网鼎杯青龙组逆向writeup

原创

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bang

1. 配置frida环境：安装python3，pip install frida ，pip install fridatools。

在https://github.com/frida/frida/releases下载对应的frida-server

frida-server-12.8.20-android-arm.xz

frida-server-12.8.20-android-arm64.xz

frida-server-12.8.20-android-x86.xz

frida-server-12.8.20-android-x86_64.xz

用下面命令把frida-server push到手机或模拟器中

adb push frida-server /data/local/tmp

adb chmod 777 /data/local/tmp/frida-server

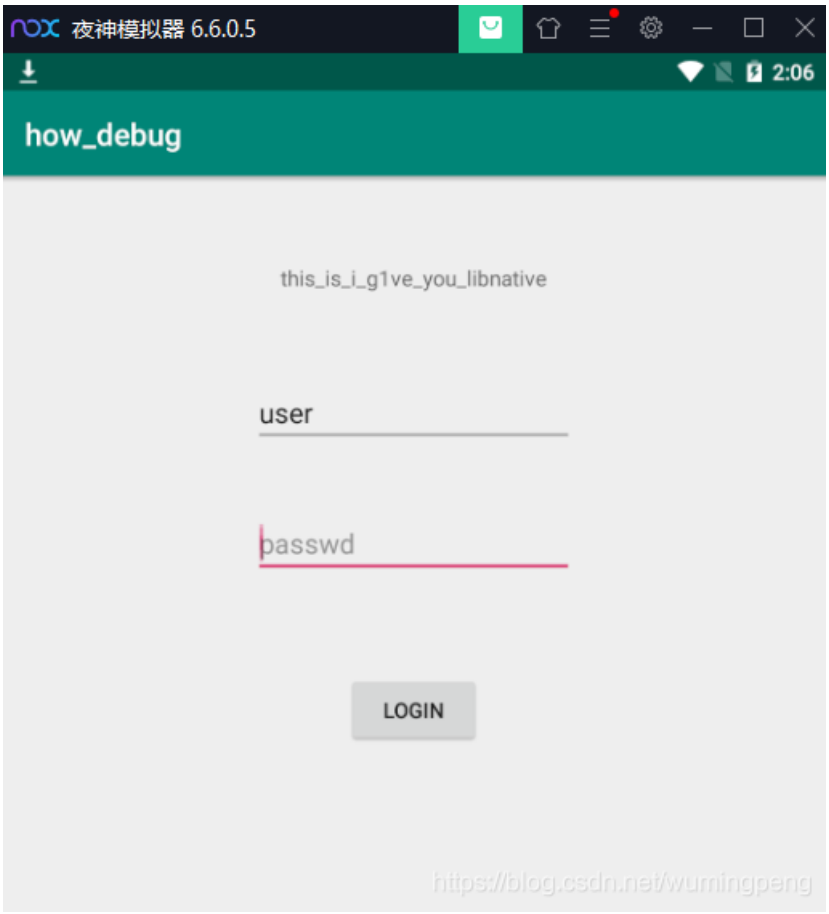
执行frida-server

再开一个命令行窗口，执行adb forward tcp:27042 tcp:27042

```
C:\Users\wmp10>adb shell
root@shamu:/ # chmod 777 /data/local/tmp/frida-server
chmod 777 /data/local/tmp/frida-server
root@shamu:/ # /data/local/tmp/frida
/data/local/tmp/frida
/system/bin/sh: /data/local/tmp/frida: not found
127|root@shamu:/ # /data/local/tmp/frida-server
/data/local/tmp/frida-server
WARNING: linker: /data/local/tmp/frida-server: unused DT entry: type 0x6ffffef5 arg 0x1c24
```

