LAB-11 ASSIGNMENT

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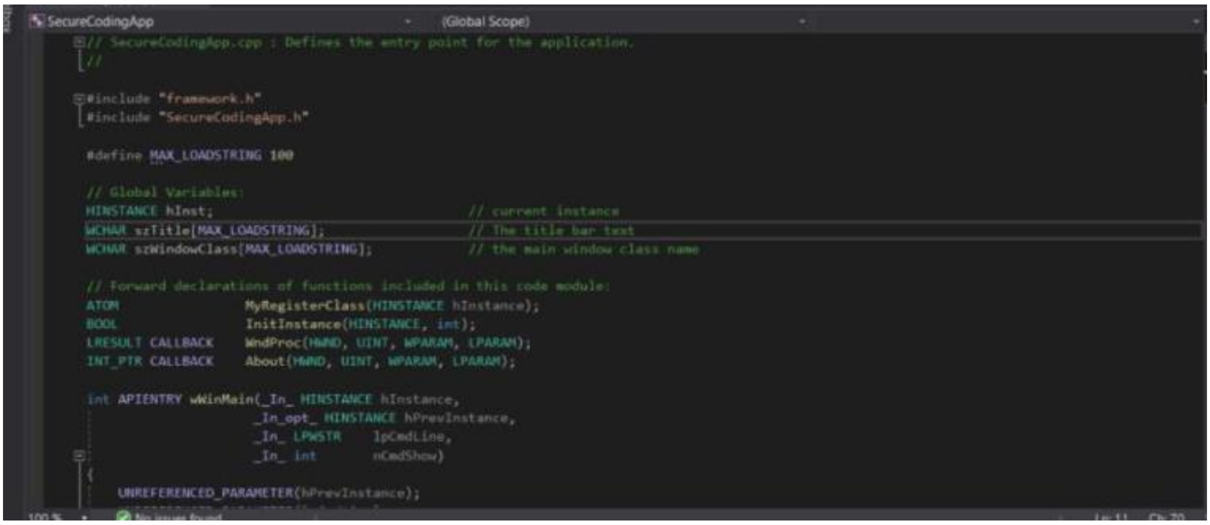
Lab experiment – Creating secure and safe executable

Download and install visual studio (recent edition)
Write a C++ code of your own to build an executable and run the same.
