

# SP\_hw6

## 一. 測試環境

- WSL2 (Windows Subsystem for Linux 2) 20.04.4

```
dereklee0310@Computer1: ~  
dereklee0310@Computer1:~$ lsb_release -a  
No LSB modules are available.  
Distributor ID: Ubuntu  
Description:   Ubuntu 20.04.4 LTS  
Release:      20.04  
Codename:     focal  
dereklee0310@Computer1:~$ uname -a  
Linux Computer1 5.10.102.1-microsoft-standard-WSL2 #1 SMP Wed Mar 2 00:30:59 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux  
dereklee0310@Computer1:~$
```

## 二. makefile內容

```
dereklee0310@Computer1: ~  
dereklee0310@Computer1:~/sp_repo/hw6$ cat makefile  
all:      myBusybox.c  
          gcc myBusybox.c -o myBusybox  
          ln -s myBusybox ls  
          ln -s myBusybox cp  
          ln -s myBusybox cat  
          ln -s myBusybox chown  
  
clean:  
        rm myBusybox  
        rm ls cp cat chown  
dereklee0310@Computer1:~/sp_repo/hw6$
```

create soft link to myBusybox

## 二.執行結果

### 1.查看程式所需要的動態連結函式庫

```
readelf -d /usr/bin/ls
```

```
dereklee0310@Computer1: ~ X + v
dereklee0310@Computer1:~/sp_repo/hw6$ readelf -d /usr/bin/ls

Dynamic section at offset 0x21a58 contains 28 entries:
   Tag               Type              Name/Value
0x0000000000000001 (NEEDED)         Shared library: [libselinux.so.1]
0x0000000000000001 (NEEDED)         Shared library: [libc.so.6]
0x000000000000000c (INIT)           0x4000
0x000000000000000d (FINI)           0x17574
0x0000000000000019 (INIT_ARRAY)     0x22010
0x000000000000001b (INIT_ARRAYSZ)   8 (bytes)
0x000000000000001a (FINI_ARRAY)     0x22018
0x000000000000001c (FINI_ARRAYSZ)   8 (bytes)
0x0000000006ffffef5 (GNU_HASH)       0x3a0
0x0000000000000005 (STRTAB)       0x1190
0x0000000000000006 (SYMTAB)       0x488
0x000000000000000a (STRSZ)        1612 (bytes)
0x000000000000000b (SYMENT)       24 (bytes)
0x0000000000000015 (DEBUG)         0x0
0x0000000000000003 (PLTGOT)       0x22c58
0x0000000000000002 (PLTRELSZ)     2544 (bytes)
0x0000000000000014 (PLTREL)       RELA
0x0000000000000017 (JMPREL)       0x2cb8
0x0000000000000007 (RELA)         0x1968
0x0000000000000008 (RELASZ)       4944 (bytes)
0x0000000000000009 (RELAENT)      24 (bytes)
0x000000000000001e (FLAGS)        BIND_NOW
0x0000000006fffffb (FLAGS_1)      Flags: NOW PIE
0x0000000006fffffe (VERNEED)     0x18f8
0x0000000006ffffff (VERNEEDNUM)   1
0x0000000006fffff0 (VERSYM)       0x17dc
0x0000000006fffff9 (RELACOUNT)    193
0x0000000000000000 (NULL)         0x0
dereklee0310@Computer1:~/sp_repo/hw6$
```

```
readelf -d ~/busybox/_install/bin/busybox
```

```
dereklee0310@Computer1: ~  
dereklee0310@Computer1:~/sp_repo/hw6$ readelf -d ~/busybox/_install/bin/busybox  
There is no dynamic section in this file.  
dereklee0310@Computer1:~/sp_repo/hw6$
```

## 2. 執行busybox所支援的shell

```
sudo chroot ~/busybox/_install/ ash
```

```
dereklee0310@Computer1: ~  
dereklee0310@Computer1:~/sp_repo/hw6$ sudo chroot ~/busybox/_install/ ash  
/#
```

## 3. 簡易測試

```
./ls -al
```

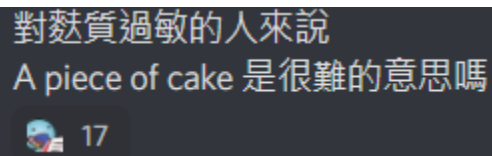
```
dereklee0310@Computer1: ~  
dereklee0310@Computer1:~/sp_repo/hw6$ make  
gcc myBusybox.c -o myBusybox  
ln -s myBusybox ls  
ln -s myBusybox cp  
ln -s myBusybox cat  
ln -s myBusybox chown  
dereklee0310@Computer1:~/sp_repo/hw6$ ./ls -al  
total 36  
drwxr-xr-x 2 dereklee0310 dereklee0310 4096 Apr 11 04:14 .  
drwxr-xr-x 7 dereklee0310 dereklee0310 4096 Apr 11 02:34 ..  
lrwxrwxrwx 1 dereklee0310 dereklee0310    9 Apr 11 04:14 cat -> myBusybox  
lrwxrwxrwx 1 dereklee0310 dereklee0310    9 Apr 11 04:14 chown -> myBusybox  
lrwxrwxrwx 1 dereklee0310 dereklee0310    9 Apr 11 04:14 cp -> myBusybox  
lrwxrwxrwx 1 dereklee0310 dereklee0310    9 Apr 11 04:14 ls -> myBusybox  
-rw-r--r-- 1 dereklee0310 dereklee0310  171 Apr 11 03:53 makefile  
-rwxr-xr-x 1 dereklee0310 dereklee0310 16896 Apr 11 04:14 myBusybox  
-rw-r--r-- 1 dereklee0310 dereklee0310   557 Apr 11 03:58 myBusybox.c  
dereklee0310@Computer1:~/sp_repo/hw6$
```

## 三.總結

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BusyBox 是一個自由軟體，它在一個可執行檔中提供了很多常用且精簡的 Unix 工具，由於 BusyBox 執行檔的檔案大小比較小，使得它非常適合使用於嵌入式系統 Embedded Linux，BusyBox 就像「嵌入式 Linux 的瑞士小刀」一樣。

至於笑話的部分，就交給我來分享一則爛笑話



對麩質過敏的人來說  
A piece of cake 是很難的意思嗎  
17

2022 4/11 4:35 Derek Lee