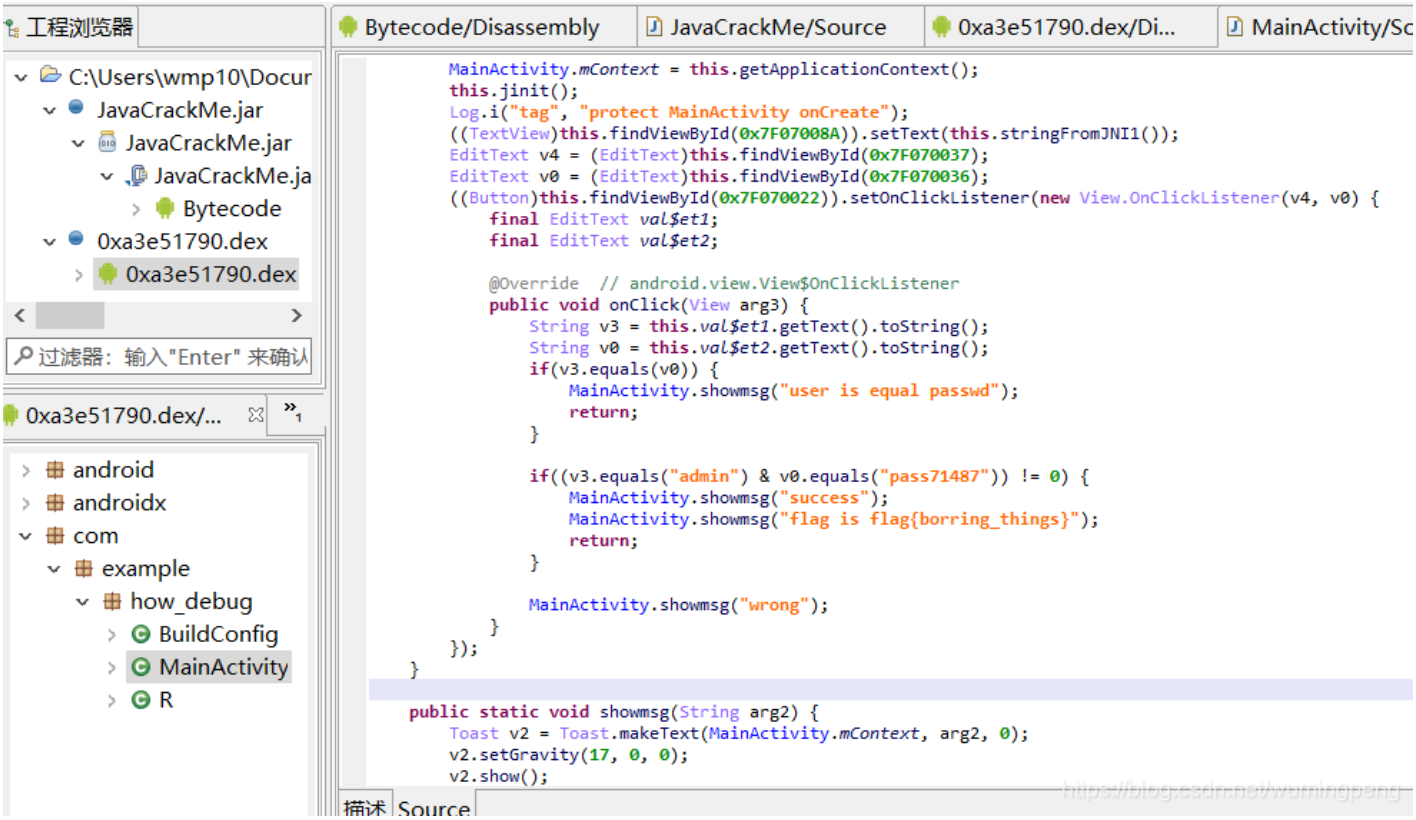
```
C:\Windows\system32\cmd.exe
Microsoft Windows [版本 10.0.18362.778]
(c) 2019 Microsoft Corporation。保留所有权利。

C:\Users\wmp10>adb forward tcp:27042 tcp:27042

C:\Users\wmp10>
```


然后再模拟器里面启动apk



然后运行脱壳工具

1. 用jeb反编译脱壳的dex,就可以看到flag

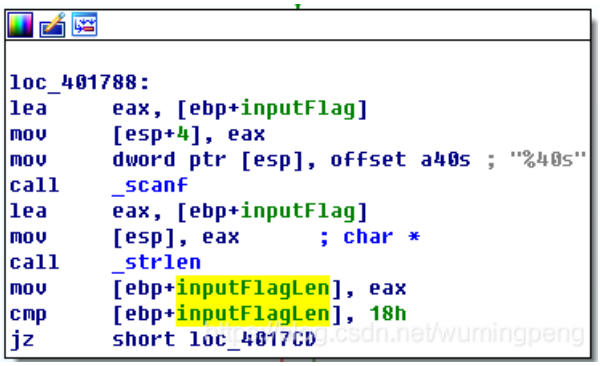


Jocker

1.首先在程序的开头就把代码段的一段空间修改为可读可写的属性。代码段本身属性是可读可执行，不可写的。

```
lea     ecx, [esp+4]
and     esp, 0FFFFFFF0h
push    dword ptr [ecx-4]
push    ebp
mov     ebp, esp
push    ecx
sub     esp, 0A4h
call    ___main
mov     dword ptr [esp], offset aPleaseInputYou ; "please input you flag:"
call    _puts
lea     eax, [ebp+flOldProtect]
mov     [esp+0Ch], eax  ; lpflOldProtect
mov     dword ptr [esp+8], 4 ; flNewProtect
mov     dword ptr [esp+4], 0C8h ; dwSize
mov     dword ptr [esp], offset __Z7encryptPc ; lpAddress
mov     eax, ds:__imp__VirtualProtect@16 ; VirtualProtect(x,x,x,x)
call    eax ; VirtualProtect(x,x,x,x) ; VirtualProtect(x,x,x,x)
sub     esp, 10h
test    eax, eax
setz    al
test    al, al
jz      short loc_401788
```


