# De wondere wereld van HW Hacking



Platform voor Informatie Beveiliging



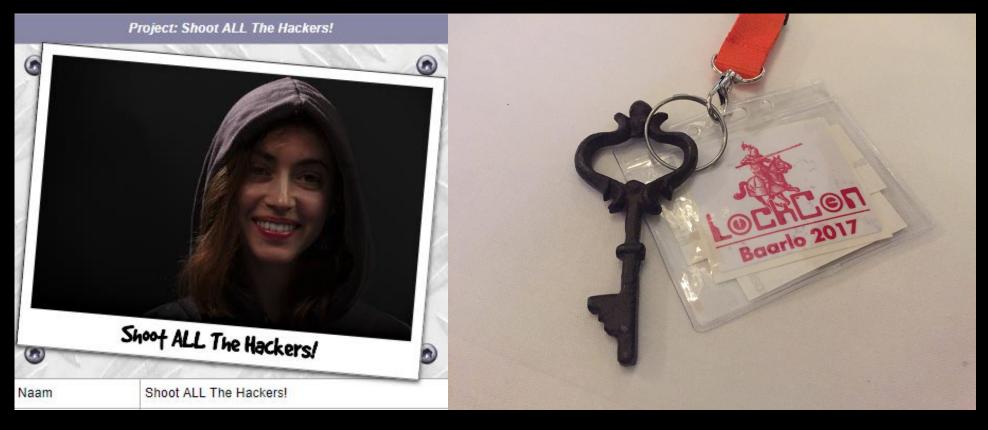
Jilles



Jurre

#### Shoot ALL The Hackers!





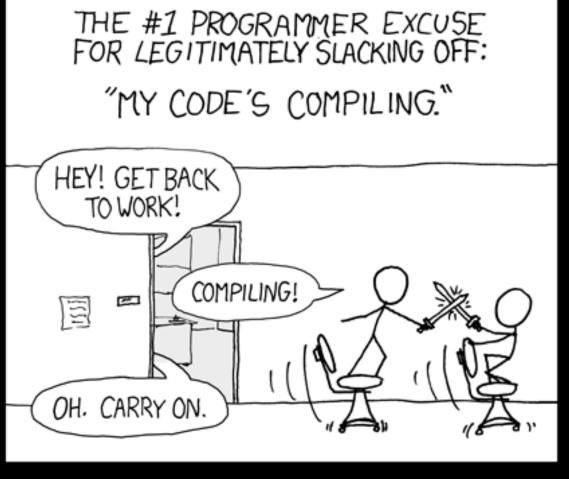




## Poll 1/3: are you a maker?



## Poll 2/3: do you program?



```
int getRandomNumber()
{
    return 4; // chosen by fair dice roll.
    // guaranteed to be random.
}
```





### Poll 3/3: do you hack?

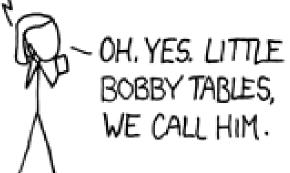
HI, THIS IS
YOUR SON'S SCHOOL.
WE'RE HAVING SOME
COMPUTER TROUBLE.



OH, DEAR — DID HE BREAK SOMETHING? IN A WAY— )



DID YOU REALLY
NAME YOUR SON
Robert'); DROP
TABLE Students;--?

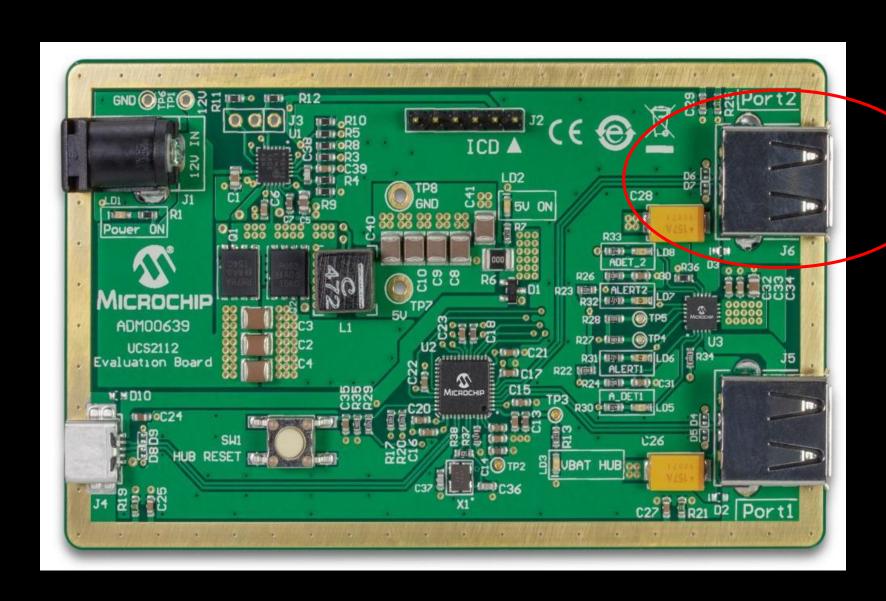


WELL, WE'VE LOST THIS YEAR'S STUDENT RECORDS. I HOPE YOU'RE HAPPY.

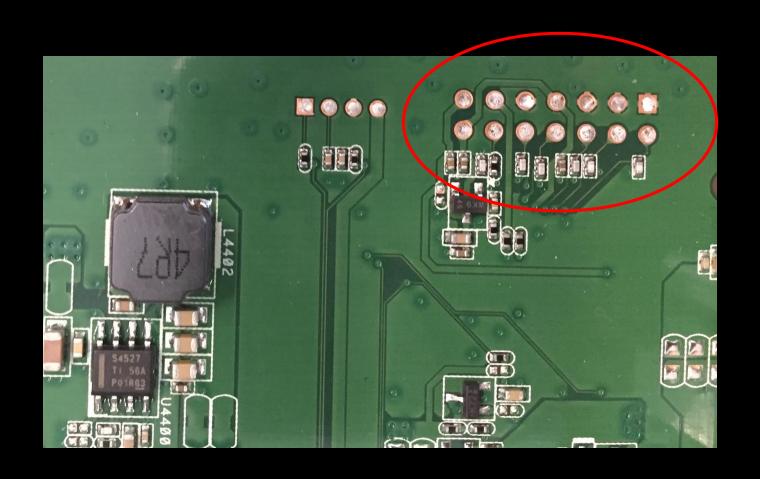


AND I HOPE YOU'VE LEARNED TO SANITIZE YOUR DATABASE INPUTS.

