PROJ 6: IDA Pro

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CY -640

MALWARE ANALYSIS & DEFENSE

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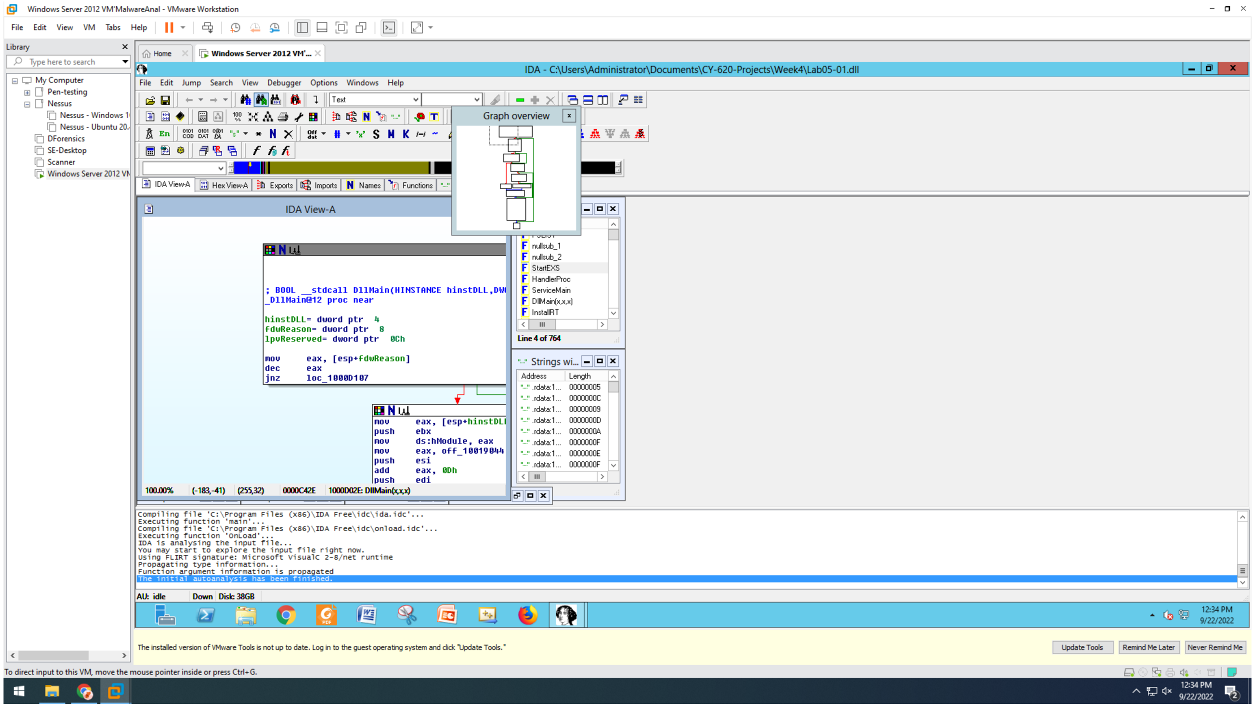
Introduction: In this lab, we are going to perform the practical malware analysis using IDA Pro.

Procedure :

Getting Started with IDA Pro

- Go to Start and Type IDA Pro to open the application.
- Once the program is launched then click Ok and then the New / PE Dynamic Library icon and Ok.



```
; BOOL __stdcall DllMain(HINSTANCE hinstDLL,DW
_DllMain@12 proc near

hinstDLL= dword ptr  4
fdwReason= dword ptr  8
lpvReserved= dword ptr  0Ch

mov     eax, [esp+fdwReason]
dec     eax
jnz     loc_1000D107
```

```
mov     eax, [esp+hinstDLL
push    ebx
mov     ds:hModule, eax
mov     eax, off_10019044
push    esi
add     eax, 0Dh
push    edi
```

100.00% (-183,-41) (255,32) 0000C42E 1000D02E: DllMain(x,x,x)

Address	Length
.rdata:1...	00000005
.rdata:1...	0000000C
.rdata:1...	00000009
.rdata:1...	0000000D
.rdata:1...	0000000A
.rdata:1...	0000000F
.rdata:1...	0000000E
.rdata:1...	0000000F