2.比较输入的flag字符串长度是否为24

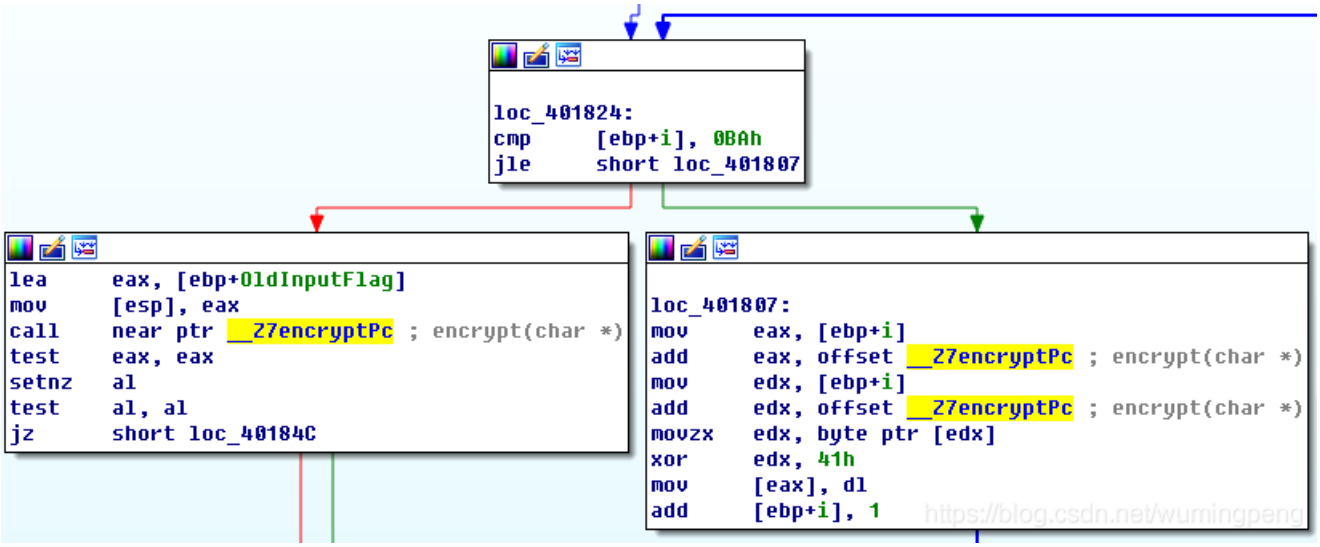


```
loc_401788:
lea     eax, [ebp+inputFlag]
mov     [esp+4], eax
mov     dword ptr [esp], offset a40s ; "%40s"
call    _scanf
lea     eax, [ebp+inputFlag]
mov     [esp], eax      ; char *
call    _strlen
mov     [ebp+inputFlagLen], eax
cmp     [ebp+inputFlagLen], 18h
jz      short loc_4017CD
```


3.有两段伪加解密和比较伪flag函数

```
char flag[]={'f','k','c','d',0x7f,'a','g','d',0x3b,'v','k','a',0x7b,0x26,0x3b,0x50,0x63,0x5f,0x4d,0x5a,0x71,
0xc,0x37,0x66};
for(int i=0;i<=23;i++)
{if(i&1)
    {flag[i]=flag[i]+i; }
else
    {flag[i]=flag[i]^i;
}
}//flag{fak3_alw35_sp_me!!}
```

4.解密正真的flag算法和比较代码，也就是1里面修改了内存属性的那一段地址代码。



下图是解密前的代码

```
; _DWORD __cdecl encrypt(char *)
public __Z7encryptPc
__Z7encryptPc proc far
adc     al, 0C8h
movsb
push    ss
pop     ss
adc     al, dl
lodsd
cmp     eax, 40A10486h
inc     ecx
inc     ecx
inc     ecx
int     3               ; Trap to Debugger
add     al, 0D5h
cli
add     [ecx+1], esi
inc     ecx
sti
push    edx
inc     ecx
inc     ecx
inc     ecx
enter   0FFFFC886h, 9Fh
enter   0FFFFB290h, 0E4h
xchg    al, ds:41414141h
stosb
or      dl, cl
adc     al, 0A5h
retf    4904h
```


