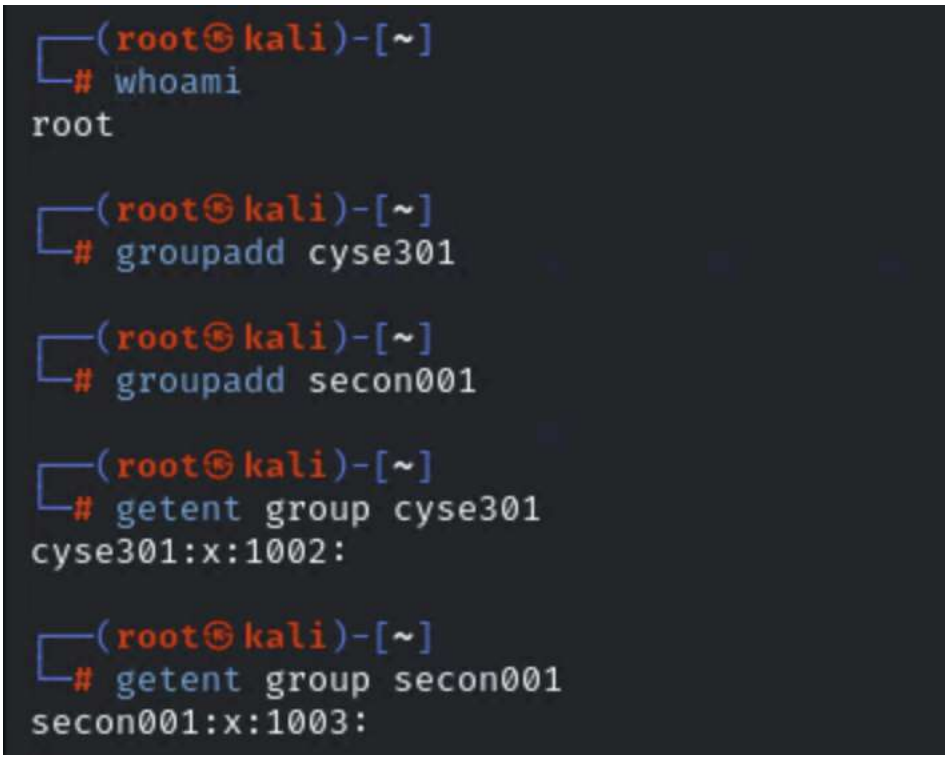
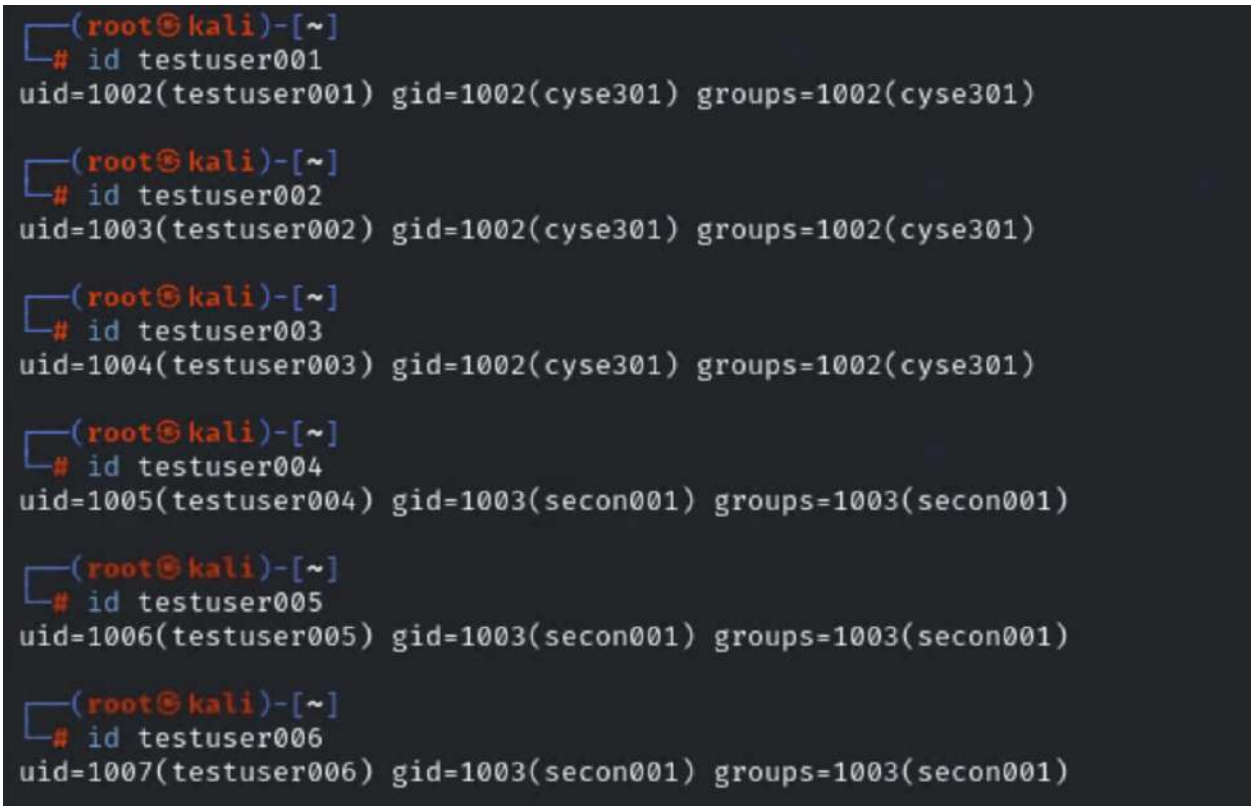
Task A: Linux Password Cracking (25 points)