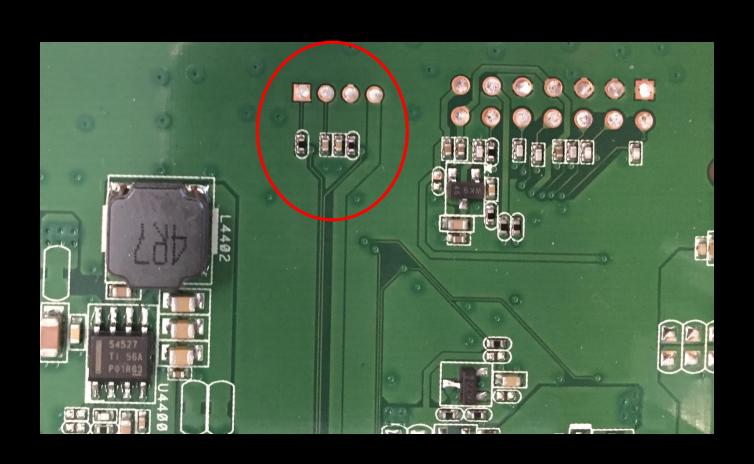
## Quiz 1/13: name the port



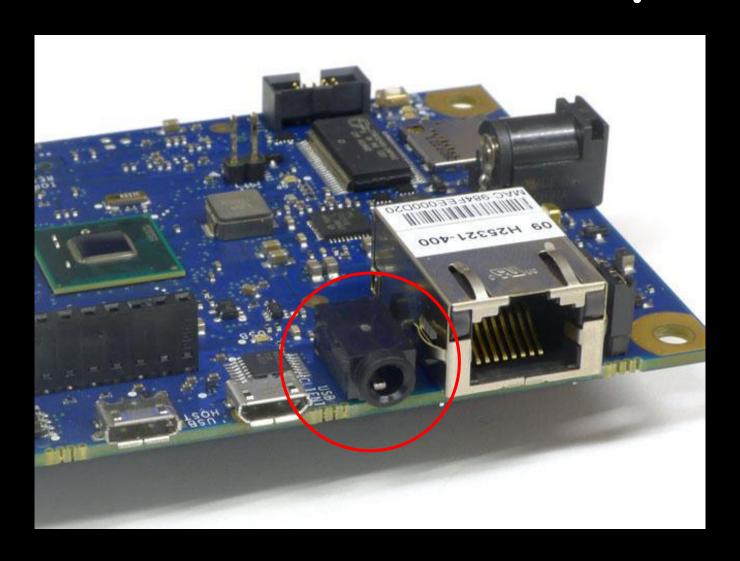
## Quiz 2/13: name the port



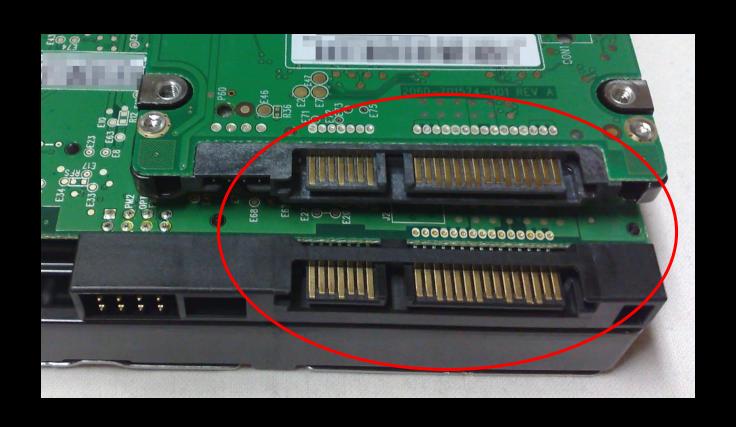
## Quiz 3/13: name the port



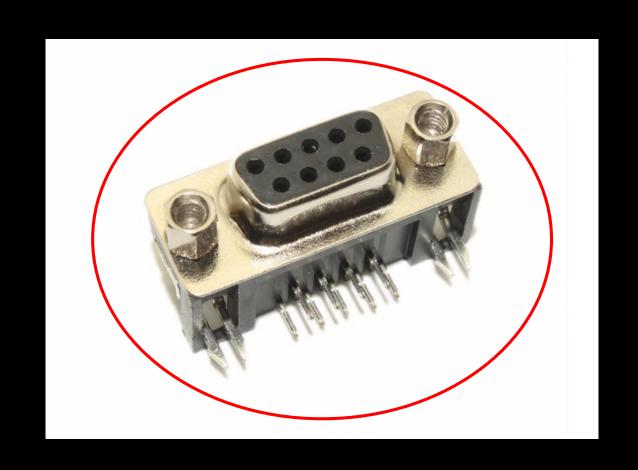
# Quiz 4/13: name the port



### Quiz 5/13: name the port



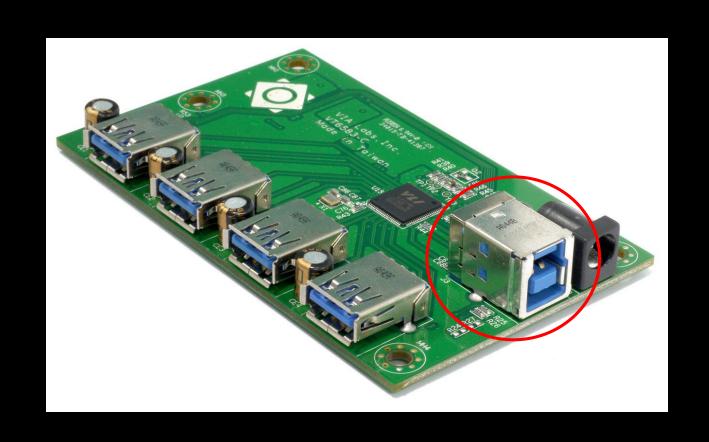
## Quiz 6/13: name the port



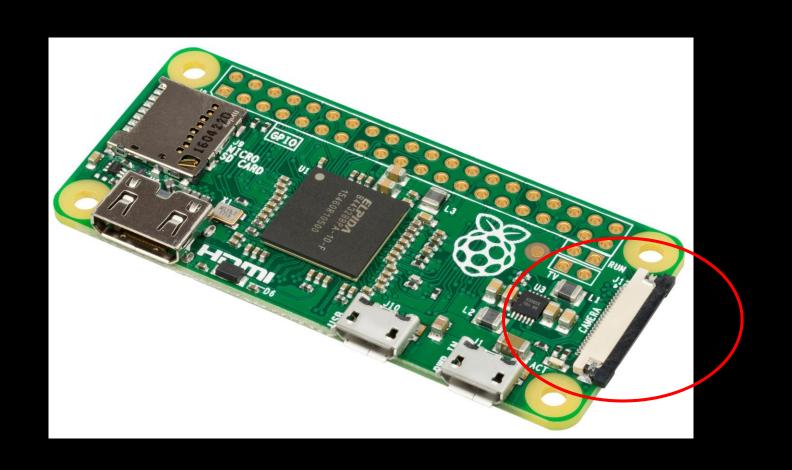
## Quiz 7/13: name the port



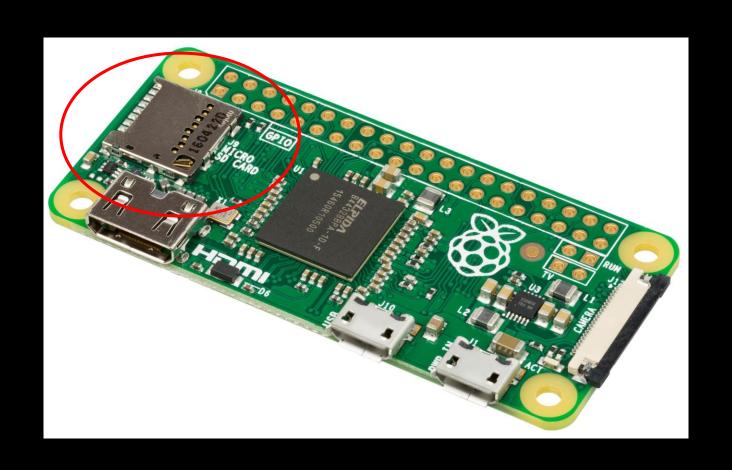
## Quiz 8/13: name the port



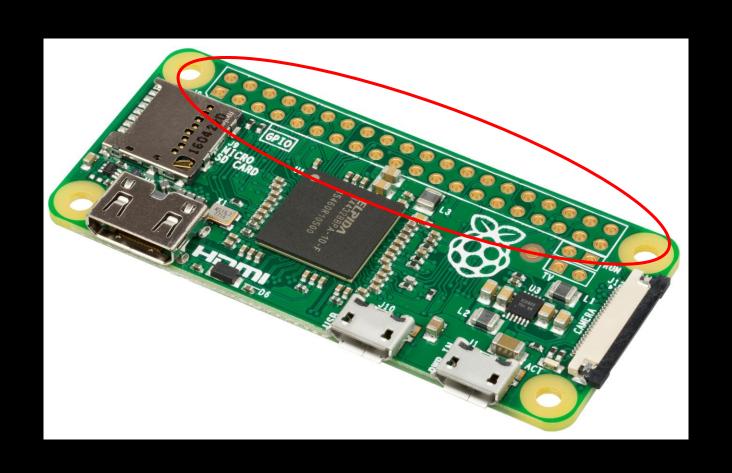
## Quiz 9/13: name the port



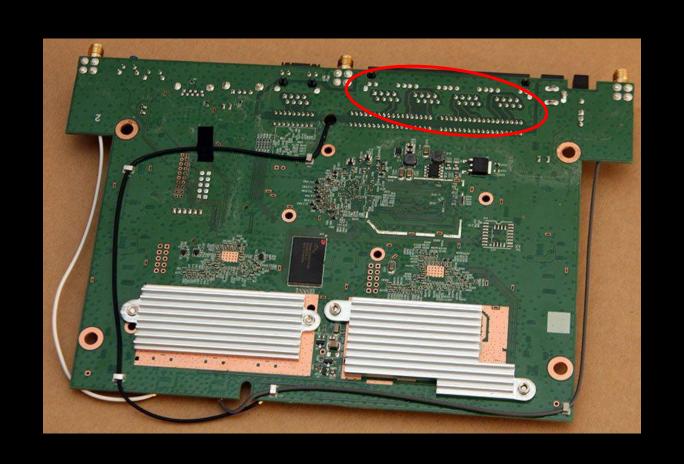
## Quiz 10/13: name the port



## Quiz 11/13: name the port



## Quiz 12/13: name the port



## Quiz 13/13: name the port



#### Lets talk about



# Jilles Groenendijk 49 years old LTS Electrotechniek



### Trip down memory lane





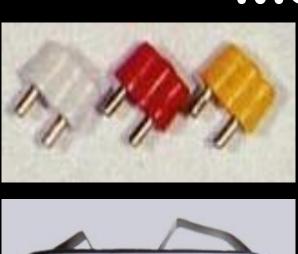
## 4 Generations



# Scrapbox



# Magical box



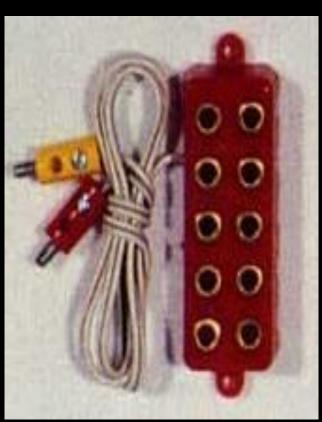












## "Does he take stuff apart?"



Always!

