Advanced Programming Techniques

Ethics in Software

Christopher Moretti

SPACETOUCH

About SpaceTouch:

- Founded by Princeton Ph.D.s and faculty in 2015
- Patented capacitive gesture sensing technology
- Virtual reality and interactive displays
- Offices at Princeton eHub at 34 Chambers St.

Cool Project Hiring:

- Gesture interaction on smartphone-based VR goggles
- Android VR interactive app development
- Period: Internship April and May
- Summer program is available too

Contact us at hu@spacetouch.co (not .com!)
Visit us at 34 Chambers St., Suite 017

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< May 2016 >

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29	30	31				

June 2016

Calendar for Christopher M. Moretti

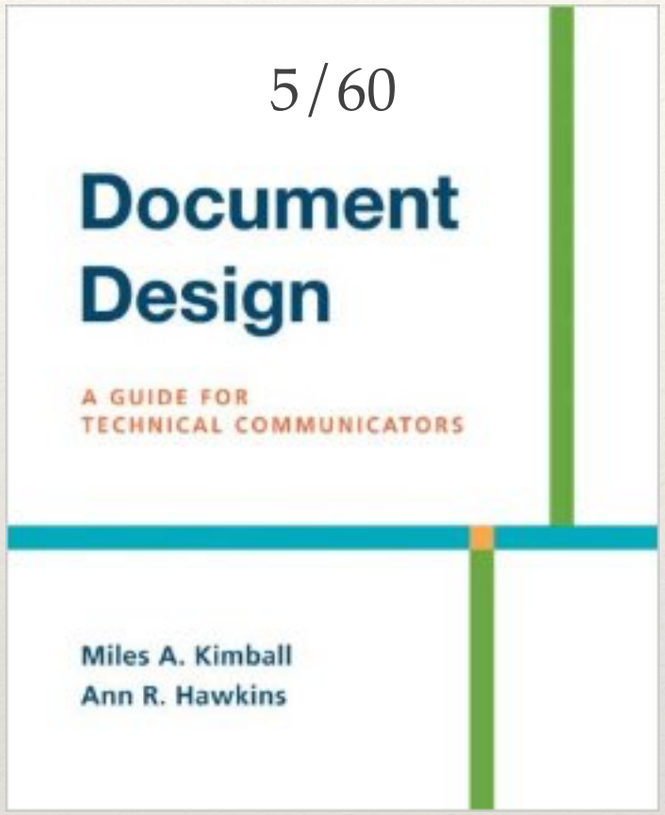
◀ May 2016 ▶

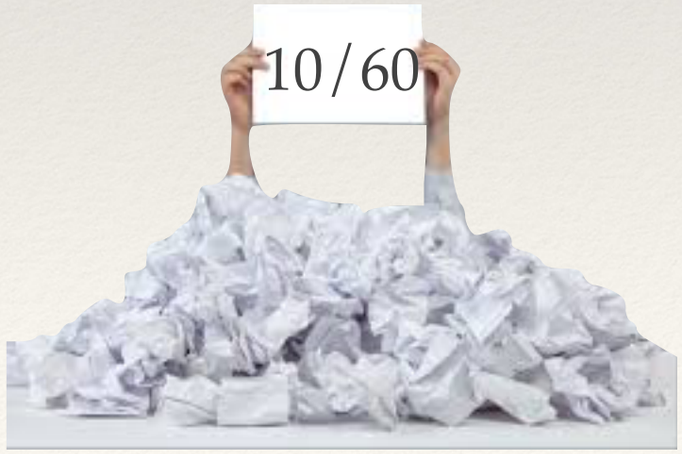
Da

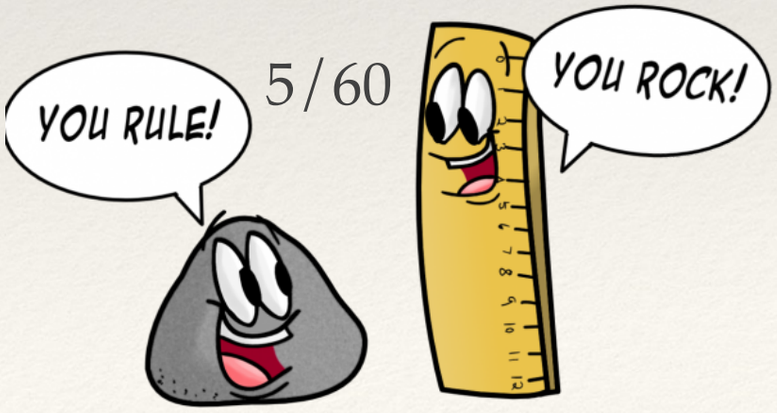
Dis

Sun	Mon	Tue	Wed	Thu
1 ***Teaching***	**2** 9:00a - 12:00p **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 6 Available 12:30p - 5:00p **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 9 Available ***Reading***	**3** 9:00a - 12:00p **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 6 Available 12:30p - 5:00p **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 9 Available ***Reading***	**4** 9:00a - 11:00a **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 4 Available 2:00p - 5:00p **COS333 Demos** *with Christopher M. Moretti* 0 Appointments 6 Available ***Reading***	**5** ***Reading***
8 ***Reading***	**9** ***Reading***	**10** ***Reading***	**11** ***Exam***	**12** ***Exam***

Project Evaluation







Project Submission

https://dropbox.cs.princeton.edu/COS333_S2016/Project
productguide.pdf
finalreport.pdf
${leader_netid}.tar.gz

… only one submission per group; please use leader's netid,
even if someone else submits, i.e. joestu might submit jeleve.tar.gz

https://dropbox.cs.princeton.edu/COS333_S2016/Peer
peer.txt

… all students submit, rating each other member of their group.
there are 3 points available per other group member,
and no score may be <0

