

EECS 498 System Design of a Search Engine

Winter 2026

Lecture 20: The Citicorp Crisis and Backdoor to the iPhone

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agenda

1. details
2. the Citicorp crisis
3. ethical spheres
4. backdoor to the iPhone

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tee shirt orders close tomorrow

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Mar 8, 2026

Order your tee shirt! #117

N

Nicole Hamilton STAFF

4 days ago in Announcements

PIN STAR WATCHING 80 VIEWS

♡

The order form is live! You can order and pay for your shirt online at Custom Ink. It's a genuinely high quality shirt hand-picked by our Fine Arts Commission, featuring Jess Morton's insanely great cartoons of our steadfast octopus mascot. Price is \$24.95 each. Here's the link:
<https://www.customink.com/g/vmj0-00d1-q2y3>

American Apparel Garment Dyed Cotton T-shirt – Faded Cream



The order form will stay open until next Friday, March 27, 11:59 pm. Shirts will delivered here by April 10. These shirts are a one-time opportunity.

Nicole

details

1. Please read my ranking paper.
2. The best heuristics are the ones that can cherry pick the really good matches out of the sea of trash.
3. Lab on getting starting on GCP will be next week. You'll go from logging in the first time to building and running your LinuxGetSsl utility.

details

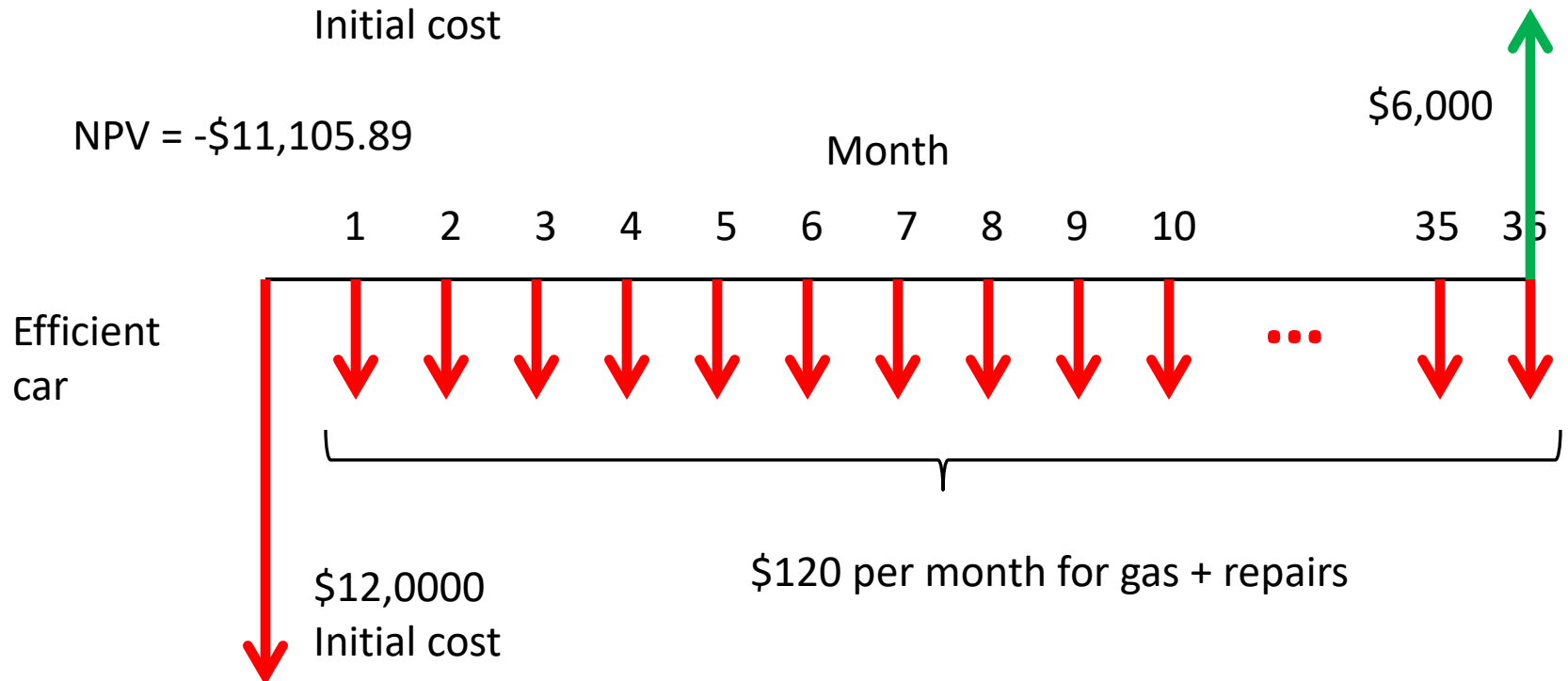
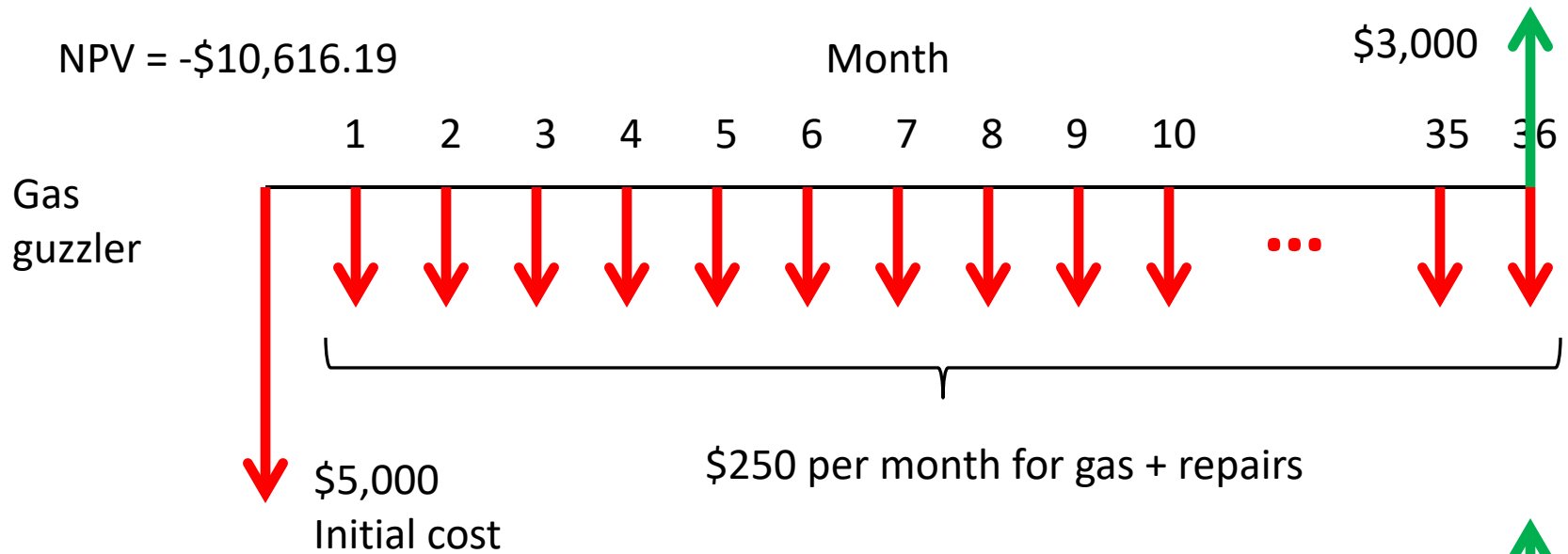
1. We are now into fun topics while you build your engines. Today will be some case studies on ethics.
2. I'm thinking negotiations next, followed by organizational behavior.
3. I'm also thinking of a lecture on time value of money and cash flow diagrams? To enjoy it, you will need a free HP-12 financial calculator emulator on your phone or laptop.