Download process explorer and verify the DEP & ASLR status
Enable software DEP, ASLR and SEH in the visual studio and rebuild the same executable
Again, verify the DEP & ASLR status in the process explorer
Report the same with separate screenshot - before and after enabling DEP & ASLR.

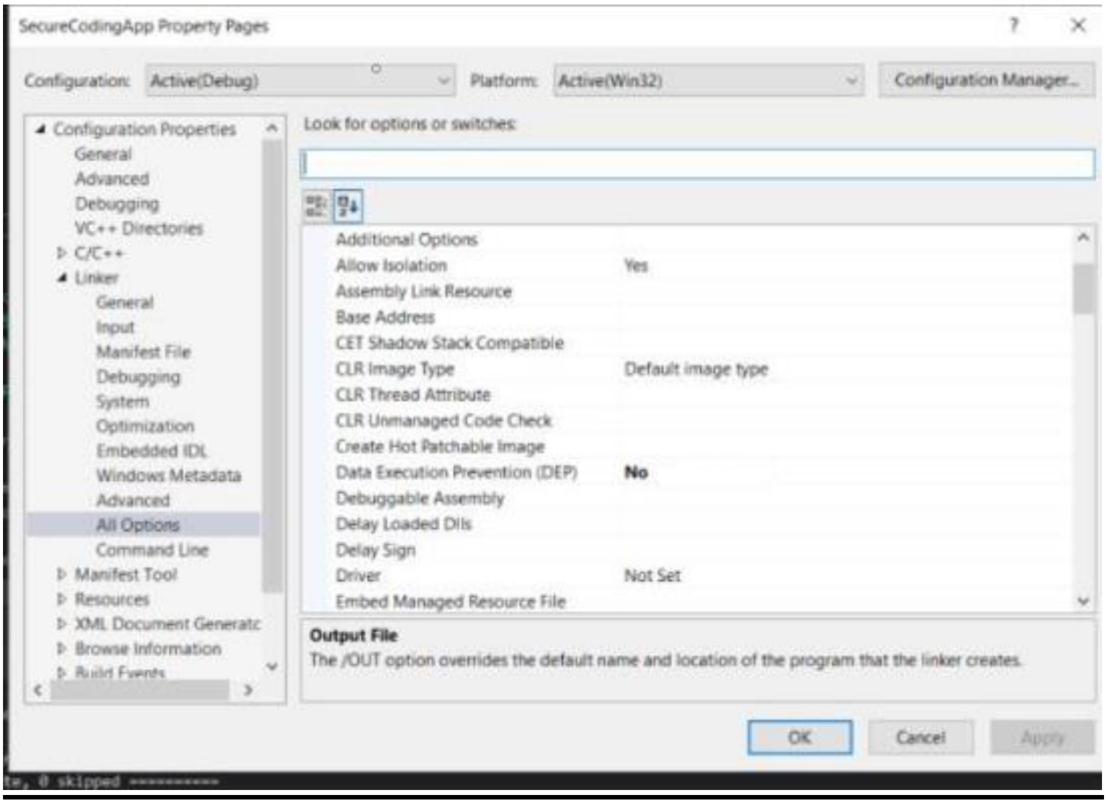
Sol:

