



CSE 536 Spring 2026

Jed Crandall

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A bit about me...

- Associate Professor, SCAI *and* Biodesign Center for Biocomputation, Security, and Society
- Research is about Internet Freedom, including:
 - Internet censorship and censorship evasion
 - Machine-in-the-middle attacks, adversarial networking
 - Privacy, forensics, and a few other things






IBM 1130, U.S. 1965
The 1130 was unusual in offering removable disk storage and a full line of peripherals including card readers and printers. IBM also offered over 50 in-house developed tools, such as highway alignment, bridge design, and software for customers.
Base: 124,000 with disk. Memory size: 16 words. Memory type: Core. Memory width: 16 bits.

GENERAL AUTOMATION

Not every minicomputer company was created by engineers jumping ship. A marketing executive and a salesperson at Honeywell founded General Automation.



https://commons.wikimedia.org/wiki/File:Apple_II_typical_configuration_1977.png



Welcome to Debian Linux 1.1!

This is the Debian Linux Boot Disk. On most systems, you can go ahead and press <ENTER> to begin installation. You will probably want to try doing that before you try anything else. If you run into trouble, or if you already have questions, press the function key <F1> for quick installation help.

WARNING: You should completely back up all of your hard disks before proceeding. The installation procedure can completely and irreversibly erase them! If you haven't made backups yet, remove the floppy from the disk drive and press <RESET> or <Control-Alt-Del> to get back to your old system.

Debian Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law. For copyright information, press <F5>.

This boot floppy installs the Linux kernel version 2.0.0.

Press <F1> for help, or <ENTER> to boot!

boot: _

https://archive.org/details/debian_1.1



Plagiarized from
<https://sites.psu.edu/thedeepweb/2015/09/17/captain-crunch-and-his-toy-whistle/>

<https://archives.phrack.org/issues/7/3.txt>

==Phrack Inc.==

Volume One, Issue 7, Phile 3 of 10

The following was written shortly after my arrest...

\\The Conscience of a Hacker\\

by

+++The Mentor+++

Written on January 8, 1986

Yes, I am a criminal. My crime is that of curiosity. My crime is that of judging people by what they say and think, not what they look like. My crime is that of outsmarting you, something that you will never forgive me for.

I am a hacker, and this is my manifesto. You may stop this individual, but you can't stop us all... after all, we're all alike.

