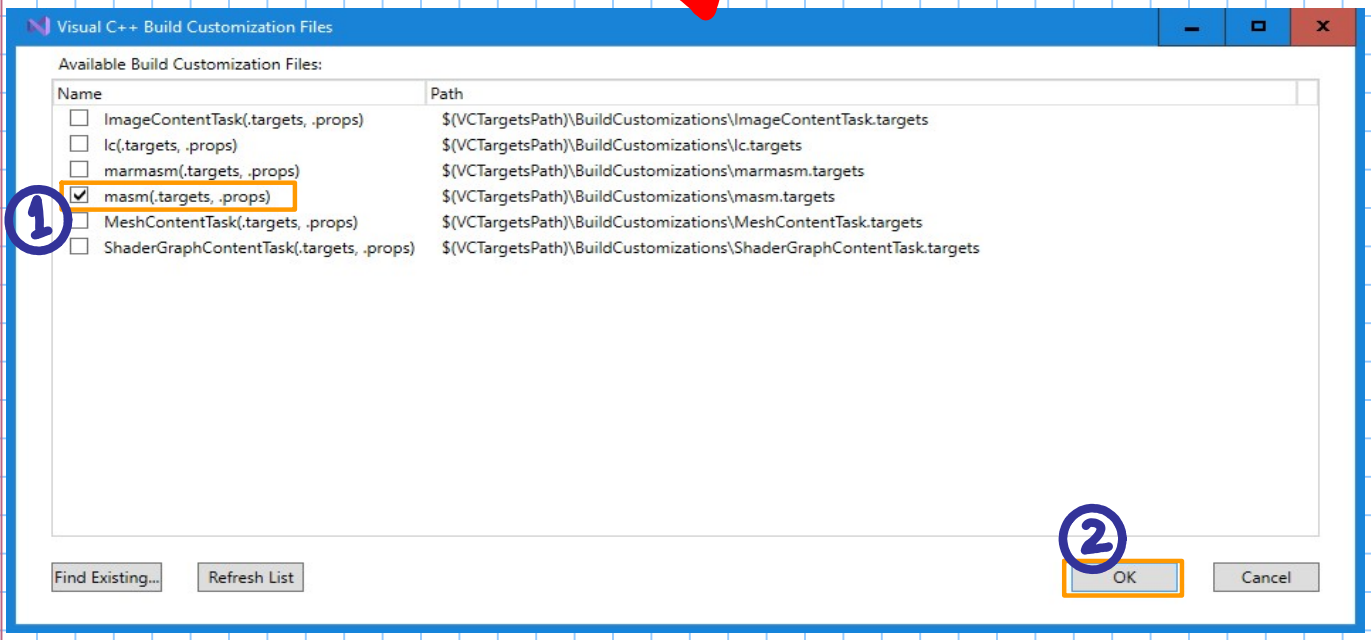


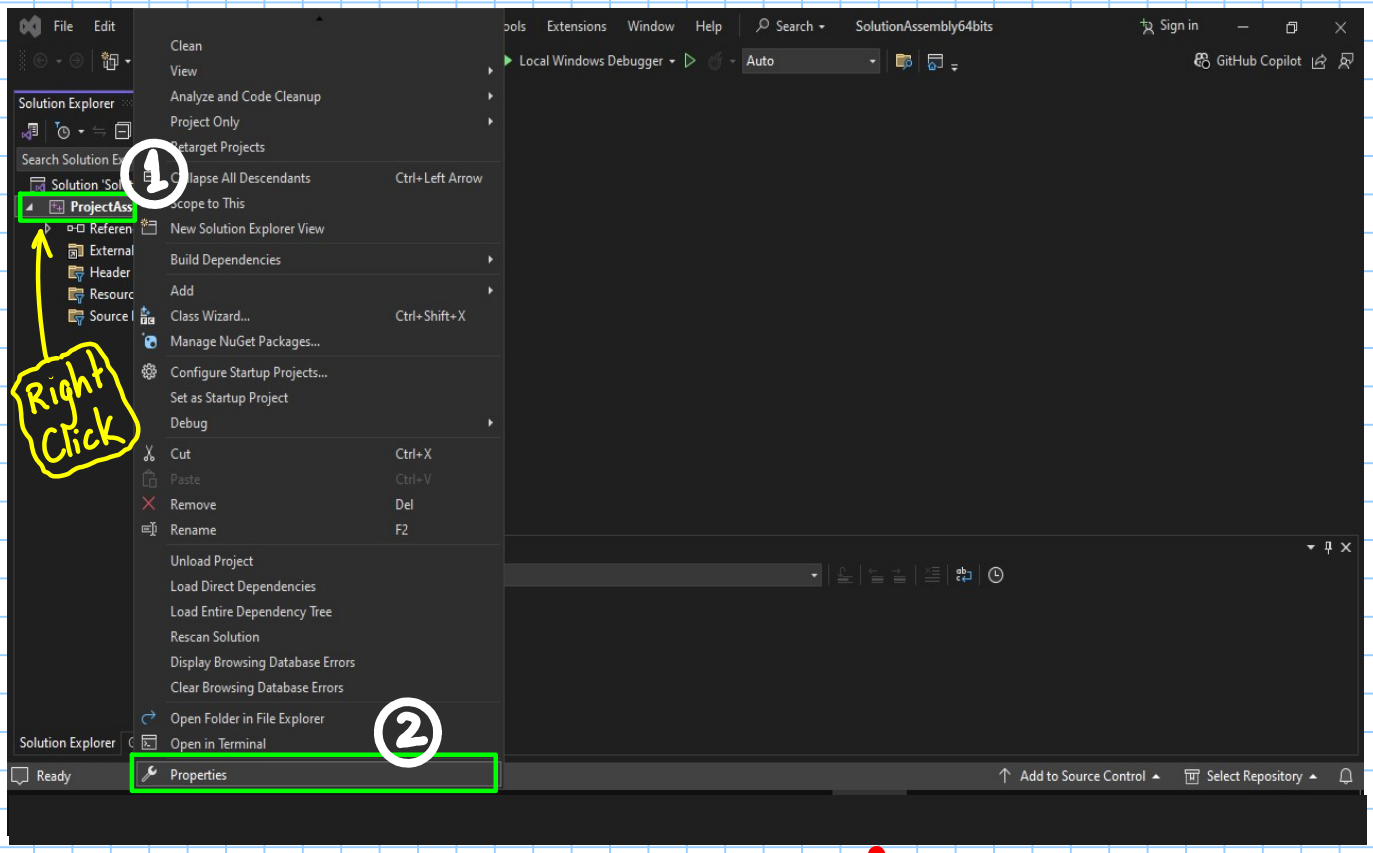


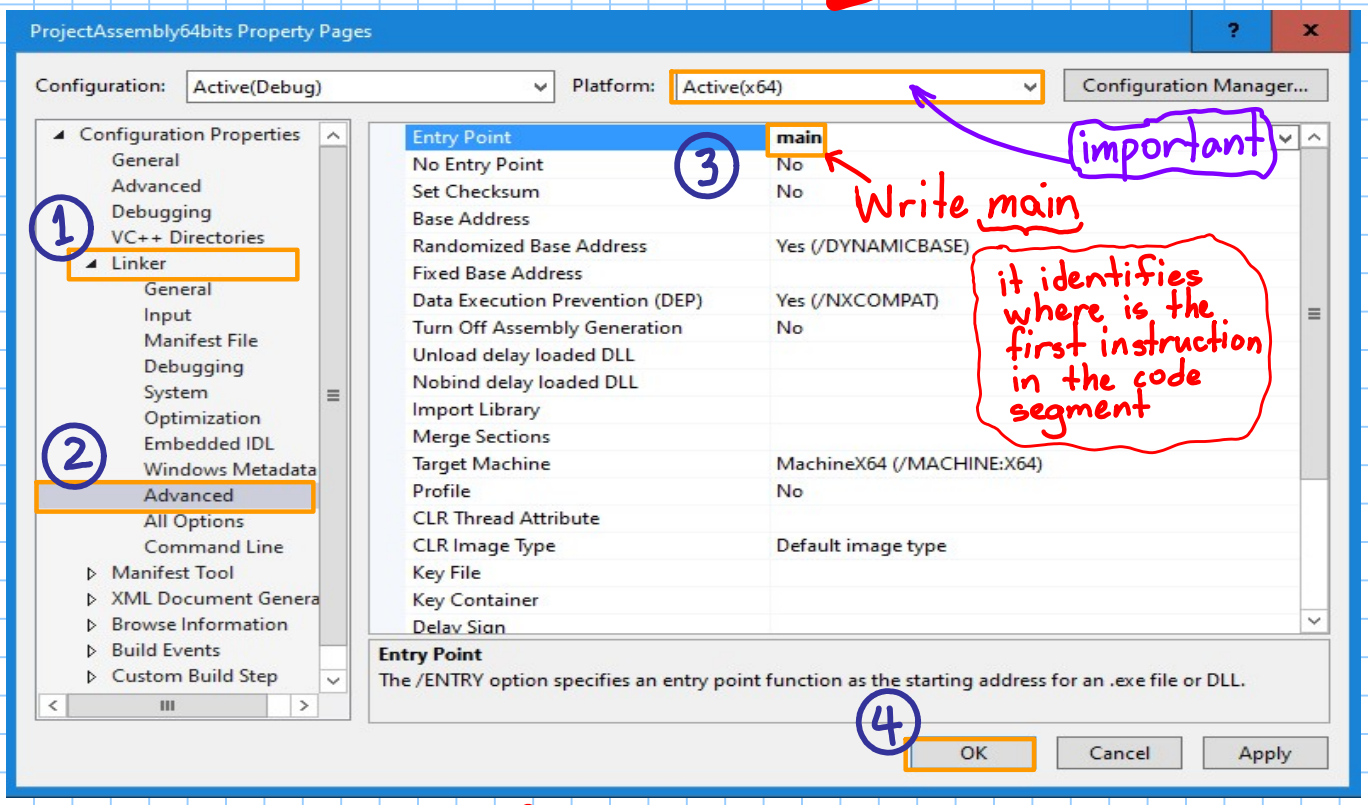

Configure your new project
Empty Project
C++
Windows
Console
Project name
ProjectAssembly64bits
Location
C:\Users\Iortiz\Desktop\Assembly Repository\
...