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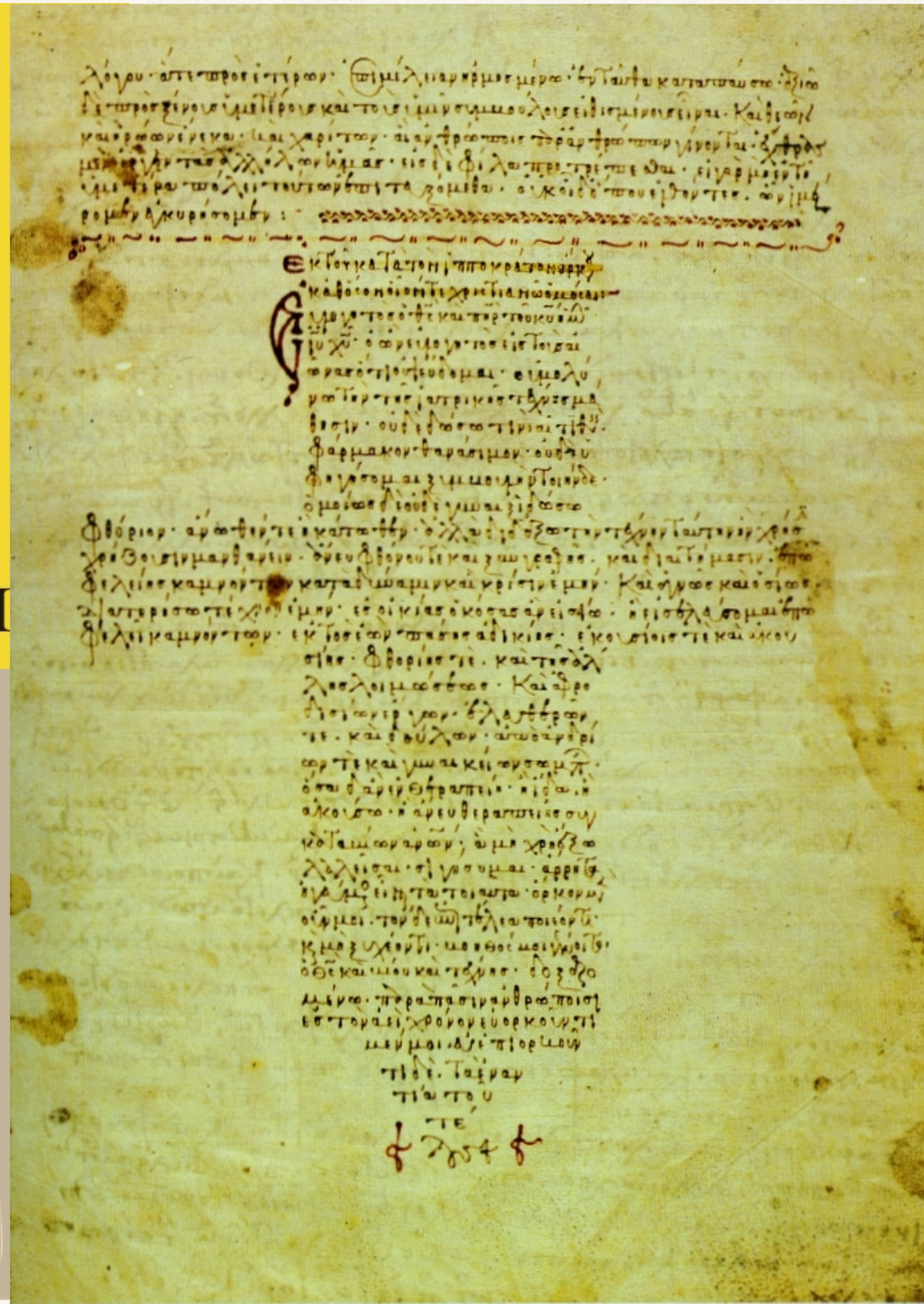
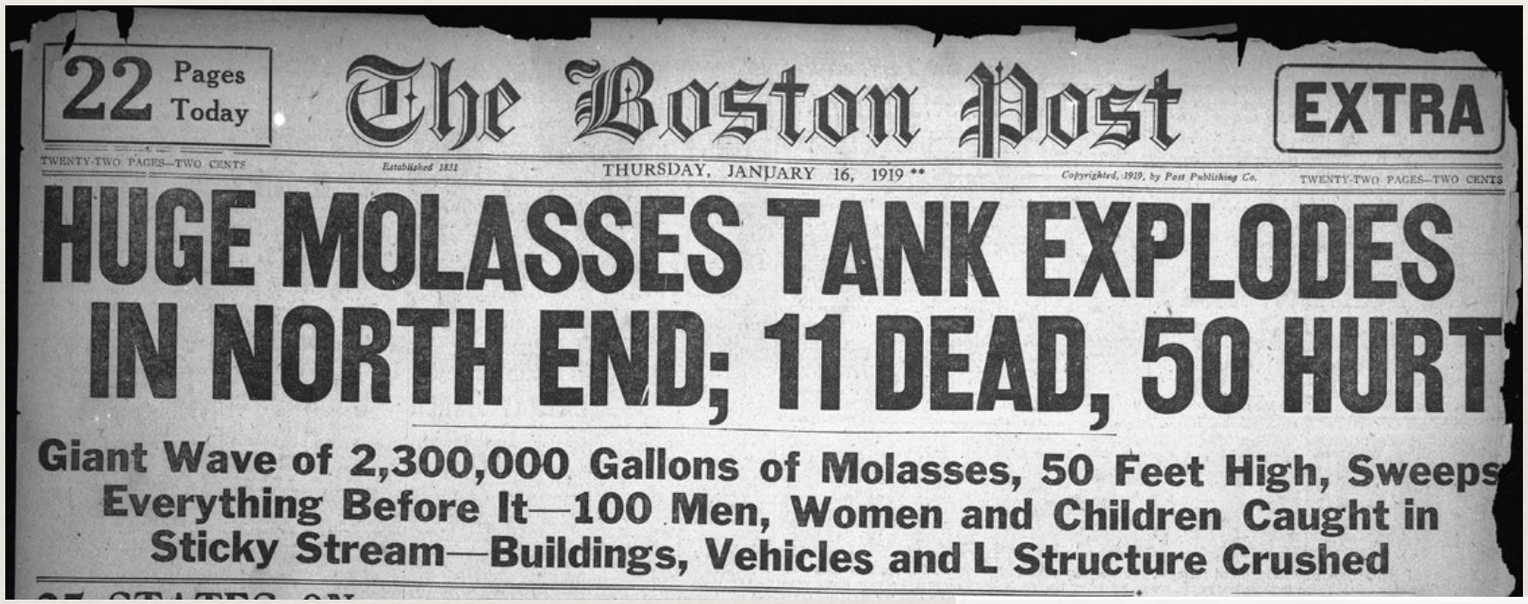
Professional Ethics Overview



Professional Ethics in Engineering

- North American professionalism standards developed in early 20th century as reactions to engineering disasters



22 Pages Today

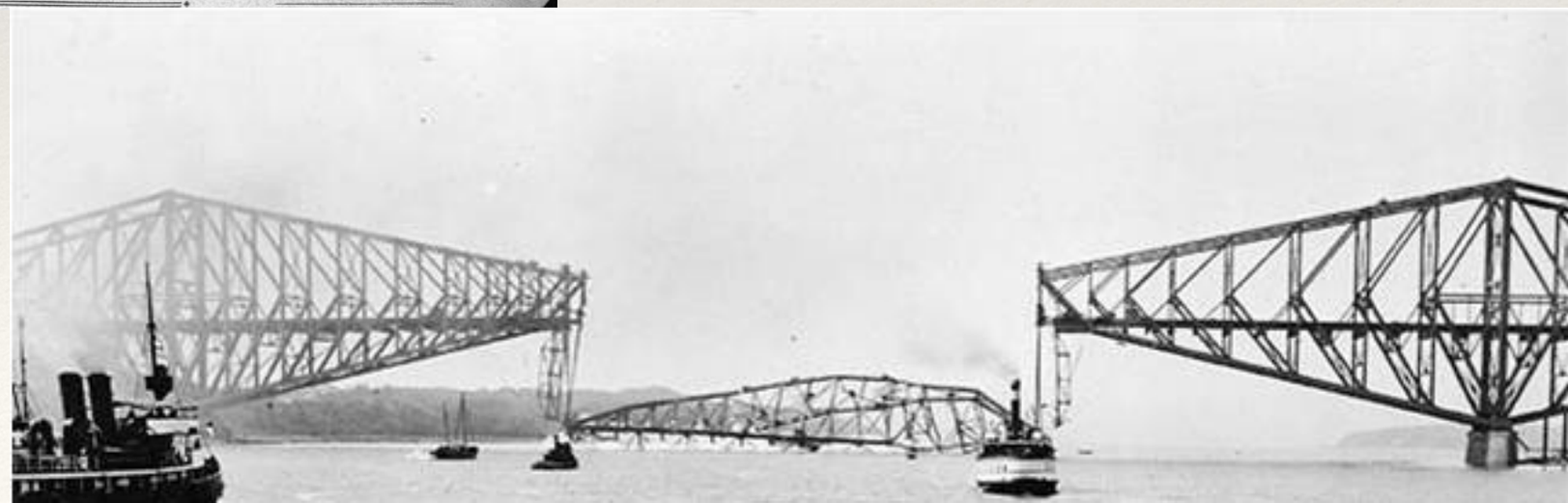
The Boston Post

EXTRA

TWENTY-TWO PAGES—TWO CENTS Established 1831 THURSDAY, JANUARY 16, 1919 ** Copyrighted, 1919, by Post Publishing Co. TWENTY-TWO PAGES—TWO CENTS

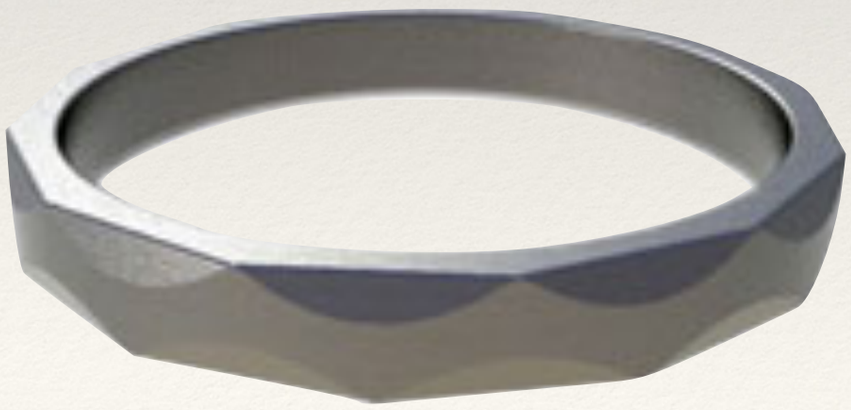
HUGE MOLASSES TANK EXPLODES IN NORTH END; 11 DEAD, 50 HURT

Giant Wave of 2,300,000 Gallons of Molasses, 50 Feet High, Sweeps Everything Before It—100 Men, Women and Children Caught in Sticky Stream—Buildings, Vehicles and L Structure Crushed



Professional Ethics in Engineering

- Professionalism standards developed in late-19th and early 20th century as reactions to engineering disasters
- Each of the major engineering societies established codes of ethics, and many governments established deeper licensing requirements.



src

I ..... in the presence of these my betters and my equals in my Calling, bind myself upon my Honour and Cold Iron, that, of the best of my knowledge and power, I will not henceforward suffer or pass, or be privy to the passing of, Bad Workmanship or Faulty Material in aught that concerns my works before mankind as an Engineer, or in my dealings with my own Soul before my Maker.

MY TIME I will not refuse; my Thought I will not grudge; my Care I will not deny towards the honour, use, stability and perfection of any works to which I may be called to set my hand.

MY FAIR WAGES for that work I will openly take. My Reputation in my Calling I will honourably guard; but I will in no way go about to compass or wrest judgement or gratification from any one with whom I may deal. And further, I will early and warily strive my uttermost against professional jealousy and the belittling of my working-colleagues in any field of their labour.

FOR MY ASSURED FAILURES and derelictions, I ask pardon beforehand of my betters and my equals in my Calling here assembled; praying that in the hour of my temptations, weakness and weariness, the memory of this my Obligation and of the company before whom it was entered into, may return to me to aid, comfort and restrain.