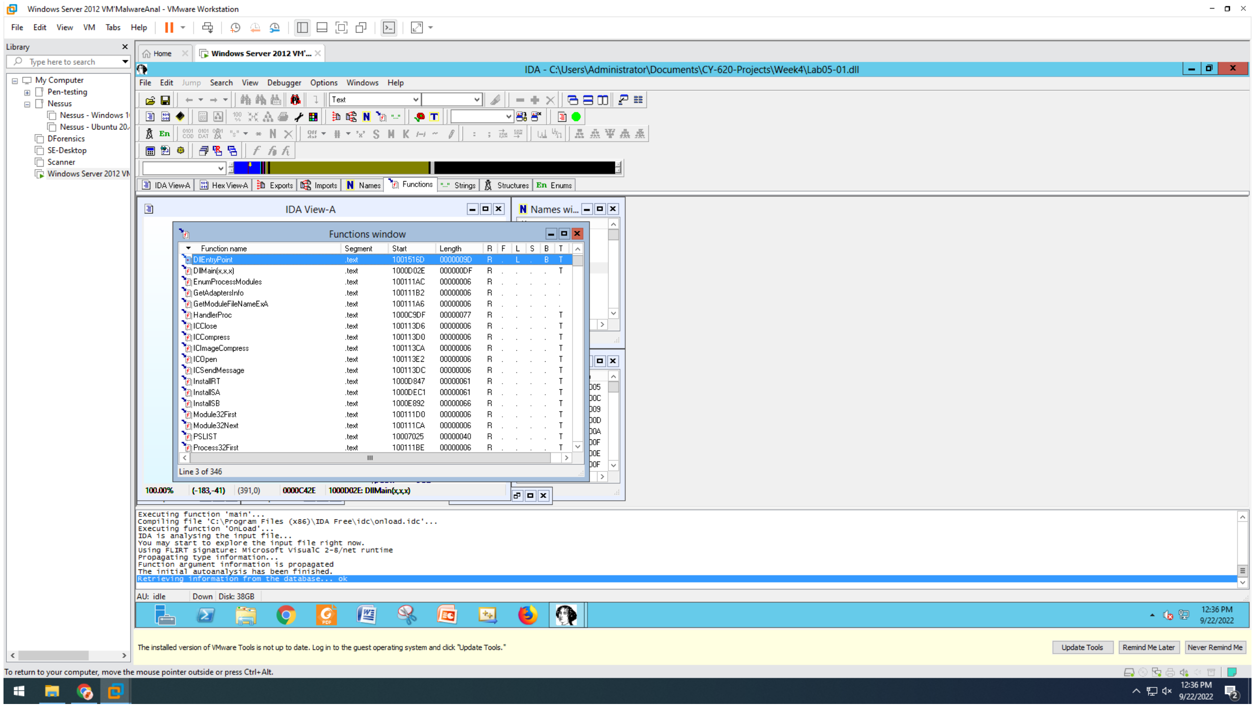
```
Compiling file 'C:\Program Files (x86)\IDA Free\idc\ida.idc'...
Executing function 'main'...
Compiling file 'C:\Program Files (x86)\IDA Free\idc\onload.idc'...
Executing function 'OnLoad'...
IDA is analysing the input file...
You may start to explore the input file right now.
Using FLIRT signature: Microsoft VisualC 2-8/net runtime
Propagating type information...
Function argument information is propagated
The initial autoanalysis has been finished.
```

AU: idle Down Disk: 38GB

The installed version of VMware Tools is not up to date. Log in to the guest operating system and click "Update Tools."

Finding the Address of DLLMain

- In IDA Pro, click Windows/ Function Window and click Function name.
- Take a screenshot and capture the DLLMain window.