Solution name
SolutionAssembly64bits
Place solution and project in the same directory
Project will be created in "C:\Users\Iortiz\Desktop\Assembly Repository\SolutionAssembly64bits
\ProjectAssembly64bits\"
1
2
3
4
Back
Create

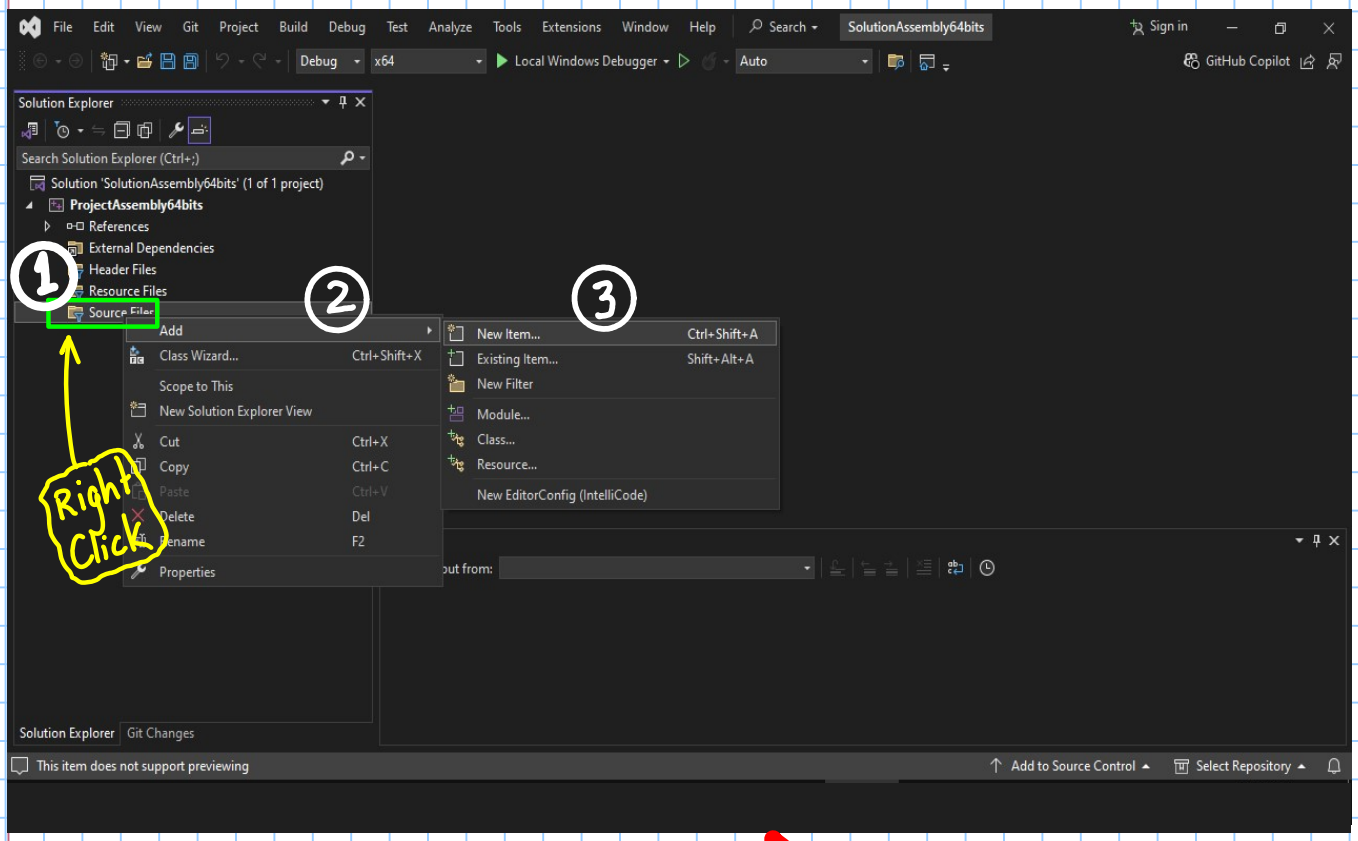

File Edit View Git Project Build Debug Test Analyze Tools Extensions Window Help
Search
SolutionAssembly64bits
Sign in
Debug
x64
Local Windows Debugger
Auto
GitHub Copilot
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'SolutionAssembly64bits' (1 of 1 project)
ProjectAssembly64bits
References
External Dependencies
Header Files
Resource Files
Source Files
Important
Solution
Output
Show output from:
Solution Explorer
Git Changes
Creating project 'ProjectAssembly64bits'... project creation successful.