# Discovering AC/DC







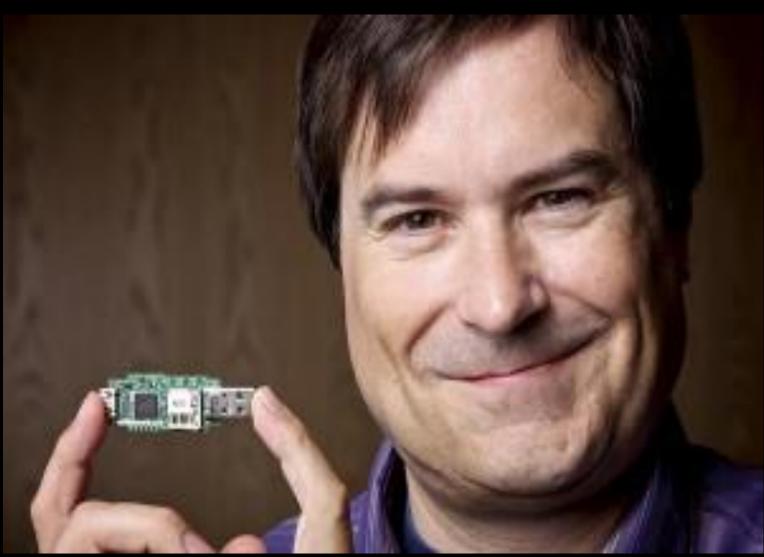


# Causing outages



## David Braben



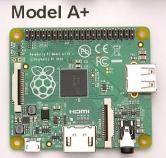


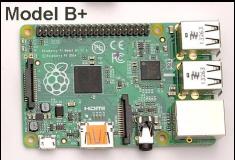
### Raspberry Pi





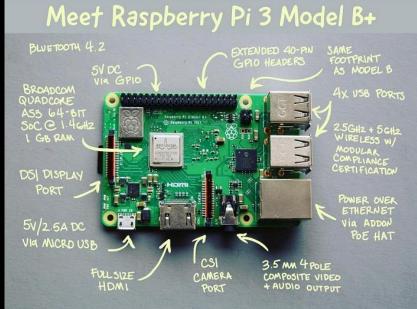






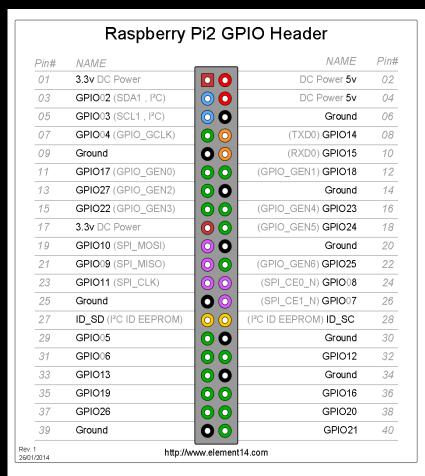


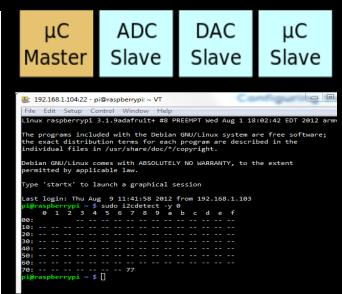


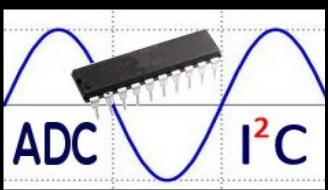


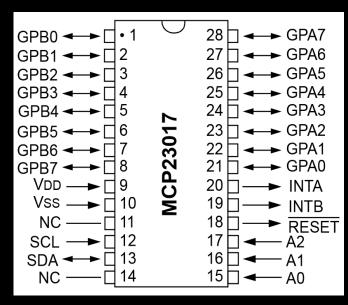


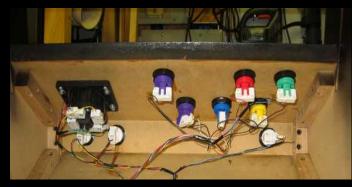
## Learning the protocols











# Magical Box 2.0

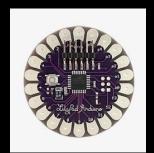




#### Arduino













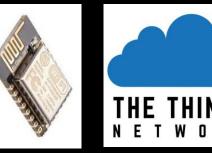




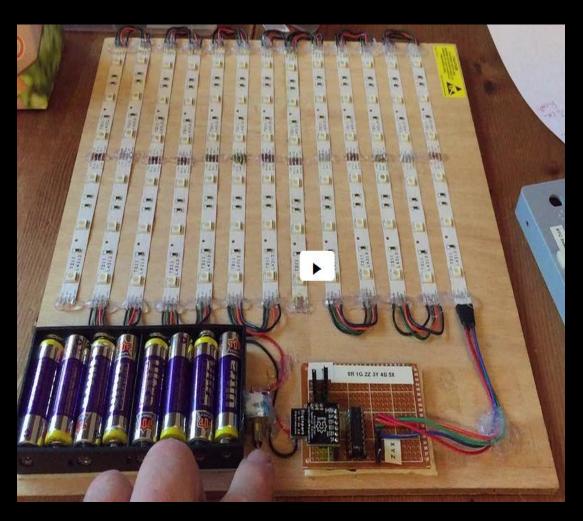


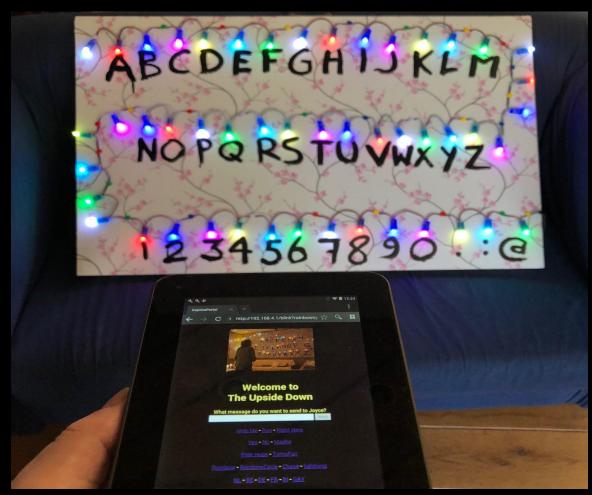




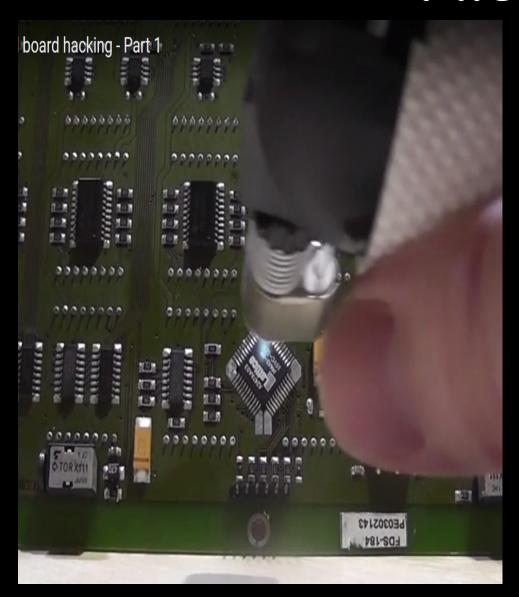


#### Create stuff





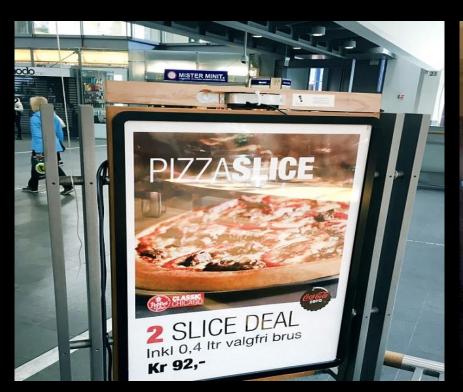
### Alter stuff

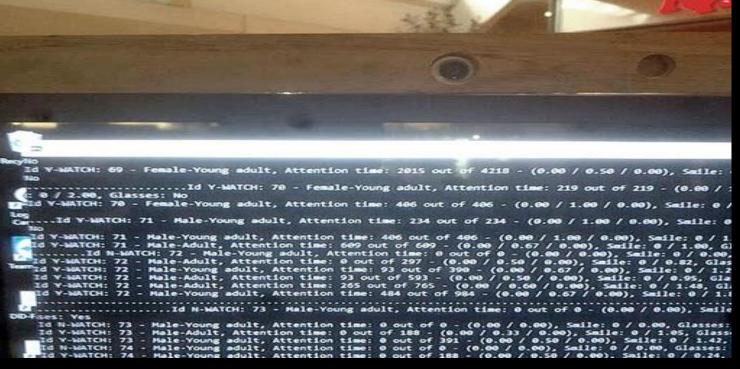




# #Privacy

### Big Brother





```
Id N-WATCH: 73 - Hale-Young adult, Attention time: 0 out of 0 - (0.00 / 0.00), Smile: 0 / 0.00, Glasses: Id Y-WATCH: 73 - Hale-Adult, Attention time: 0 out of 188 - (0.00 / 0.33 / 0.00), Smile: 0 / 1.05, Glasses: Id Y-WATCH: 73 - Hale-Young adult, Attention time: 0 out of 391 - (0.00 / 0.50 / 0.00), Smile: 0 / 1.42, Id N-WATCH: 74 - Hale-Young adult, Attention time: 0 out of 0 - (0.00 / 0.00), Smile: 0 / 0.00, Glasses: If Id Y-WATCH: 74 - Male-Young adult, Attention time: 0 out of 188 - (0.00 / 0.50 / 0.00), Smile: 0 / 0.24, Id Y-WATCH: 74 - Hale-Young adult, Attention time: 0 out of 375 - (0.00 / 0.33 / 0.00), Smile: 0 / 0.16, Id Y-WATCH: 74 - Hale-Young adult, Attention time: 0 out of 578 - (0.00 / 0.50 / 0.00), Smile: 0 / 0.64, Id Y-WATCH: 74 - Hale-Young adult, Attention time: 203 out of 781 - (0.00 / 0.60 / 0.00), Smile: 0 / 0.76 Id Y-WATCH: 74 - Hale-Young adult, Attention time: 406 out of 984 - (0.00 / 0.67 / 0.00), Smile: 0 / 0.95
```

### Big Brother







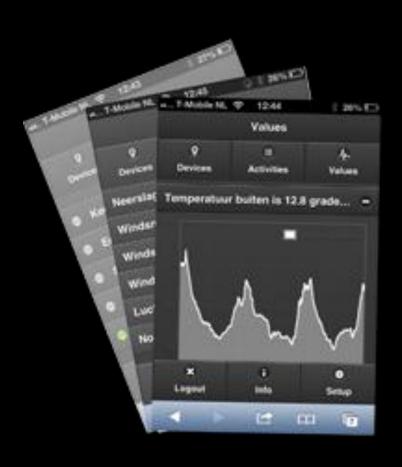
# #Domotica

### **Check Power Consumption**





### Check Weather





### DIY Alarm system











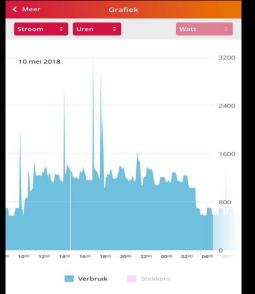
# Migraine



### **Commercial Solution**









<	<b>Tageco</b> Vakantie	
	Vakantiestand <b>uit</b>	
	Van:	
	Tot:	
	Temperatuur:	
		+

### Hackathon "Game of Toons"



### Most techy hack

Team RamseyBolToon, studenten van Forensische ICT van de Hogeschool Leiden, wisten tijdens Game of Toons de meest technisch geavanceerde hack te plegen op Toon van Eneco. Jurylid Michiel Fokke, (CTO Quby) en juryvoorzitter Hans Valk (CEO Quby) vertellen waarom.

### Wierdest hack

Team Sesamstraat wist tijdens Game of Toons de meeste bijzondere hack te plegen. Jurylid Glenn ten Cate (Security Engineer Schuberg Philis) en juryvoorzitter Hans Valk (CEO Quby) vertellen waarom. Tot de uitreiking was dit team anoniem. Toen Patricia Zorko, directeur Cybersecurity bij NCTV, de prijs in ontvangst nam was dat een bijzondere verrassing.

### TEK TOK

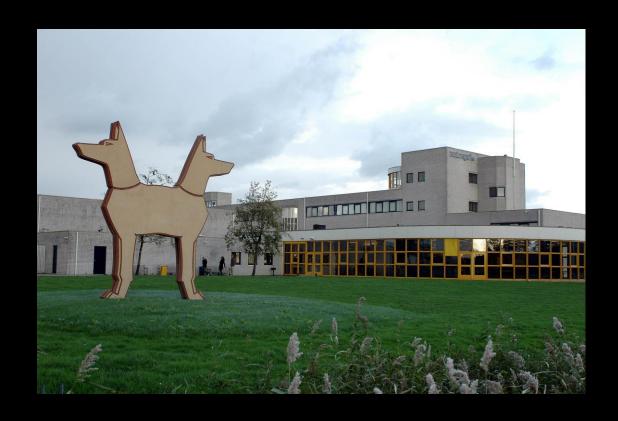


### Most dangerous hack

Team LooneyToons van Dearbytes wist tijdens Game of Toons de gevaarlijkste hack te plegen op Toon van Eneco. Jurylid Edwin van Andel (Security Advisor Zerocopter) en juryvoorzitter Hans Valk, (CEO Quby) vertellen waarom.

# Now over to

# Jurre Groenendijk 16 years old VWO bilingual NT





### Twin brother Jelle





### See how stuff works







## Scrapbox



### **#PLUSKLAS**







# Science



# Privacy



# Technology

I

### **TCP Packet**



### Programming



25 Exercises

Jun 2, 2013



25 points earned in one day

Jun 2, 2013



Tip Calculator

Jun 2, 2013



Python Syntax

Jun 2, 2013



10 Exercises

Jun 2, 2013



First Lesson

Jun 2, 2013

### script.py

```
my_int = 7
   my_int = my_int - 4
   # The print keyword will be covered in detail soon!
13 print my int
```



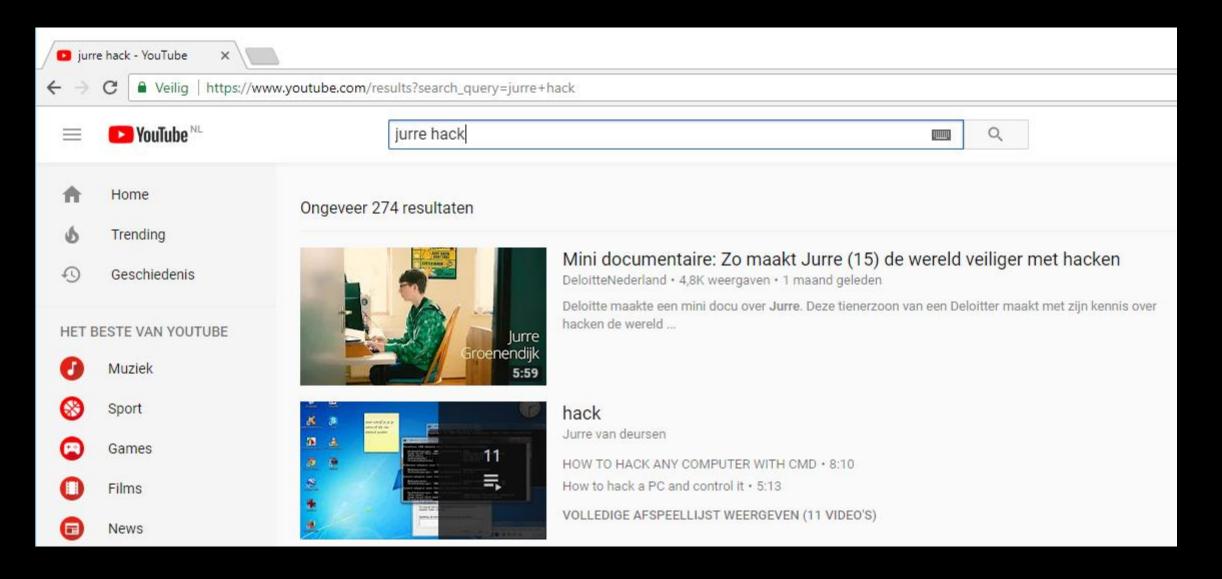
Congratulations, you've finished this section!