<https://archives.phrack.org/issues/7/3.txt>

==Phrack Inc

Volume One, Issue 7, Ph

The following was written shortly after my

\\The Conscience of

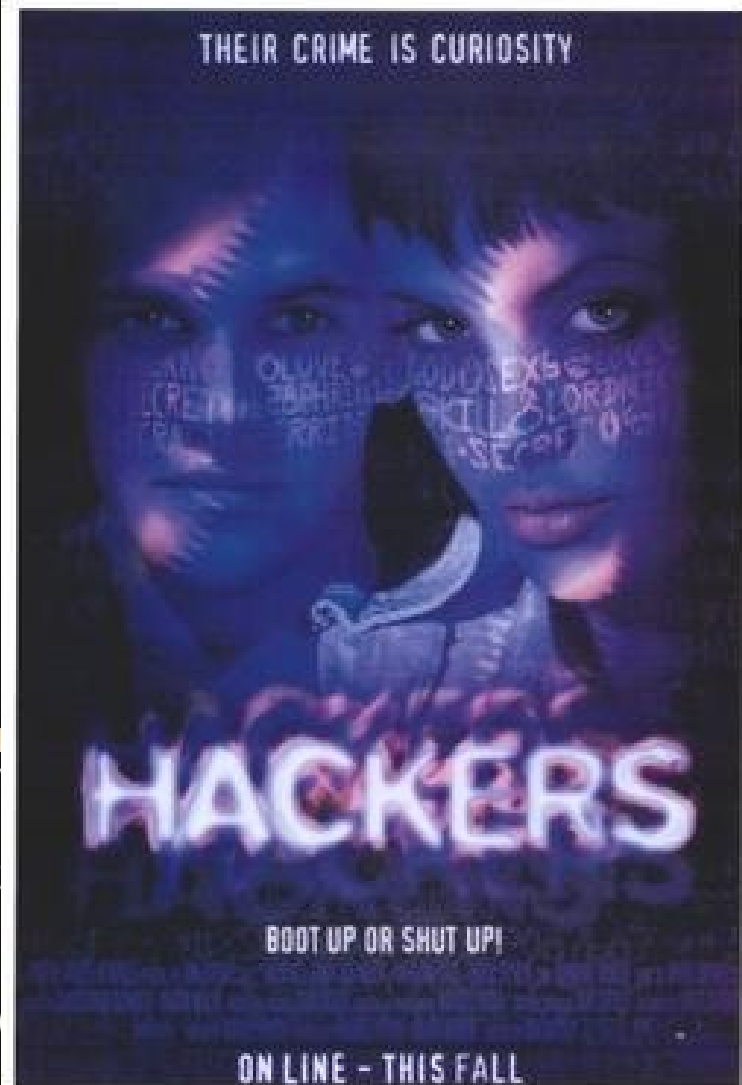
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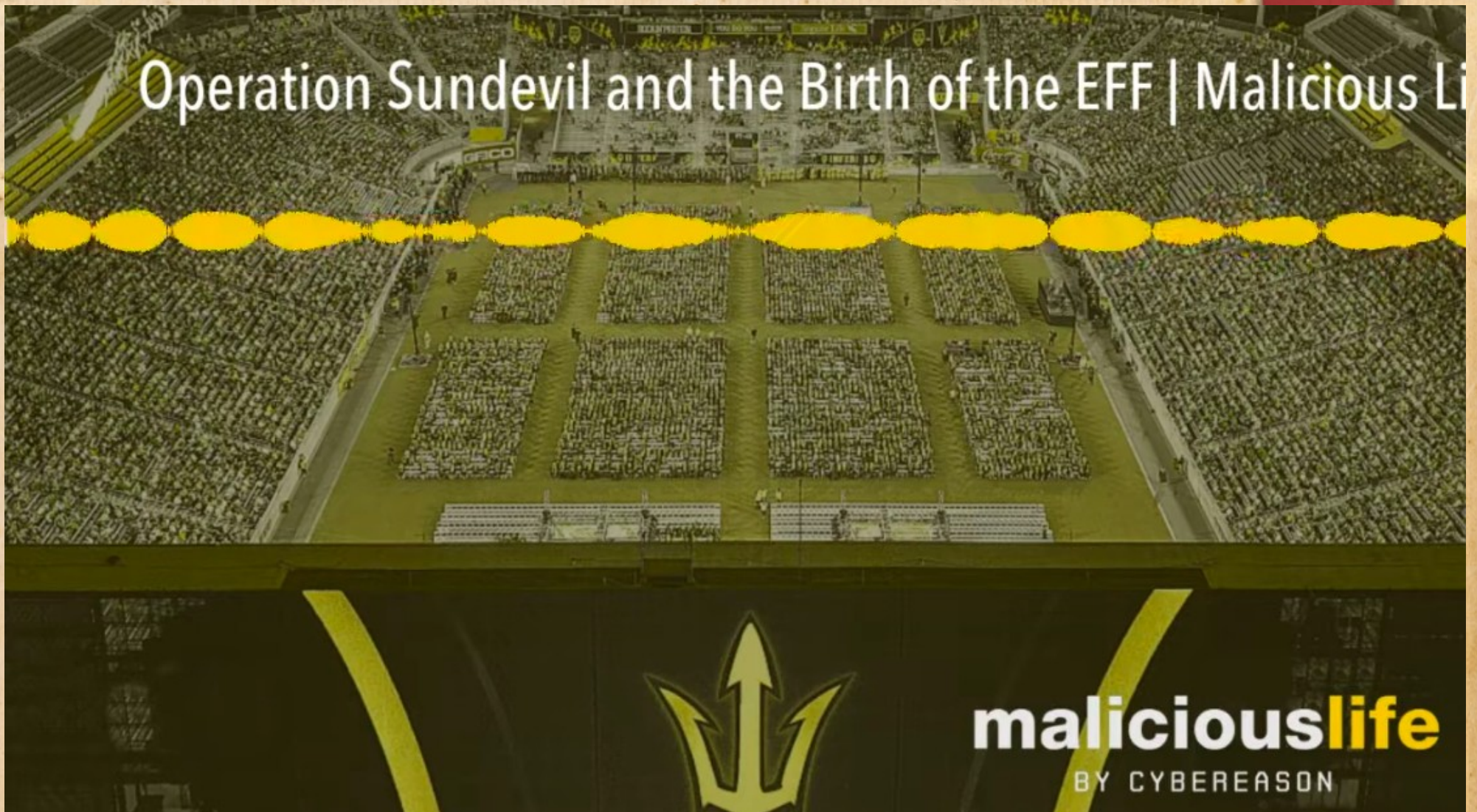
I am a hacker, and this is my manif
but you can't stop us all... after all, we'



