## WI-FI HACKING WITH A RASPBERRY PI

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# **BACKGROUND**

Project is about cyber security and creating awareness of threats.

Build hacking prototype.

Retrieve hardware and software information and penetrate Wi-Fi network.

Objective is educate campus community.

Give suggestions to the Wi-Fi network owners found vulnerable.

## **FUNCTIONAL REQUIREMENTS**

Detect available Wi-Fi networks and hidden networks.

Retrieve information about each network detected.

Convert Mac address to vendor names.

Where possible penetrate Wi-Fi network with weak encryption.

**Community the importance of strong passwords.** 

## **TESTING STRATEGIES**

Unit testing and system testing Unit testing: Testing individual source codes. **Five Python scripts** System testing: Hardware and Software integration Kali Linux, Raspberry Pi and Python.

## **TESTING DESIGN**

Unit Testing: Run each script Then simultaneously, from scanning available networks to the hacking script. **Each script function.** System Testing: All libraries installed in same directory Minimized time for penetration to avoid over heat on Raspberry Pi.

## <u>TEST REPORT</u>

Tool built detects available networks and hidden ones.

Save all information on a CSV file.

**Read** Mac address column and convert to vendor

#### names.

SSID	ENCRYPTION	RADIO FREQUENCY	MAC ADDRESS	CHANNEL	ENCRYPTION TYPI	SIGNAL
TP-LINK_D21F	TRUE	2.457 GHz	18:D6:C7:85:D2:1F	10	wpa2	-14
UWC-Guest	FALSE	2.412 GHz	40:01:7A:AF:B9:A0	1	None	-58
UWC-CAMPUS	TRUE	2.412 GHz	40:01:7A:AF:B9:A1	1	wpa	-59
eduroam	TRUE	2.412 GHz	40:01:7A:AF:B9:A2	1	wpa	-59
WiFi-Support(Limited	FALSE	2.412 GHz	40:01:7A:AF:B9:A3	1	None	-60
UWC-WifiPortal	FALSE	2.412 GHz	40:01:7A:AF:B9:A4	1	None	-58
UWC-Guest	FALSE	2.437 GHz	40:01:7A:BE:80:40	6	None	-52
UWC-CAMPUS	TRUE	2.437 GHz	40:01:7A:BE:80:41	6	wpa	-51
eduroam	TRUE	2.437 GHz	40:01:7A:BE:80:42	6	wpa	-49
WiFi-Support(Limited	FALSE	2.437 GHz	40:01:7A:BE:80:43	6	None	-49
UWC-WifiPortal	FALSE	2.437 GHz	40:01:7A:BE:80:44	6	None	-47
UWC-Guest	FALSE	2.437 GHz	40:01:7A:BE:E2:80	6	None	-76

## TEST REPORT

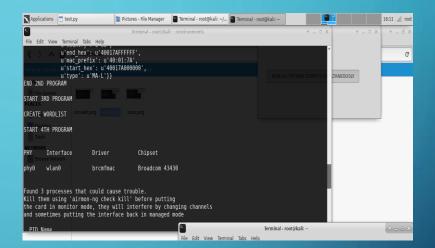
Testing has been conducted on three networks.
 With different passwords in length and difficulty level.

- passwords:
  - **First password contain numbers only.**
  - second password contain numbers and alphabet characters.
  - Third password has numbers, alphabets and special characters e.g. %\_134Zdyou.

### **TEST REPORT**

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## <u>REFERENCE</u>

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- CISCO, "Security," CISCO/Security, 2018. [Online]. Available: https://www.cisco.com/c/en/us/products/security/what-is-cybersecurity.html. [Accessed: 14- Feb-2019].
- [2] hash3liZer, "No Title," 2018. [Online]. Available: https://www.shellvoide.com/python/how-to- code-a- simple- wirelesssniffer-in-python/. [Accessed: 05-Aug-2019].
- [3] A. L. and J. Muniz, Penetration Testing with Raspberry Pi. Birmingham,UK: Packt Publishing Ltd., 2015.
  - V. Kumkar, A. Tiwari, P. Tiwari, A. Gupta, and S. Shrawne, "Vulnerabilities of Wireless Security protocols (WEP and WPA2)," Int. J. Adv. Res. Comput. Eng. Technol., vol. 1, no. 2, pp. 2278–1323, 2012.
- [5] J. F. and S. A. Tyler Williams, "security of the internet of things(iot)," Digitalcommons.murraystate.edu, 2017. [Online]. Available: https://www.google.com/search?rlz=1C1AVFC\_enZA833ZA833&ei=myOCXMr nCeGU1fAPkqOooAI &q=securit y+of+the+internet+of+things%28iot%29+murray+state+university&oq=%22secu rity+of+the+internet+ of+thin gs%28IoT%29%

## **DEMO**

**Run two Python scripts.** > First script run two scripts simultaneously. > Detect available networks, then convert Mac addresses of detected networks to vendor names. Last script crack passwords. > Weak password, has digits only. > Strong password, has digits, alphabets and special characters.

# THANK

YOU