Generating an executable file:-



```
// SecureCodingApp.cpp : Defines the entry point for the application.
//

#include "framework.h"
#include "SecureCodingApp.h"

#define MAX_LOADSTRING 100

// Global Variables:
HINSTANCE hInst;                                // current instance
WCHAR szTitle[MAX_LOADSTRING];                  // The title bar text
WCHAR szWindowClass[MAX_LOADSTRING];            // the main window class name

// Forward declarations of functions included in this code module:
ATOM                MyRegisterClass(HINSTANCE hInstance);
BOOL                InitInstance(HINSTANCE, int);
LRESULT CALLBACK    WndProc(HWND, UINT, WPARAM, LPARAM);
INT_PTR CALLBACK    About(HWND, UINT, WPARAM, LPARAM);

int APIENTRY wWinMain(_In_ HINSTANCE hInstance,
                     _In_opt_ HINSTANCE hPrevInstance,
                     _In_ LPWSTR    lpCmdLine,
                     _In_ int       nCmdShow)
{
    UNREFERENCED_PARAMETER(hPrevInstance);
```

Disabling DER and ASLR:-



SecureCodingApp Property Pages

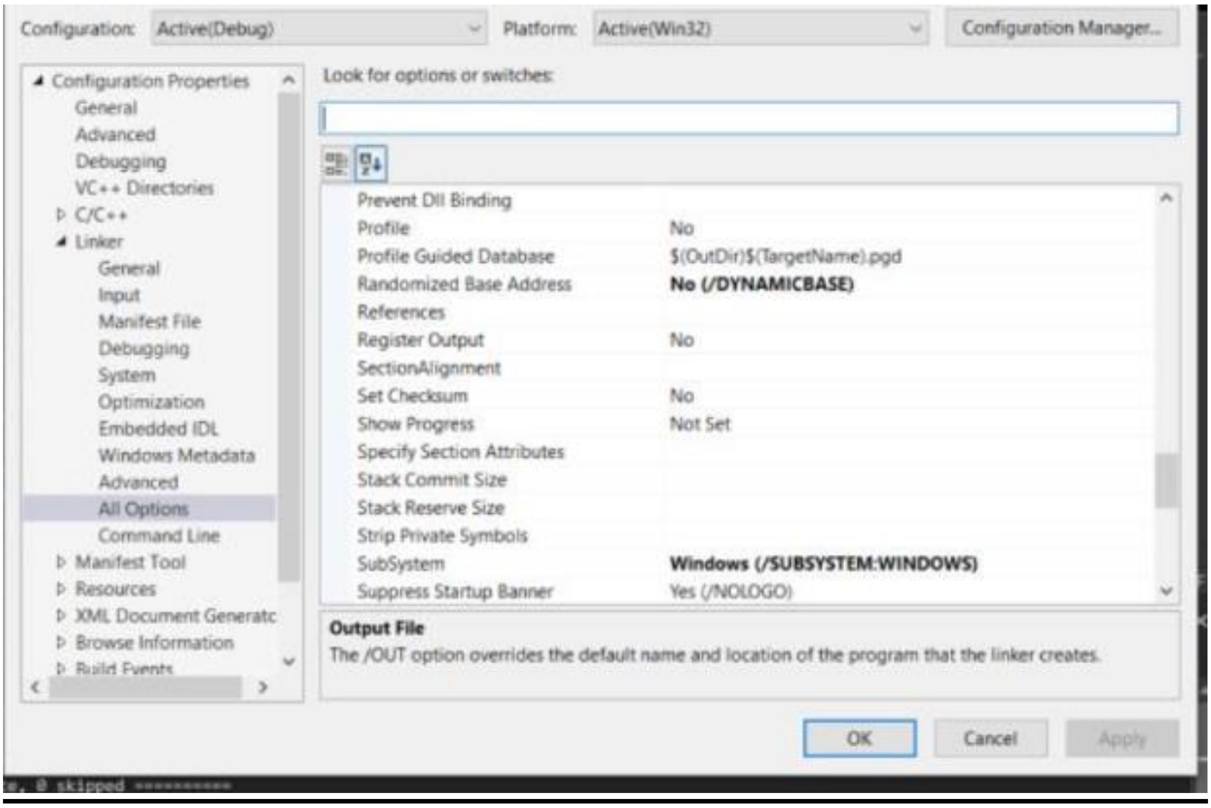
Configuration: Active(Debug) Platform: Active(Win32) Configuration Manager...

Look for options or switches:

Additional Options	
Allow Isolation	Yes
Assembly Link Resource	
Base Address	
CET Shadow Stack Compatible	
CLR Image Type	Default image type
CLR Thread Attribute	
CLR Unmanaged Code Check	
Create Hot Patchable Image	
Data Execution Prevention (DEP)	**No**
Debuggable Assembly	
Delay Loaded Dlls	
Delay Sign	
Driver	Not Set
Embed Managed Resource File	

Output File
The /OUT option overrides the default name and location of the program that the linker creates.

```
te, 0 skipped ==========
```



Configuration: Active(Debug) Platform: Active(Win32) Configuration Manager...