1. 5 points. Create two groups, one is cyse301, and the other is your ODU Midas ID (for example, svatsa). Then display the corresponding group IDs.



2. 5 points. Create and assign three users to each group. Display related UID and GID information of each user.



3. 5 points. Choose Three new passwords, from easy to hard, and assign them to the users you created. You need to show me the password you selected in your report, and DO NOT use your real-world passwords.

```
┌──(root㉿kali)-[~]
└─# passwd testuser001
New password:
Retype new password:
passwd: password updated successfully

┌──(root㉿kali)-[~]
└─# passwd testuser002
New password:
Retype new password:
passwd: password updated successfully

┌──(root㉿kali)-[~]
└─# passwd testuser003
New password:
Retype new password:
Sorry, passwords do not match.
passwd: Authentication token manipulation error
passwd: password unchanged

┌──(root㉿kali)-[~]
└─# passwd testuser003
New password:
Retype new password:
passwd: password updated successfully

┌──(root㉿kali)-[~]
└─# passwd testuser004
New password:
Retype new password:
passwd: password updated successfully
```

```
┌──(root㉿kali)-[~]
└─# passwd testuser005
New password:
Retype new password:
passwd: password updated successfully

┌──(root㉿kali)-[~]
└─# passwd testuser006
New password:
Retype new password:
passwd: password updated successfully
```

4. 5 points. Export all Three users' password hashes into a file named "YourMIDAS-HASH" (for example, svatsa-HASH). Then launch a dictionary attack to crack the passwords. You MUST crack at least one password in order to complete this assignment.

```
root@kali: ~
File  Actions  Edit  View  Help
  GNU nano 7.2                                  secon001-HASH *
testuser001:$y$j9T$q2rrnGxTnGn1zU8GF63Uj/$n8flZmQglnfHFVzI/ulb1n6ASissA7TtNvocKDaJtG5
testuser002:$y$j9T$KNYbn1PTj8sLPGAJXJH89.$EtmUVc8C0QE8zIa95fR4J6fE/xdCCZFq/hKwSs5wPwA
testuser003:$y$j9T$0bGC5Q/xPxPaCQGg.jO7N1$M8XcWqsnwCFHikqedaudy.muffRaC0/yoGK7IEBkxoA
```

```
┌──(root㉿kali)-[~]
└─# cat secon001-HASH
testuser001:$y$j9T$q2rrnGxTnGn1zU8GF63Uj/$n8flZmQglnfHFVzI/ulb1n6ASissA7TtNvocKDaJtG5
testuser002:$y$j9T$KNYbn1PTj8sLPGAJXJH89.$EtmUVc8C0QE8zIa95fR4J6fE/xdCCZFq/hKwSs5wPwA
testuser003:$y$j9T$0bGC5Q/xPxPaCQGg.jO7N1$M8XcWqsnwCFHikqedaudy.muffRaC0/yoGK7IEBkxoA
```

