1. Linux Networking Commands (15%)

1. 測試是否可以上網(從樹莓派輸入指令)

```
E94117013@raspberrypi:~ $ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=112 time=143 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=112 time=169 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=112 time=294 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=112 time=35.6 ms
^C
 --- 8.8.8.8 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3004ms rtt min/avg/max/mdev = 35.607/160.541/294.446/92.085 ms
E94117013@raspberrypi:~ $
```

2. 查看隨便一個網址(e.g. google.com, apple.com, etc.)的 ip

```
E94117013@raspberrypi:~ $ dig facebook.com
; <<>> DiG 9.16.33-Raspbian <<>> facebook.com
;; global options: +cmd
;; Got answer:
;; —>>HEADER«— opcode: QUERY, status: NOERROR, id: 13389
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 4, ADDITIONAL: 9
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
; facebook.com.
                                     ΤN
                                               Α
;; ANSWER SECTION:
facebook.com.
                            253
                                     IN
                                               Α
                                                        31.13.87.36
;; AUTHORITY SECTION: facebook.com.
                            171096 IN
                                               NS
                                                        b.ns.facebook.com.
                            171096 IN
                                              NS
                                                        d.ns.facebook.com.
facebook.com.
                                                        a.ns.facebook.com.
facebook.com.
                            171096
                                    TN
                                               NS
facebook.com.
                            171096 IN
                                                        c.ns.facebook.com.
;; ADDITIONAL SECTION:
a.ns.facebook.com.
                            172529
a.ns.facebook.com.
                            171096
                                    IN
IN
                                               AAAA
                                                        2a03:2880:f0fc:c:face:b00c:0:35
                            171096
b.ns.facebook.com.
                                                        129.134.31.12
                            171096
                                                        2a03:2880:f0fd:c:face:b00c:0:35
b.ns.facebook.com.
                                     IN
                                               AAAA
c.ns.facebook.com.
                            85820
                                     IN
                                                        185.89.218.12
c.ns.facebook.com.
                                               ΔΔΔΔ
                                                        2a03:2880:f1fc:c:face:b00c:0:35
                            85820
                                     TN
                                    IN
IN
d.ns.facebook.com.
                            171096
                                                        185.89.219.12
                                               ΔΔΔΔ
                                                        2a03:2880:f1fd:c:face:b00c:0:35
d.ns.facebook.com.
                            172529
;; SERVER: 192.168.137.1#53(192.168.137.1)
;; WHEN: Sun Nov 27 07:04:51 GMT 2022
;; MSG SIZE rcvd: 300
```

3. 查看到那個網頁的路徑

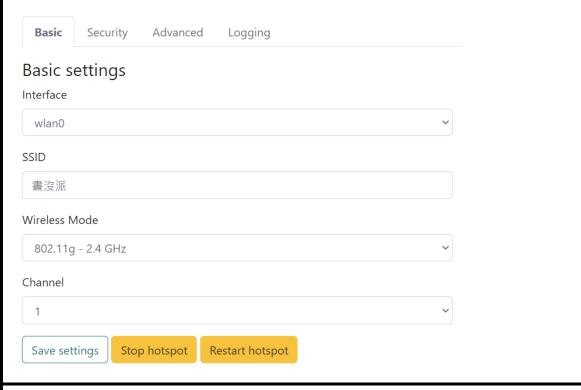
```
5. 直有到那個網見的路徑

E94117013@raspberrypt:~ $ traceroute facebook.com
traceroute to facebook.com (31.13.87.36), 30 hops max, 60 byte packets

1 DESKTOP-3AGOBSN.mshome.net (192.168.137.1) 2.965 ms **
2 ***
3 140.116.128.253 (140.116.243.33) 3.948 ms 3.951 ms 3.968 ms
4 140.116.243.33 (140.116.243.33) 3.948 ms 3.951 ms 3.968 ms
5 140.116.243.33 (140.116.243.33) 4.105 ms 4.841 ms 4.854 ms
6 140.116.243.179 (140.116.243.177) 5.950 ms 4.818 ms 4.948 ms
7 192.192.61.246 (192.192.61.244) 9.581 ms 9.377 ms 9.161 ms
9 192.192.61.244 (192.192.61.24) 9.581 ms 9.377 ms 9.161 ms
9 192.192.61.248 (192.192.61.48) 9.578 ms 9.380 ms 9.542 ms
10 192.192.61.51.88 (192.192.61.48) 9.578 ms 9.380 ms 9.542 ms
11 ae5.pr01.tpe1.tfbnv.net (157.240.71.56) 63.722 ms 62.723 ms 62.268 ms
11 ae5.pr01.tpe1.tfbnv.net (147.75.213.152) 9.485 ms p0111.assv01.tpe1.tfbnv.net (147.75.213.159) 9.842 ms 9.727 ms
13 po294.psv01.tpe1.tfbnv.net (147.75.212.245) 9.387 ms po251.psv03.tpe1.tfbnv.net (147.75.213.159) 9.756 ms po236.psv03.tpe1.tfbnv.net (147.75.213.59) 9.756 ms po23
```