Add to Source Control
Select Repository


File
Edit
Build
Run Build Insights
Rebuild
Clean
View
Analyze and Code Cleanup
Project Only
Retarget Projects
Collapse All Descendants Ctrl+Left Arrow
Scope to This
New Solution Explorer View
Build Dependencies
Add
Class Wizard... Ctrl+Shift+X
Manage NuGet Packages...
Configure Startup Projects...
Set as Startup Project
Debug
Cut Ctrl+X
Paste Ctrl+V
Remove Del
Rename F2
Unload Project
Load Direct Dependencies
Load Entire Dependency Tree
Rescan Solution
Display Browsing Database Errors
Clear Browsing Database Errors
Build Customizations...
Tools
Extensions
Window
Help
Search
SolutionAssembly64bits
Sign in
Local Windows Debugger
Auto
GitHub Copilot
Solution Explorer
Search Solution
Right Click
1
2
3
Ready
Add to Source Control
Select Repository


Visual C++ Build Customization Files
Available Build Customization Files:
Name
Path
ImageContentTask(.targets, .props) $(VCTargetsPath)\BuildCustomizations\ImageContentTask.targets
lc(.targets, .props) $(VCTargetsPath)\BuildCustomizations\lc.targets
marmasm(.targets, .props) $(VCTargetsPath)\BuildCustomizations\marmasm.targets
masm(.targets, .props) $(VCTargetsPath)\BuildCustomizations\masm.targets
MeshContentTask(.targets, .props) $(VCTargetsPath)\BuildCustomizations\MeshContentTask.targets
ShaderGraphContentTask(.targets, .props) $(VCTargetsPath)\BuildCustomizations\ShaderGraphContentTask.targets
1
2
Find Existing...
Refresh List
OK
Cancel


File Edit
Extensions Window Help
Search
SolutionAssembly64bits
Sign in
Local Windows Debugger
Auto
GitHub Copilot
Solution Explorer
Clean
View
Analyze and Code Cleanup
Project Only
Retarget Projects
Collapse All Descendants Ctrl+Left Arrow
Scope to This
New Solution Explorer View
Build Dependencies
Add
Class Wizard... Ctrl+Shift+X
Manage NuGet Packages...
Configure Startup Projects...
Set as Startup Project
Debug
Cut Ctrl+X
Paste Ctrl+V
Remove Del
Rename F2
Unload Project
Load Direct Dependencies
Load Entire Dependency Tree
Rescan Solution
Display Browsing Database Errors
Clear Browsing Database Errors
Open Folder in File Explorer
Open in Terminal
Properties
1
2
Right Click
Ready
Add to Source Control
Select Repository


ProjectAssembly64bits Property Pages
Configuration: Active(Debug)
Platform: Active(x64)
Configuration Manager...
Configuration Properties
General
Advanced
Debugging
VC++ Directories
Linker
General
Input
Manifest File
Debugging
System
Optimization
Embedded IDL
Windows Metadata
Advanced
All Options
Command Line
Manifest Tool
XML Document Genera
Browse Information
Build Events
Custom Build Step
1
2
3
Entry Point main
No Entry Point No
Set Checksum No
Base Address
Randomized Base Address Yes (/DYNAMICBASE)
Fixed Base Address
Data Execution Prevention (DEP) Yes (/NXCOMPAT)
Turn Off Assembly Generation No
Unload delay loaded DLL
Nobind delay loaded DLL
Import Library
Merge Sections
Target Machine MachineX64 (/MACHINE:X64)
Profile No
CLR Thread Attribute
CLR Image Type Default image type
Key File
Key Container
Delay Sign
important
Write main
it identifies where is the first instruction in the code segment
Entry Point
The /ENTRY option specifies an entry point function as the starting address for an .exe file or DLL.