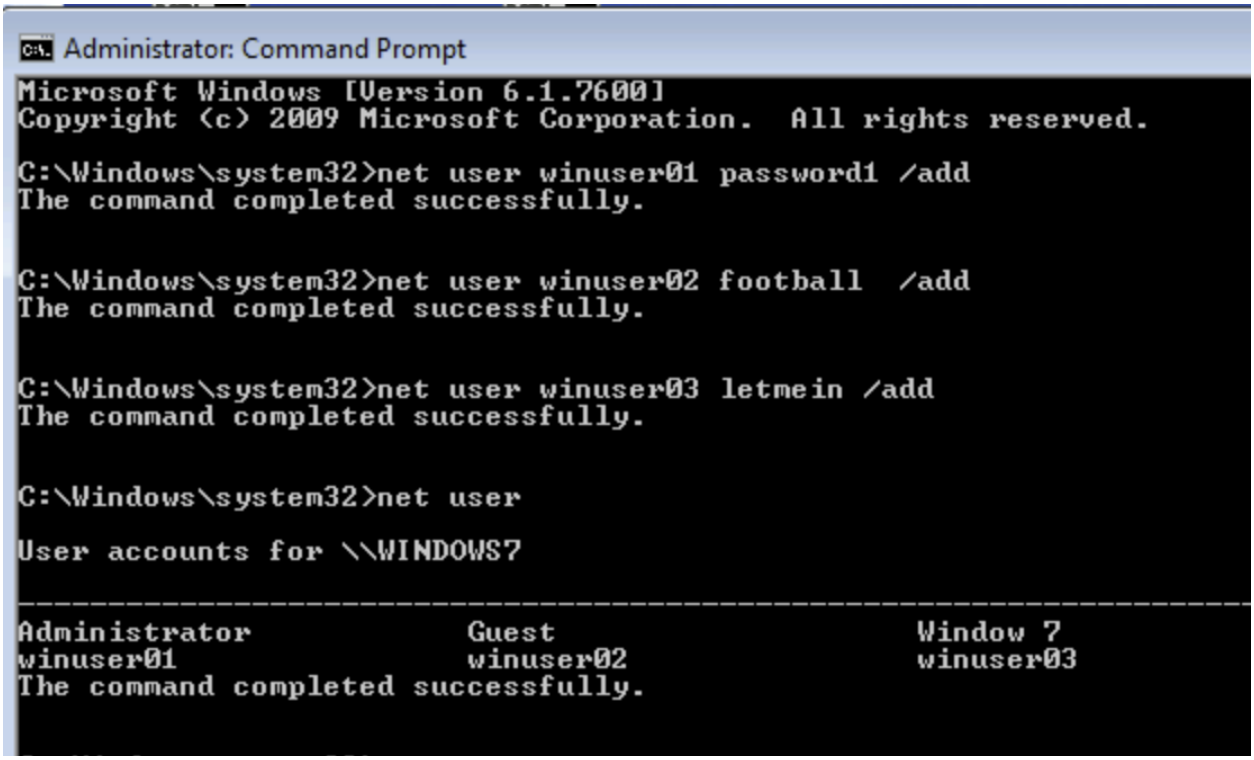
```
┌──(root㉿kali)-[~]
└─# john --format=sha512crypt --wordlist=/root/Desktop/VMshare/rockyou.txt secon001-HASH
Using default input encoding: UTF-8
Loaded 3 password hashes with 3 different salts (sha512crypt, crypt(3) $6$ [SHA512 512/512 AVX512BW 8x])
Cost 1 (iteration count) is 5000 for all loaded hashes
Will run 2 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key for status
password1        (testuser002)
1234             (testuser001)
2g 0:00:00:38 1.55% (ETA: 01:42:04) 0.05249g/s 6866p/s 6920c/s 6920C/s ronnie29..rebel92
Use the "--show" option to display all of the cracked passwords reliably
Session aborted

┌──(root㉿kali)-[~]
└─# john --show secon001-HASH
testuser001:1234
testuser002:password1

2 password hashes cracked, 1 left
```

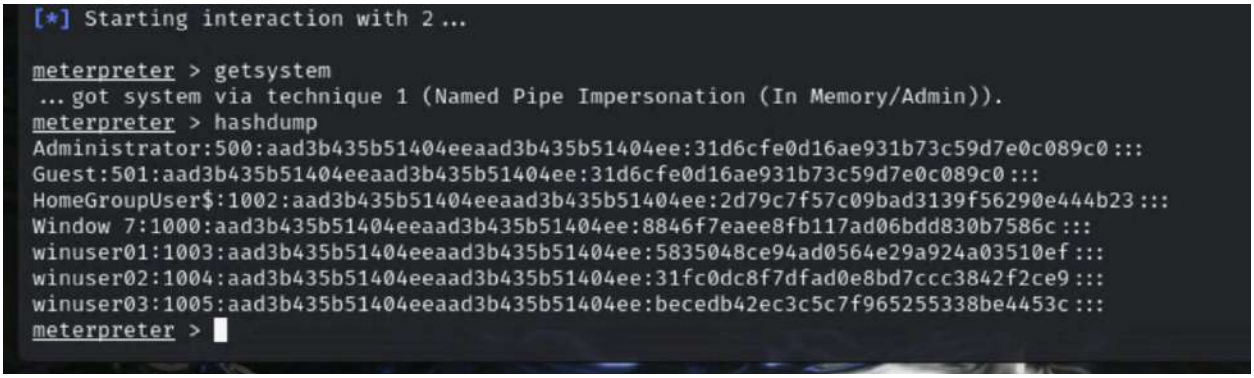
Task B: Windows Password Cracking (25 points)

Log on to Windows 7 VM and create a list of 3 users with different passwords (OR you may create users using net users \add command as you did in lab-4-task-c). Then you need to establish a reverse shell connection with the admin privilege to the target Windows 7 VM.