Next: Whitespace and Statements→

### Security



### Documentary: "Jurre hack"



### Be Responsible!



### **HELPENDE HACKERS**

Verantwoorde onthullingen in het digitale polderlandschap

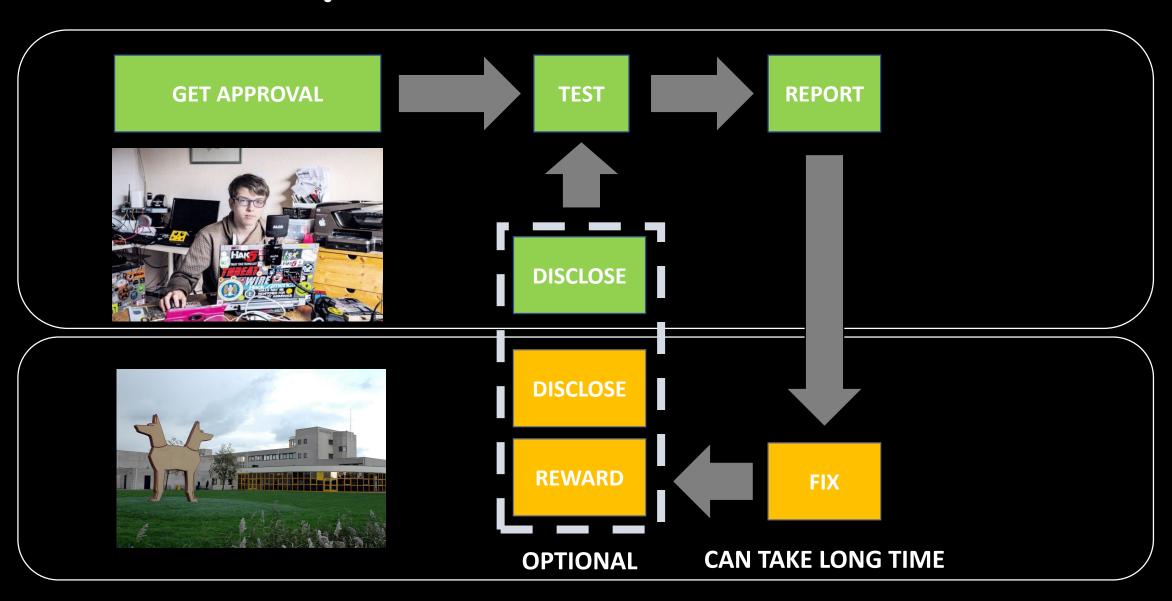


Chris van 't Hof

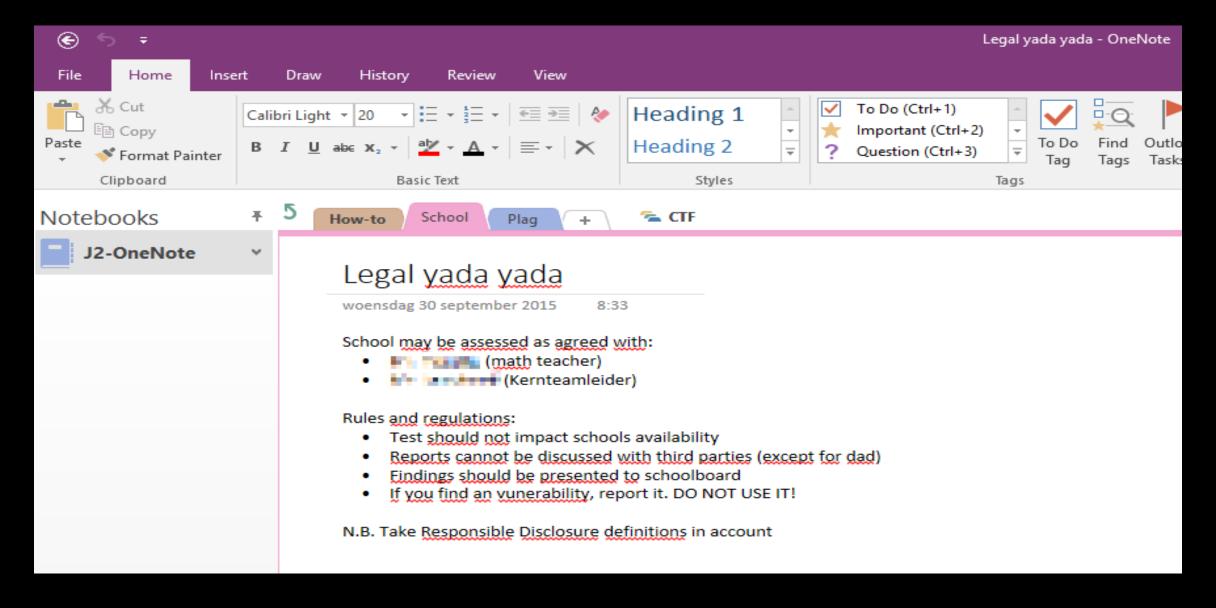




### Responsible Disclosure



### Agreement upfront



### Don't break stuff

Nmap scan	-T4 192 report	Data Network					
Host is up	Host is up $(0.00012s latency)$ .						
Not shown:	985	closed ports	Head Office				
PORT	STATE	SERVICE	LAN	<u> </u>			
80/ <u>tcp</u>	open	http		Remote Location			
135/ <u>tcp</u>	open	msrpc	777	Router LAN			
139/tcp	open	netbios-ssn	T1 HDSL PIX Demarcation T1 Line	1 tours			
443/tcp	open	https	Firewall Router Extender Wide Area Network				
445/tcp	open	microsoft-ds		1			
1044/tcp	open	dcutility	Servers Sign Back-up	Pouter			
1433/tcp	open	ms-sql-s	Main Router Analogue Internet	Router Remote			
2301/tcp	open	compagdiag	V.35  Remote Administration	Location LAN			
2381/tcp	open	compag-https	As/400 Auto-answer modern	1 244			
3389/tcp	open	ms-wbt-server	Minicomputer				
5633/tcp	open	beorl					
5989/tcp	open	wbem-https					
6101/tcp	open	backupexec					
6106/tcp	open	isdninfo					
10000/tcp	open	snet-sensor-mgmt					

## Always lock your devices



### Your passwords are in memory

```
Authentication Id :
                    0 ; 2858340 (000000000:002b9d64)
Session
                  : Service from 0
User Name
                  : svc-SQLDBEngine01
Domain
                  : ADSECLAB
SID
                   S-1-5-21-1473643419-774954089-2222329127-1607
        msu :
                      svc-SQLDBEngine01
          Username
                     ADSECLAB
          Domain
                      d0abfc0cb689f4cdc8959a1411499096
          NTLM
                    : 467f0516e6155eed60668827b0a4dab5eecefacd
        tspkq:
                      svc-SQLDBEngine01
          Username
          Domain
                    : ADSECLAB
          Password : ThisIsAGoodPassword99!
                                                   credentials!
        wdigest :
           Username
                      svc-SQLDBEngine01
                    : ADSECLAB
         * Domain
                      ThisIsAGoodPassword99!
          Password :
        kerberos :
         * Username : svc-SQLDBEngine01
                    : LAB.ADSECURITY.ORG
         * Domain
          Password : ThisIsAGoodPassword99!
        ssp :
        credman :
```

### Poor students become creative





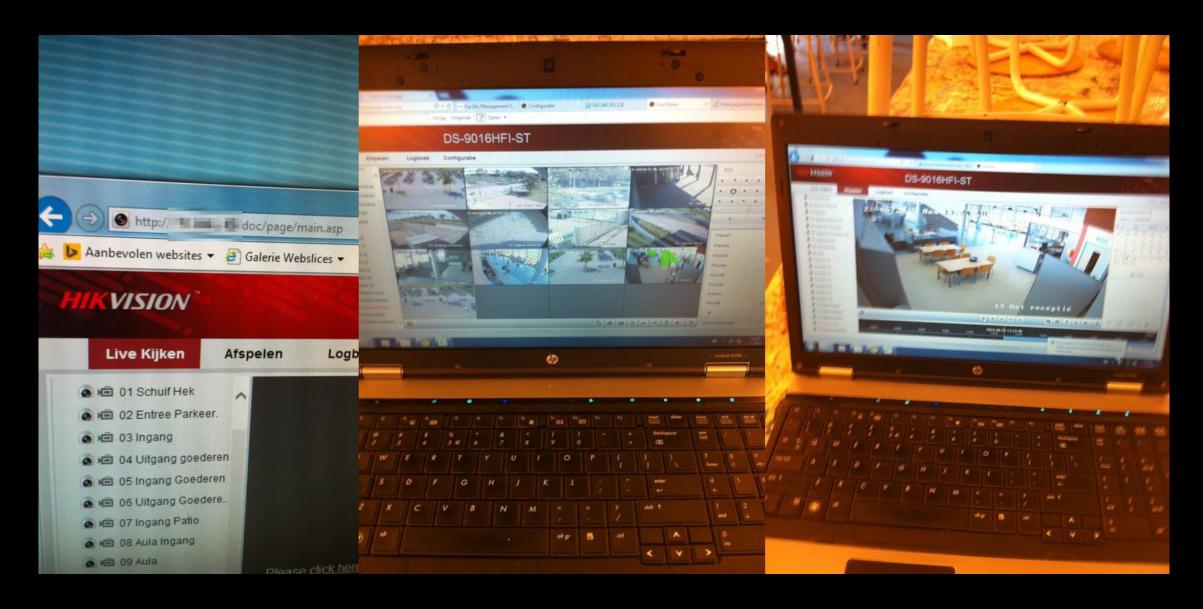


```
#include "DigiKeyboard.h"
int btn = 5;
void setup(){
  pinMode(btn, INPUT);
  pinMode(1, OUTPUT);
```

```
void loop() {
 if (digitalRead(btn) == HIGH) {
   DigiKeyboard.sendKeyStroke(0, MOD GUI LEFT);
   DigiKeyboard.delay(500);
   DigiKeyboard.print("Windows PowerShell");
   DigiKeyboard.delay(850);
   DigiKeyboard.sendKeyStroke(KEY ENTER);
   DigiKeyboard.delay(500);
   DigiKeyboard.print("start https://www.supertwins.nl/troll");
   digitalWrite(1, HIGH); delay(250); digitalWrite(1, LOW);
```