4
OK
Cancel
Apply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Search Solution Explorer (Ctrl+;)
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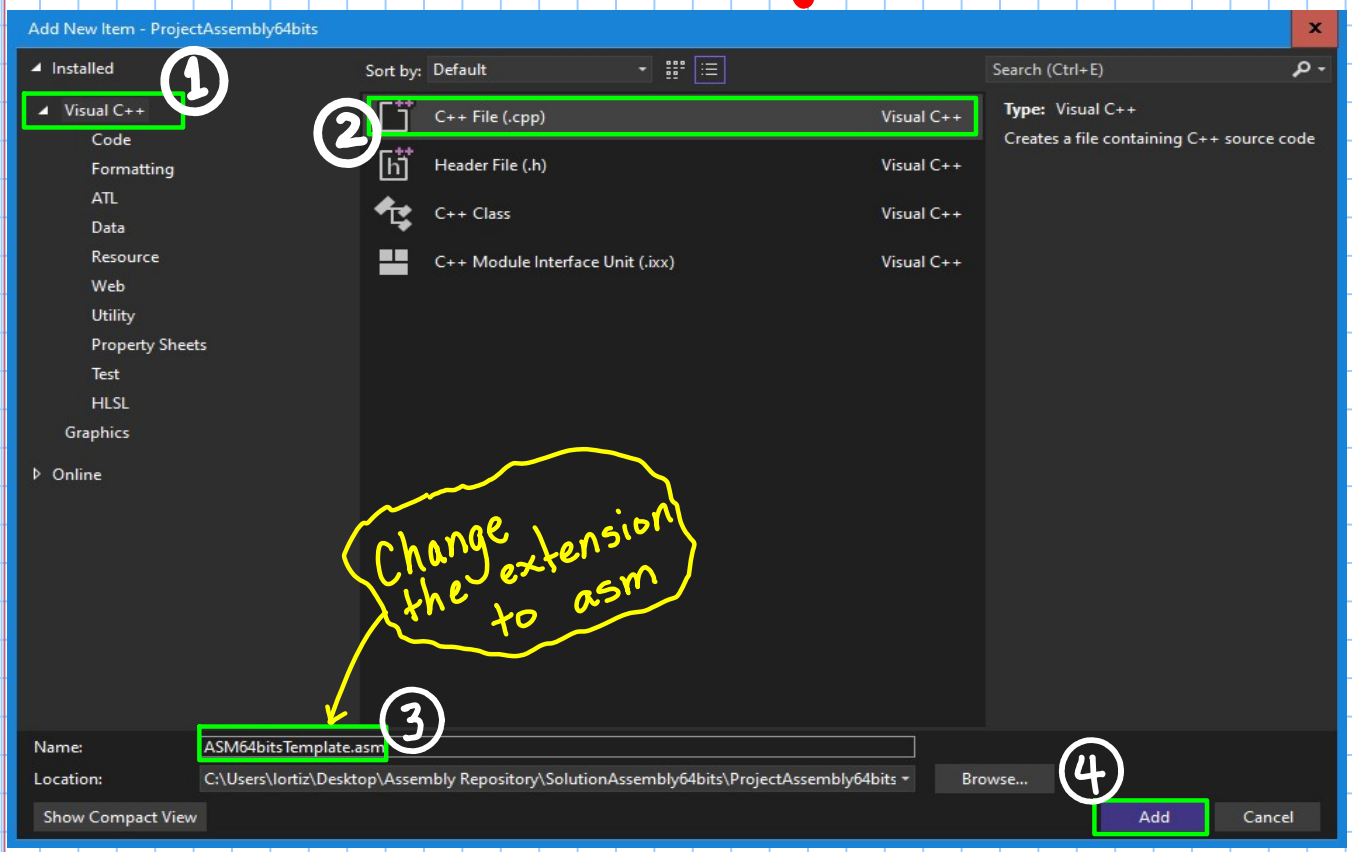
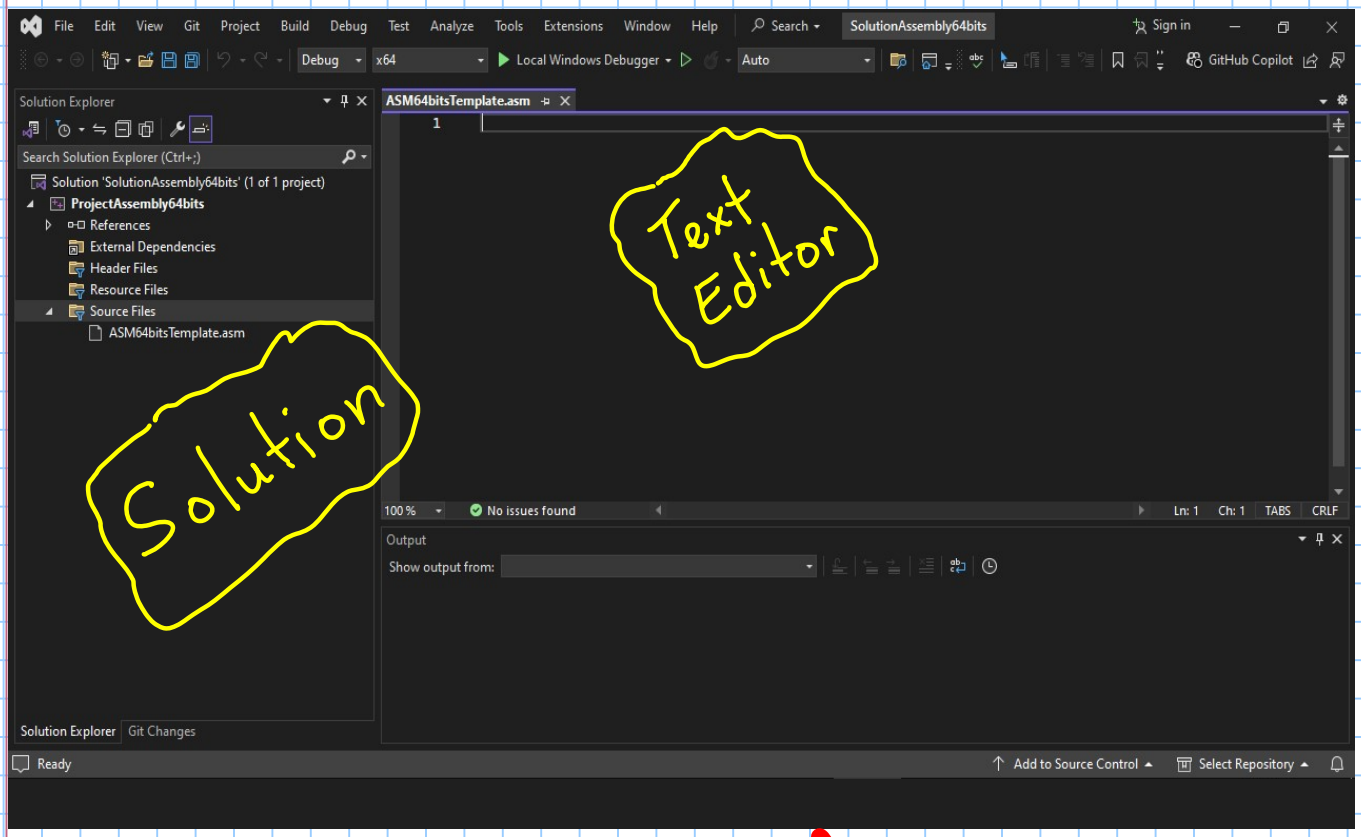
Resource Files
Source Files
1
2
3
Add
Class Wizard... Ctrl+Shift+X
Scope to This
New Solution Explorer View
Cut Ctrl+X
Copy Ctrl+C
Paste Ctrl+V
Delete Del
Rename F2
Properties
New Item... Ctrl+Shift+A
Existing Item... Shift+Alt+A
New Filter
Module...
Class...
Resource...
New EditorConfig (IntelliCode)
Right Click
Solution Explorer
Git Changes
This item does not support previewing
Add to Source Control
Select Repository


Add New Item - ProjectAssembly64bits
Installed
Visual C++
Code
Formatting
ATL
Data
Resource
Web
Utility
Property Sheets
Test
HLSL
Graphics
Online
1
Sort by: Default
Search (Ctrl+E)
2
C++ File (.cpp) Visual C++
Header File (.h) Visual C++
C++ Class Visual C++
C++ Module Interface Unit (.ixx) Visual C++
Type: Visual C++
Creates a file containing C++ source code
Change the extension to asm
3
Name: ASM64bitsTemplate.asm
Location: C:\Users\lortiz\Desktop\Assembly Repository\SolutionAssembly64bits\ProjectAssembly64bits
Browse...