Obligation Of An Engineer

I am an Engineer. In my profession I take deep pride. To it I owe solemn obligations.

Since the Stone Age, human progress has been spurred by the engineering genius.
Engineers have made usable Nature's vast resources of material and energy
for Mankind's benefit. Engineers have vitalized and turned to
practical use the principles of science and the means of technology.
Were it not for this heritage of accumulated experience, my efforts would be feeble.

As an Engineer, I

JEFFREY JONAS

pledge to practice integrity and fair dealing, tolerance and respect; and to uphold devotion to
the standards and the dignity of my profession, conscious always that my skill carries with it
the obligation to serve humanity by making the best use of Earth's precious wealth.

As an Engineer, in humility and with the need for Divine Guidance,
I shall participate in none but honest enterprises. When needed, my skill and knowledge
shall be given without reservation for the public good. In the performance of duty
and in fidelity to my profession, I shall give the utmost.

ORDER OF THE ENGINEER 1970

Copyright © 1970, The Order of the Engineer

Jeffrey Scott Jonas
Signature

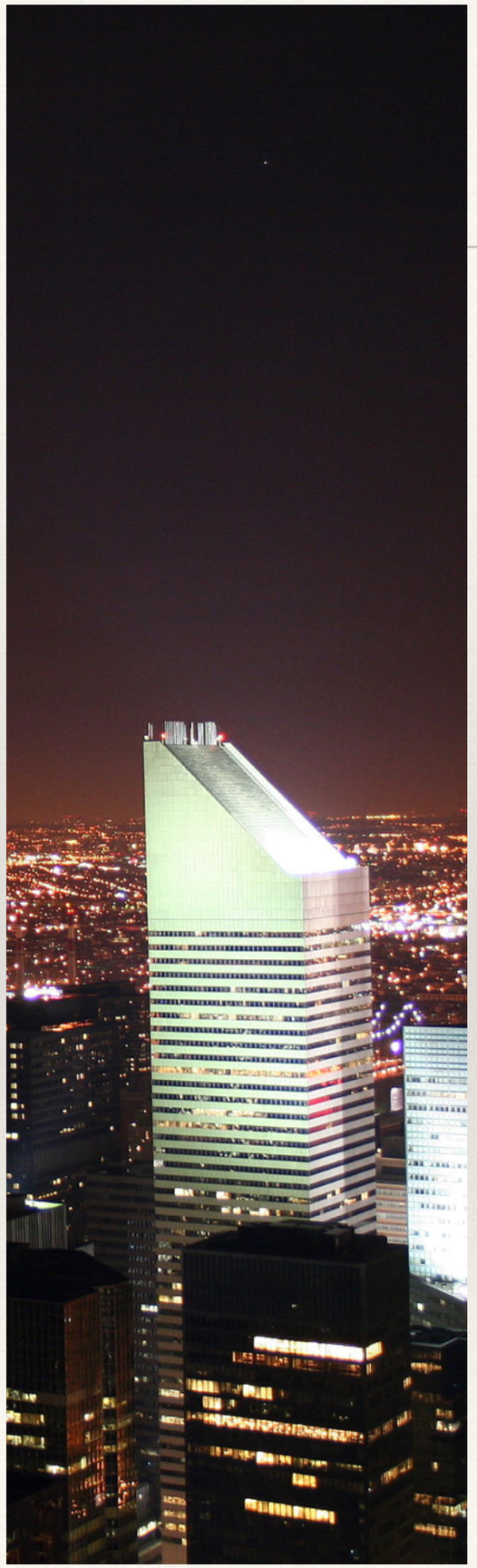
February 22, 1983
Date

THE COOPER UNION, NEW YORK CITY
Location

http://www.ferretronix.com

Professional Engineers

- Accredited PEs:
  - ABET engineering degree
  - Fundamentals examination
  - Engineering experience under a senior PE
  - Principles and Practice exam
- Code of ethics dates to the 1940s



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And into the modern day

Citigroup Center - 601 Lexington Avenue, New York

William LeMessurier - structural engineer

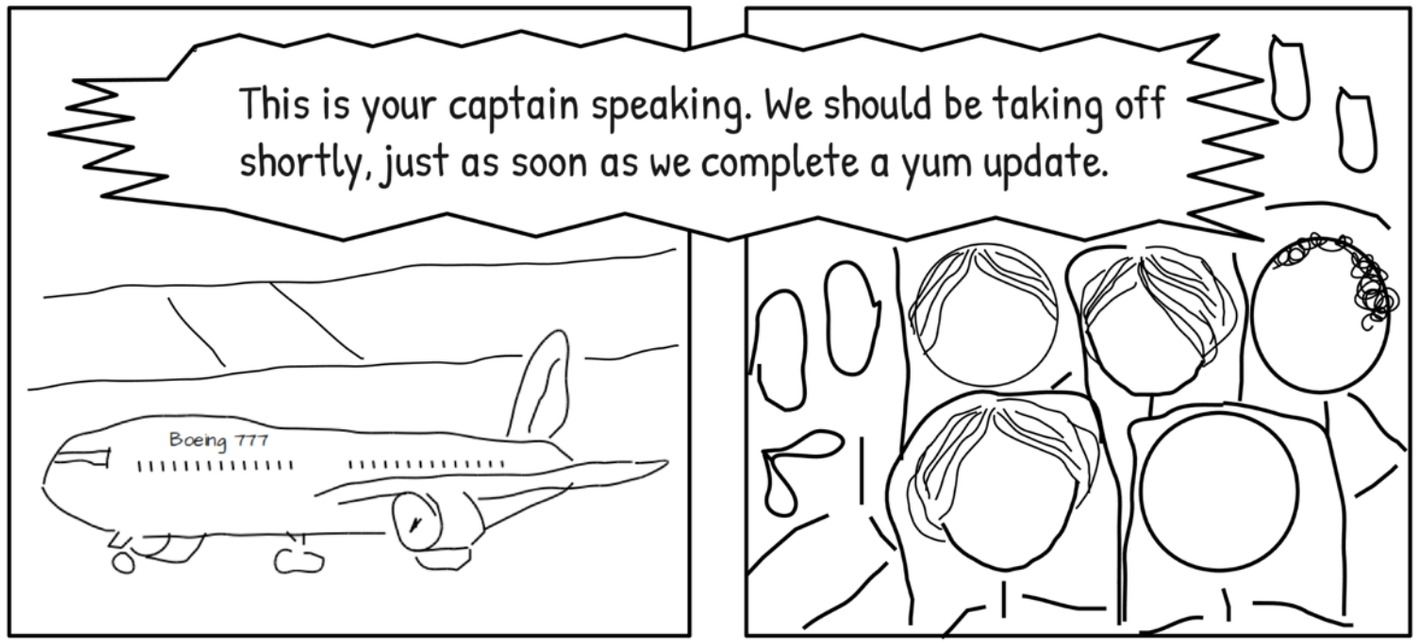
Diane Hartley ’78 (BSE - Civil) - Princeton undergrad

… wind-tunnel tests showed winds on the corners could bring down the tower (est. once in 55 year wind event)

… worse, without power for the self-stability system, the risk was only a once in 16 year wind event

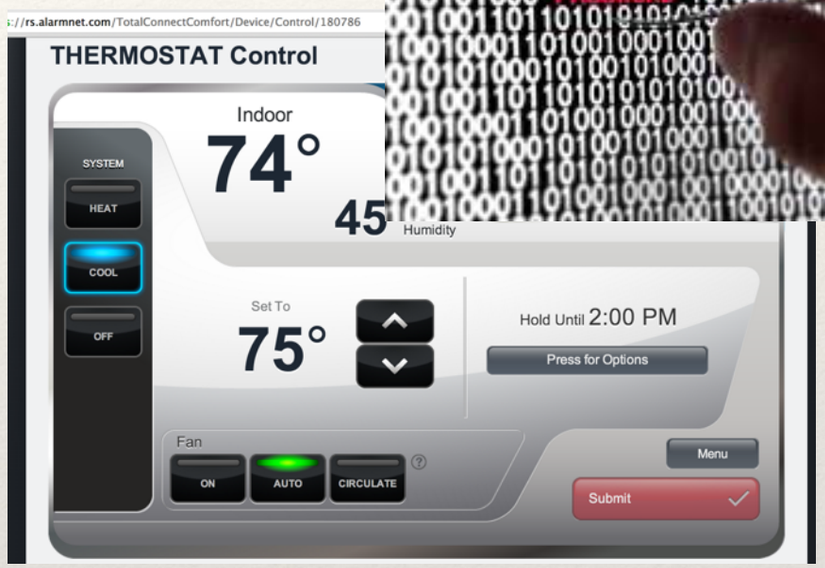
Evacuate building? Alert the public? Fix in secret?