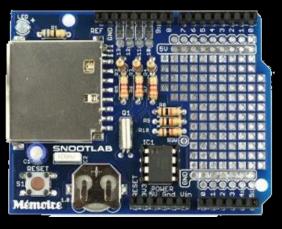
NEVER FORGET TO LOCK YOUR PC

### Change your default password



### Lunchbox electronics





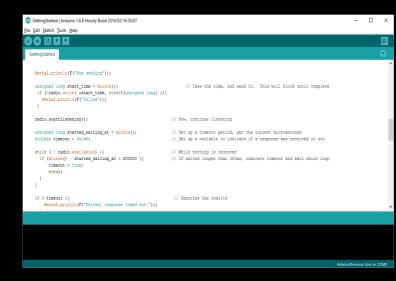












### Lunchbox challenges



### ISO14443-A emulated tag are protected

```
// Notes for ISO14443-A emulated tags:
00220  // * Only short UIDs are supported
00221  // If your UID is longer it will be truncated
00222  // Therefore e.g. an Ultralight can only have short UID, which is
00223  // typically badly handled by readers who still try to send their "0x95"
00224  // * First byte of UID will be masked by 0x08 by the PN53x firmware
00225  // as security countermeasure against real UID emulation
```

From <a href="http://www.libnfc.org/api/nfc-emulate-tag">http://www.libnfc.org/api/nfc-emulate-tag</a> 8c source.html>

### Patch nfc-mfclassic to write 0-byte

```
File: libnfc-1.5.1/utils/nfc-mfclassic.c

// Try to write the trailer
if (nfc initiator mifare cmd (pnd, MC_WRITE, uiBlock, &mp) == false) {
   printf ("failed to write trailer block %d \n", uiBlock);
   bFailure = true;
}
} else {
   // The first block 0x00 is read only, skip this
// COMMENT THIS if (uiBlock == 0 && ! write block zero)
// COMMENT THIS continue;

From <a href="https://gist.github.com/alphazo/3303282">https://gist.github.com/alphazo/3303282</a>>
```

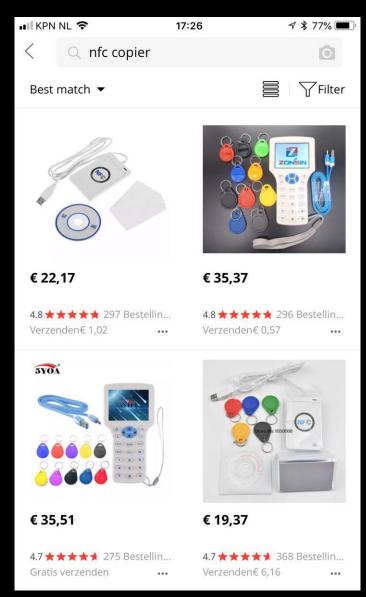
### Lunchbox coding

```
Copycard.sh
                                               #!/bin/bash
                                               td=$(date +%Y%m%d %H%M)
                                               echo -n "Cardname: "
                                               read cardname
old:00bbfa05
                                               toilet --gay -f standard Reading card
new:00161105
                                               old=$(nfc-list | grep UID | cut -d: -f2 | sed -e "s/ //g")
                                               path=${old} ${cardname}
                                               mkdir ${path} 2> /dev/null
                                               mfoc -f keys.txt -0 ${path}/keys.mfd -P 150 -T 50 > ${path}/keys.log
 root@Kali:"/copycard# nfc-list
                                               nfc-mfclassic r a ${path}/dump-a.mfd ${path}/keys.mfd > ${path}/dump-a.log
nfc-list uses libnfc 1.7.1
NFC device: ACS / ACR122U PICC Interface opened
                                               echo "Please remove old card and place empty, Press enter to continue"
 1 ISO14443A passive target(s) found:
 ISO/IEC 14443A (106 kbps) target:
                                               read a
     ATQA (SENS_RES): 00 04
        UID (NFCID1): 00 16 11 05
                                               toilet --gay -f standard Writing card
       SAK (SEL_RES): 88
                                               tmp=$(nfc-list | grep UID | cut -d: -f2 | sed -e "s/ //g")
 root@Kali:~/copycard# ▮
                                               nfc-mfclassic W A ${path}/dump-a.mfd ${path}/keys.mfd f > ${path}/write-a.log
                                               new=$(nfc-list | grep UID | cut -d: -f2 | sed -e "s/ //g")
                                               echo old:$old
                                               echo tmp:$tmp
                                               echo new:$new
                                               toilet --gay -f standard Done
```

### Lunchbox process



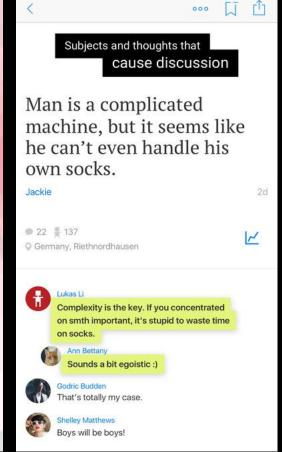
### **Commercial Alternatives**





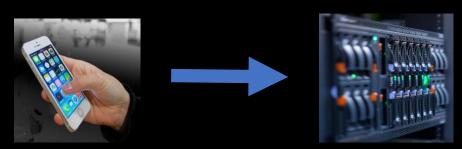
### Plag\*\* Client / Server

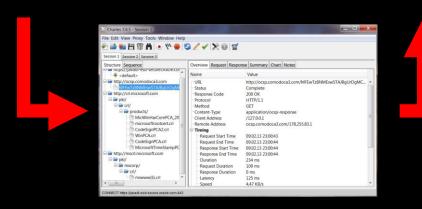


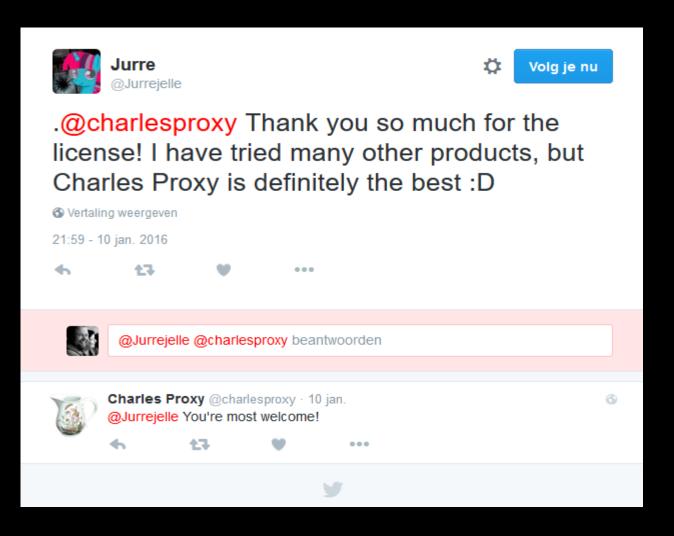


### Plag\*\* Man In The Middle









# Watch hacking videos



### Play Capture The Flag (CTF)

CTF D TIME

CTFs Upcoming Archive Calendar Teams FAQ Contact us About

Sign in

#### SECCON CTF



#### Official URL

Total events: 10 Avg weight: 27.68

#### **DEF CON CTF Qualifier**



#### Official URL

Total events: 8 Ava weight: 86.88

#### RuCTFE



#### Official URL

Total events: 8 Avg weight: 69.81

#### **PlaidCTF**



#### Official URL

Total events: 8 Avg weight: 83.99

Plaid CTF :: Hosted by Plaid Parliament of Pwning

#### Nuit du Hack CTF Quals



#### Official URL

Total events: 8 Avg weight: 41.23

#### **HITB CTF Amsterdam**



#### Official URL

Total events: 8 Avg weight: 30.00

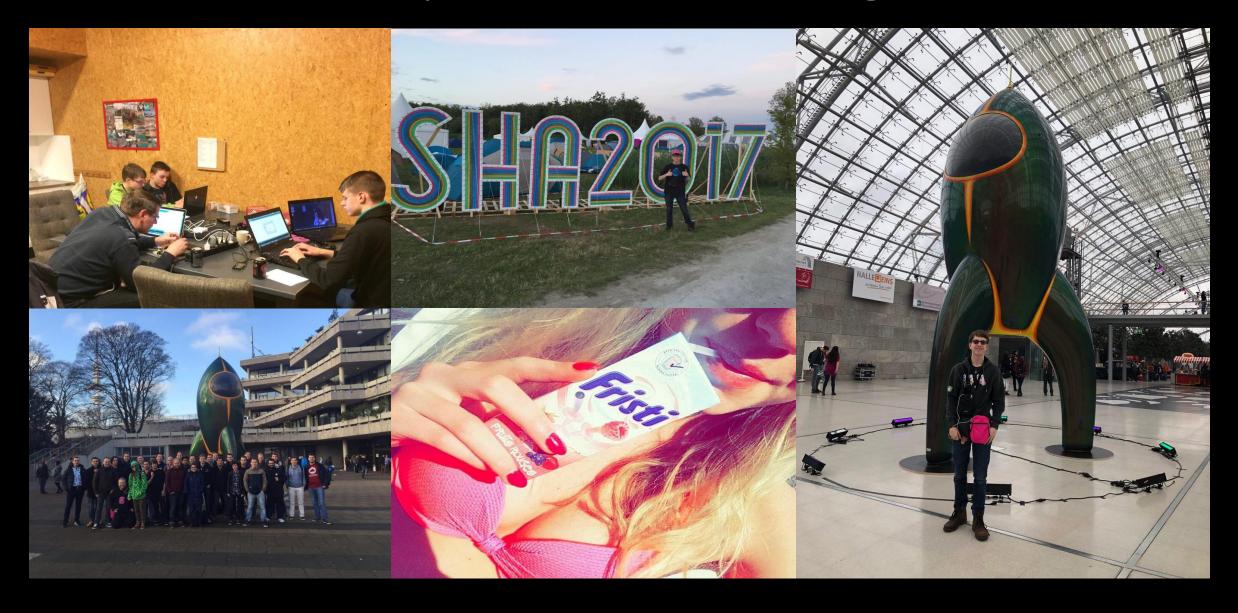
What: Jeopardy style CTF hacking competition

When: April 12th & 13th 2018

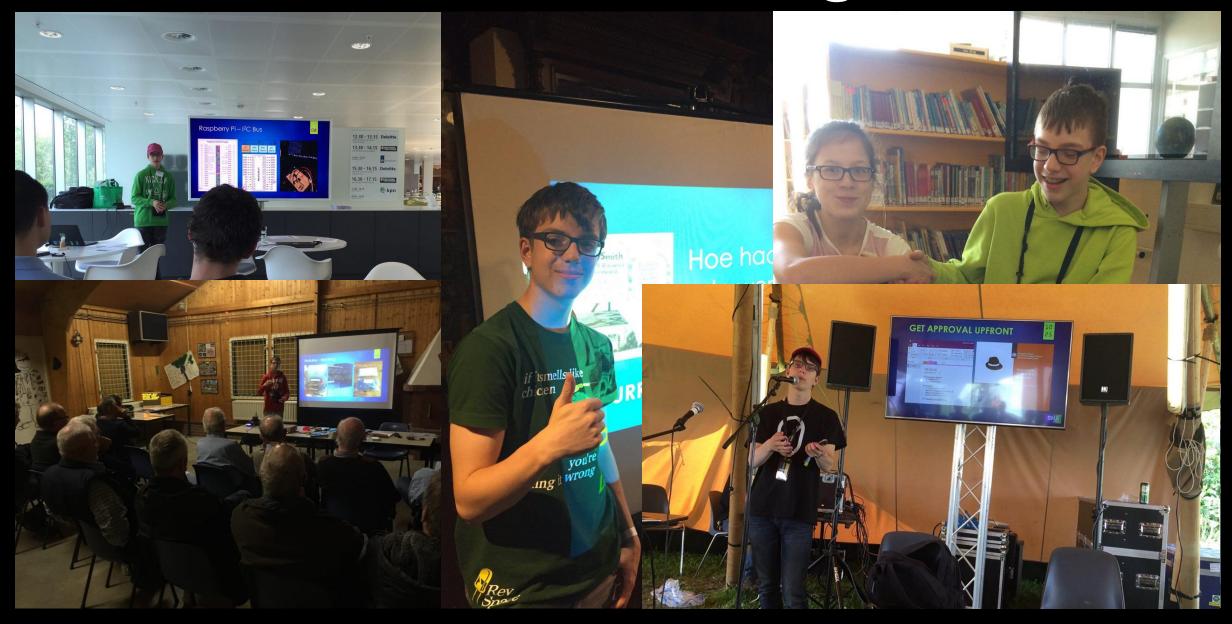
Where: On site at HITB2018AMS @ NH Krasnapolsky

Who: Max of 24 teams with up to 3...