Windows Server 2012 VM'MalwareAnal - VMware Workstation

IDA - C:\Users\Administrator\Documents\CY-620-Projects\Week4\Lab05-01.dll

Functions window

Function name	Segment	Start	Length	R	F	L	S	B	T
DllEntryPoint	.text	1001516D	0000009D	R	.	L	.	B	T
DllMain(x,x,x)	.text	1000D02E	000000DF	R	.	.	.	.	T
EnumProcessModules	.text	100111AC	00000006	R	.	.	.	.	.
GetAdaptersInfo	.text	100111B2	00000006	R	.	.	.	.	.
GetModuleFileNameExA	.text	100111A6	00000006	R	.	.	.	.	.
HandlerProc	.text	1000C9DF	00000077	R	.	.	.	.	T
ICClose	.text	100113D6	00000006	R	.	.	.	.	T
ICCompress	.text	100113D0	00000006	R	.	.	.	.	T
ICImageCompress	.text	100113CA	00000006	R	.	.	.	.	T
ICOpen	.text	100113E2	00000006	R	.	.	.	.	T
ICSendMessage	.text	100113DC	00000006	R	.	.	.	.	T
InstallRT	.text	1000D847	00000061	R	.	.	.	.	T
InstallSA	.text	1000DEC1	00000061	R	.	.	.	.	T
InstallSB	.text	1000E892	00000066	R	.	.	.	.	T
Module32First	.text	100111D0	00000006	R	.	.	.	.	T
Module32Next	.text	100111CA	00000006	R	.	.	.	.	T
PSLIST	.text	10007025	00000040	R	.	.	.	.	T
Process32First	.text	100111BE	00000006	R	.	.	.	.	T

Line 3 of 346

100.00% (-183,-41) (391,0) 0000C42E 1000D02E: DllMain(x,x,x)

```
Executing function 'main'...
Compiling file 'C:\Program Files (x86)\IDA Free\idc\onload.idc'...
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Retrieving information from the database... ok
```

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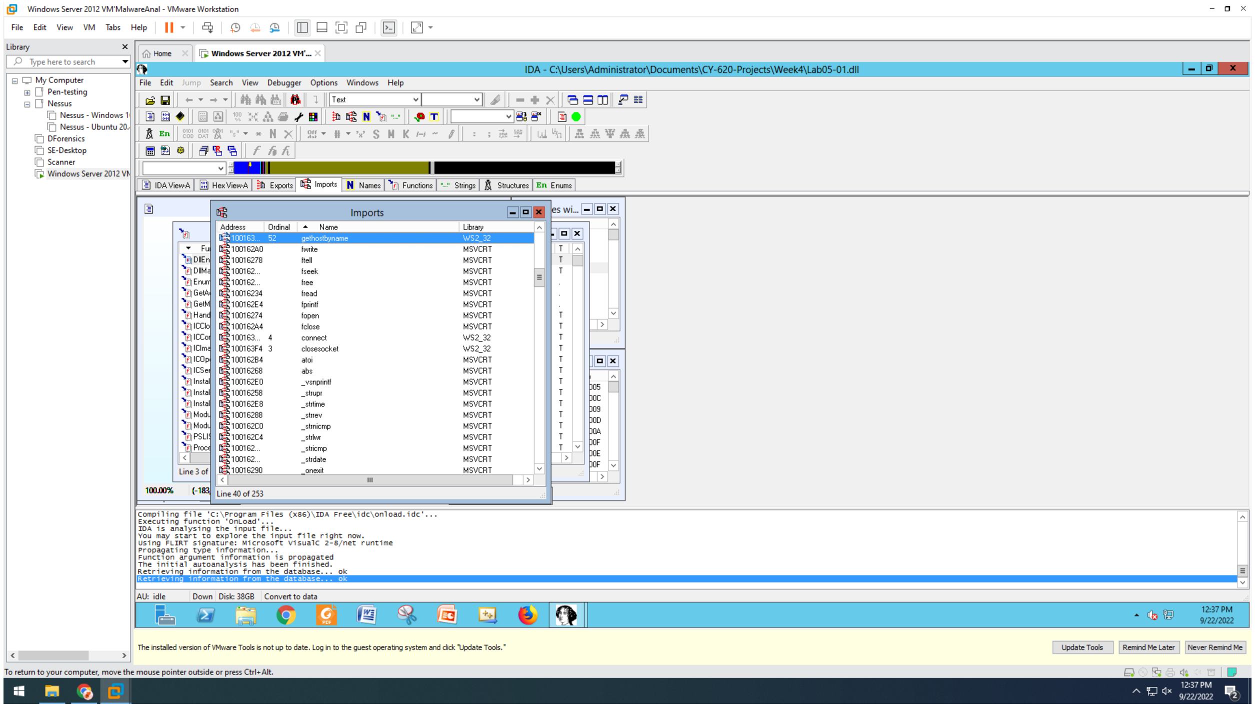
To return to your computer, move the mouse pointer outside or press Ctrl+Alt.