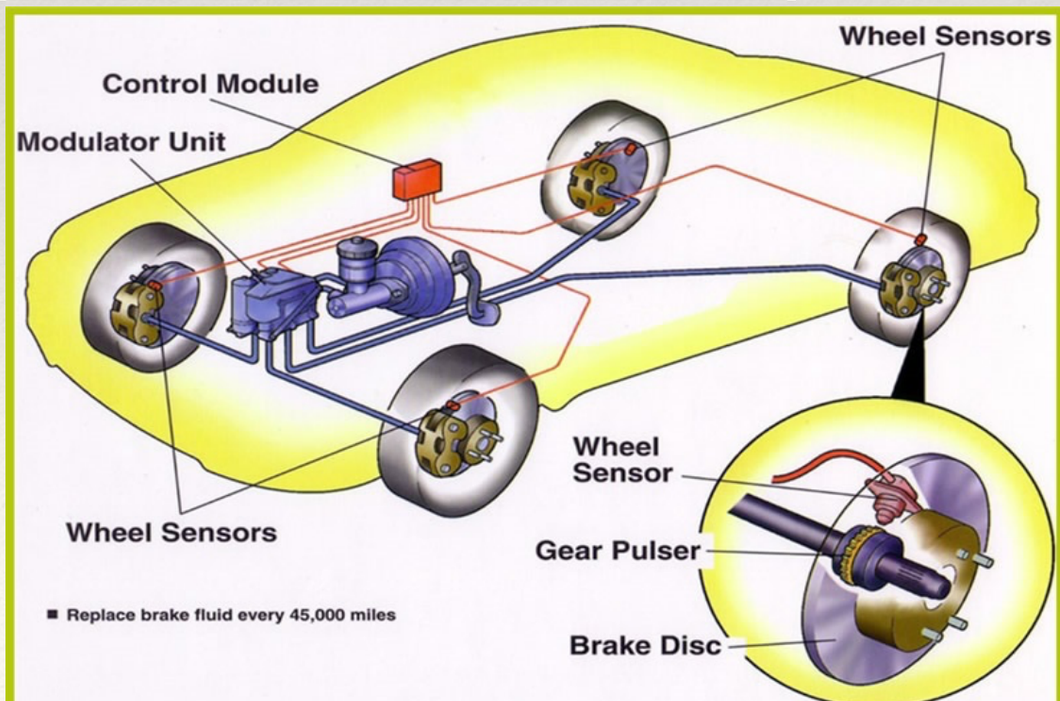
Software isn't the same, you say …



Open Source Fly-by-Wire.

icanbarelydraw.com CC BY-NC-ND 3.0





Software Engineering

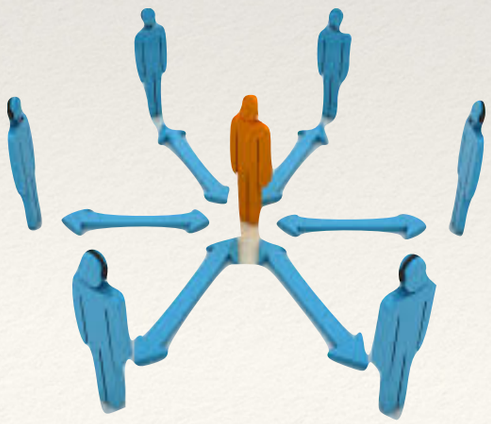
- ACM/IEEE-CS aspirations and details. Eight Principles:

Public

Client/Employer

Product

Judgment



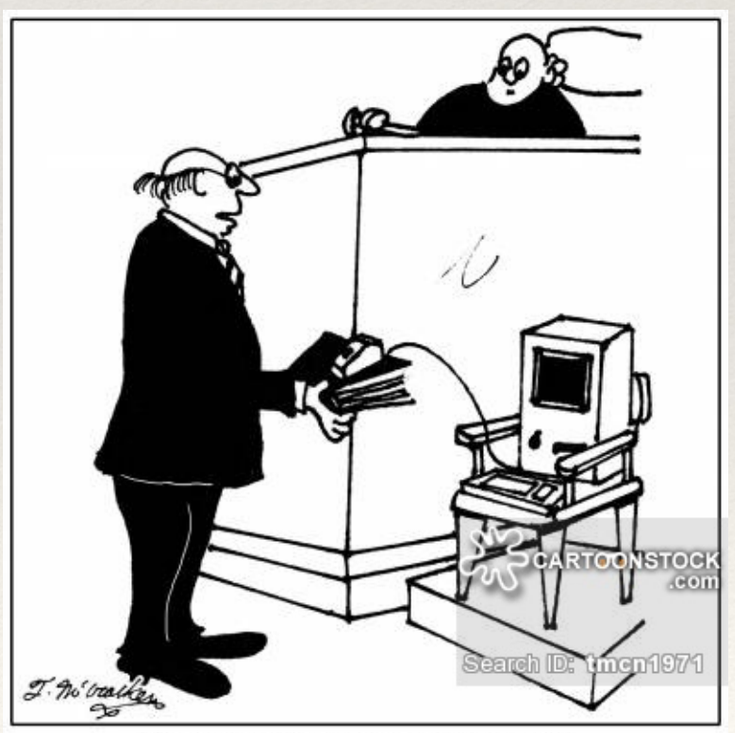
Management

Profession

Colleagues

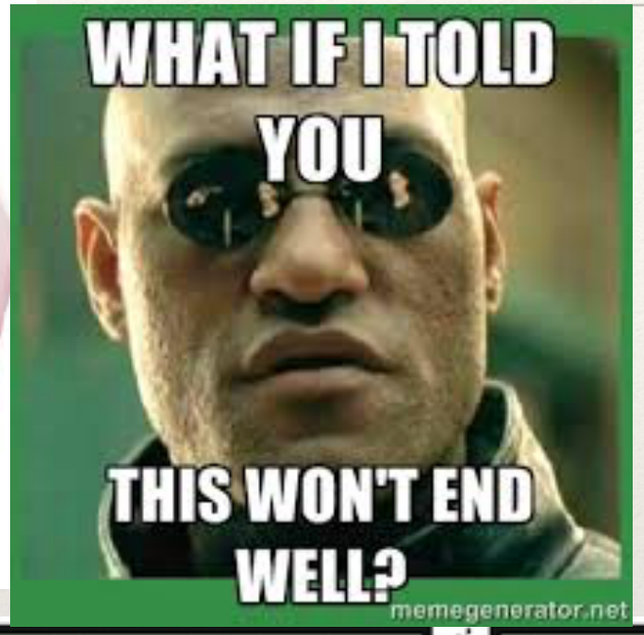
Self

To the Public



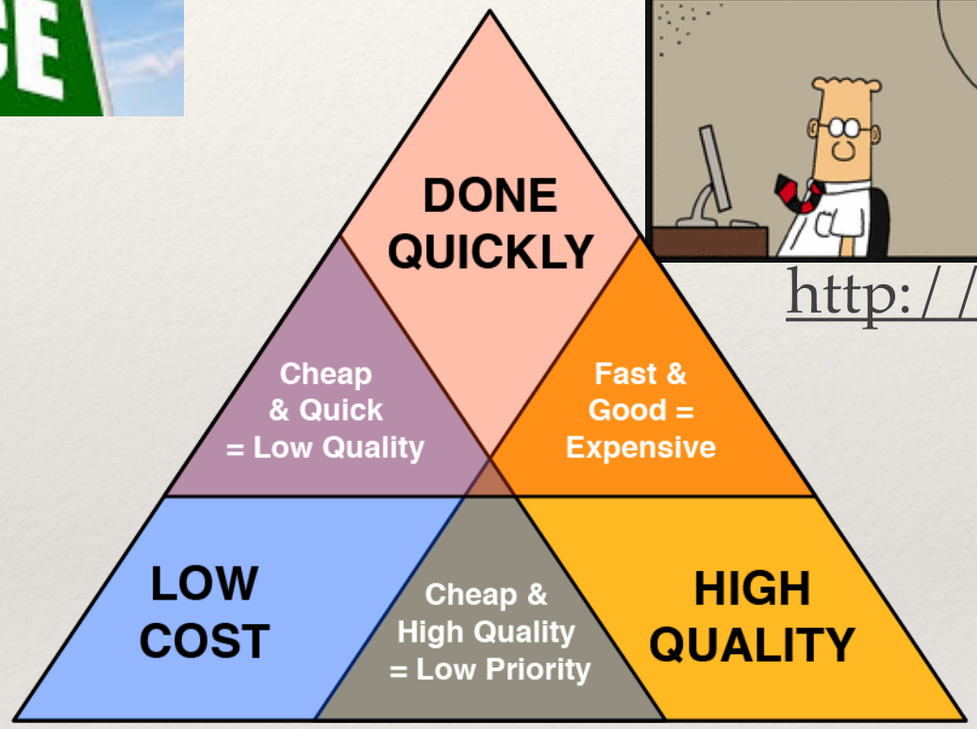
"Do you swear to tell the truth,
the whole truth, and nothing but the truth?"