Now, complete the following tasks:

1. 5 points. Display the password hashes by using the “hashdump” command in the meterpreter shell. Then



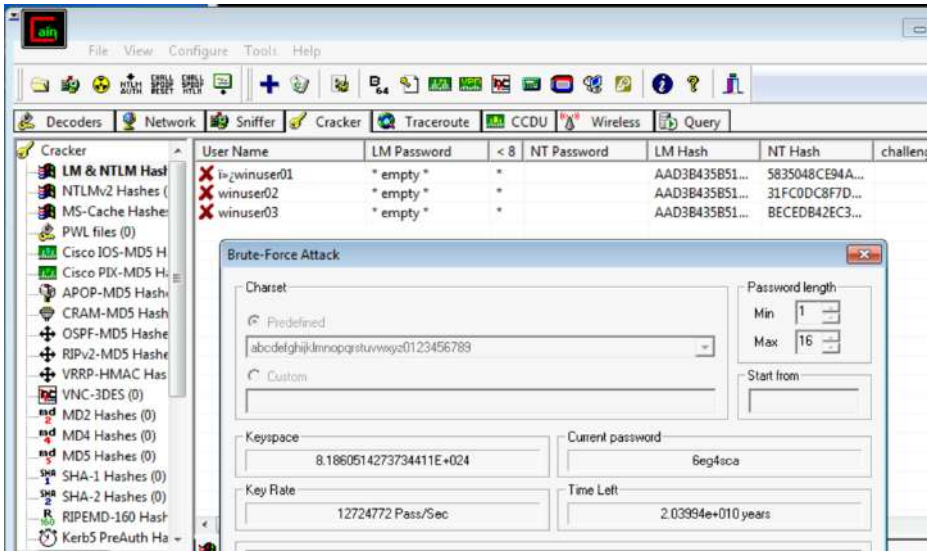
2. 10 points. Save the password hashes into a file named “your_midas.WinHASH” in Kali Linux (you need to replace the “your_midas” with your university MIDAS ID). Then run John the ripper for 10 minutes to crack the windows users’ passwords (You MUST crack at least one password in order to complete this assignment.).

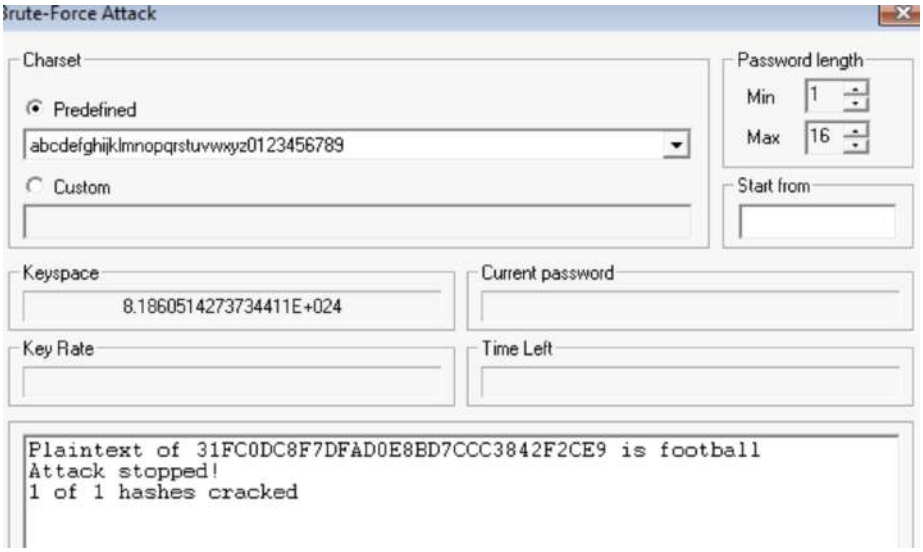
```
┌──(root㉿kali)-[~]
└─# john --format=NT secon001.WinHASH
Using default input encoding: UTF-8
Loaded 3 password hashes with no different salts (NT [MD4 512/512 AVX512BW 16×3])
Warning: no OpenMP support for this hash type, consider --fork=2
Proceeding with single, rules:Single
Press 'q' or Ctrl-C to abort, almost any other key for status
Almost done: Processing the remaining buffered candidate passwords, if any.
Proceeding with wordlist:/usr/share/john/password.lst
password1        (winuser01)
letmein          (winuser03)
football         (winuser02)
3g 0:00:00:00 DONE 2/3 (2025-11-26 02:51) 18.75g/s 18225p/s 18225c/s 54675C/s 123456..larry
Use the "--show --format=NT" options to display all of the cracked passwords reliably
Session completed.

┌──(root㉿kali)-[~]
└─# john --show --format=NT secon001.WinHASH
winuser01:password1:1003:aad3b435b51404eeaad3b435b51404ee:5835048ce94ad0564e29a924a03510ef:::
winuser02:football:1004:aad3b435b51404eeaad3b435b51404ee:31fc0dc8f7dfad0e8bd7ccc3842f2ce9:::
winuser03:letmein:1005:aad3b435b51404eeaad3b435b51404ee:becedb42ec3c5c7f965255338be4453c:::

3 password hashes cracked, 0 left
```

3. 10 points. Launch/open the password cracking tool, Cain and Abel in Windows 7 VM, via a remote desktop window. Then, implement BOTH brute force and dictionary attacks to crack the passwords for Windows7 users. (You MUST crack at least one password in order to complete this assignment).