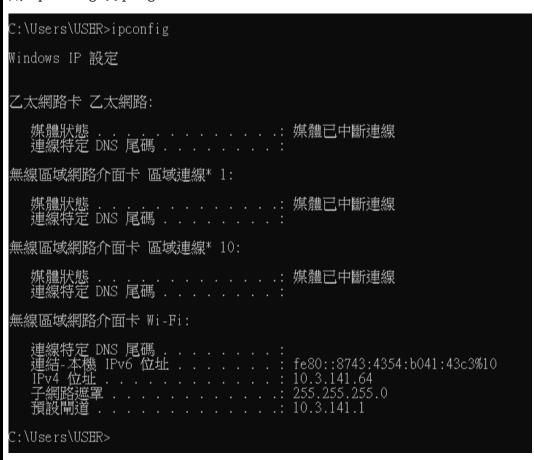
2. RaspAP (15%)

1. 更改 Hotspot 名稱&密碼(要 Save settings, Restart hotspot), 安全起見不要設定的太簡單,但自己要能記住。



2. 測試是否可以上網(從電腦輸入指令)

用 ipconfig 或 ping 10.3.141.1



```
Microsoft Windows [版本 10.0.19044.2251]
(c) Microsoft Corporation. 著作權所有,並保留一切權利。

C:\Users\USER>ping 10.3.141.1

Ping 10.3.141.1 (使用 32 位元組的資料):
回覆自 10.3.141.1: 位元組=32 時間=5ms TTL=64
回覆自 10.3.141.1: 位元組=32 時間=6ms TTL=64
回覆自 10.3.141.1: 位元組=32 時間=5ms TTL=64
回覆自 10.3.141.1: 位元組=32 時間=5ms TTL=64
10.3.141.1 的 Ping 統計資料:
封包:已傳送 = 4,已收到 = 4,已遺失 = 0 (0% 遺失),
大約的來回時間 (毫秒):
最小值 = 5ms,最大值 = 6ms,平均 = 5ms
```

3. 將手機連上 AP, 測試是否可以連到手機

```
E94117013@raspberrypi:~ $ ping 10.3.141.61
PING 10.3.141.61 (10.3.141.61) 56(84) bytes of data.
64 bytes from 10.3.141.61: icmp_seq=1 ttl=64 time=2.85 ms
64 bytes from 10.3.141.61: icmp_seq=2 ttl=64 time=5.89 ms
64 bytes from 10.3.141.61: icmp_seq=3 ttl=64 time=87.9 ms
64 bytes from 10.3.141.61: icmp_seq=4 ttl=64 time=3.91 ms
64 bytes from 10.3.141.61: icmp_seq=5 ttl=64 time=27.1 ms
^C
--- 10.3.141.61 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4006ms
rtt min/avg/max/mdev = 2.850/25.529/87.857/32.418 ms
E94117013@raspberrypi:~ $
```

手机 ip

Client list

Active DHCP leases				
Expire time	MAC Address	IP Address	Host name	Client ID
1669761726	74:40:bb:37:a7:a3	10.3.141.64	DESKTOP-3AGD83N	01:74:40:bb:37:a7:a3
1669760685	6a:9e:78:94:3e:e7	10.3.141.61	*	01:6a:9e:78:94:3e:e7