To Your Client/Employer

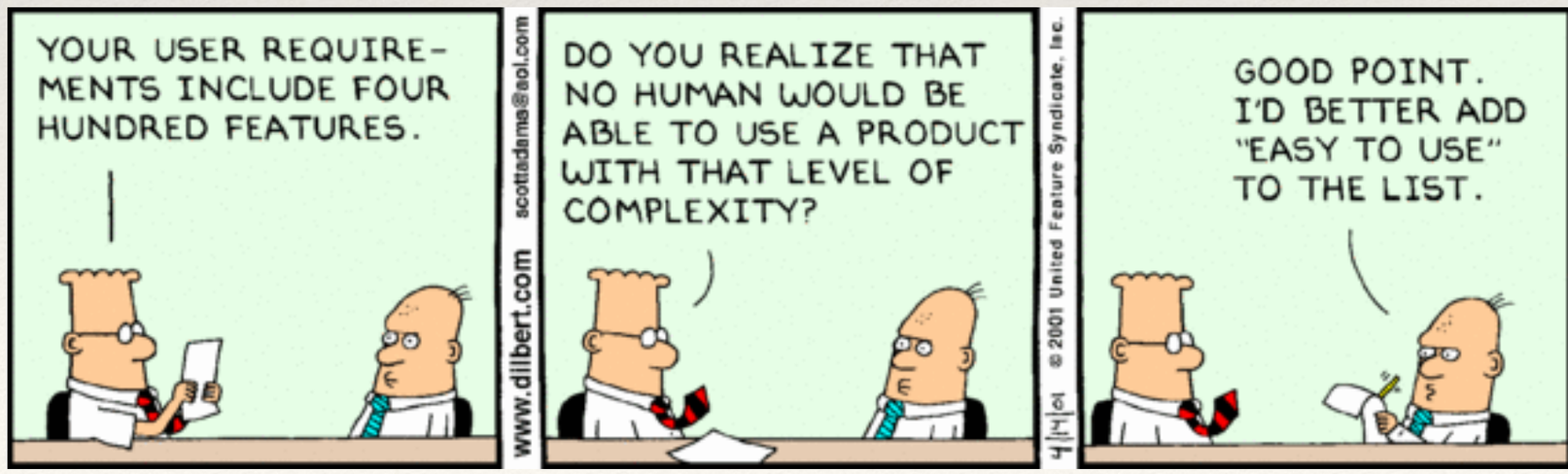


http://dilbert.com/strip/2004-01-27

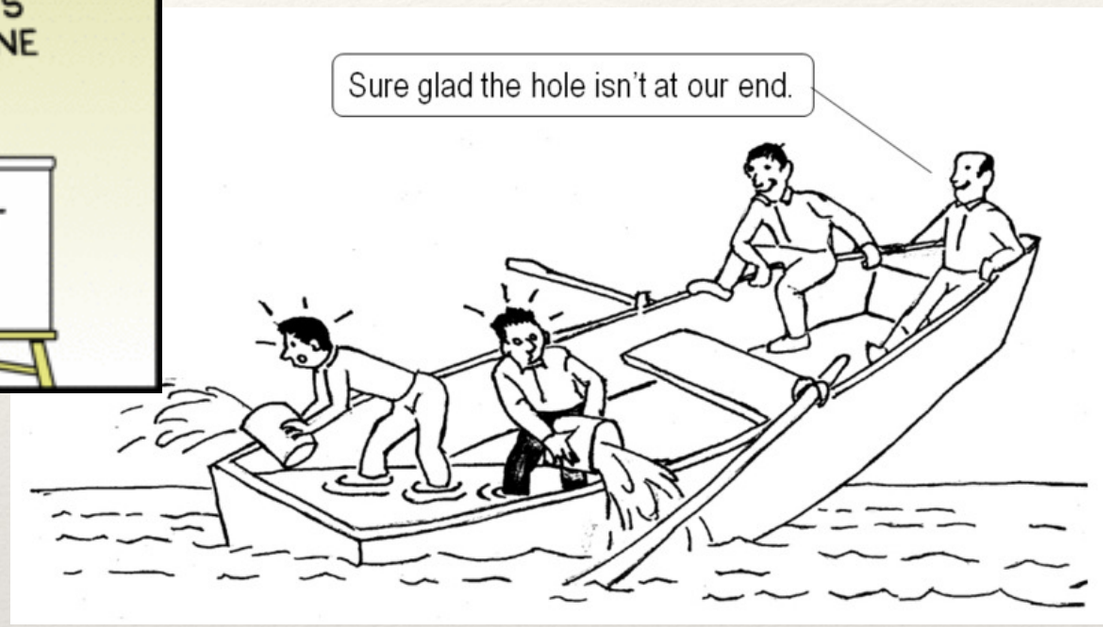
To the Product

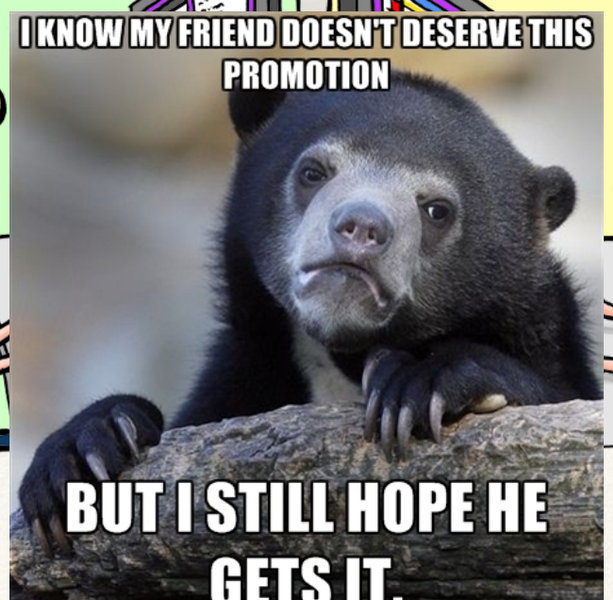


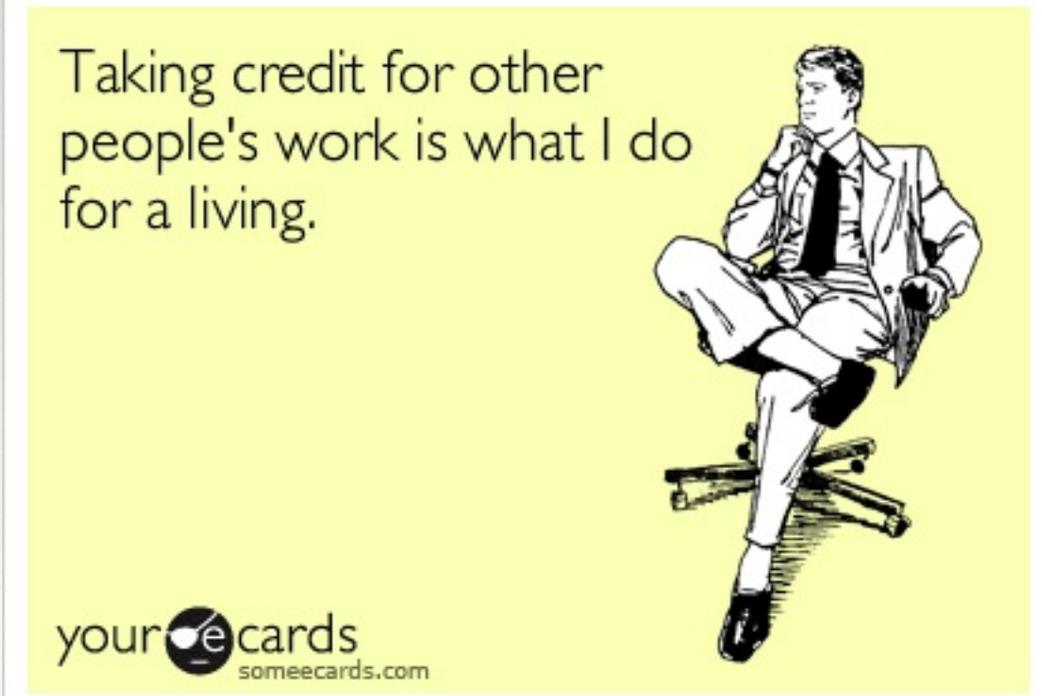
http://dilbert.com/strip/2011-02-15



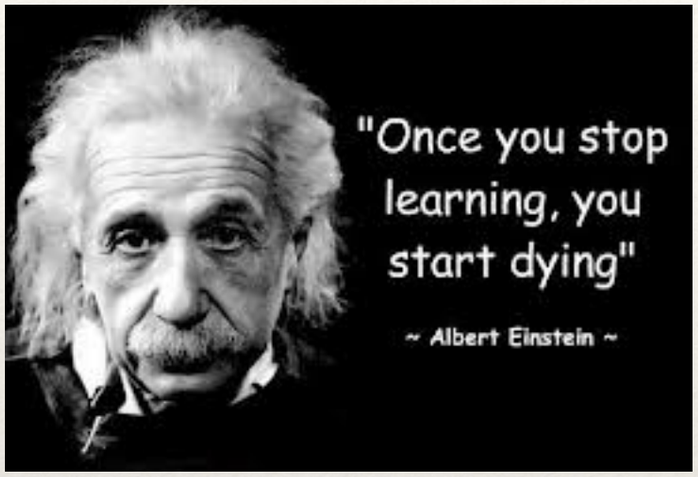
To Your Colleagues

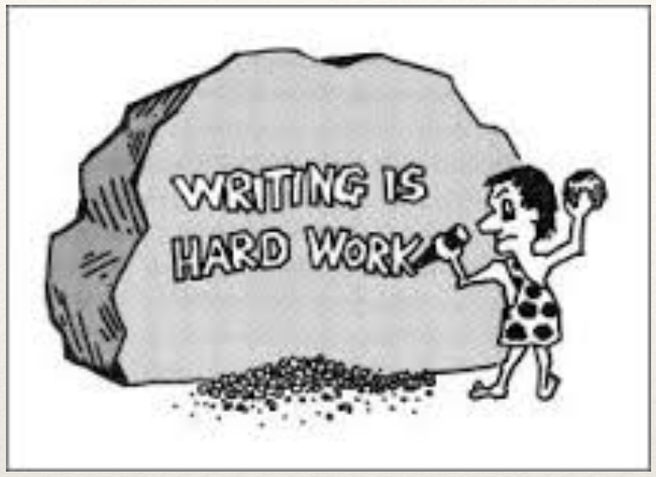


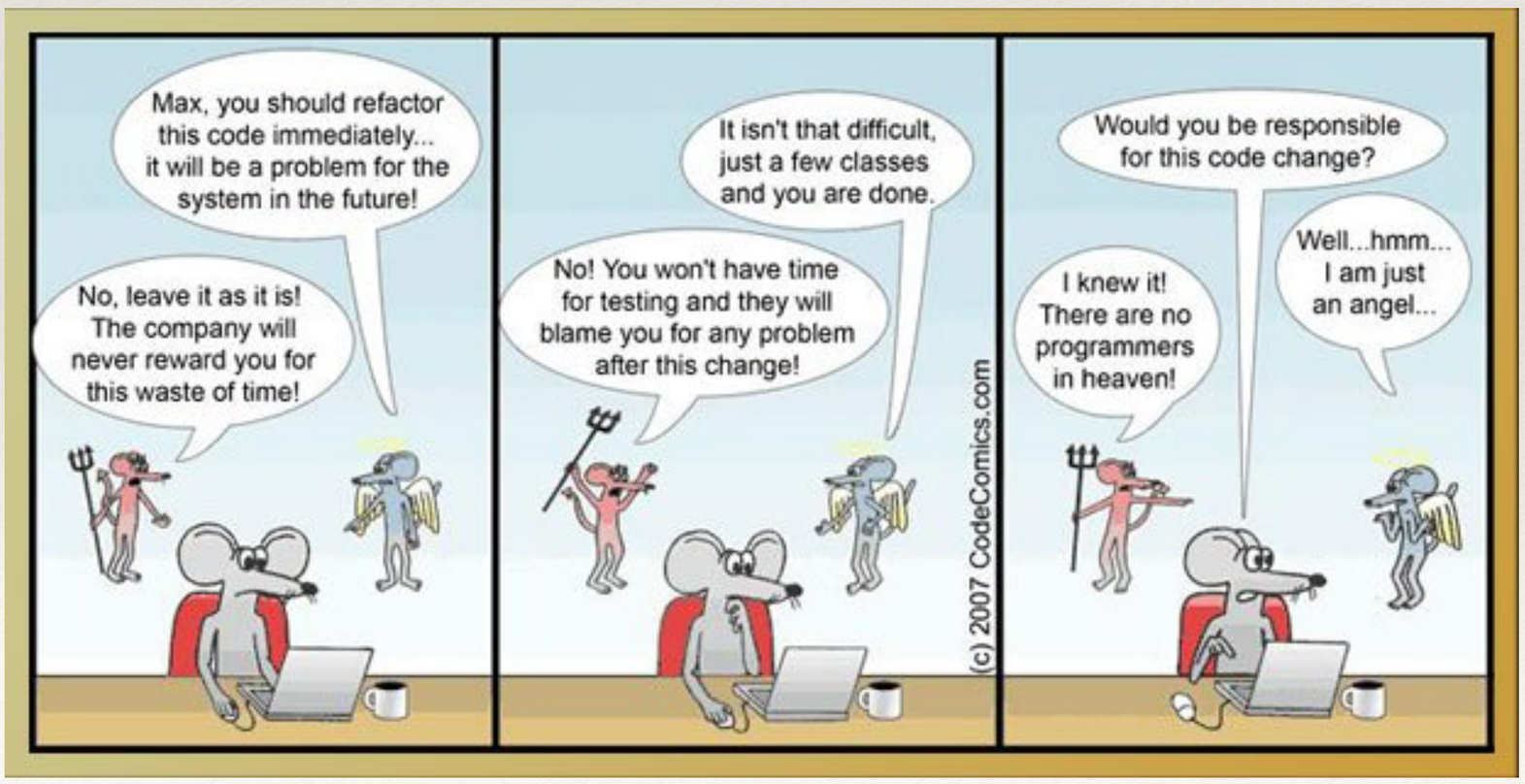




To Yourself


"Once you stop learning, you start dying"
~ Albert Einstein ~


WRITING IS HARD WORK


Max, you should refactor this code immediately... it will be a problem for the system in the future!
No, leave it as it is! The company will never reward you for this waste of time!