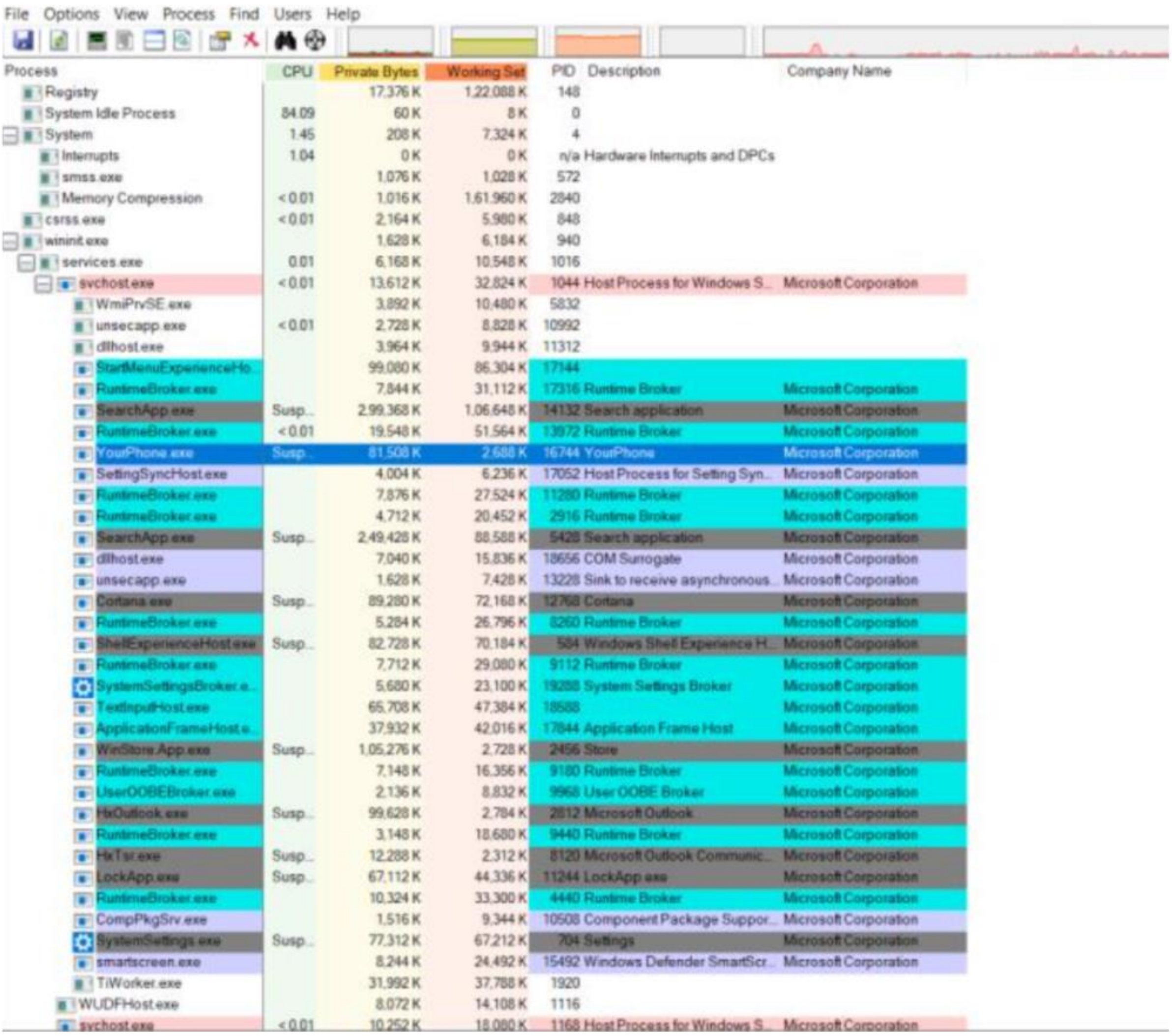
Look for options or switches:

Prevent Dll Binding	
Profile	No
Profile Guided Database	$(OutDir)$(TargetName).pgd
Randomized Base Address	**No (/DYNAMICBASE)**
References	
Register Output	No
SectionAlignment	
Set Checksum	No
Show Progress	Not Set
Specify Section Attributes	
Stack Commit Size	
Stack Reserve Size	
Strip Private Symbols	
SubSystem	**Windows (/SUBSYSTEM:WINDOWS)**
Suppress Startup Banner	Yes (/NOLOGO)