Find the import for the gethostbyname

- In IDA Pro, click Windows/ Imports. Click the Name header to sort by name. Find "gethostbyname" and widen the Address column to make the entire address visible.
- Take a fullscreen screenshot of the desktop.



Windows Server 2012 VM'MalwareAnal - VMware Workstation

IDA - C:\Users\Administrator\Documents\CY-620-Projects\Week4\Lab05-01.dll

Imports

Address	Ordinal	Name	Library
100163...	52	gethostbyname	WS2_32
100162A0		fwrite	MSVCRT
10016278		ftell	MSVCRT
100162...		fseek	MSVCRT
100162...		free	MSVCRT
10016234		fread	MSVCRT
100162E4		fprintf	MSVCRT
10016274		fopen	MSVCRT
100162A4		fclose	MSVCRT
100163...	4	connect	WS2_32
100163F4	3	closesocket	WS2_32
100162B4		atoi	MSVCRT
10016268		abs	MSVCRT
100162E0		_vsnprintf	MSVCRT
10016258		_strupr	MSVCRT
100162E8		_strtime	MSVCRT
10016288		_strrev	MSVCRT
100162C0		_strnicmp	MSVCRT
100162C4		_strlwr	MSVCRT
100162...		_stricmp	MSVCRT
100162...		_strdate	MSVCRT
10016290		_onexit	MSVCRT

Line 40 of 253

```
Compiling file 'C:\Program Files (x86)\IDA Free\idc\onload.idc'...
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```

AU: idle Down Disk: 38GB Convert to data

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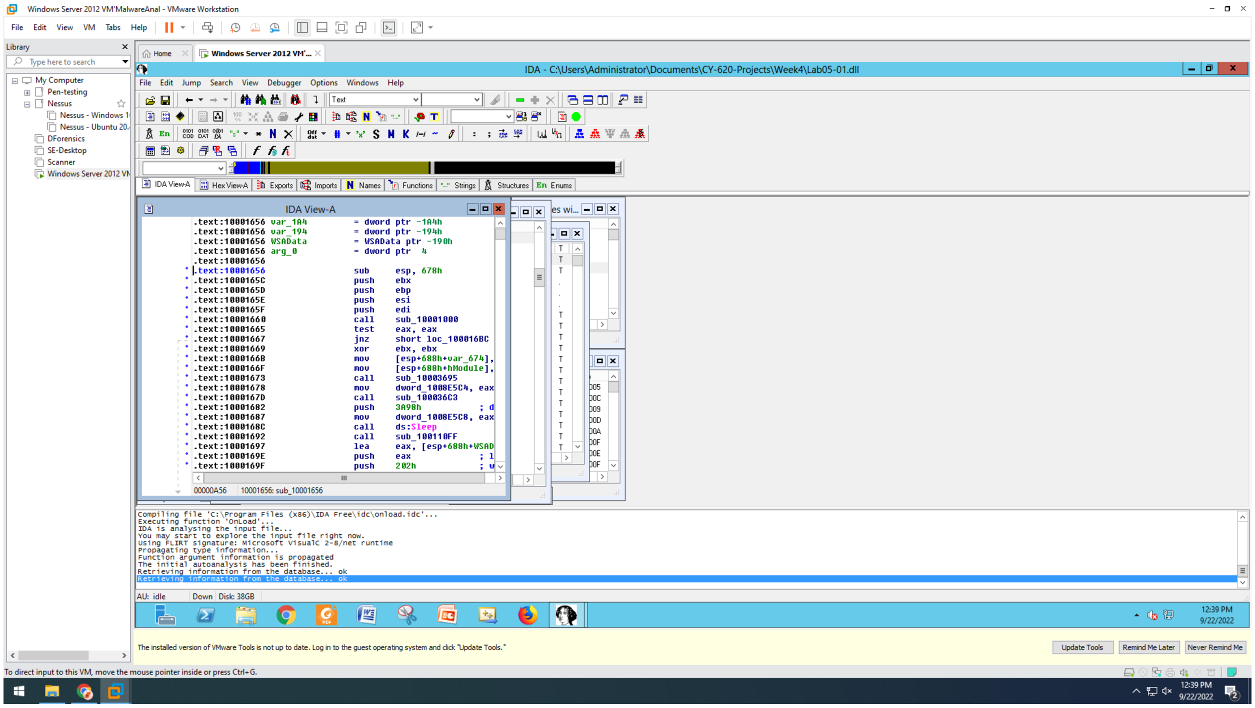
Count Local Variables for the Subroutine at 0x10001656

- In IDA Pro, click Windows/ IDA View-A and press SPACEBAR to get the text view.
- Now press g to go and enter address 0x10001656 and click OK.



