

# O perigo dos Softwares Não Livres em Dispositivos Biomédicos

Marcel Ribeiro Dantas

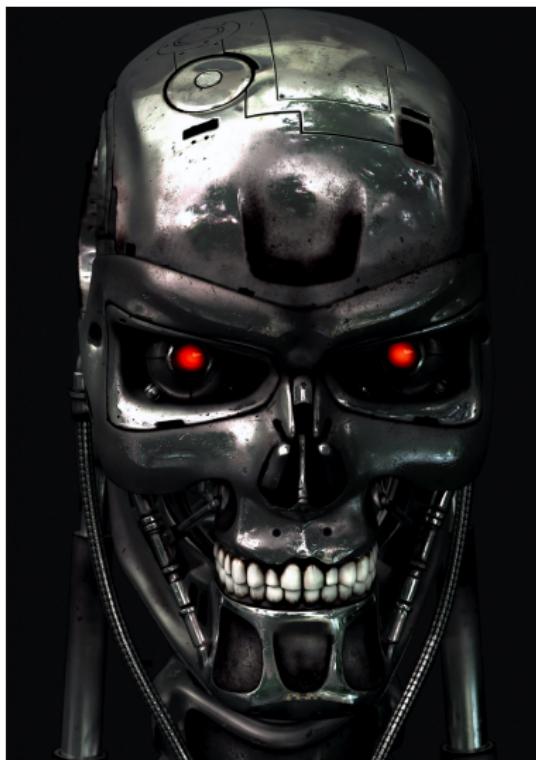
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I CONSOLINE - Recife/PE

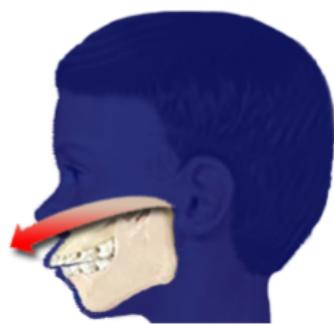
9 de Novembro de 2013



I'm a Cyborg. How about you?