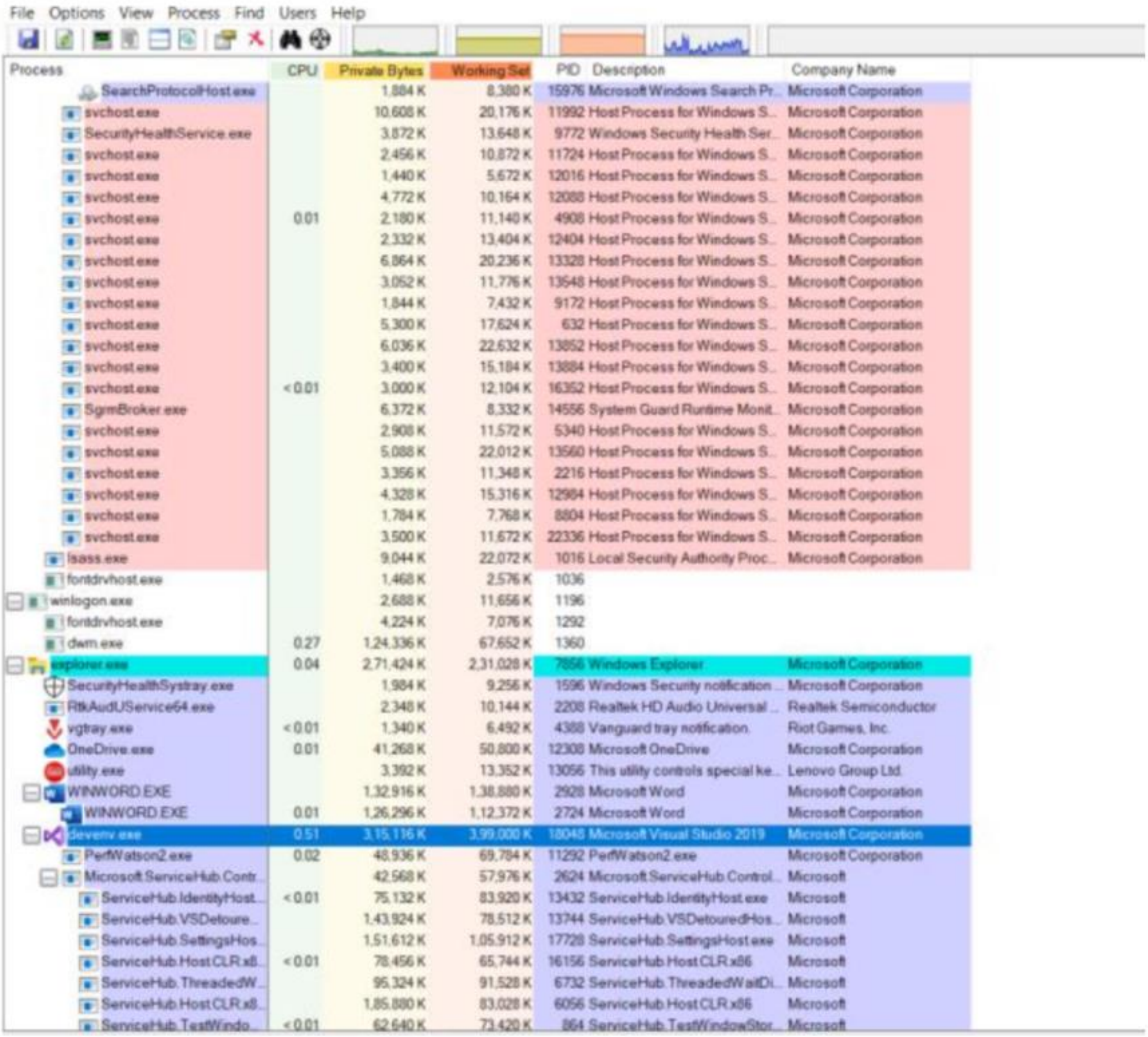
Output File
The /OUT option overrides the default name and location of the program that the linker creates.

```
e, 0 skipped ==========
```

Downloading process explorer and verifying the DEP & ASLR status .Enabling software DEP, ASLR and SEH in the visual studio and rebuilding the same executable :-