.
me

dual,

Operation Sundevil and the Birth of the EFF | Malicious Life




https://www.youtube.com/watch?v=Mookr_VrhyU



Take out your cell phone...


- What OS is it running?
- Who's in control of the software on it and what it does with your private data?
- Open your apps and scroll through them
 - Any that you don't know much about (*e.g.*, who developed it)?
 - Any that you've ever had problems before that seemed to be software errors?
 - Concurrency



“How many of you have broken no laws this month? That's the kind of society I want to build. I want a guarantee - ***with physics and mathematics, not with laws*** - that we can give ourselves real privacy of personal communications.”

— John Gilmore






This semester is all about the operating systems you use (both in your pocket and remote servers), and how they can be made more secure and reliable. And, especially, how operating systems define who's in control of your private data.


Why study “Advanced Operating Systems?”



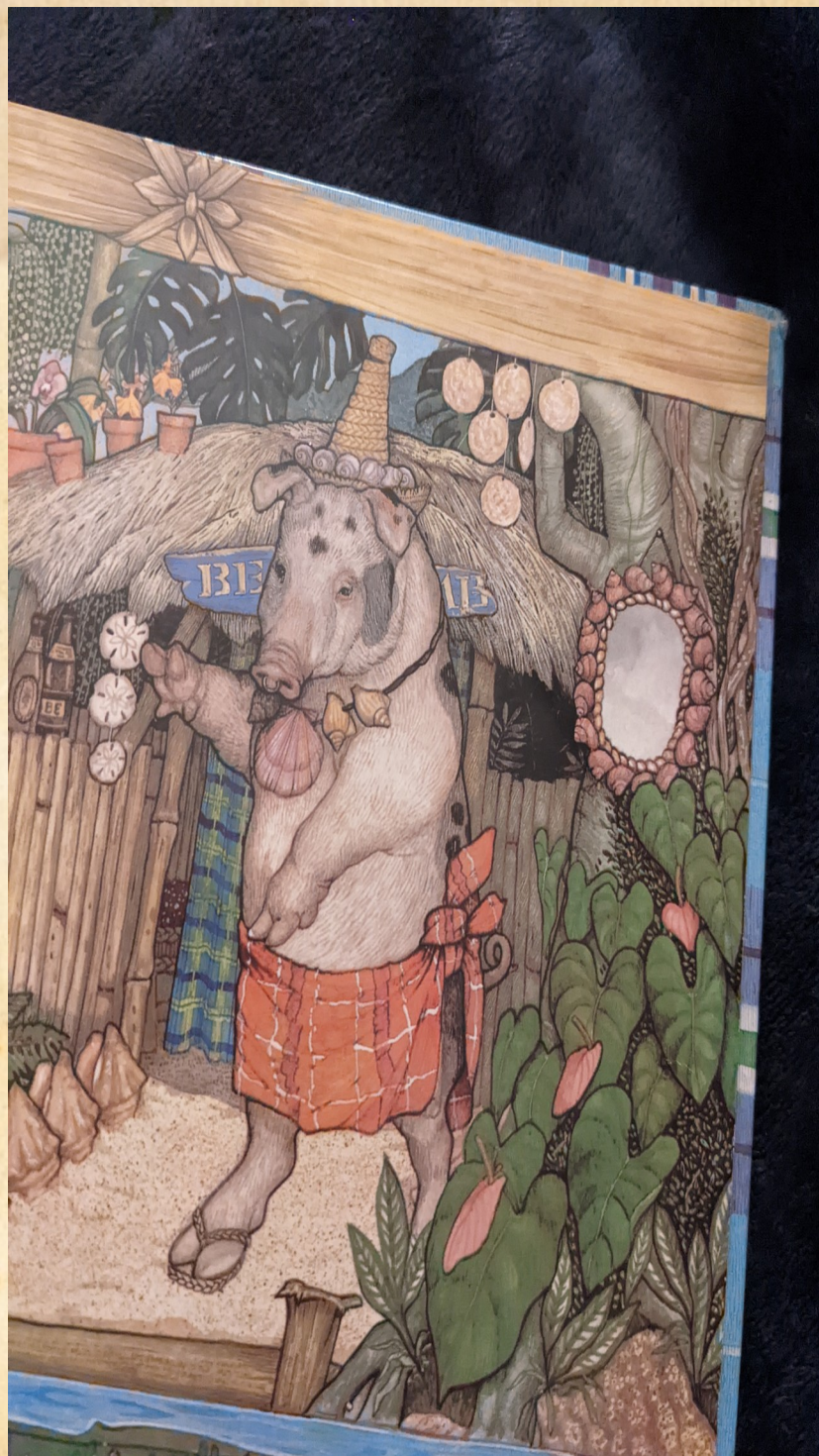
- I/O queues, shared memory, multithreading, *etc.* can make or break whatever code you're writing
 - Machine learning or AI
 - Web apps
 - Embedded devices
 - Even if a library takes care of things for you, you should understand *how*
 - Security and privacy, hacker mindset
- 