```
.text:10001656 var_1A4         = dword ptr -1A4h
.text:10001656 var_194         = dword ptr -194h
.text:10001656 WSAData         = WSAData ptr -190h
.text:10001656 arg_0           = dword ptr  4
.text:10001656
.text:10001656                 sub     esp, 678h
.text:1000165C                 push    ebx
.text:1000165D                 push    ebp
.text:1000165E                 push    esi
.text:1000165F                 push    edi
.text:10001660                 call    sub_10001000
.text:10001665                 test    eax, eax
.text:10001667                 jnz     short loc_100016BC
.text:10001669                 xor     ebx, ebx
.text:1000166B                 mov     [esp+688h+var_674],
.text:1000166F                 mov     [esp+688h+hModule],
.text:10001673                 call    sub_10003695
.text:10001678                 mov     dword_1008E5C4, eax
.text:1000167D                 call    sub_100036C3
.text:10001682                 push    3A98h           ; d
.text:10001687                 mov     dword_1008E5C8, eax
.text:1000168C                 call    ds:Sleep
.text:10001692                 call    sub_100110FF
.text:10001697                 lea     eax, [esp+688h+WSAD
.text:1000169E                 push    eax             ; l
.text:1000169F                 push    202h            ; w
```

00000A56 10001656: sub_10001656

```
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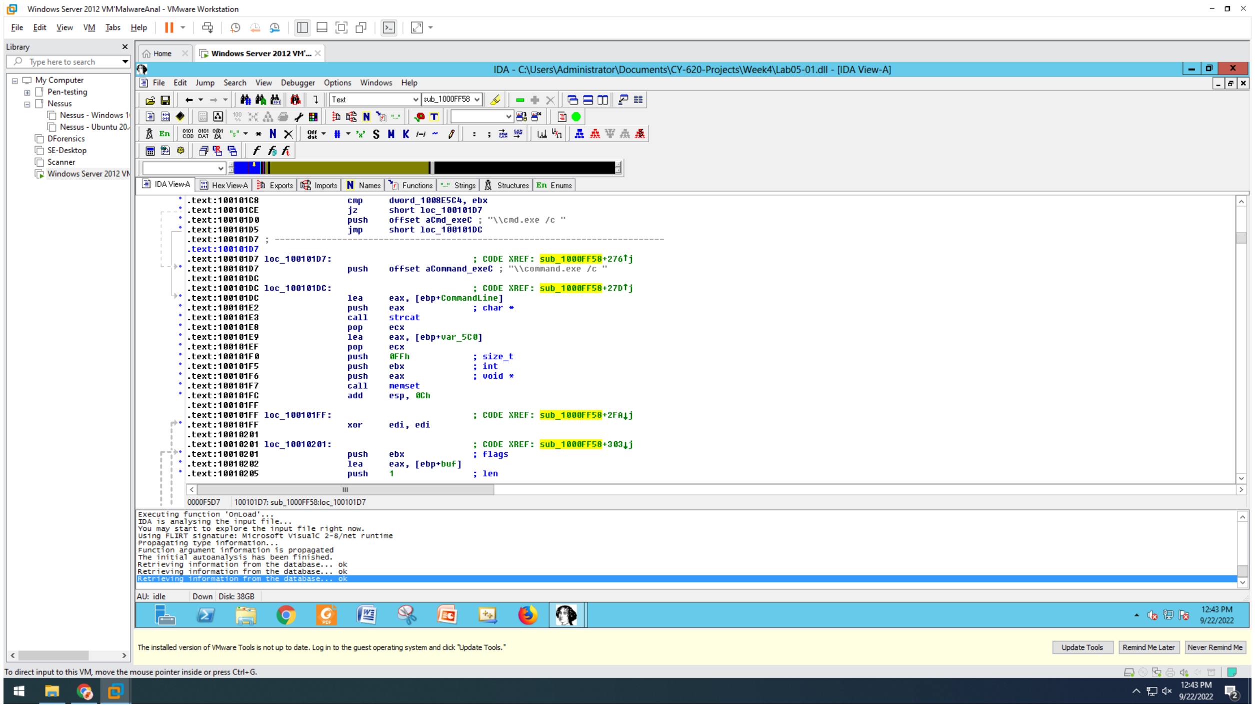
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.