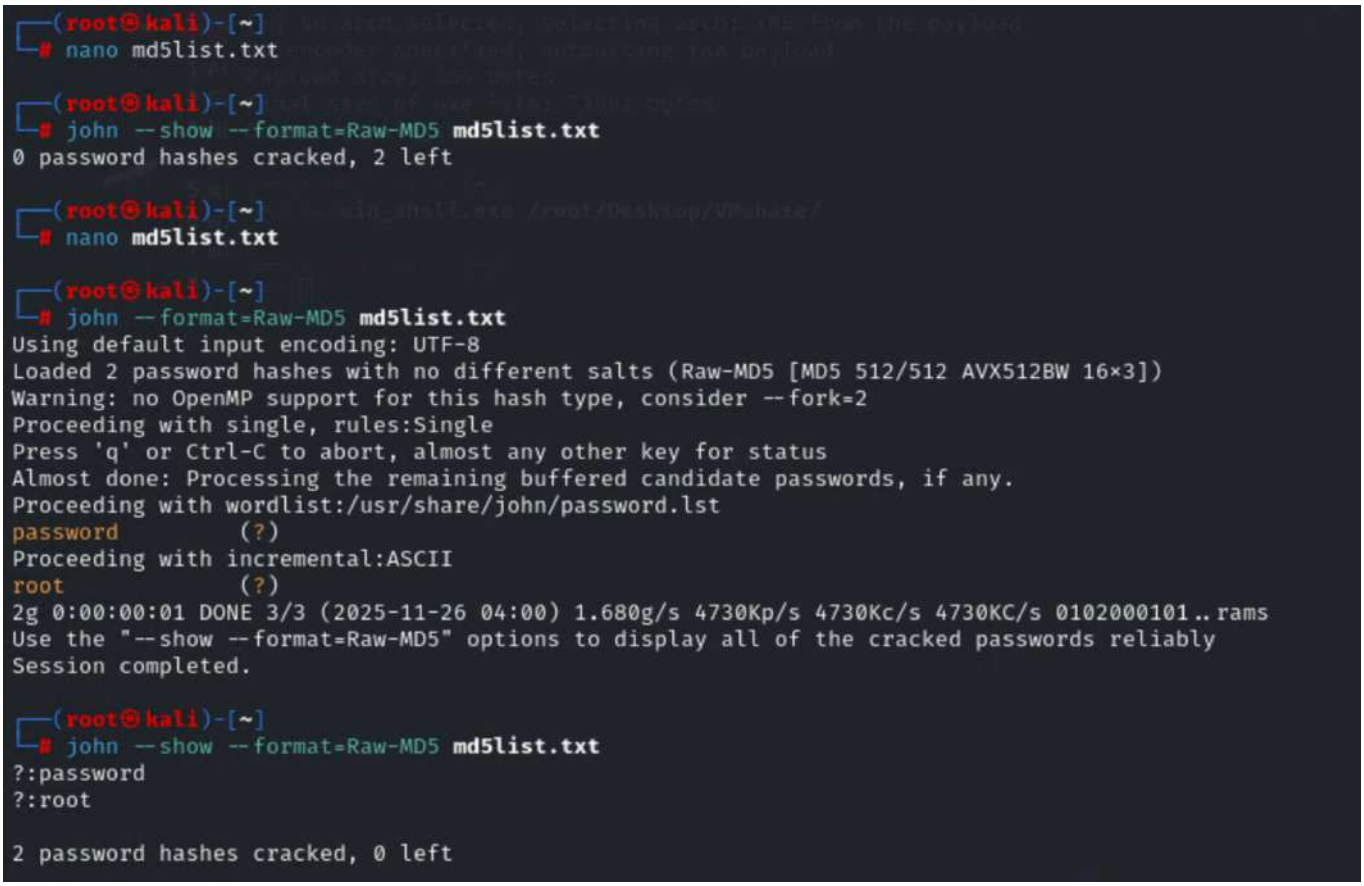
NOTE: Please refer to the class lecture to learn how to add users in windows7 and using Cain tool for windows password cracking

Extra credit: (10 points)

Search the proper format in John the Ripper to crack the following MD5 hashes (use the --list=formats option to list all supported formats). Show your steps and results.