5写脚本解密代码

stadd=0x401500

stsize=186

i=0

while(i<=186):

```
    ch=ord(ida_bytes.get_bytes(stadd+i,1))^0x41
    ida_bytes.patch_byte(stadd+i,ch)
    i+=1
print("done")
```

下图是解密后真正计算和比较flag的代码

```
int __cdecl encrypt(char *a1)
{
  int v2[19]; // [esp+1Ch] [ebp-6Ch]
  int v3; // [esp+68h] [ebp-20h]
  int i; // [esp+6Ch] [ebp-1Ch]

  v3 = 1;
  qmemcpy(v2, &unk_403040, sizeof(v2));
  for ( i = 0; i <= 18; ++i )
  {
    if ( (char)(a1[i] ^ aHahahahaDoYouF[i]) != v2[i] )
    {
      puts("wrong ~~");
      v3 = 0;
      exit(0);
    }
  }
  if ( v3 == 1 )
    puts("come here");
  return v3;
}
```



```
00401500   55              push    ebp
00401501   89E5            mov     ebp, esp
00401503   57              push    edi
00401504   56              push    esi
00401505   53              push    ebx
00401506   83EC 7C         sub     esp, 7C
00401509   C745 E0 010000(mov     dword ptr [ebp-20], 1
00401510   8D45 94         lea     eax, [ebp-6C]
00401513   BB 40304000     mov     ebx, 00403040
00401518   BA 13000000     mov     edx, 13
0040151D   89C7            mov     edi, eax
0040151F   89DE            mov     esi, ebx
00401521   89D1            mov     ecx, edx
00401523   F3:A5           rep     movs dword ptr es:[edi], dword ptr [esi]
00401525   C745 E4 000000(mov     dword ptr [ebp-1C], 0
0040152C   EB 49           jmp     short 00401577
0040152E   8B55 E4         mov     edx, [ebp-1C]
00401531   8B45 08         mov     eax, [ebp+8]
00401534   01D0            add     eax, edx
00401536   0FB610          movzx   edx, byte ptr [eax]
00401539   8B45 E4         mov     eax, [ebp-1C]
0040153C   05 12404000     add     eax, 00404012                   ASCII "hahahaha_do_you_find_me?"
00401541   0FB600          movzx   eax, byte ptr [eax]
00401544   31D0            xor     eax, edx
00401546   0FBED0          movsx   edx, al
00401549   8B45 E4         mov     eax, [ebp-1C]
0040154C   8B4485 94       mov     eax, [ebp+eax*4-6C]
00401550   39C2            cmp     edx, eax
00401552   74 1F           je      short 00401573
00401554   C70424 0040400(mov     dword ptr [esp], 00404000       ASCII "wrong ~~"
0040155B   E8 E0130000     call    <jmp.&msvcrt.puts>
00401560   C745 E0 000000(mov     dword ptr [ebp-20], 0
00401567   C70424 0000000(mov     dword ptr [esp], 0
0040156E   E8 AD130000     call    <jmp.&msvcrt.exit>
00401573   8345 E4 01      add     dword ptr [ebp-1C], 1
00401577   837D E4 12      cmp     dword ptr [ebp-1C], 12
0040157B   7E B1           jle     short 0040152E
0040157D   837D E0 01      cmp     dword ptr [ebp-20], 1
00401581   75 0C           jnz     short 0040158F
00401583   C70424 0840400(mov     dword ptr [esp], 00404008       ASCII "come here"
0040158A   E8 B1130000     call    <jmp.&msvcrt.puts>
```

5算法

取输入的flag的19个字符与hahahaha_do_you_find_me?的前19个字符做异或运算

比较值是否为

{0xe,0xd,0x9,0x6,0x13,0x5,0x58,0x56,0x3e,0x6,0xc,0x3c,0x1f,0x57,0x14,0x6b,0x57,0x59,0xd}

