HW1

(1)

strcpy()因為沒有限制複製的大小，有可能會造成 buffer overflow

myprivatetest()沒有被呼叫過，最好不要放在裡面，使用者有可能透過 buffer overflow 去執行

(2)

```
wei@wei-virtual-machine:~/Desktop/HW1$ flawfinder --columns --context hw1.c --html
Flawfinder version 1.31, (C) 2001-2014 David A. Wheeler.
Number of rules (primarily dangerous function names) in C/C++ ruleset: 169
Examining hw1.c
Warning: Skipping non-existent file --html

FINAL RESULTS:

hw1.c:20:5:  [4] (buffer) strcpy:
  Does not check for buffer overflows when copying to destination (CWE-120).
  Consider using strcpy_s, strncpy, or strlcpy (warning, strncpy is easily
  misused).
    strcpy(Uid, a1);
hw1.c:21:5:  [4] (buffer) strcpy:
  Does not check for buffer overflows when copying to destination (CWE-120).
  Consider using strcpy_s, strncpy, or strlcpy (warning, strncpy is easily
  misused).
    strcpy(Uname, a2);
hw1.c:22:5:  [4] (buffer) strcpy:
  Does not check for buffer overflows when copying to destination (CWE-120).
  Consider using strcpy_s, strncpy, or strlcpy (warning, strncpy is easily
  misused).
    strcpy(Upass, a3);
hw1.c:32:1:  [4] (shell) system:
  This causes a new program to execute and is difficult to use safely
  (CWE-78). try using a library call that implements the same functionality
  if available.
system("/usr/bin/xeyes");
hw1.c:19:5:  [2] (buffer) char:
  Statically-sized arrays can be improperly restricted, leading to potential
  overflows or other issues (CWE-119:CWE-120). Perform bounds checking, use
  functions that limit length, or ensure that the size is larger than the
  maximum possible length.
    char Uid[27], Uname[25], Upass[70];

ANALYSIS SUMMARY:

Hits = 5
Lines analyzed = 33 in approximately 0.01 seconds (4827 lines/second)
Physical Source Lines of Code (SLOC) = 33
Hits@level = [0]   0 [1]   0 [2]   1 [3]   0 [4]   4 [5]   0
Hits@level+ = [0+]   5 [1+]   5 [2+]   5 [3+]   4 [4+]   4 [5+]   0
Hits/KSLOC@level+ = [0+] 151.515 [1+] 151.515 [2+] 151.515 [3+] 121.212 [4+] 121.212 [5+]   0
Minimum risk level = 1
Not every hit is necessarily a security vulnerability.
There may be other security vulnerabilities; review your code!
See 'Secure Programming for Linux and Unix HOWTO'
(http://www.dwheeler.com/secure-programs) for more information.
wei@wei-virtual-machine:~/Desktop/HW1$
```

strcpy()沒有檢查大小

使用 system()會執行一個新的程式，而且不容易安全的使用

固定的陣列大小可能會產生 buffer overflow

(3)

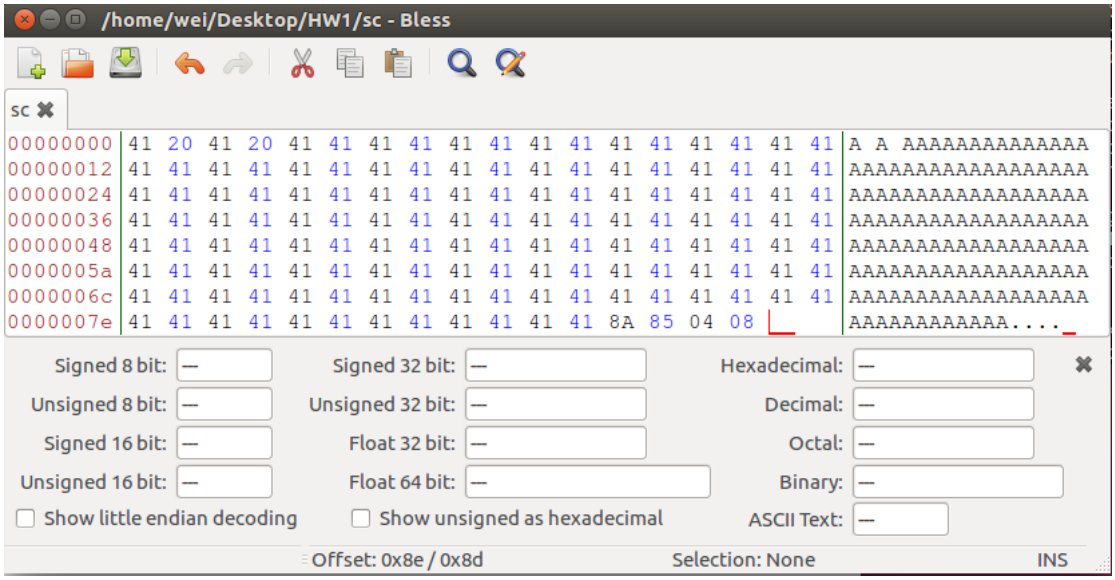
```
(gdb) r A A `perl -e 'print "A"x138'`
Starting program: /home/wei/Desktop/HW1/hw1 A A `perl -e 'print "A"x138'`

Program received signal SIGSEGV, Segmentation fault.
0x41414141 in ?? ()
(gdb) bt
#0  0x41414141 in ?? ()
#1  0xbffff100 in ?? ()
Backtrace stopped: previous frame inner to this frame (corrupt stack?)
(gdb)
```