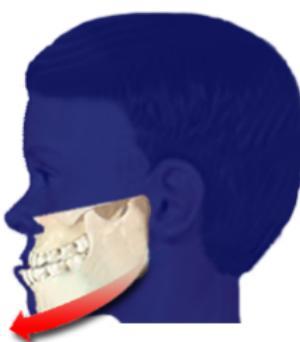




Maxillary  
prognathism



Jaw without  
prognathism



Mandibular  
prognathism

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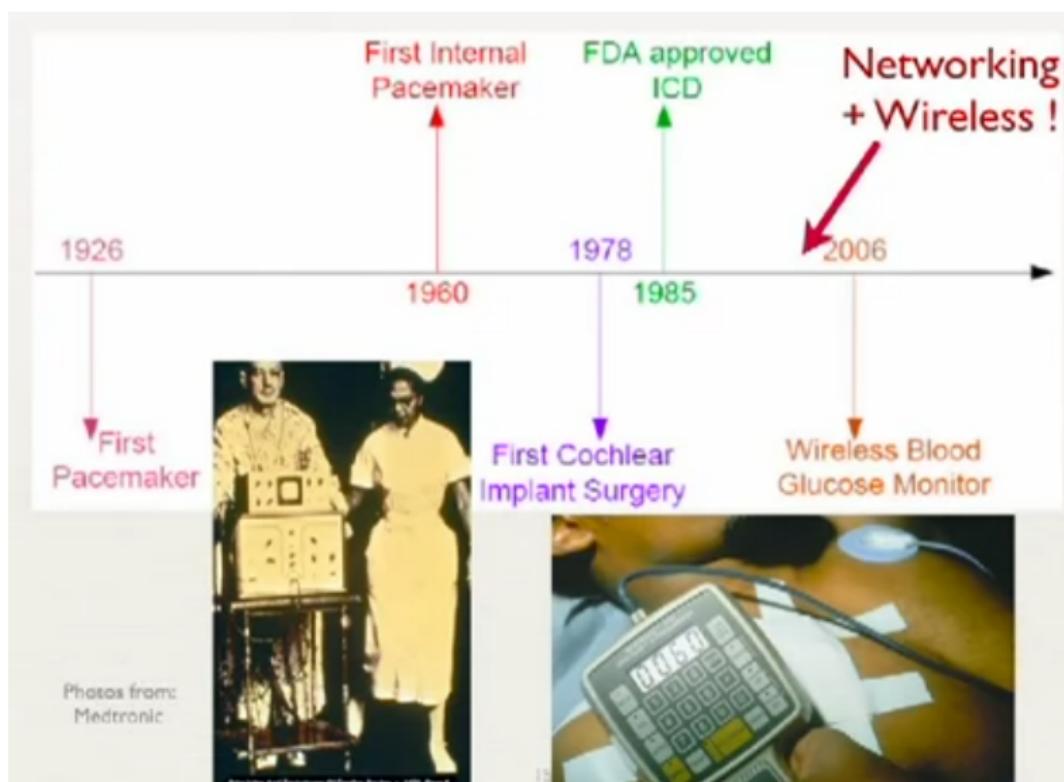
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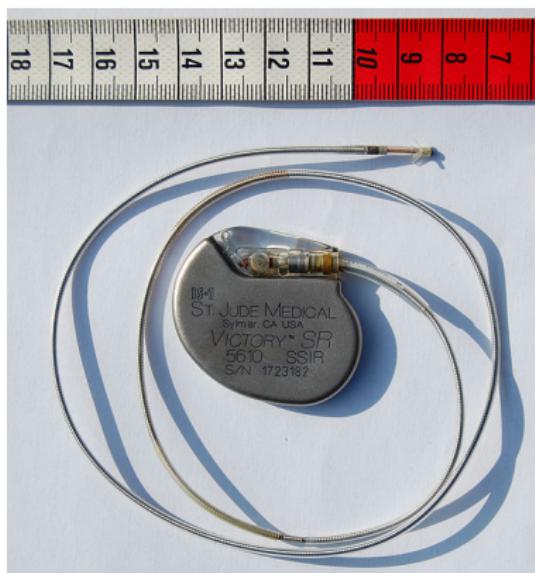
# How common is an implantable device?

- Over 3.000.000 people worldwide with pacemakers
- Each year 600.000 pacemakers are implanted
- Usually, 60 yo or older, but not necessarily
- Global market for pacemakers: USD 4.2 billion in 2008

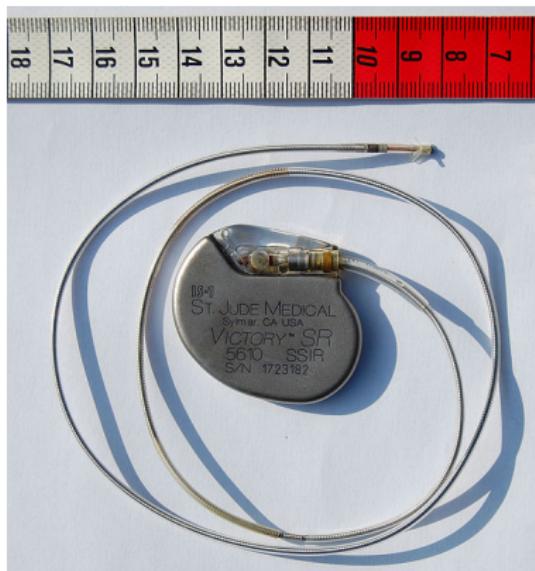
They're not new. They're just different now