Process	CPU	Private Bytes	Working Set	PID	Description	Company Name
Registry		17,376 K	1,22,088 K	148		
System Idle Process	84.09	60 K	8 K	0		
System	1.45	208 K	7,324 K	4		
Interrupts	1.04	0 K	0 K	n/a	Hardware Interrupts and DPCs	
smss.exe		1,076 K	1,028 K	572		
Memory Compression	< 0.01	1,016 K	1,61,960 K	2840		
csrss.exe	< 0.01	2,164 K	5,980 K	848		
wininit.exe		1,628 K	6,184 K	940		
services.exe	0.01	6,168 K	10,548 K	1016		
svchost.exe	< 0.01	13,612 K	32,824 K	1044	Host Process for Windows S...	Microsoft Corporation
WmiPrvSE.exe		3,892 K	10,480 K	5832		
unsecapp.exe	< 0.01	2,728 K	8,828 K	10992		
dllhost.exe		3,964 K	9,944 K	11312		
StartMenuExperienceHo...		99,080 K	86,304 K	17144		
RuntimeBroker.exe		7,844 K	31,112 K	17316	Runtime Broker	Microsoft Corporation
SearchApp.exe	Susp...	2,99,368 K	1,06,648 K	14132	Search application	Microsoft Corporation
RuntimeBroker.exe	< 0.01	19,548 K	51,564 K	13972	Runtime Broker	Microsoft Corporation
YourPhone.exe	Susp...	81,508 K	2,688 K	16744	YourPhone	Microsoft Corporation
SettingSyncHost.exe		4,004 K	6,236 K	17052	Host Process for Setting Syn...	Microsoft Corporation
RuntimeBroker.exe		7,876 K	27,524 K	11280	Runtime Broker	Microsoft Corporation
RuntimeBroker.exe		4,712 K	20,452 K	2916	Runtime Broker	Microsoft Corporation
SearchApp.exe	Susp...	2,49,428 K	88,588 K	5428	Search application	Microsoft Corporation
dllhost.exe		7,040 K	15,836 K	18656	COM Surrogate	Microsoft Corporation
unsecapp.exe		1,628 K	7,428 K	13228	Sink to receive asynchronous...	Microsoft Corporation
Cortana.exe	Susp...	89,280 K	72,168 K	12768	Cortana	Microsoft Corporation
RuntimeBroker.exe		5,284 K	26,796 K	8260	Runtime Broker	Microsoft Corporation
ShellExperienceHost.exe	Susp...	82,728 K	70,184 K	584	Windows Shell Experience H...	Microsoft Corporation
RuntimeBroker.exe		7,712 K	29,080 K	9112	Runtime Broker	Microsoft Corporation
SystemSettingsBroker.e...		5,680 K	23,100 K	19288	System Settings Broker	Microsoft Corporation
TextInputHost.exe		65,708 K	47,384 K	18588		Microsoft Corporation
ApplicationFrameHost.e...		37,932 K	42,016 K	17844	Application Frame Host	Microsoft Corporation
WinStore.App.exe	Susp...	1,05,276 K	2,728 K	2456	Store	Microsoft Corporation
RuntimeBroker.exe		7,148 K	16,356 K	9180	Runtime Broker	Microsoft Corporation
UserOOBEBroker.exe		2,136 K	8,832 K	9968	User OOBE Broker	Microsoft Corporation
HxOutlook.exe	Susp...	99,628 K	2,784 K	2812	Microsoft Outlook	Microsoft Corporation
RuntimeBroker.exe		3,148 K	18,680 K	9440	Runtime Broker	Microsoft Corporation
HxTsr.exe	Susp...	12,288 K	2,312 K	8120	Microsoft Outlook Communic...	Microsoft Corporation
LockApp.exe	Susp...	67,112 K	44,336 K	11244	LockApp.exe	Microsoft Corporation
RuntimeBroker.exe		10,324 K	33,300 K	4440	Runtime Broker	Microsoft Corporation
CompPkgSrv.exe		1,516 K	9,344 K	10508	Component Package Suppor...	Microsoft Corporation
SystemSettings.exe	Susp...	77,312 K	67,212 K	704	Settings	Microsoft Corporation
smartscreen.exe		8,244 K	24,492 K	15492	Windows Defender SmartScr...	Microsoft Corporation
TiWorker.exe		31,992 K	37,788 K	1920		
WUDFHost.exe		8,072 K	14,108 K	1116		
svchost.exe	< 0.01	10,252 K	18,080 K	1168	Host Process for Windows S...	Microsoft Corporation