# Acquire knowledge



# Share knowledge



# Next Wednesday Library Veenendaal



### Strange requests







### **Beware of Script Kiddies**





#### Leerlingen Schiedamse school frauderen met cijfers

Tientallen leerlingen van S.G. Spieringshoek in Schiedam hebben waarschijnlijk de cijfers van hun proefwerken aangepast. Een jongen uit havo-4 zou erin geslaagd zijn het leerlingvolgsysteem van de school te hacken.

Redactie 07-06-17, 16:01 Laatste update: 17:23



De politie doet onderzoek en ik ga ervan uit dat deze school dit zorgvuldig aanpakt

- Wethouder Mario Stam

#### SHODAN

The World's Most Dangerous
Search Engine



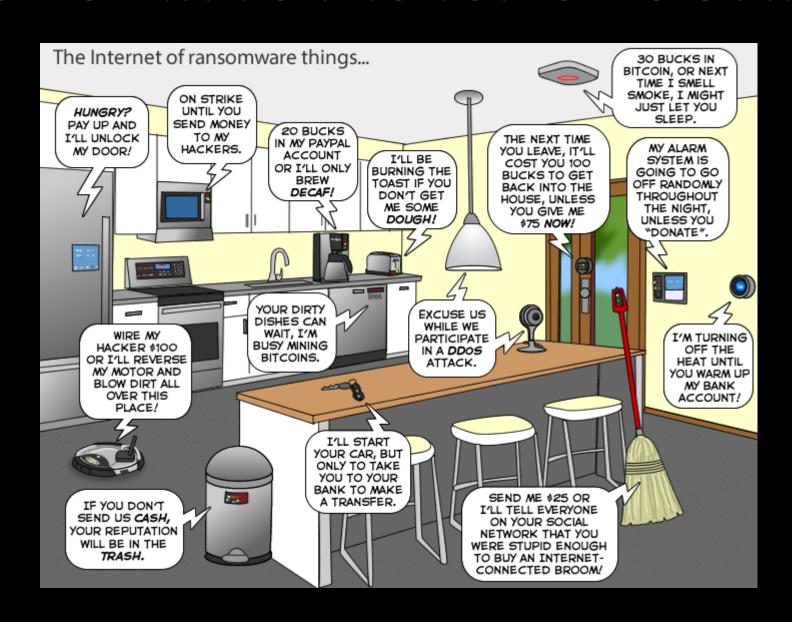




Knowledge Is Free.
We Are Anonymous.
We Are Legion.
We Do Not Forgive.
We Do Not Forget.
Expect Us.

# What about

#### The "S" in IOT is for SECURITY

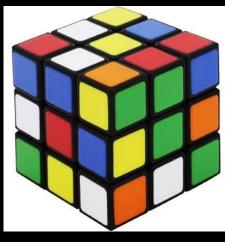


# Most IOT security be like











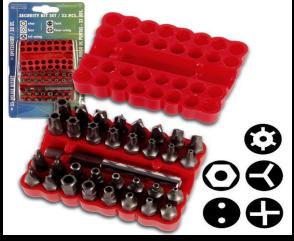


#### **OWASP IOT**

- | | | Insecure Web Interface
- 12 | Insufficient Authentication/Authorization
- 13 | Insecure Network Services
- | | | Lack of Transport Encryption |
- 15 | Privacy Concerns
- 16 | Insecure Cloud Interface
- 17 | Insecure Mobile Interface
- 18 | Insufficient Security Configurability
- 19 | Insecure Software/Firmware
- I10 | Poor Physical Security

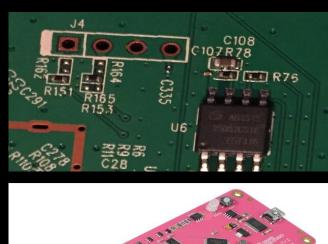
### **Security Measures**



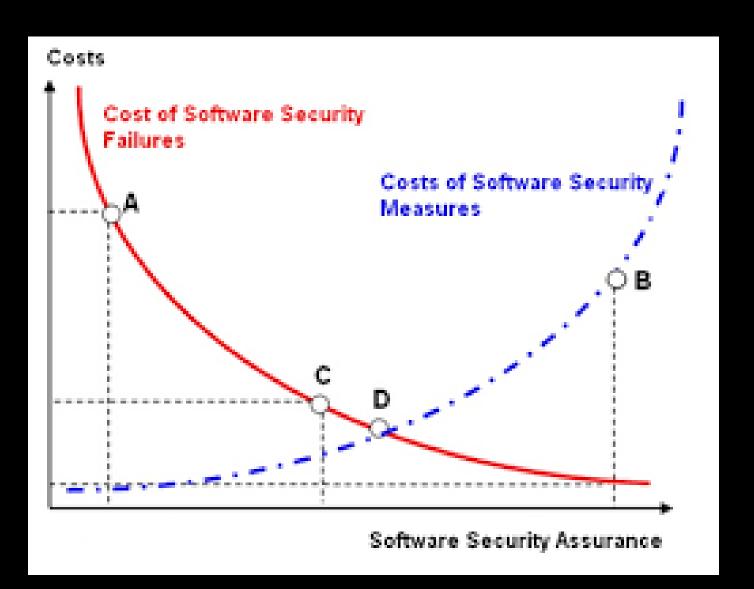




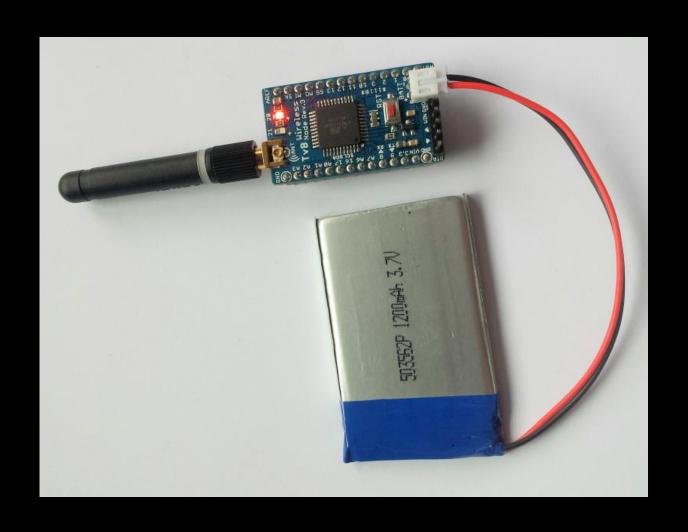




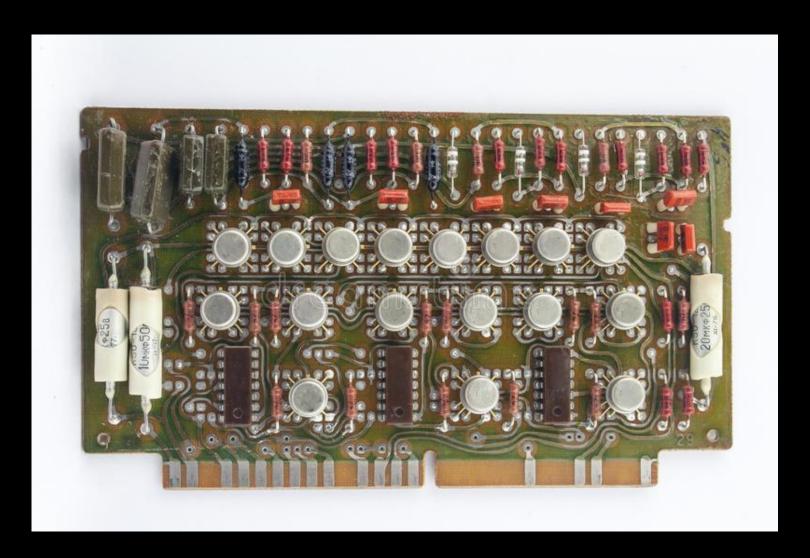
### Security vs Cost



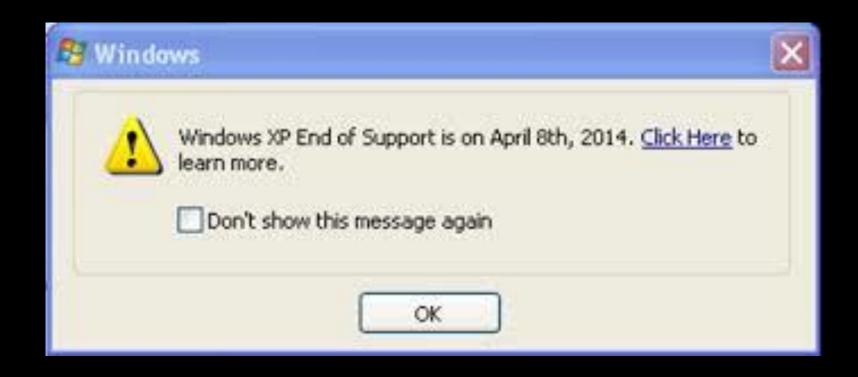
# Security vs Battery life



# Security vs Lifetime

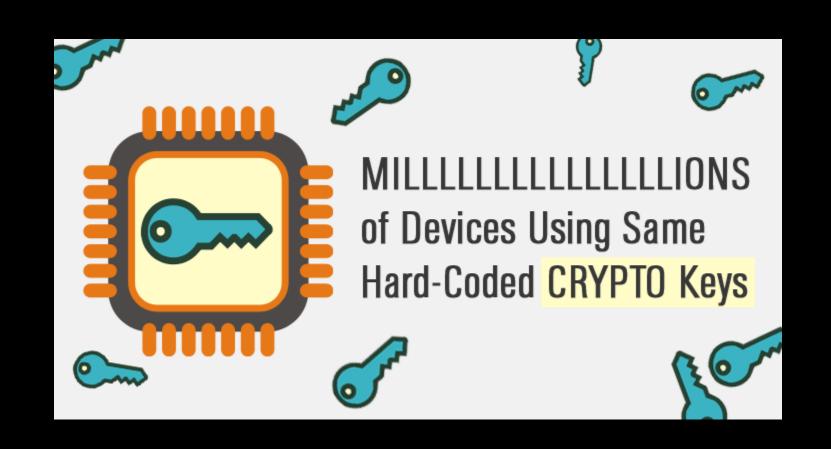


### No update = Not safe!



#### #OTA

### Hack one = Hacked 'm all



### Lack of secure crypto



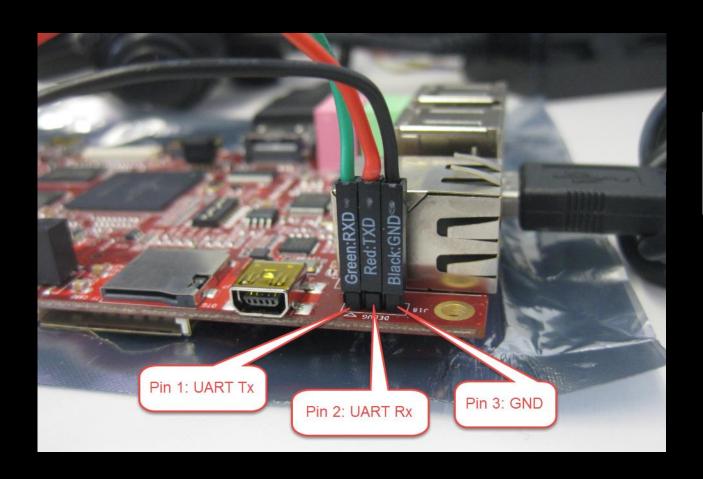
```
int getRandomNumber()
{

return 4; // chosen by fair dice roll.

// guaranteed to be random.
}
```