UNIX, C, and the Internet...

- UNIX was developed to run on anything
 - Bell Labs, 1969 (Thompson and Ritchie)
 - Contrast with TOPS10
- C provides direct access to hardware, virtually no runtime environment
 - Bell Labs, 1972-1973 (Ritchie)
 - Contrast with COBOL



UNIX example...




```
jedi@mariposa:~$ cat /usr/share/dict/american-english | tr [a-z] [A-Z] | grep "MB$" | head -n 20
```

COULOMB

HOLCOMB

LAMB

LIPSCOMB

MB

MB

APLOMB

BENUMB

BOMB

CATACOMB

CLIMB

COCKSCOMB

COMB

COXCOMB

CRUMB

CURRYCOMB

DUMB

ENTOMB

FIREBOMB

HONEYCOMB

```
jedi@mariposa:~$
```


TOPS10 example...

A TOPS-10 command primer

But

```
C:\> mkdir foo
```

```
C:\> cd foo
```

```
C:\FOO> dir
```

becomes:

```
.r credir
```

```
Create directory: [,,foo]
```

```
Created DSKC0:[42,42,  
FOO].SFD/PROTECTION:775
```

```
Create directory: ^Z
```

```
.r setsrc
```

```
*cp [,,foo]
```

```
*^Z
```

```
EXIT
```

```
.dir
```

```
%WLDDEM Directory is empty
```




[https://commons.wikimedia.org/wiki/
File:DECSys10-KI10.JPG](https://commons.wikimedia.org/wiki/File:DECSys10-KI10.JPG)

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https://en.wikipedia.org/wiki/CAP_computer



https://en.wikipedia.org/wiki/Electrologica_X8



Who cares?

- Early computing
 - Failed to create a separation between users
 - Concurrency was handled *via* hardware support
- Today (Internet is prevalent)
 - Security and privacy are very personal
 - Users are in a “walled garden”, powerless
 - Concurrent processes span continents



Gmail

facebook



Hotmail

YAHOO!