It isn't that difficult, just a few classes and you are done.
No! You won't have time for testing and they will blame you for any problem after this change!
Would you be responsible for this code change?
I knew it! There are no programmers in heaven!
Well...hmm... I am just an angel...
(c) 2007 CodeComics.com

Savage Chickens
by Doug Savage
YOU'VE GOT A PROBLEM WITH AVOIDING PERSONAL ACCOUNTABILITY
YA, AND WHOSE FAULT IS THAT?
© 2006 BY DOUG SAVAGE
www.savagechickens.com

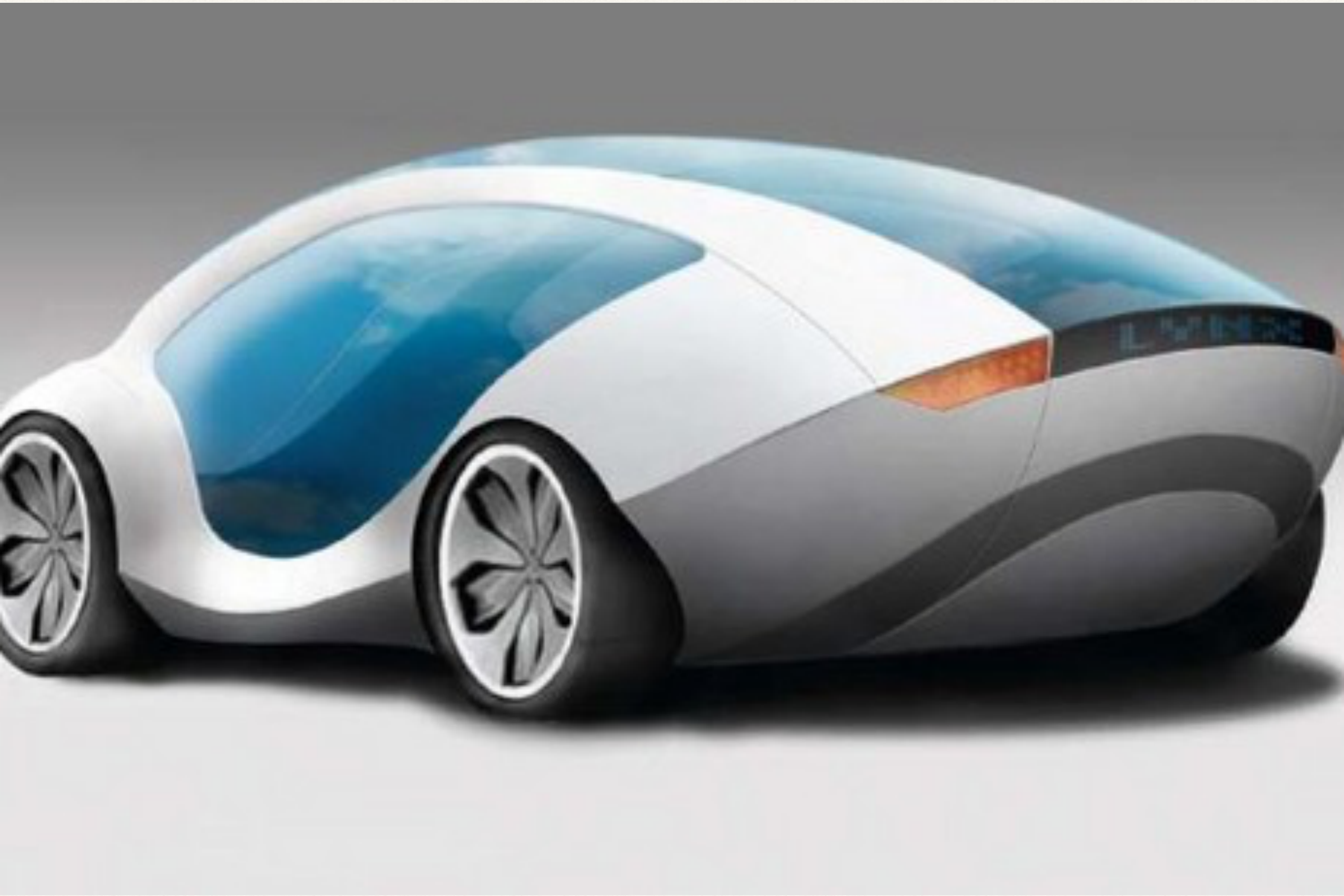
Machine Ethics

"How do we program machines to act in an ethical way? What does it mean for some*thing* to be acting in an ethical way?"