Finding the Purpose of the code that References \cmd.exe /c

- In IDA Pro, click on strings and sort by string find the string “\\cmd.exe/c” and double click it.
- You will see the “XREF” double click the address and Press SPACEBAR to the graph view.
- Take a full Screenshot of the desktop.
- Now drag the graph view to subroutines and Double click “aHiMasterDDDD” to find the whole message.


Windows Server 2012 VM'MalwareAnal - VMware Workstation
IDA - C:\Users\Administrator\Documents\CY-620-Projects\Week4\Lab05-01.dll - [IDA View-A]
IDA View-A
Hex View-A
Exports
Imports
Names
Functions
Strings
Structures
Enums

```
.text:100101C8                 cmp     dword_1008E5C4, ebx
.text:100101CE                 jz      short loc_100101D7
.text:100101D0                 push    offset aCmd_exeC ; "\\cmd.exe /c "
.text:100101D5                 jmp     short loc_100101DC
.text:100101D7 ; ---------------------------------------------------------------------------
.text:100101D7
.text:100101D7 loc_100101D7:                           ; CODE XREF: sub_1000FF58+276↑j
.text:100101D7                 push    offset aCommand_exeC ; "\\command.exe /c "
.text:100101DC
.text:100101DC loc_100101DC:                           ; CODE XREF: sub_1000FF58+27D↑j
.text:100101DC                 lea     eax, [ebp+CommandLine]
.text:100101E2                 push    eax             ; char *
.text:100101E3                 call    strcat
.text:100101E8                 pop     ecx
.text:100101E9                 lea     eax, [ebp+var_5C0]
.text:100101EF                 pop     ecx
.text:100101F0                 push    0FFh            ; size_t
.text:100101F5                 push    ebx             ; int
.text:100101F6                 push    eax             ; void *
.text:100101F7                 call    memset
.text:100101FC                 add     esp, 0Ch
.text:100101FF
.text:100101FF loc_100101FF:                           ; CODE XREF: sub_1000FF58+2FA↓j
.text:100101FF                 xor     edi, edi
.text:10010201
.text:10010201 loc_10010201:                           ; CODE XREF: sub_1000FF58+303↓j
.text:10010201                 push    ebx             ; flags
.text:10010202                 lea     eax, [ebp+buf]
.text:10010205                 push    1               ; len