### #ecb #entropy

# Connect a port & get root



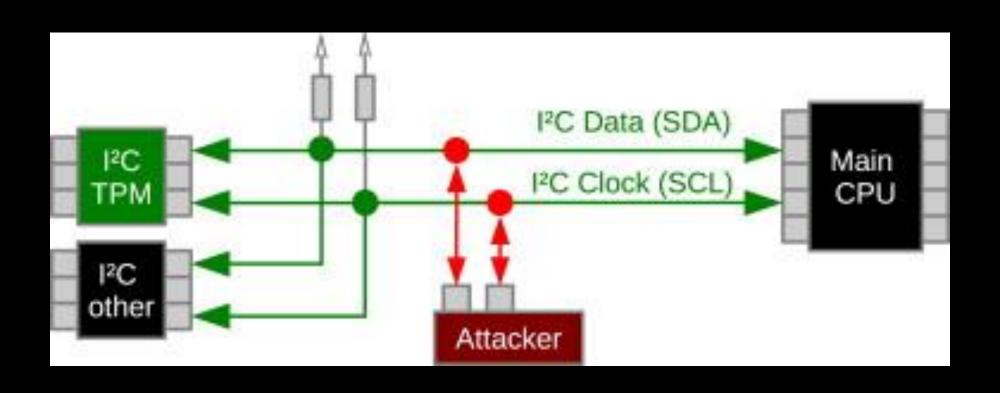




### Storage not encrypted

```
root@ubuntu: ~
root@ubuntu:~# more /etc/passwd
root:$6$NrGiStv6$p4cemGQQwkkOwg2cJn5lh4b9KZHDqr7AiHHNyJQvFtXhP9V0IOhsgf.PleeYIyi
M44htso86L.3S2RPLitoTe1:0:0:root:/root:/bin/bash
daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin
bin:x:2:2:bin:/bin:/usr/sbin/nologin
sys:x:3:3:sys:/dev:/usr/sbin/nologin
sync:x:4:65534:sync:/bin:/bin/sync
games:x:5:60:games:/usr/games:/usr/sbin/nologin
man:x:6:12:man:/var/cache/man:/usr/sbin/nologin
lp:x:7:7:lp:/var/spool/lpd:/usr/sbin/nologin
mail:x:8:8:mail:/var/mail:/usr/sbin/nologin
news:x:9:9:news:/var/spool/news:/usr/sbin/nologin
uucp:x:10:10:uucp:/var/spool/uucp:/usr/sbin/nologin
proxy:x:13:13:proxy:/bin:/usr/sbin/nologin
www-data:x:33:33:www-data:/var/www:/usr/sbin/nologin
backup:x:34:34:backup:/var/backups:/usr/sbin/nologin
list:x:38:38:Mailing List Manager:/var/list:/usr/sbin/nologin
irc:x:39:39:ircd:/var/run/ircd:/usr/sbin/nologin
```

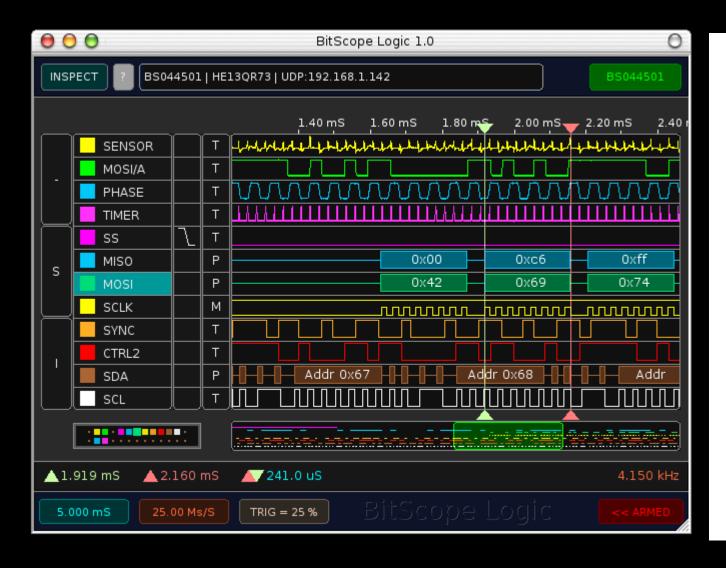
# Eavesdropping (MitM)

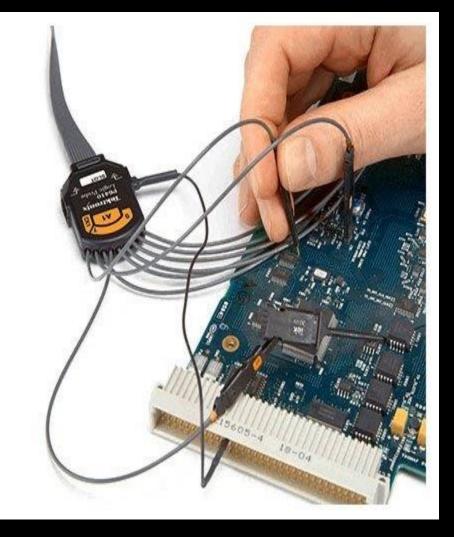


# Eavesdropping (WiFi)



# Eavesdropping (Logic Analyzer)





# Eavesdropping (Protocols)

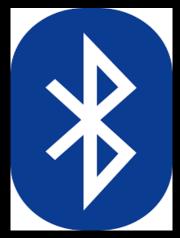


















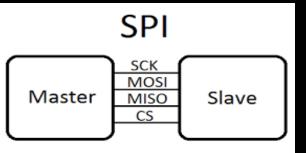














### Release notes are a goldmine

#### Hardware Requirements:

This firmware requires one of the following Zebra Mobile Printers (where "X" means the value is not important):

#### Firmware Releases:

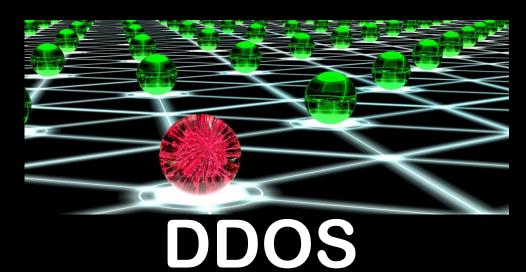
#### 11z42

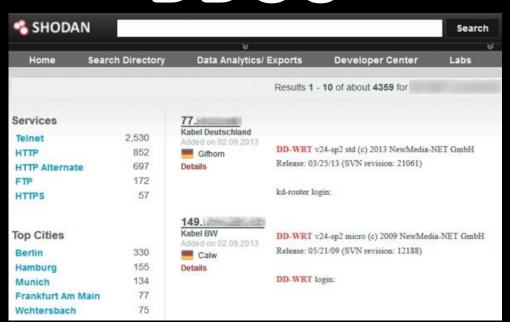
Refer to Date: 15 April 2011

#### Enhancements

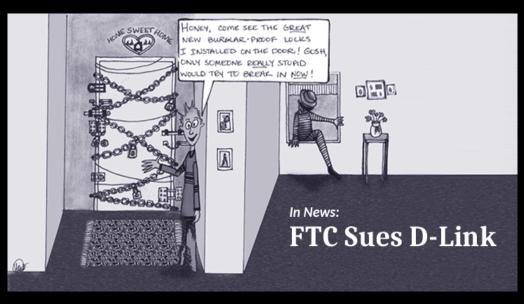
- RFID: Increased maximum size of EPC length from 96 to 496 bits [6632]
- Mirror: Added support for encrypted command files (see below for description).

### IOT will be the easy entry point







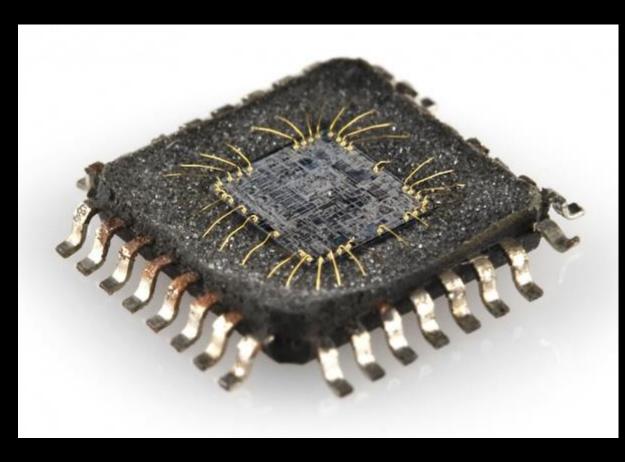


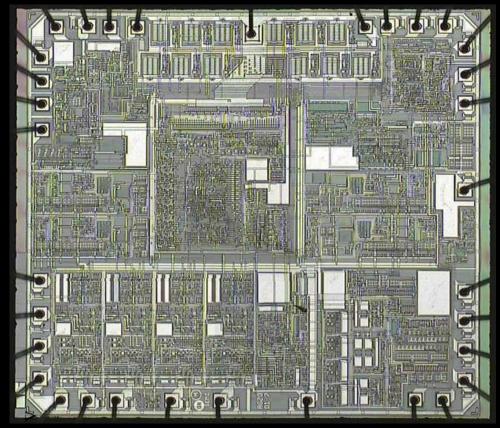
### Sidechannel Attacks



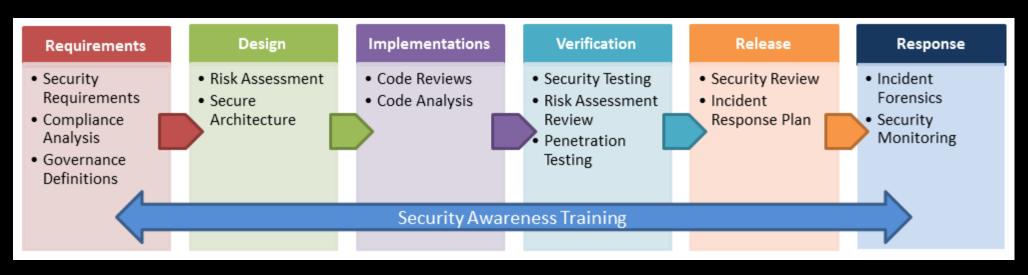
- Clock
- Temperature
- Optical (Light)
- Electromagnet ic radiation
- Power