1. 5f4dcc3b5aa765d61d8327deb882cf99

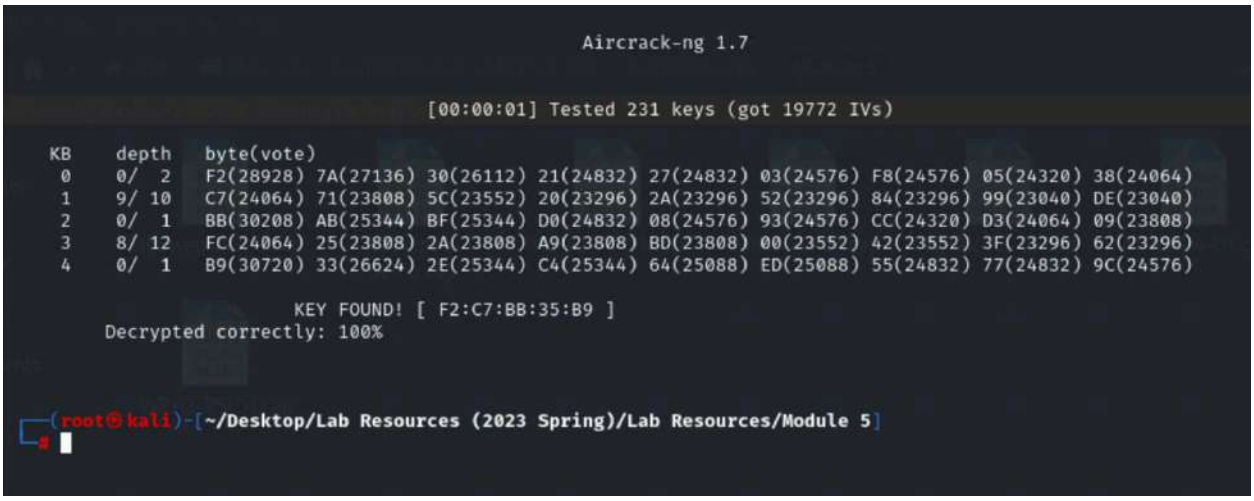
2. 63a9f0ea7bb98050796b649e85481845



Part 2

1. Decrypting *lab5wep-demo.cap* (5 points)

For the WEP file, I used **aircrack-ng** to test the captured IVs. The command successfully recovered the WEP key:
Key: F2:C7:BB:35:B9

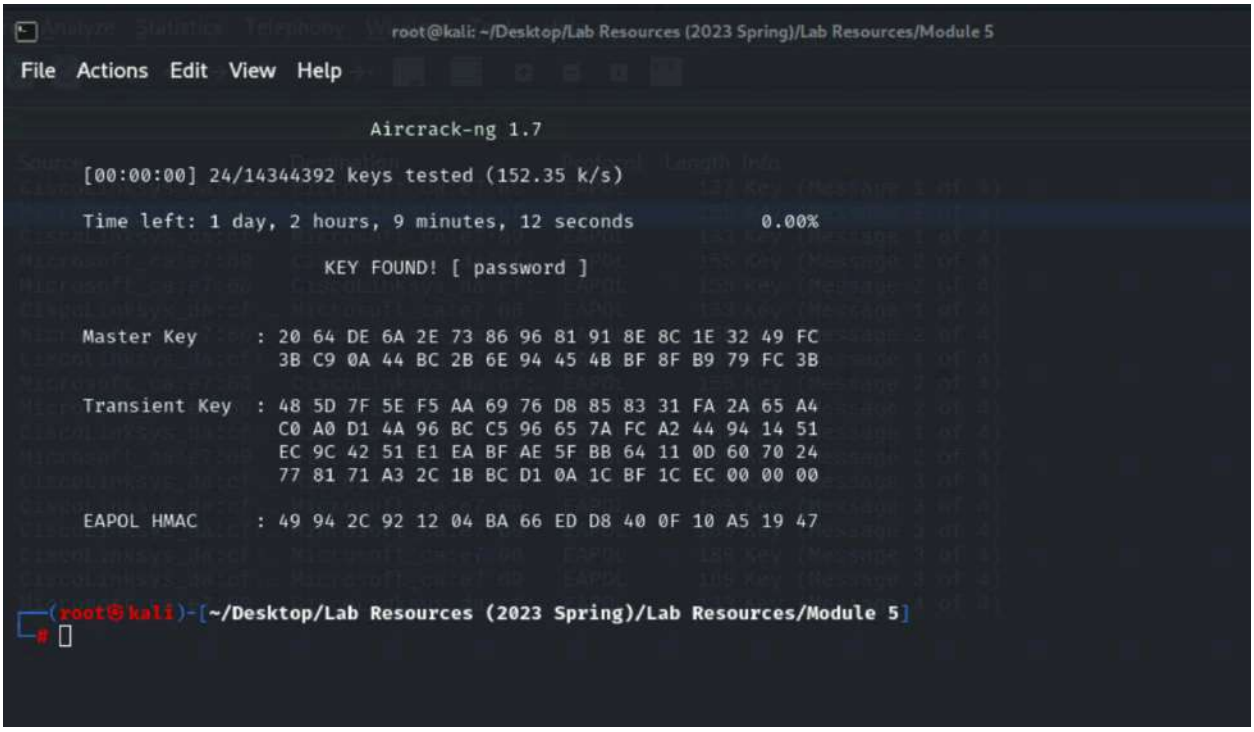


2. Decrypting *lab5wpa2-demo.cap* (5 points)

For the WPA2 demo file, I ran a dictionary attack using:

Aircrack found the WPA2 password successfully.
Password: password

I placed this password into Wireshark using the WPA-PWD method (password:SSID). After applying the key, Wireshark began decrypting the 4-way EAPOL handshake as well as encrypted data.