Google



skype

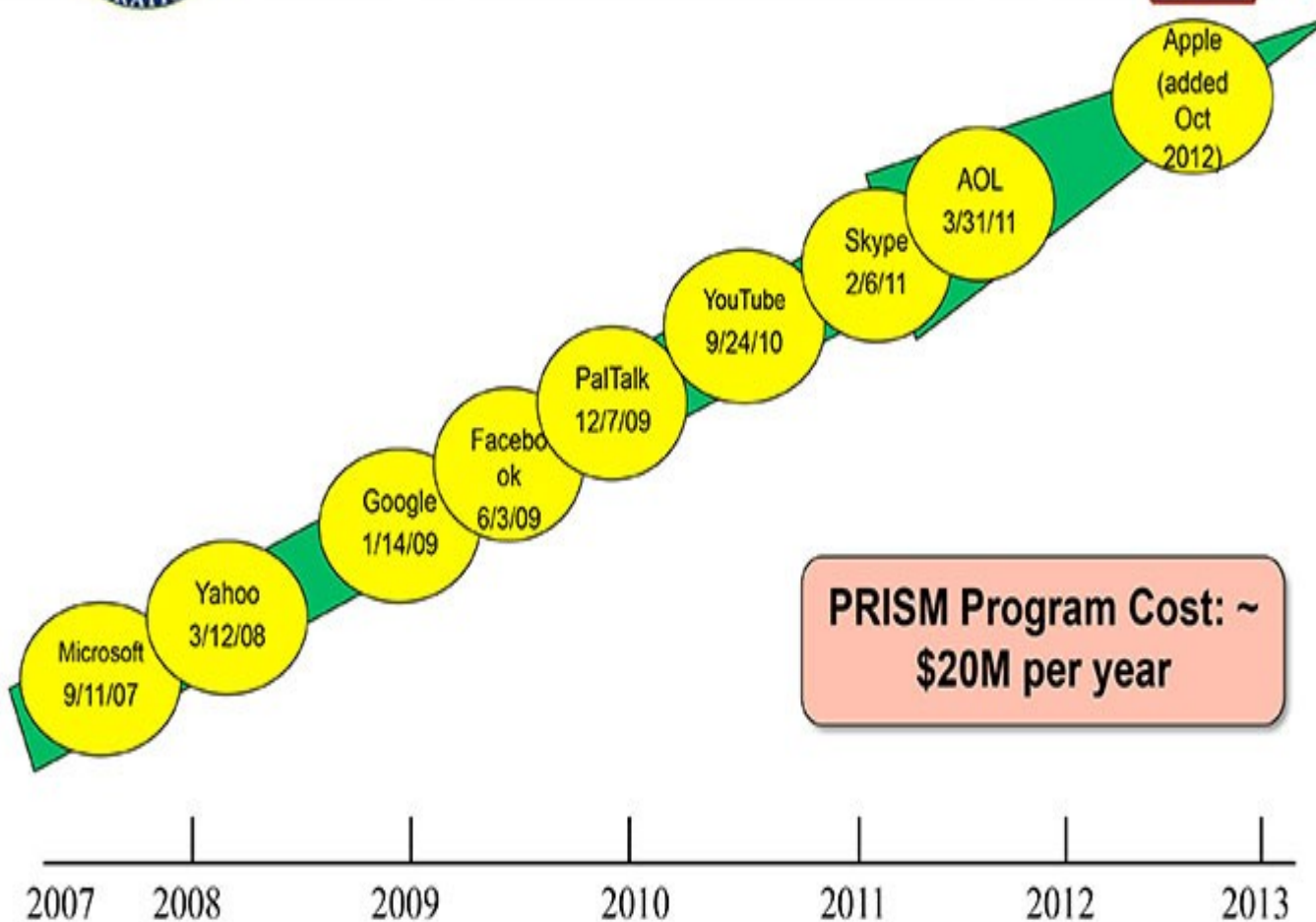
paltalk.com

YouTube

AOL

mail

(TS//SI//NF) Dates When PRISM Collection
Began For Each Provider





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HOME

SERVICES

TESTIMONIALS

PEOPLE

FAQ

LOCATIONS



ARSENAL CONSULTING REPORTS REVEAL ELECTRONIC EVIDENCE TAMPERING IN THE INDIAN BHIMA KOREGAON CASE

See details about the compromise of multiple computers leading to incriminating document deliveries.



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MARK SPENCER, PRESIDENT



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MALICIOUS APP —

Android app from China executed 0-day exploit on millions of devices

Fast-growing e-commerce app Pinduoduo had an EvilParcel stow-away.

DAN GOODIN - 3/27/2023, 5:31 AM

ARS VIDEO

How The Callisto Protocol's
Gameplay Was Perfected Months
Before Release

Ad : (0:13) ?