–Paul Fenwick

Examples adapted from Fenwick's talk "Machine Ethics and Emerging Technologies"

Note: these slides will make no sense without the lecture, but you can check out the source of the example in the first ~15 minutes of his talk here: YouTube



Google

WHAT SHOULD I DO?

Okay, imagine such a car exists …

a.length&&(x=a[i])&&x.
d.MM_p) d.MM_p=new Array();
MM_preloadImages.arguments; for(i=0; i<
d.MM_p[j]=new Image; d.MM_p[j++].src=
n.indexOf("?"))>0&&parent.
n.substring(0,p);}
for (i=0;!x&&i<d.forms.length;i++) x=
d.layers.length;i++) x=MM_findObj(n,d.layers[i].
n); return x;}
document.MM_sr=new Array;
document.MM_sr[j++]=x; if(!x.oSrc)

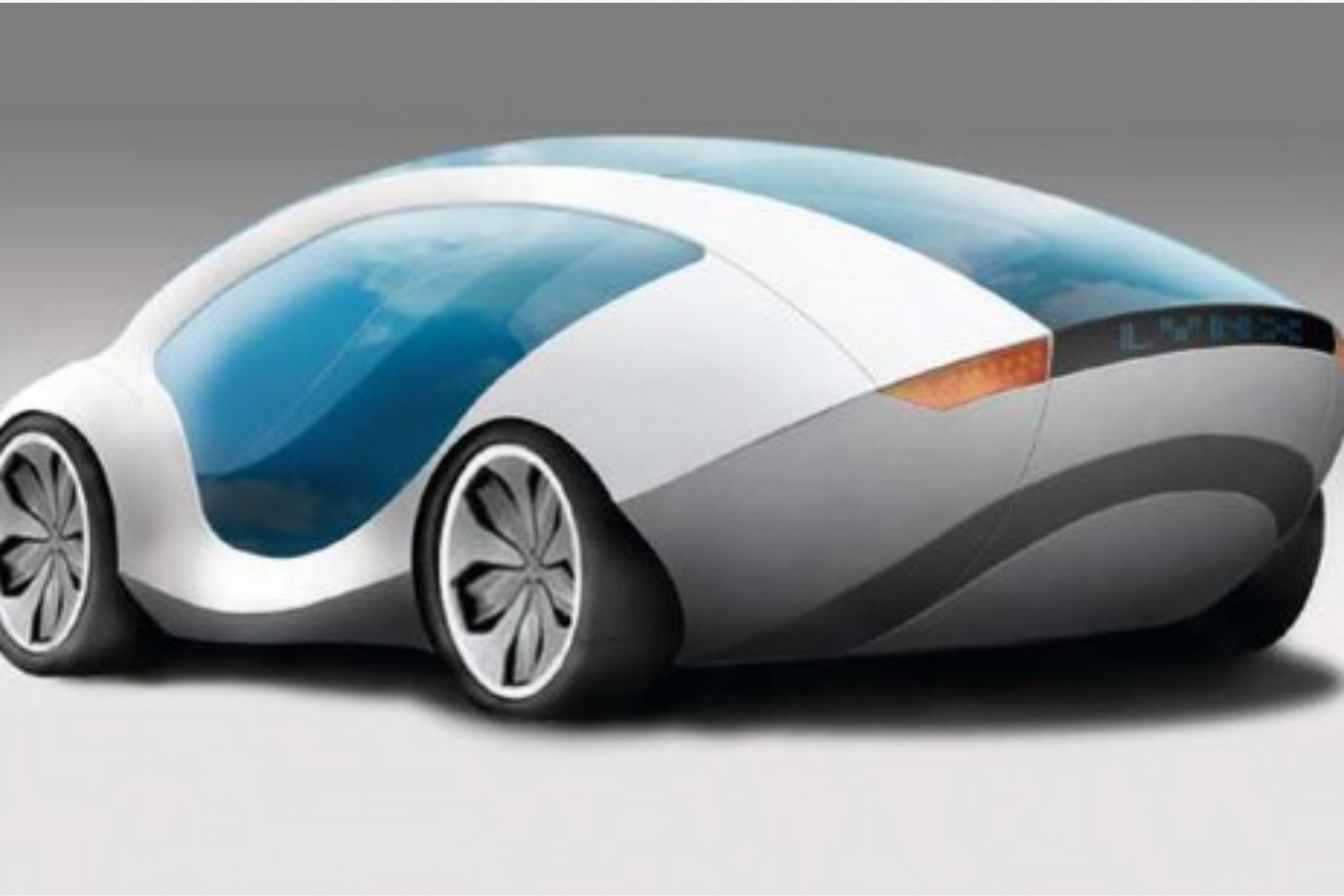
If you wouldn't buy one ....

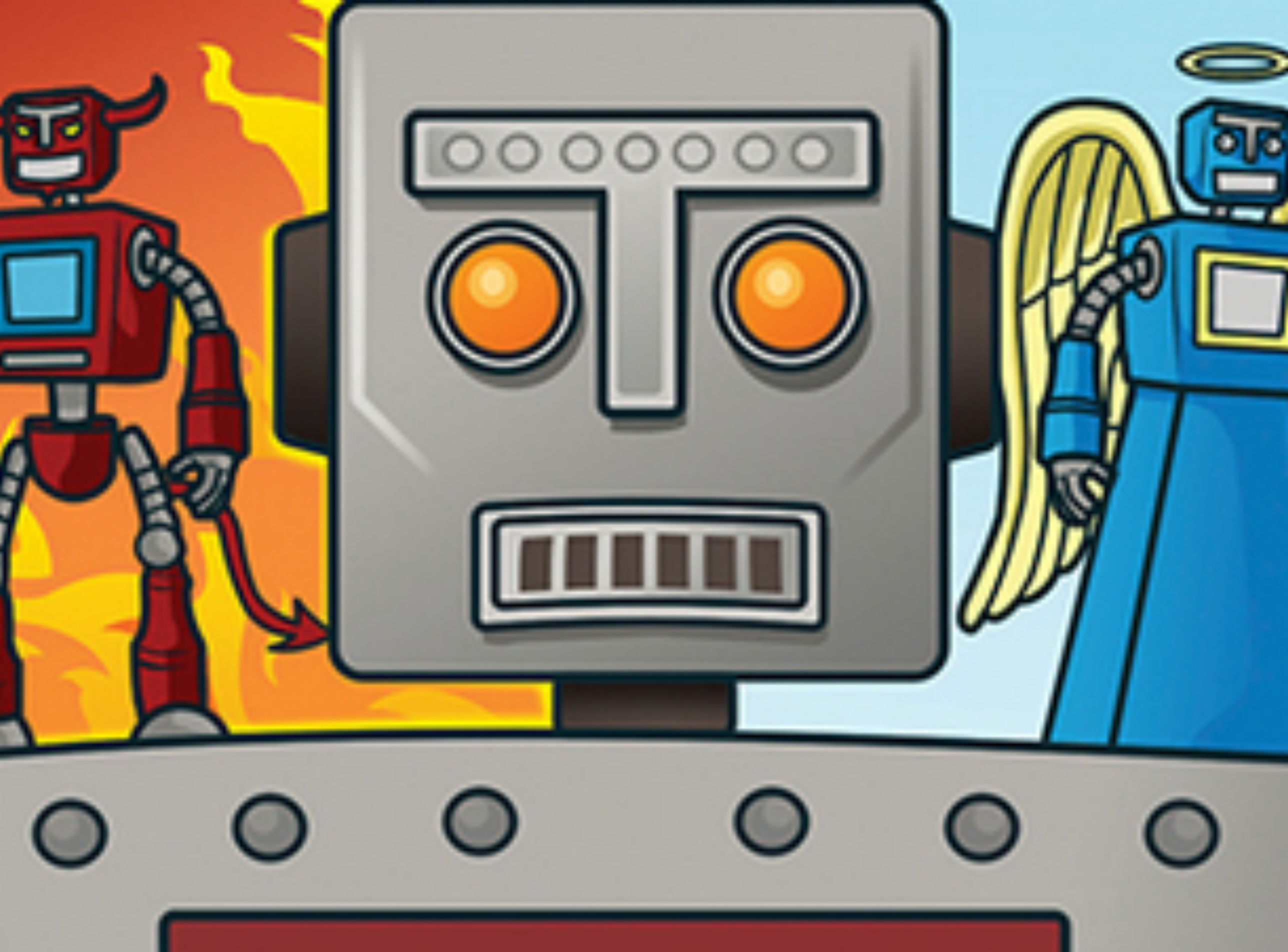
- Does this mean there's a market for "unethical" autonomous vehicles?