4
Show Compact View
Add
Cancel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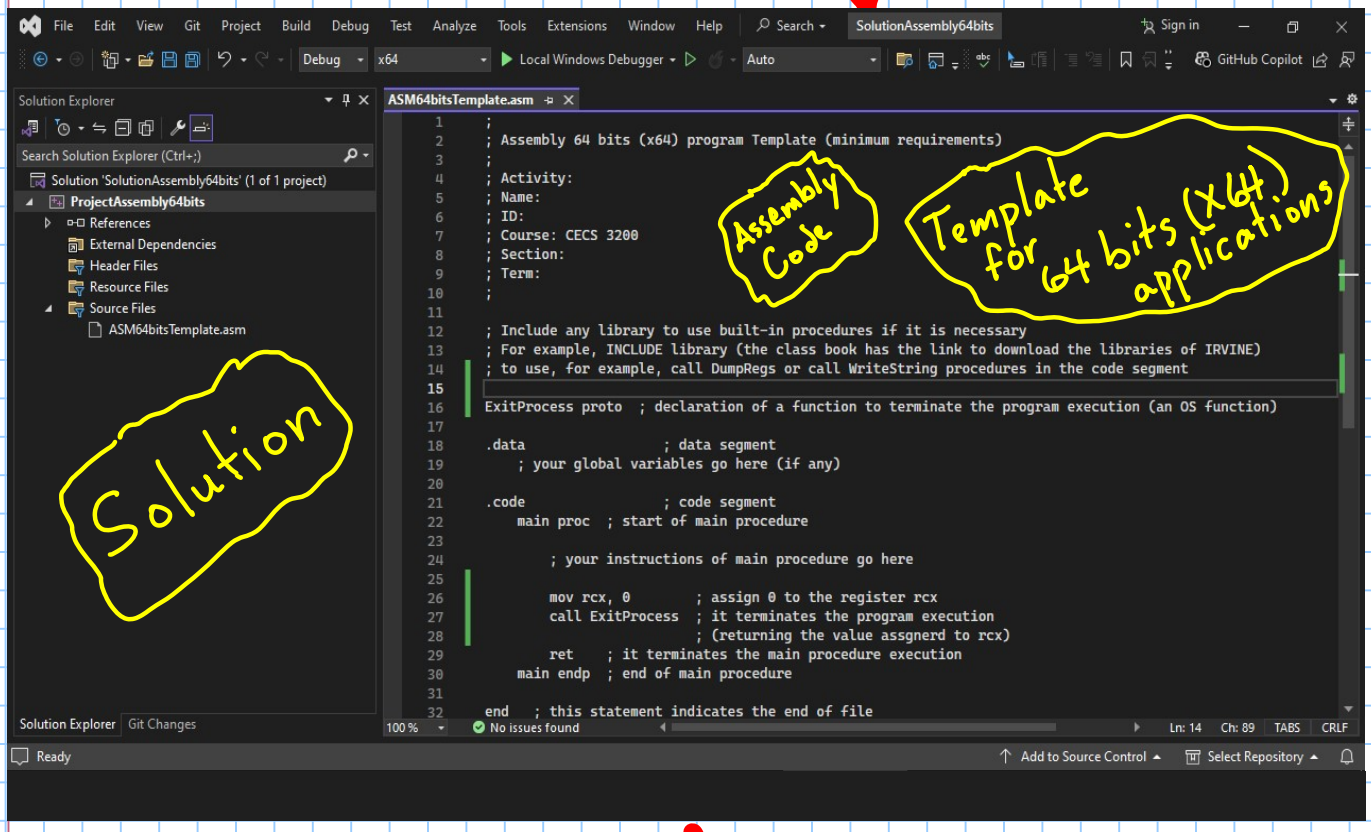
Search Solution Explorer (Ctrl+;)
Solution 'SolutionAssembly64bits' (1 of 1 project)
ProjectAssembly64bits
References
External Dependencies
Header Files
Resource Files
Source Files
ASM64bitsTemplate.asm
ASM64bitsTemplate.asm
Text Editor
Solution
100 %
No issues found
Ln: 1 Ch: 1 TABS CRLF
Output
Show output from:
Solution Explorer
Git Changes
Ready
Add to Source Control
Select Repository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ProjectAssembly64bits
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External Dependencies
Header Files
Resource Files
Source Files
ASM64bitsTemplate.asm
ASM64bitsTemplate.asm
; Assembly 64 bits (x64) program Template (minimum requirements)
; Activity:
; Name:
; ID:
; Course: CECS 3200
; Section:
; Term:
; Include any library to use built-in procedures if it is necessary
; For example, INCLUDE library (the class book has the link to download the libraries of IRVINE)
; to use, for example, call DumpRegs or call WriteString procedures in the code segment
ExitProcess proto ; declaration of a function to terminate the program execution (an OS function)
.data ; data segment
; your global variables go here (if any)
.code ; code segment
main proc ; start of main procedure
; your instructions of main procedure go here
mov rcx, 0 ; assign 0 to the register rcx
call ExitProcess ; it terminates the program execution
; (returning the value assgnerd to rcx)