Process	CPU	Private Bytes	Working Set	PID	Description	Company Name
SearchProtocolHost.exe		1,884 K	8,380 K	15976	Microsoft Windows Search Pr...	Microsoft Corporation
svchost.exe		10,608 K	20,176 K	11992	Host Process for Windows S...	Microsoft Corporation
SecurityHealthService.exe		3,872 K	13,648 K	9772	Windows Security Health Ser...	Microsoft Corporation
svchost.exe		2,456 K	10,872 K	11724	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,440 K	5,672 K	12016	Host Process for Windows S...	Microsoft Corporation
svchost.exe		4,772 K	10,164 K	12088	Host Process for Windows S...	Microsoft Corporation
svchost.exe	0.01	2,180 K	11,140 K	4908	Host Process for Windows S...	Microsoft Corporation
svchost.exe		2,332 K	13,404 K	12404	Host Process for Windows S...	Microsoft Corporation
svchost.exe		6,864 K	20,236 K	13328	Host Process for Windows S...	Microsoft Corporation
svchost.exe		3,052 K	11,776 K	13548	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,844 K	7,432 K	9172	Host Process for Windows S...	Microsoft Corporation
svchost.exe		5,300 K	17,624 K	632	Host Process for Windows S...	Microsoft Corporation
svchost.exe		6,036 K	22,632 K	13852	Host Process for Windows S...	Microsoft Corporation
svchost.exe		3,400 K	15,184 K	13884	Host Process for Windows S...	Microsoft Corporation
svchost.exe	< 0.01	3,000 K	12,104 K	16352	Host Process for Windows S...	Microsoft Corporation
SgrmBroker.exe		6,372 K	8,332 K	14556	System Guard Runtime Monit...	Microsoft Corporation
svchost.exe		2,908 K	11,572 K	5340	Host Process for Windows S...	Microsoft Corporation
svchost.exe		5,088 K	22,012 K	13560	Host Process for Windows S...	Microsoft Corporation
svchost.exe		3,356 K	11,348 K	2216	Host Process for Windows S...	Microsoft Corporation
svchost.exe		4,328 K	15,316 K	12984	Host Process for Windows S...	Microsoft Corporation
svchost.exe		1,784 K	7,768 K	8804	Host Process for Windows S...	Microsoft Corporation
svchost.exe		3,500 K	11,672 K	22336	Host Process for Windows S...	Microsoft Corporation
lsass.exe		9,044 K	22,072 K	1016	Local Security Authority Proc...	Microsoft Corporation
fontdrvhost.exe		1,468 K	2,576 K	1036		
winlogon.exe		2,688 K	11,656 K	1196		
fontdrvhost.exe		4,224 K	7,076 K	1292		
dwm.exe	0.27	1,24,336 K	67,652 K	1360		
explorer.exe	0.04	2,71,424 K	2,31,028 K	7856	Windows Explorer	Microsoft Corporation
SecurityHealthSystray.exe		1,984 K	9,256 K	1596	Windows Security notification ...	Microsoft Corporation
RtkAudUService64.exe		2,348 K	10,144 K	2208	Realtek HD Audio Universal ...	Realtek Semiconductor
vgtray.exe	< 0.01	1,340 K	6,492 K	4388	Vanguard tray notification.	Riot Games, Inc.
OneDrive.exe	0.01	41,268 K	50,800 K	12308	Microsoft OneDrive	Microsoft Corporation
utility.exe		3,392 K	13,352 K	13056	This utility controls special ke...	Lenovo Group Ltd.
WINWORD.EXE		1,32,916 K	1,38,880 K	2928	Microsoft Word	Microsoft Corporation
WINWORD.EXE	0.01	1,26,296 K	1,12,372 K	2724	Microsoft Word	Microsoft Corporation
devenv.exe	0.51	3,15,116 K	3,99,000 K	18048	Microsoft Visual Studio 2019	Microsoft Corporation
PerfWatson2.exe	0.02	48,936 K	69,784 K	11292	PerfWatson2.exe	Microsoft Corporation
Microsoft.ServiceHub.Contr...		42,568 K	57,976 K	2624	Microsoft.ServiceHub.Control...	Microsoft
ServiceHub.IdentityHost...	< 0.01	75,132 K	83,920 K	13432	ServiceHub.IdentityHost.exe	Microsoft
ServiceHub.VSDetoure...		1,43,924 K	78,512 K	13744	ServiceHub.VSDetouredHos...	Microsoft
ServiceHub.SettingsHos...		1,51,612 K	1,05,912 K	17728	ServiceHub.SettingsHost.exe	Microsoft
ServiceHub.Host.CLR.x8...	< 0.01	78,456 K	65,744 K	16156	ServiceHub.Host.CLR.x86	Microsoft
ServiceHub.ThreadedW...		95,324 K	91,528 K	6732	ServiceHub.ThreadedWaitDi...	Microsoft
ServiceHub.Host.CLR.x8...		1,85,880 K	83,028 K	6056	ServiceHub.Host.CLR.x86	Microsoft
ServiceHub.TestWindo...	< 0.01	62,640 K	73,420 K	864	ServiceHub.TestWindowStor...	Microsoft