Russian Trusted Root CA

Identity: Russian Trusted Root CA

Verified by: Russian Trusted Root CA

Expires: 02/27/2032

▼ Details

Subject Name

C (Country): RU

O (Organization): The Ministry of Digital Development and Communications

CN (Common Name): Russian Trusted Root CA

Issuer Name

C (Country): RU

O (Organization): The Ministry of Digital Development and Communications

CN (Common Name): Russian Trusted Root CA

Issued Certificate

Version: 3

Serial Number: 10 00

Not Valid Before: 2022-03-01

Not Valid After: 2032-02-27

Certificate Fingerprints

SHA1: 8F F9 15 CC AB 7B C1 6F 8C 5C 80 99 D5 3E 0E 11 5B 3A EC 2F

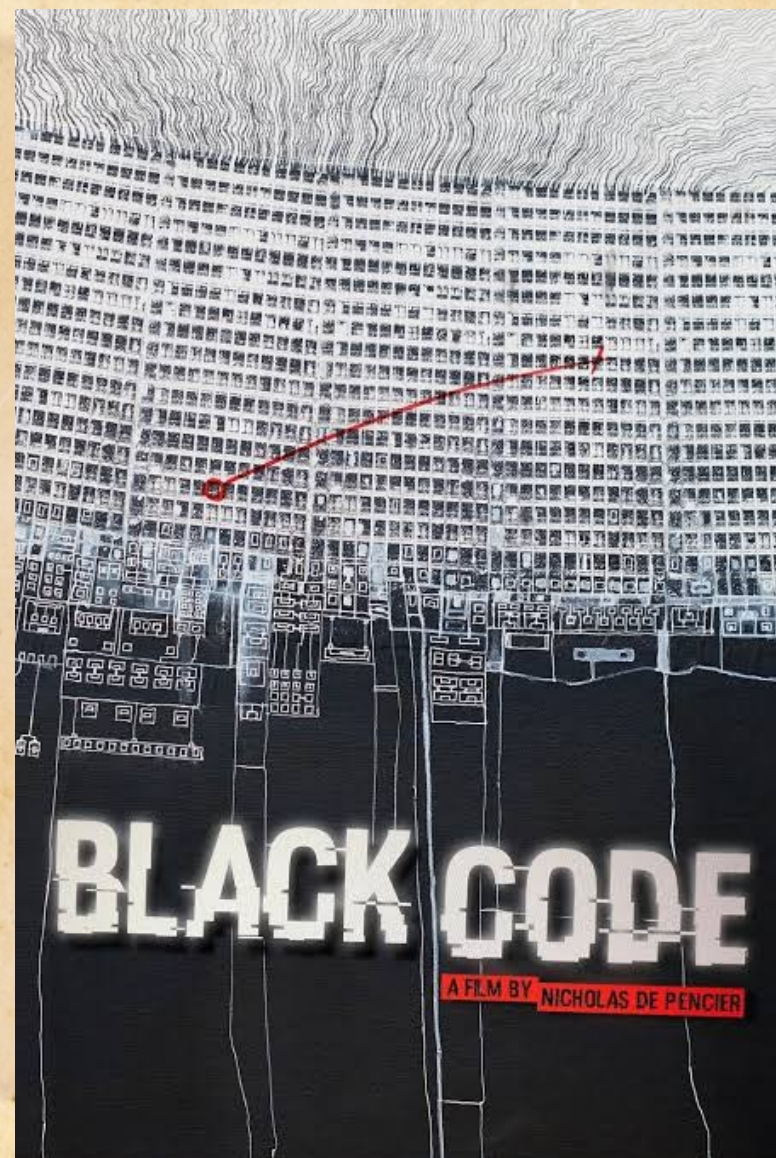
MD5: 7F BB 1F BB D1 29 47 E7 28 DC BF A4 56 8C 64 CD

How you can help

- Hacker mentality
 - Whether or not you agree with the hacker manifesto
- Give up preconceived notions
 - “Dining philosophers? Pi calculus? I thought operating systems class would be practical, useful stuff.”
 - “I don’t need to know this stuff, I just want to graduate so I can fulfill my destiny of doing X.”
- Come to class, do the reading, ...

For Thursday (January 15th)...

- Read the hacker manifesto
- Listen to the Malicious Life podcast episode about Operation Sundevil





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