# What is a pacemaker?

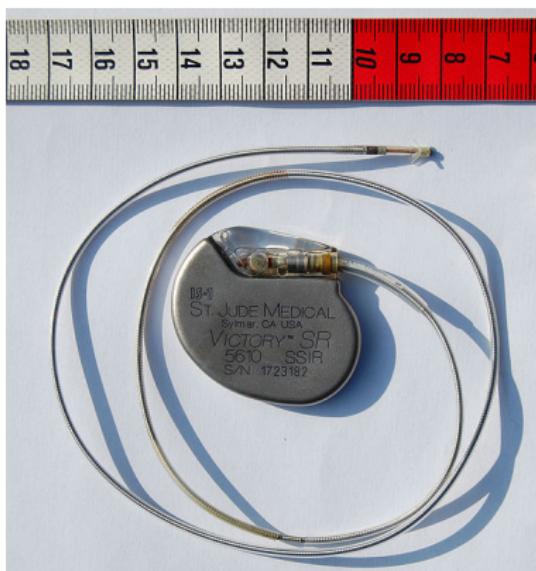


# What is a pacemaker?



- Artificial Cardiac Pacemaker

# What is a pacemaker?



- Artificial Cardiac Pacemaker
- Electrical impulses to regulate heart rate

# What is a defibrillator?



# What is a defibrillator?



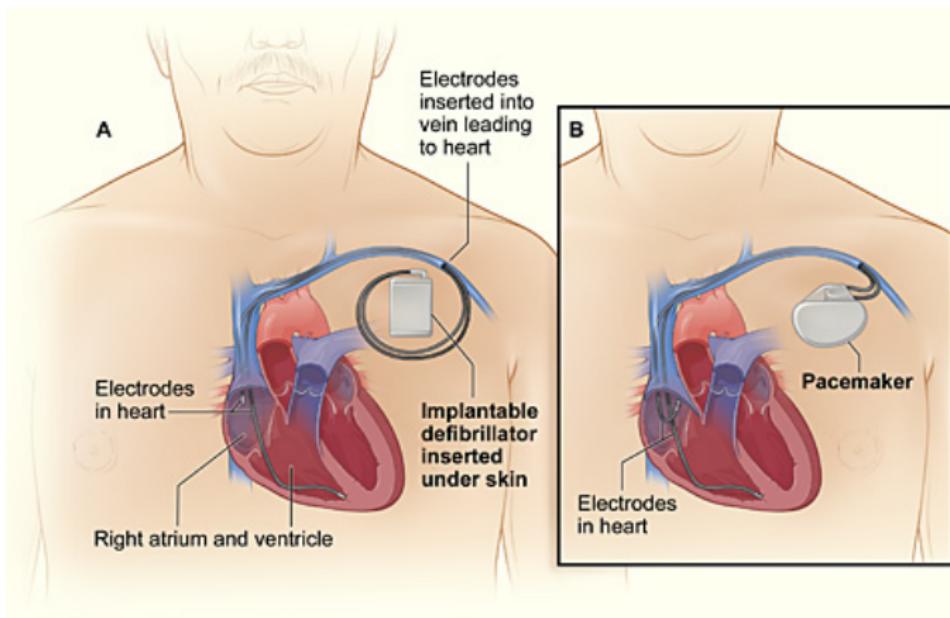
- Implantable Cardioverter Defibrillator (ICD)

# What is a defibrillator?

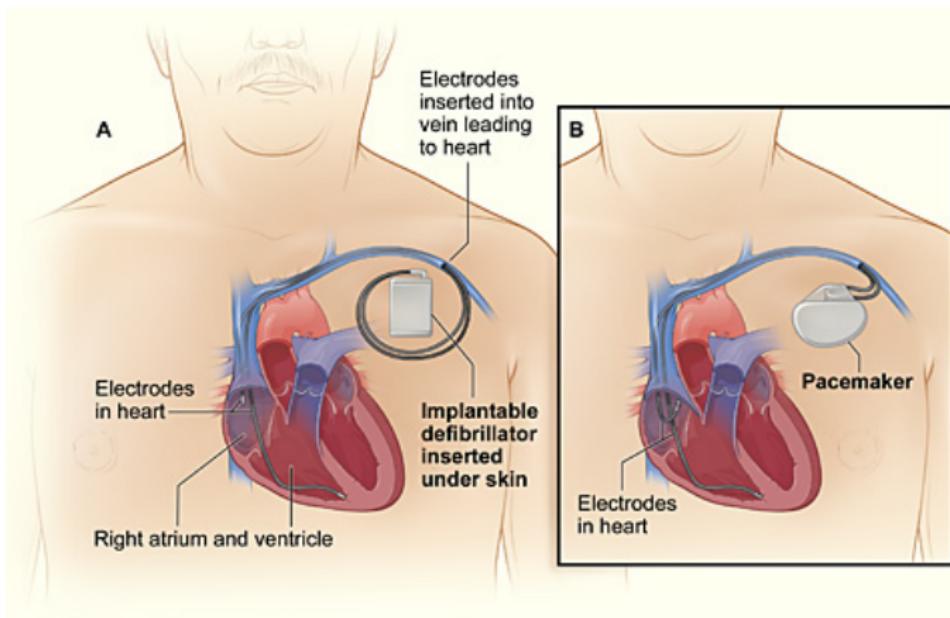


- Implantable Cardioverter Defibrillator (ICD)
- Electrical impulses to revert ventricular fibrillation