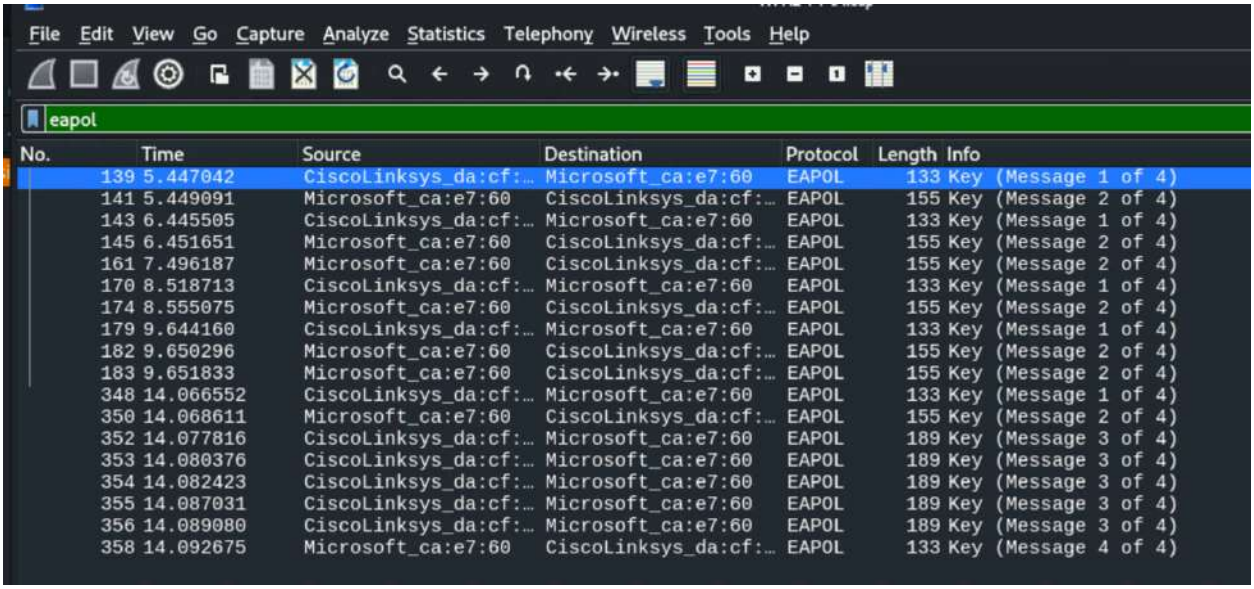


3. Detailed WPA2 Traffic Analysis (5 + 5 points)

Once decrypted, I could see:

- The **full 4-way WPA2 EAPOL handshake** (Messages 1–4)
- Normal wireless traffic like management frames (probe requests, beacons)
- Client identity/authentication exchanges
- Encrypted data frames between the client and AP

The EAPOL handshake clearly showed how the client and AP negotiated keys, confirming that decryption worked correctly.



Task D – Assigned WPA2 File (30 points)

1. Dictionary Attack & Decryption (20 points)

Based on the MD5-hash last digit rules in the instructions, my assigned file was:
WPA2-P1-01.cap

I ran the dictionary attack using:

aircrack-ng WPA2-P1-01.cap -w /root/Desktop/VMshare/rockyou.txt

Aircrack found the key successfully:
Password: CyberPHY

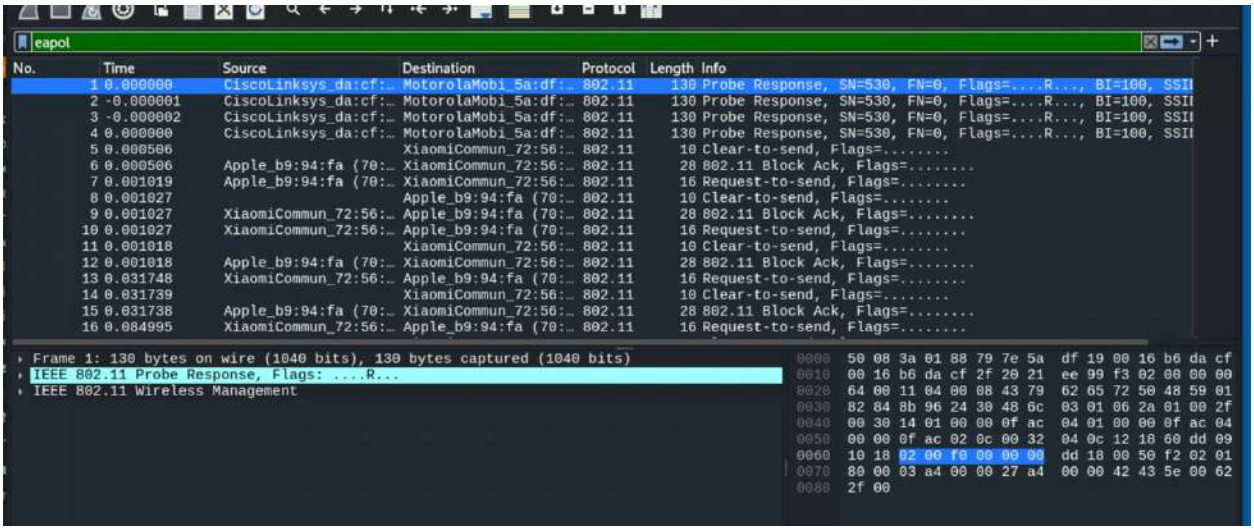
2. Traffic Summary After Decryption (10 points)