If you wouldn't buy one ...

- Are programmers of these vehicles *ipso facto* unethical themselves?
- Where does "for the public good" Principle end?

Let’s reboot

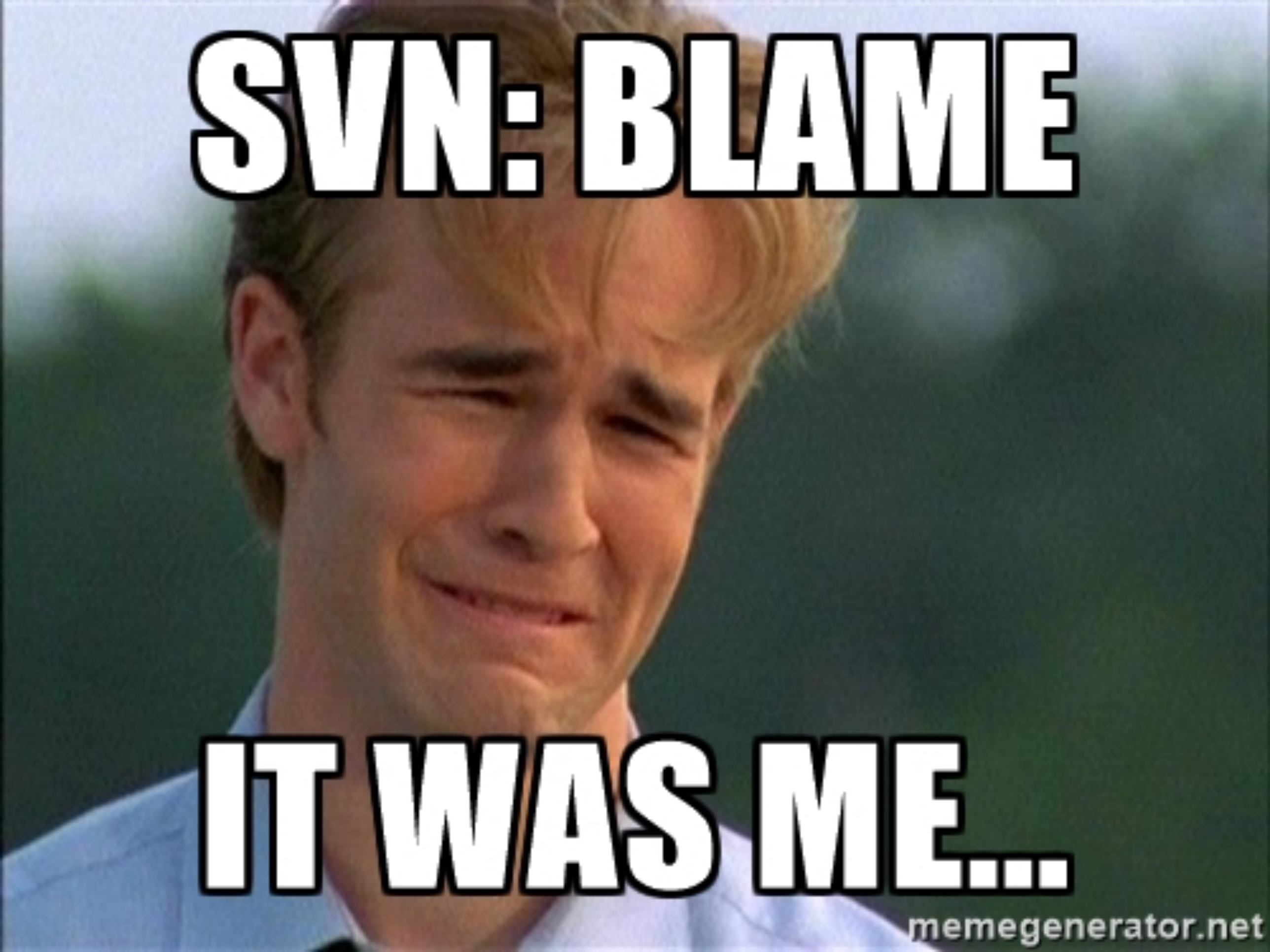




BLAME

No Single Raindrop Believes It Is Responsible For The Flood

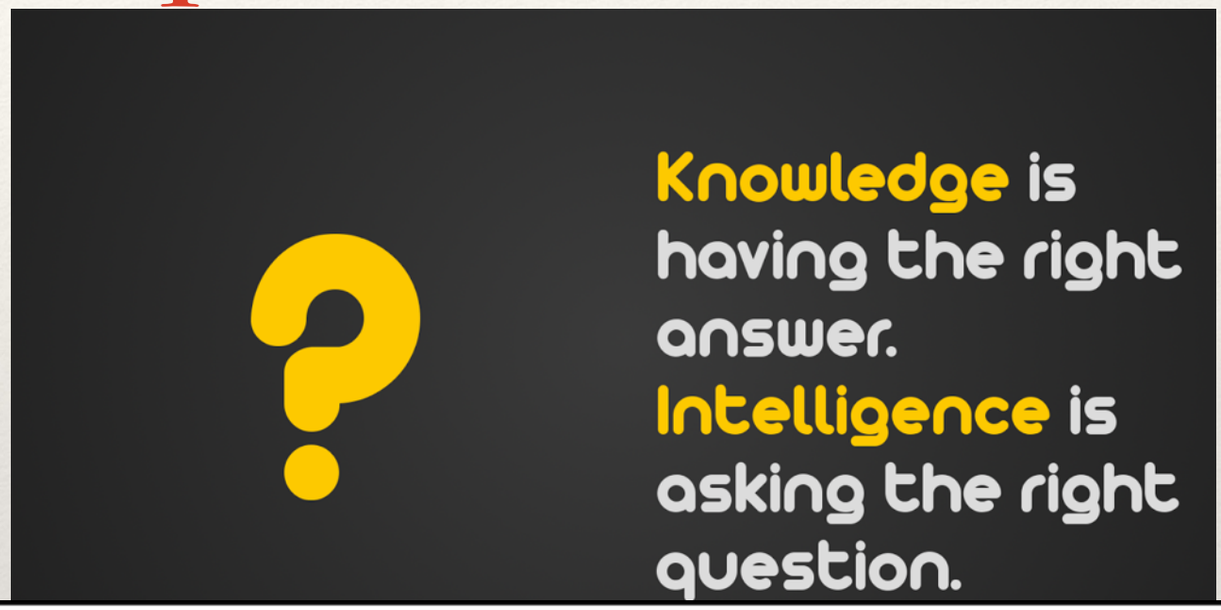
www.demotivate.org

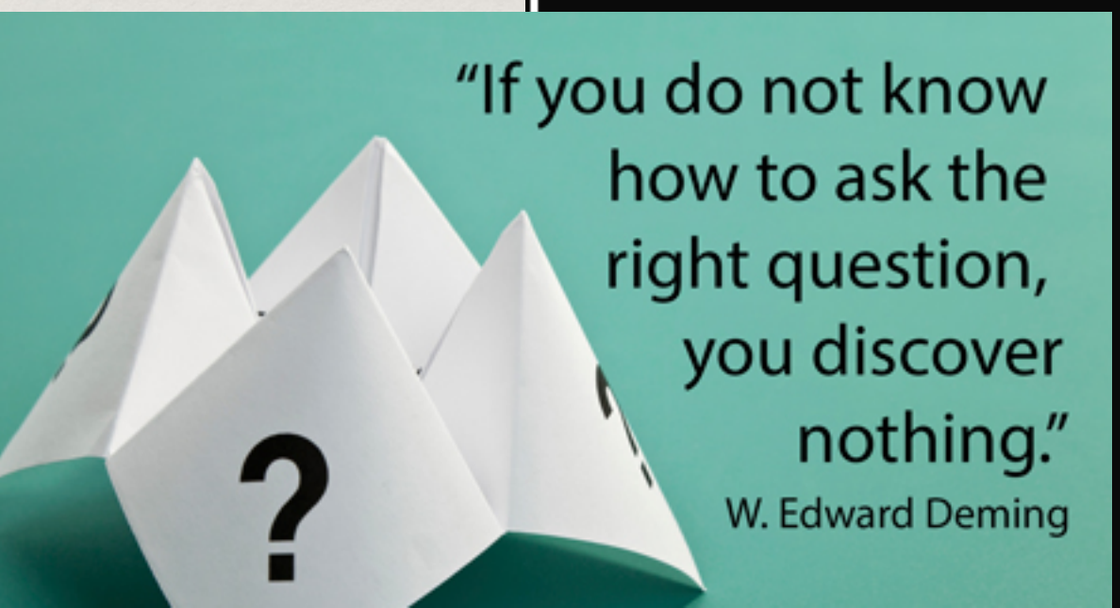

SVN: BLAME
IT WAS ME...
memegenerator.net

There are no easy answers …

But it's your responsibility

to ask the right questions





The ability to ask the right question is more than half the battle of finding the answer.

(Thomas J. Watson)