```

```
0000F5D7       100101D7: sub_1000FF58:loc_100101D7
```

```
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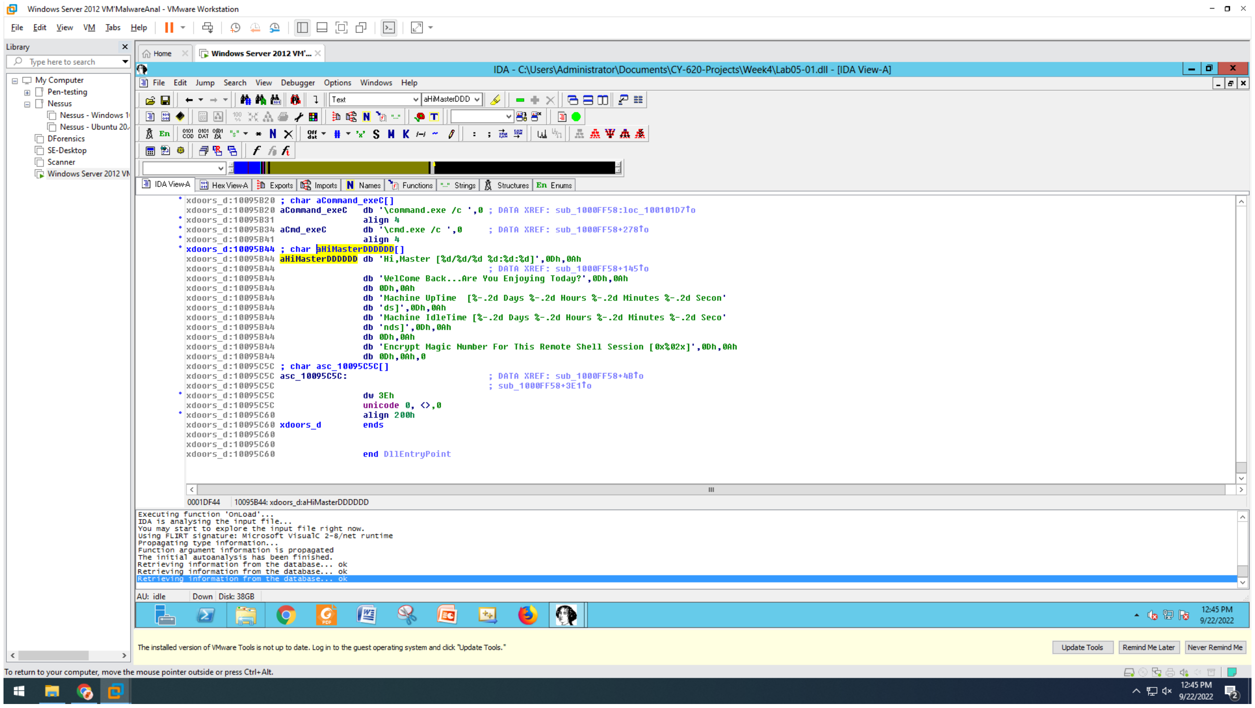
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IDA View-A
Hex View-A
Exports
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```
xdoors_d:10095B20 ; char aCommand_exeC[]
xdoors_d:10095B20 aCommand_exeC   db '\command.exe /c ',0 ; DATA XREF: sub_1000FF58:loc_100101D7↑o
xdoors_d:10095B31                 align 4
xdoors_d:10095B34 aCmd_exeC       db '\cmd.exe /c ',0     ; DATA XREF: sub_1000FF58+278↑o
xdoors_d:10095B41                 align 4
xdoors_d:10095B44 ; char aHiMasterDDDDDD[]
xdoors_d:10095B44 aHiMasterDDDDDD db 'Hi,Master [%d/%d/%d %d:%d:%d]',0Dh,0Ah
xdoors_d:10095B44                                         ; DATA XREF: sub_1000FF58+145↑o
xdoors_d:10095B44                 db 'WelCome Back...Are You Enjoying Today?',0Dh,0Ah
xdoors_d:10095B44                 db 0Dh,0Ah
xdoors_d:10095B44                 db 'Machine UpTime  [%-.2d Days %-.2d Hours %-.2d Minutes %-.2d Secon'
xdoors_d:10095B44                 db 'ds]',0Dh,0Ah
xdoors_d:10095B44                 db 'Machine IdleTime [%-.2d Days %-.2d Hours %-.2d Minutes %-.2d Seco'
xdoors_d:10095B44                 db 'nds]',0Dh,0Ah
xdoors_d:10095B44                 db 0Dh,0Ah
xdoors_d:10095B44                 db 'Encrypt Magic Number For This Remote Shell Session [0x%02x]',0Dh,0Ah
xdoors_d:10095B44                 db 0Dh,0Ah,0
xdoors_d:10095C5C ; char asc_10095C5C[]
xdoors_d:10095C5C asc_10095C5C:                           ; DATA XREF: sub_1000FF58+4B↑o
xdoors_d:10095C5C                                         ; sub_1000FF58+3E1↑o
xdoors_d:10095C5C                 dw 3Eh
xdoors_d:10095C5C                 unicode 0, <>,0
xdoors_d:10095C60                 align 200h
xdoors_d:10095C60 xdoors_d        ends
xdoors_d:10095C60
xdoors_d:10095C60
xdoors_d:10095C60                 end DllEntryPoint
```

```
0001DF44       10095B44: xdoors_d:aHiMasterDDDDDD
```

```
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Conclusion: To conclude with the lab we get to know about the basics of how to use the IDA-Pro and also we try out different tasks to get hands-on with IDA-Pro for Other Projects.