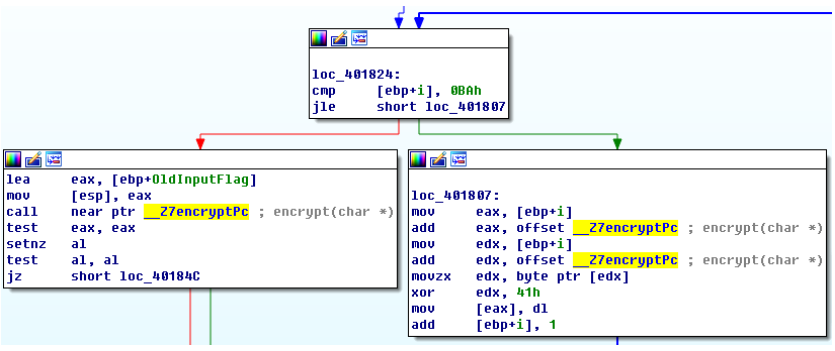
如果相等就是正确的flag。

```
char key[]={"hahahaha_do_you_find_me?"};

char enflag[]={0xe,0xd,0x9,0x6,0x13,0x5,0x58,0x56,0x3e,0x6,0xc,0x3c,0x1f,0x57,0x14,

0x6b,0x57,0x59,0xd};

char a;

for(int i=0;i<20;i++)

{

    a = key[i]^enflag[i];

    printf("%c\n",a);

}
```

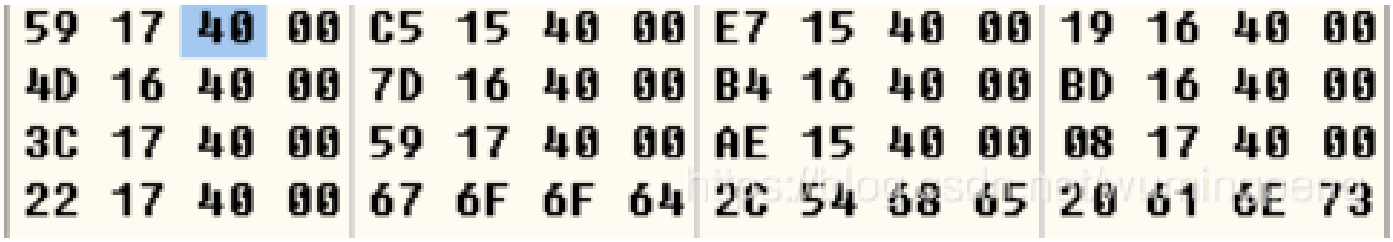
```
a = [0x25,0x74,0x70,0x26,0x3a]
flag = 'flag{d07abccf8a410c'
for i in range(len(a)):
    flag += chr(a[i]^71)
print(flag)
```

Signal

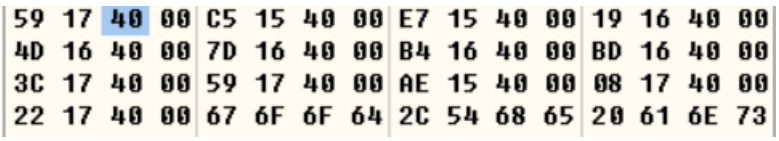
1.是一个简单的虚拟机运行的题目



2.通过虚拟机的流程控制去执行相应的操作



3.流程控制执行的代码数组，下面的代码地址对应相应的case



4.下面是程序对输入的flag做的运算处理，计算每一个字符与{0x22,0x3f,0x34,0x32,0x72,0x33,0x18,0xfa7,0x31,0xf1,0x28,0xf84,0xfc1,0x1e,0x7a}去做对比

1	10h^input[0]-5=22h
2	(20h^input[1])*3=3Fh
3	input[2]-2-1=34h
4	(input[3]+1)^4=32h
5	input[4]*3-21h=72h
6	input[5]-1-1=33h
7	9^input[6]-20=18
8	(51h+input[7])^24h=FA7
9	input[8]+1-1=31h
10	2*input[9]+25h=F1
11	(36h+input[10])^41h=28h
12	(20h+input[11])*1=F84h
13	3*input[12]+25h=C1h
14	9^input[13]-20h=1Eh
15	41h+input[14]+1=7Ah

5.还原flag

```
int main(int argc, char* argv[])
{
    printf("%c",(0x10^(0x22+5)));
    printf("%c",(0x20^(0x3f/3)));
    printf("%c",(0x34+3));
    printf("%c",((0x32^4)-1));
    printf("%c",((0x72+0x21)/3));
    printf("%c",(0x33+2));
    printf("%c",(0x9^(0x18+0x20)));
```

```
    printf("%c",((0xfa7^0x24)-0x51));
    printf("%c",(0x31));
    printf("%c",((0xf1-0x25)/2));
    printf("%c",((0x28^0x41)-0x36));
    printf("%c",(0xf84-0x20));
    printf("%c",((0xc1-0x25)/3));
    printf("%c",((0x1e+0x20)^0x9));
    printf("%c\n",(0x7a-0x42));

    return 0;
}
```