ret ; it terminates the main procedure execution
main endp ; end of main procedure
end ; this statement indicates the end of file
Assembly Code
Template for 64 bits (X64) applications
Solution
100 %
No issues found
Ln: 14 Ch: 89 TABS CRLF
Solution Explorer
Git Changes
Ready
Add to Source Control
Select Repository

Template Code

ASM64bitsTemplate.asm

```
;
; Assembly 64 bits (x64) program Template (minimum requirements)
;
; Activity:
; Name:
; ID:
; Course: CECS 3200
; Section:
; Term:
;

; Include any library to use built-in procedures if it is necessary
; For example, INCLUDE library (the class book has the link to download the libraries of IRVINE)
; to use, for example, call DumpRegs or call WriteString procedures in the code segment

ExitProcess proto  ; declaration of a function to terminate the program execution (an OS function)

.data                   ; data segment
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.code                   ; code segment
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        ; your instructions of main procedure go here

        mov rcx, 0        ; assign 0 to the register rcx
        call ExitProcess  ; it terminates the program execution
                          ; (returning the value assgnerd to rcx)
        ret    ; it terminates the main procedure execution
    main endp  ; end of main procedure

end   ; this statement indicates the end of file
```
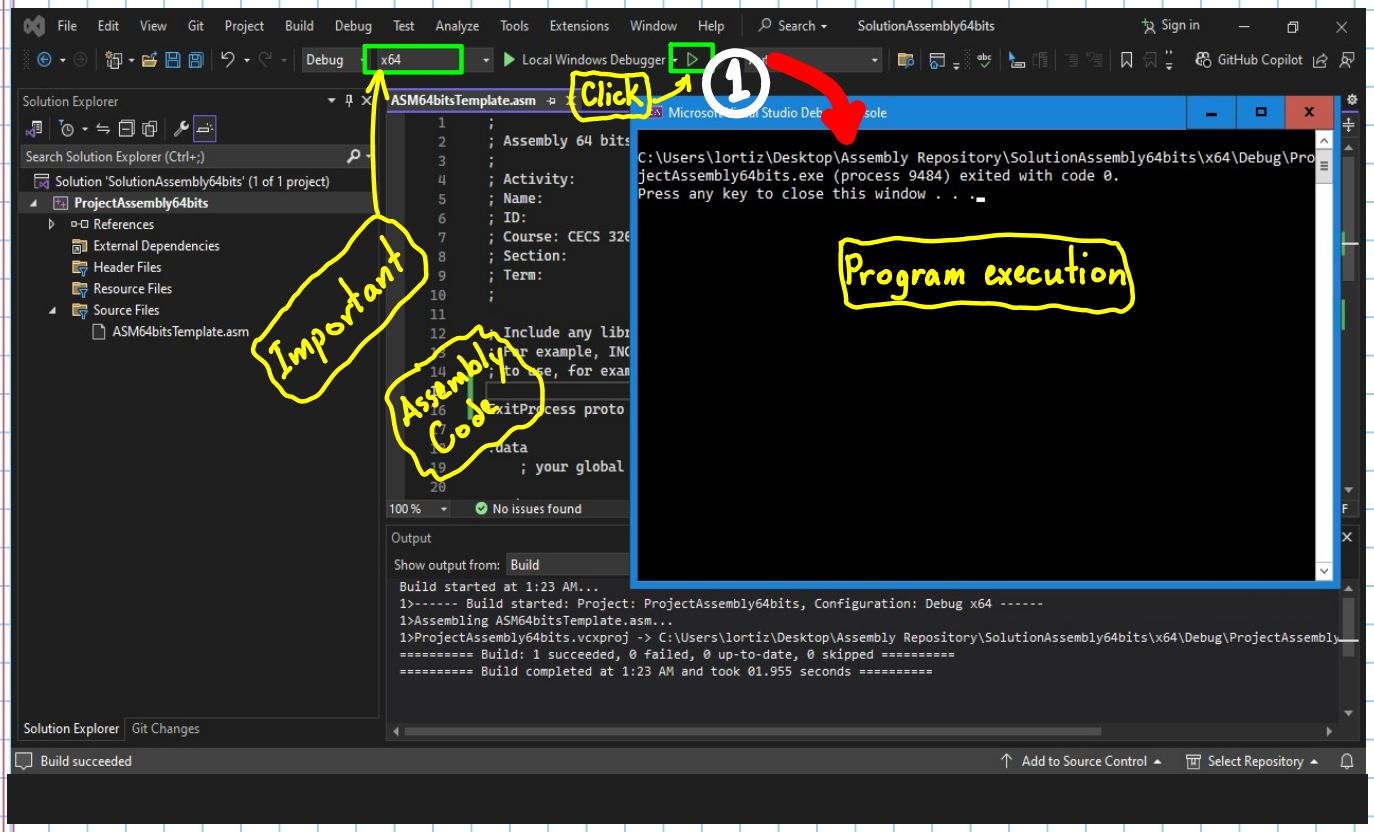

100 % No issues found Ln: 14 Ch: 89 TABS CRLF

Finally