After entering the correct key, the encrypted WPA2 traffic became readable. I filtered using **eapol** to view the WPA2 4-way handshake. The handshake messages (1–4) appeared clearly with matching source/destination MAC addresses.

Other things I observed in the decrypted capture:

- Management frames (beacons, probe requests, probe responses)
- Multiple EAPOL Key frames between a Microsoft client and a Cisco AP
- Data frames showing normal encrypted WLAN communication
- TLSv1 traffic after authentication, indicating the user accessed a secure service

Overall, decrypting the assigned file allowed me to see the full WPA2 authentication process and the early application-layer activity after the connection was established.


eapol
No. Time Source Destination Protocol Length Info
1 0.000000 CiscoLinksys_da:cf:… MotorolaMobi_5a:df:… 802.11 130 Probe Response, SN=530, FN=0, Flags=....R.., BI=100, SSI
2 -0.000001 CiscoLinksys_da:cf:… MotorolaMobi_5a:df:… 802.11 130 Probe Response, SN=530, FN=0, Flags=....R.., BI=100, SSI
3 -0.000002 CiscoLinksys_da:cf:… MotorolaMobi_5a:df:… 802.11 130 Probe Response, SN=530, FN=0, Flags=....R.., BI=100, SSI
4 0.000000 CiscoLinksys_da:cf:… MotorolaMobi_5a:df:… 802.11 130 Probe Response, SN=530, FN=0, Flags=....R.., BI=100, SSI
5 0.000586 XiaomiCommun_72:56:… 802.11 10 Clear-to-send, Flags=........
6 0.000506 Apple_b9:94:fa (70:… XiaomiCommun_72:56:… 802.11 28 802.11 Block Ack, Flags=........
7 0.001019 Apple_b9:94:fa (70:… XiaomiCommun_72:56:… 802.11 16 Request-to-send, Flags=........
8 0.001027 Apple_b9:94:fa (70:… 802.11 10 Clear-to-send, Flags=........
9 0.001027 XiaomiCommun_72:56:… Apple_b9:94:fa (70:… 802.11 28 802.11 Block Ack, Flags=........
10 0.001027 XiaomiCommun_72:56:… Apple_b9:94:fa (70:… 802.11 16 Request-to-send, Flags=........
11 0.001018 XiaomiCommun_72:56:… 802.11 10 Clear-to-send, Flags=........
12 0.001018 Apple_b9:94:fa (70:… XiaomiCommun_72:56:… 802.11 28 802.11 Block Ack, Flags=........
13 0.031748 XiaomiCommun_72:56:… Apple_b9:94:fa (70:… 802.11 16 Request-to-send, Flags=........
14 0.031739 XiaomiCommun_72:56:… 802.11 10 Clear-to-send, Flags=........
15 0.031738 Apple_b9:94:fa (70:… XiaomiCommun_72:56:… 802.11 28 802.11 Block Ack, Flags=........
16 0.084995 XiaomiCommun_72:56:… Apple_b9:94:fa (70:… 802.11 16 Request-to-send, Flags=........
Frame 1: 130 bytes on wire (1040 bits), 130 bytes captured (1040 bits)
IEEE 802.11 Probe Response, Flags: ....R...
IEEE 802.11 Wireless Management
0000 50 08 3a 01 88 79 7e 5a df 19 00 16 b6 da cf
0010 00 16 b6 da cf 2f 20 21 ee 99 f3 02 00 00 00
0020 64 00 11 04 00 08 43 79 62 65 72 50 48 59 01
0030 82 84 8b 96 24 30 48 6c 03 01 06 2a 01 00 2f
0040 00 30 14 01 00 00 0f ac 04 01 00 00 0f ac 04
0050 00 00 0f ac 02 0c 00 32 04 0c 12 18 60 dd 09
0060 10 18 02 00 f0 00 00 00 dd 18 00 50 f2 02 01
0070 80 00 03 a4 00 00 27 a4 00 00 42 43 5e 00 62
0080 2f 00