# Single unit



# Single unit



- Pacemaker + ICD

## ICD

| Arrhythmia Logbook Report |                 |       |      |             |                      |  |
|---------------------------|-----------------|-------|------|-------------|----------------------|--|
| Episode Query Selections  |                 |       |      |             |                      |  |
| Show All Episodes         |                 |       |      |             |                      |  |
| Episode                   | Date/Time       | Type  | Zone | Rate<br>bpm | Therapy/<br>Duration |  |
| 1,230                     | 23-JUN-05 19:10 | Spont | VF   | 222         | Diverted             |  |
| 1,229                     | 20-JUN-05 12:08 | Spont | VF   | 216         | Diverted             |  |
| 1,228                     | 21-MAY-07 21:22 | ATR   |      | 130         | ???:??               |  |
| 1,227                     | 21-MAY-07 15:01 | ATR   |      | 121         | 06:20 h:m            |  |
| 1,226                     | 21-MAY-07 15:01 | ATR   |      | 119         | 00:45 m:s            |  |
| 1,225                     | 21-MAY-07 15:00 | ATR   |      | 120         | 00:11 m:s            |  |
| 1,224                     | 21-MAY-07 15:00 | ATR   |      | 119         | 00:16 m:s            |  |
| 1,223                     | 21-MAY-07 15:00 | ATR   |      | 118         | 00:07 m:s            |  |
| 1,222                     | 21-MAY-07 14:59 | ATR   |      | 119         | 00:09 m:s            |  |

# Therac-25



But.. But.. it never happened

## The Tylenol Scare of 1982

### Fatal tampering case is renewed

FBI searches a condo in Cambridge

### The Tylenol Terrorist



T Smaller | Larger

By Rachael Bell

#### The Tylenol Terrorist: Death in a Bottle



Extra-Strength Tylenol package

On September 29, 1982, 12-year-old Mary Kellerman of Elk Grove Village, Illinois, woke up at dawn and went into her parents' bedroom. She did not feel well and complained of having a sore throat and a runny nose. To assuage her discomfort, her parents gave her one Extra-Strength Tylenol capsule. At 7 a.m. they found Mary on the bathroom floor. She was immediately taken to the hospital where she was later pronounced dead. Doctors initially suspected that Mary died from a stroke, but evidence later pointed to a more sinister diagnosis.



FBI agents carrying items, seized from an apartment building on Larchmont in Cambridge, walk out with a bag of evidence. Photo: AP/Wide World

February 5, 2009

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Last page

This story was renovated by Jonathan Gelman, John R. Ellement, Milton J.

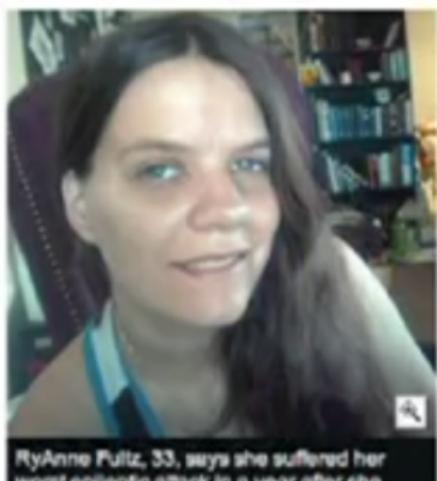
But.. But.. it never happened

## Bad People Do Exist

### Hackers Assault Epilepsy Patients via Computer

By Kevin Poulsen

03.28.08 | 8:00 PM



RyAnne Pultz, 33, says she suffered her

Internet griefers descended on an epilepsy support message board last weekend and used JavaScript code and flashing computer animation to trigger migraine headaches and seizures in some users.

The nonprofit [Epilepsy Foundation](#), which runs the forum, briefly closed the site Sunday to purge the offending messages and to boost security.

"We are seeing people affected," says Ken Lowenberg, senior director of web and print publishing at the Epilepsy Foundation. "It's fortunately only a handful. It's possible that people are just not reporting yet -- people affected by it may not be coming back to the forum so fast."