# Chip decapping





## Security should be part of design



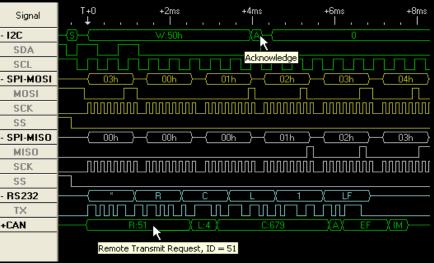


### Have your HW tested!









→ dll bina	alk 027cc450ef5f	3c5f653329641ec1fed9
DECIMAL	HEXADECIMAL	DESCRIPTION TO THE CONTRACT OF THE PARTY OF
0	0x0	Microsoft executable, portable (PE)
53088	0xCF60	CRC32 polynomial table, little endian
57184	0xDF60	CRC32 polynomial table, big endian
61463	0xF017	Copyright string: "Copyright 1995-2013 Mark Adler "
84000	0x14820	Microsoft executable, portable (PE)
98288	0x16060	Microsoft executable, portable (PE)
105196	0x19AEC	Zlib compressed data, best compression
130156	0x1FC6C	Zlib compressed data, best compression
157584	0x26798	Zlib compressed data, best compression
349192	0x55408	Zlib compressed data, best compression
356509	0x5709D	Certificate in DER format (x509 v3), header length: 4, sequence length: 1120
357633	0x57501	Certificate in DER format (x509 v3), header length: 4, sequence length: 1146
358783	0x5797F	Certificate in DER format (x509 v3), header length: 4, sequence length: 1181
359968	0x57E28	Certificate in DER format (x509 v3), header length: 4, sequence length: 1194

# Learn to do it yourself!



# 

### 1: Lock your devices

#### Lock the computer:

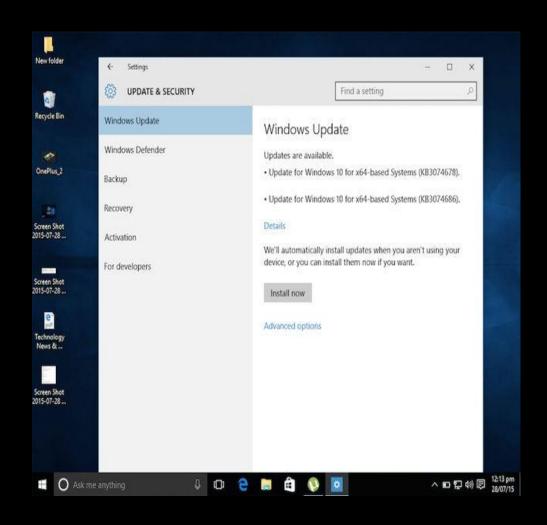


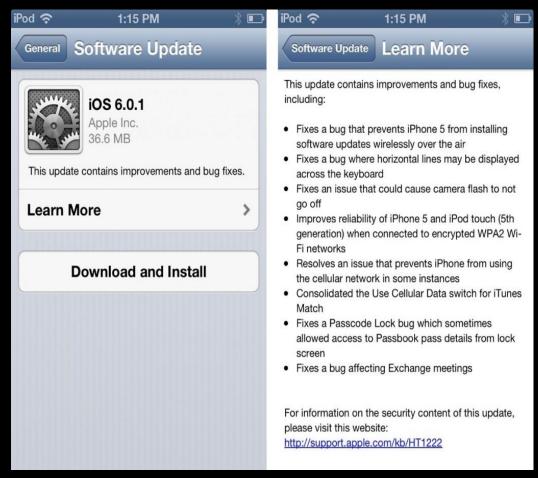
# 2: Create backup & unplug!





### 3: Update your devices

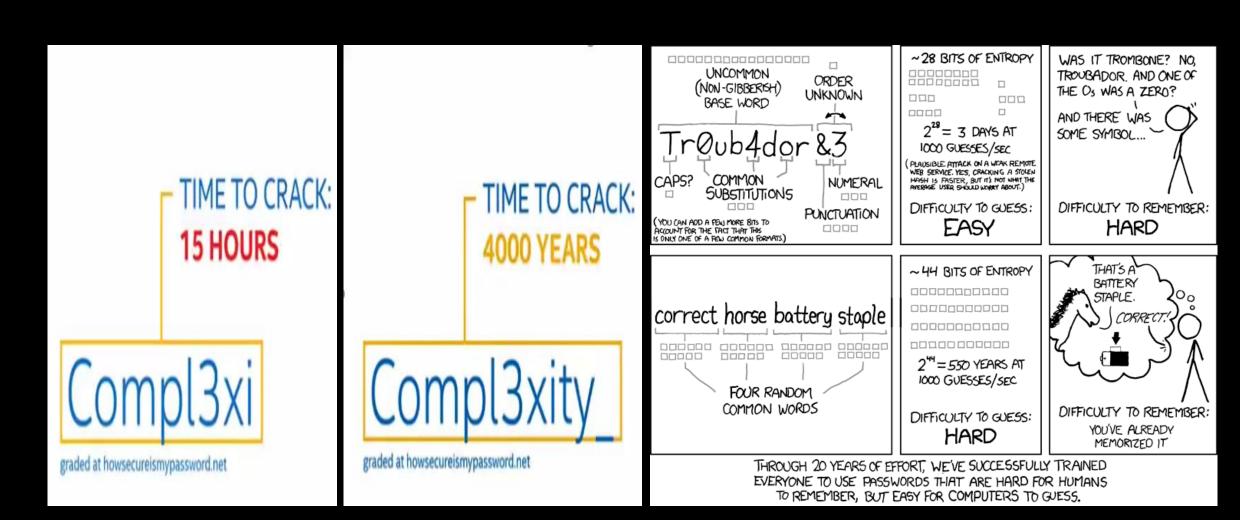




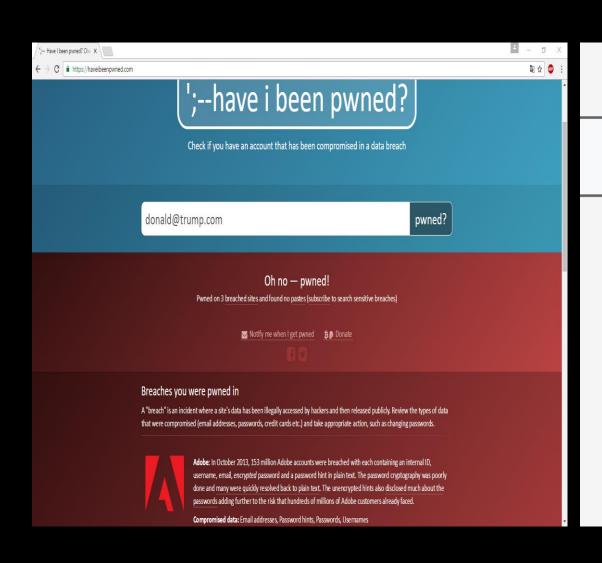
### 4: Enable Multi Factor



### 5: Use long passwords



#### 6: Password still safe?



Search through 1.4 billion leaked accounts
3.1 million in The Netherlands

Gotcha?

president@whitehouse.gov Search

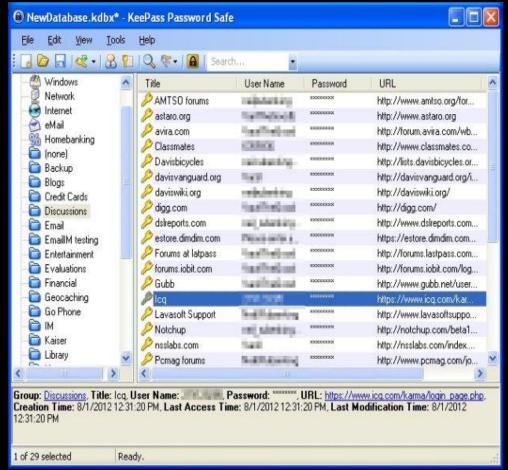
Tip: see also @whitehouse.gov or The Netherlands.

#### Found 18 account(s)

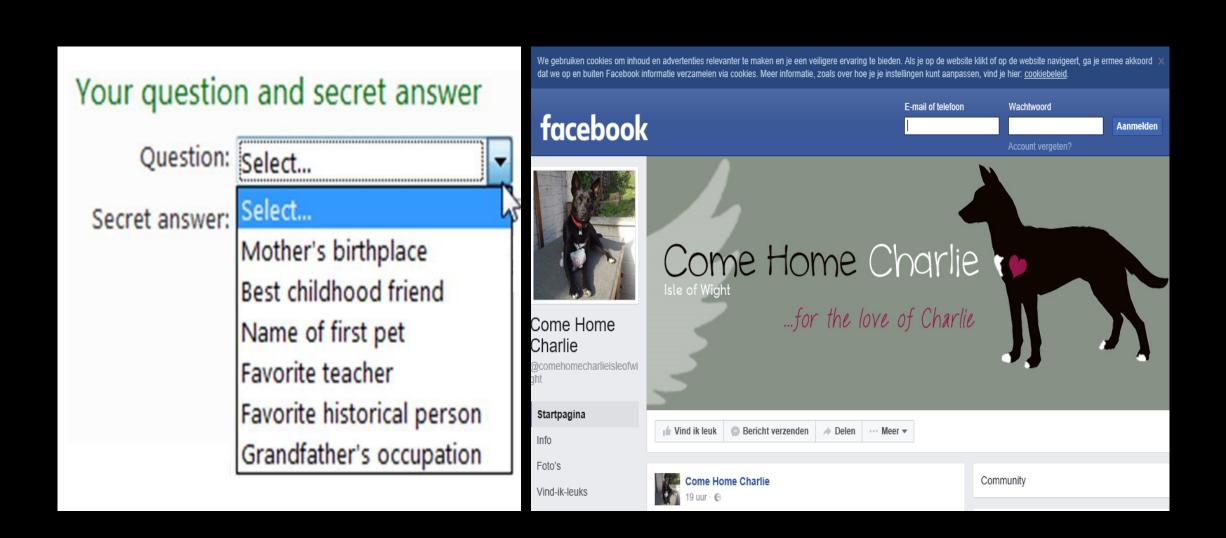
Pres\*\*\*\*\*\*@whitehouse.gov ( \*\*\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov 12\*\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov ( \*\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov Ke\*\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov ad\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov pres\*\*\*\*\*\*@whitehouse.gov bi\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov C \*\*\*\*\*\*\* ff\*\*\*\*\*\* pres\*\*\*\*\*\*@whitehouse.gov

### 7: Use a password manager





#### 8: Use fake answers



#### 9: VPN while on Free WiFi



#### Questions?









#### Jilles

@jilles\_com

CYBER Security, HW Hacking, IoT, Crypto, DFIR, SecOps, Lock picking, Education, Gadgets, LEGO, ComicCon \$\frac{\psi}{2}\$ TwitterHippie, \$\frac{\psi}{2}\$ @syljil @jurrejelle & Jelle

#### Jurre

@Jurrejelle

Gamer, Hacker, Programmer. Son of @syljil and @jilles\_com, brother of Jelle | CS-0904140001