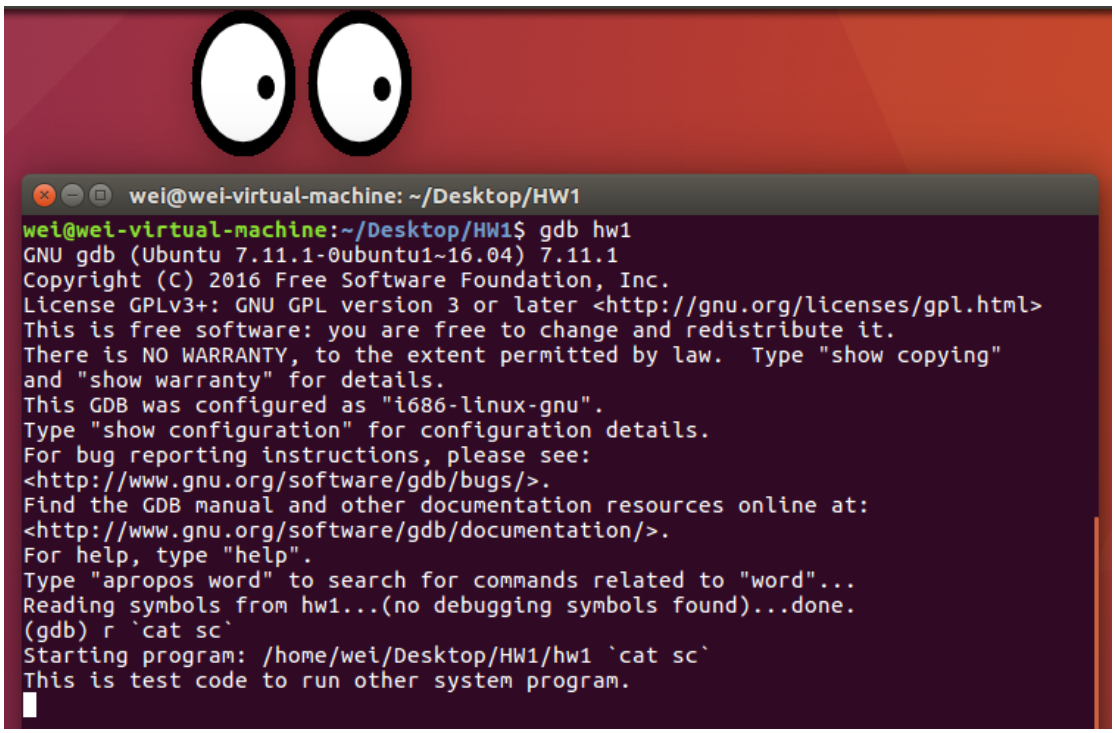
嘗試造成 buffer overflow 並找出對應的 return address

```
(gdb) disass myprivatetest
Dump of assembler code for function myprivatetest:
   0x0804858a <+0>:     push   %ebp
   0x0804858b <+1>:     mov    %esp,%ebp
   0x0804858d <+3>:     sub    $0x8,%esp
   0x08048590 <+6>:     sub    $0xc,%esp
   0x08048593 <+9>:     push   $0x8048684
   0x08048598 <+14>:    call   0x8048360 <puts@plt>
   0x0804859d <+19>:    add    $0x10,%esp
   0x080485a0 <+22>:    sub    $0xc,%esp
   0x080485a3 <+25>:    push   $0x80486b3
   0x080485a8 <+30>:    call   0x8048370 <system@plt>
   0x080485ad <+35>:    add    $0x10,%esp
   0x080485b0 <+38>:    nop
   0x080485b1 <+39>:    leave
   0x080485b2 <+40>:    ret
End of assembler dump.
```

找出 myprivatetest 的位址



利用 shellcode 將原本的 return address 改成 myprivatetest 的位址



執行結果

(4)

```c
#include <stdio.h>
#include <string.h>

int UPtest(char *, char *, char *);

int main (int argc, char**argv){

    if(UPtest(argv[1],argv[2],argv[3])){
        printf("Access granted...\n");
    }else{
        printf("Wrong username and password!!!!\n");
    }
    return 0;
}

int UPtest(char*a1, char*a2, char*a3){

    char Uid[27], Uname[25], Upass[70];
    strncpy(Uid, a1, 27);
    strncpy(Uname, a2, 25);
    strncpy(Upass, a3, 70);

if (!strcmp(Uname,"Admin")&& !strcmp(Upass,"PassAd009"))
        return 1;
else
        return 0;
}
```

使用 strncpy()限制複製的數量

刪除 myprivatetest()宣告與定義