The incident, possibly the first computer attack to inflict

# Karen Sandler

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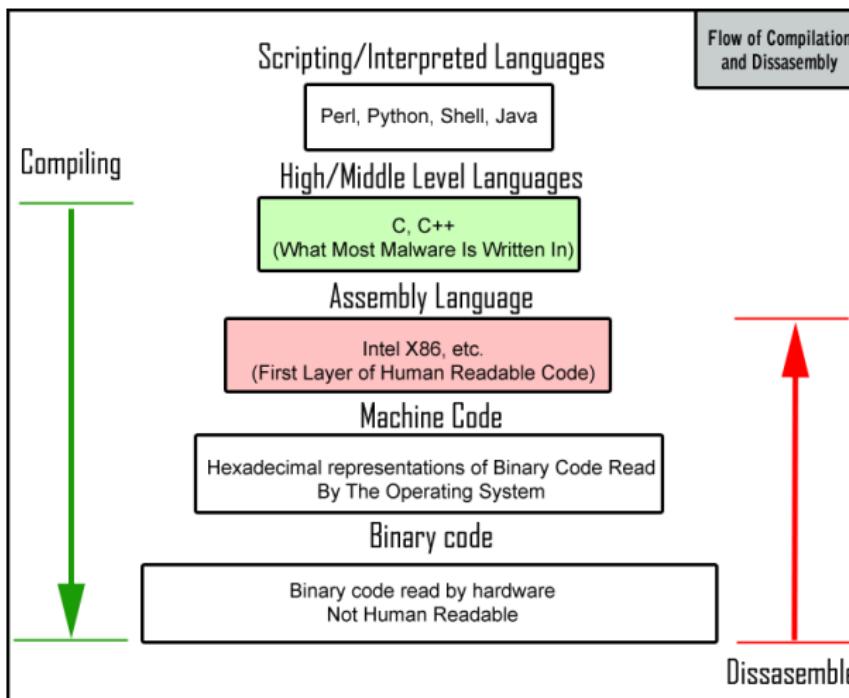
# Karen Sandler

- Lawyer at Software Freedom Law Center
- Executive Director at GNOME Foundation
- Cyborg running proprietary on software

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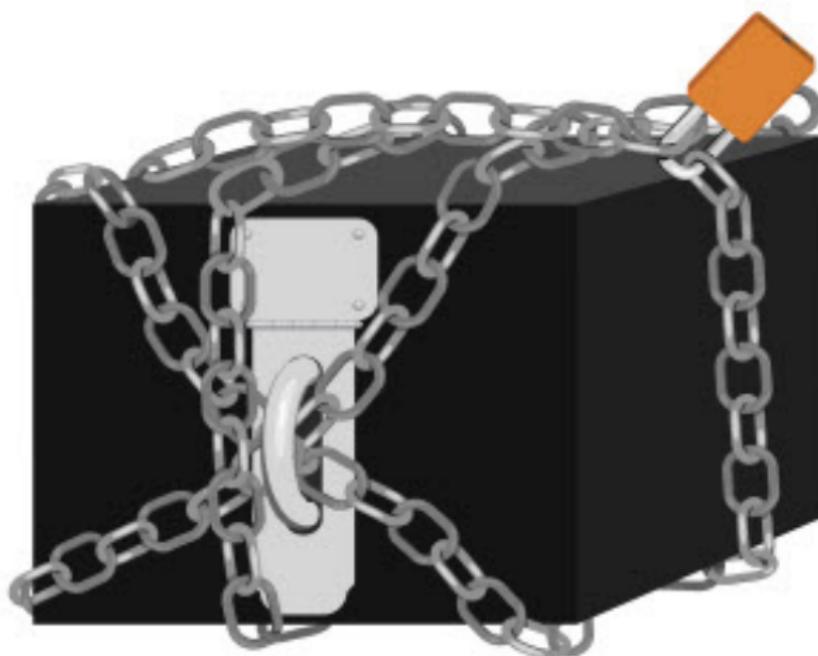
- Lawyer at Software Freedom Law Center
- Executive Director at GNOME Foundation
- Cyborg running proprietary on software
- What did she find out?

# Software running in the device



# Software running in the device

Non-free Software



# Security through obfuscation

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- Hide how it's done

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- Hide how it's done
- Don't worry, they won't find out

# Security through obfuscation

- Hide how it's done
- Don't worry, they won't find out
- Patent Encumbered

Surprise! You can't sue us :-)



Thank you for your attention

Questions?



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