example problem

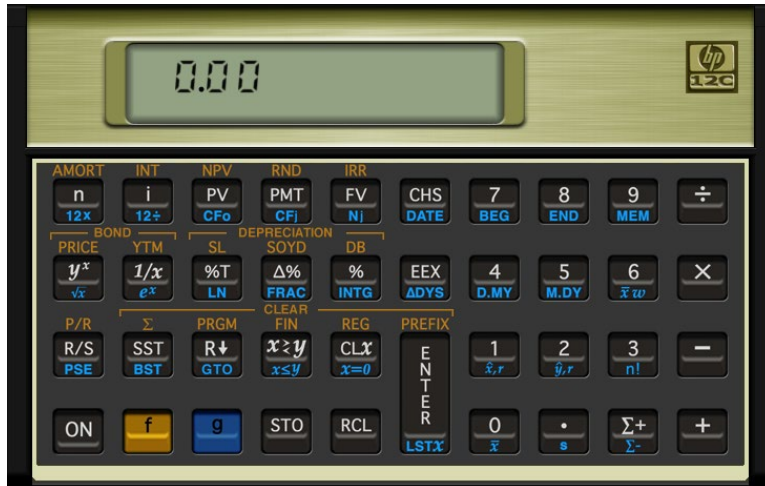
You need a car for the next 3 years and you're considering two alternatives.

1. An older gas guzzler for \$5,000 which you estimate will require \$150/month for gas and \$100/month on repairs. After 3 years, you expect it could be sold for \$3,000.
2. A newer, more efficient car that for \$12,000 that would need only \$80/month in gas and \$40/ month for repairs. After 3 years, you expect it could be sold for \$6,000.

You're living on money you're borrowing at 8% APR. Which is the better deal?



you'll need an HP-12 emulator



Fortunately, HP released a free one.
<https://www.educalc.net/page/2338917/>

HP 12c Emulator | Educalc.net

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HP 12c Emulator for MS Windows

This emulator is able to run on all versions of Microsoft Windows. It has also been tested to work with MacOS* and Linux* computers.

- with [Wine compatibility layer](#) installed.

Download from our tertiary cached server media.educalc.net (filesize 6MB)

After installing the HP 12c Emulator. Run Emulator from Start > Programs > HP Calculators > HP 12c Virtual Calculator

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the Citicorp Center crisis

The lot was owned by St. Peter's. They initially refused to sell but finally agreed on condition the bank would build a new church next to the tower on the same lot.



the Citicorp Center crisis

To maximize floor space, William LeMessurier, the structural engineer, came up with the idea of building it on 9-story high stilts, with the church under one of the corner.

So the columns wouldn't go through the church, he moved them to the middle of each side.



the Citicorp Center crisis

Diane Hartley, an UG working on her thesis in civil engineering at Princeton studied the plans and noticed it appeared more likely to topple in a hurricane than traditional designs.

She contacted LeMessurier's office and was initially brushed off.



the Citicorp Center crisis

LeMessurier heard about the call and decided to check his calculations.

To his horror, he discovered that the strongest wind loads would not be perpendicular as he'd assumed.

If high winds hit at a 45° angle, the building was in danger of collapse.



the Citicorp Center crisis

LeMessurier also found that the load-bearing columns had been bolted together instead of welded as specified in his drawings, making the considerably weaker.



the Citicorp Center crisis

LeMessurier calculated that the tower could fall in a 16-year storm if power to the powered mass damper on the roof failed.

And even with power, the tower would fall in a 55-year storm.

The risk it would fall in any given year was roughly equal to the probability of drawing the King of Spades.



the Citicorp Center crisis

LeMessurier became aware of this at the beginning of the 1978 hurricane season.



the Citicorp Center crisis

New York building code only required designers to consider perpendicular winds, so, in a strict legal sense, he had not violated the building code.

But he felt a moral obligation to the people in the building and realized his career could be over if this became known.



the Citicorp Center crisis

Who should be informed?

Did the public have a right to know?

Was LeMessurier the only person morally obliged or did he share responsibility?

What should he do?

You have 5 minutes to discuss.



what he actually did

Decide to contact Citicorp to explain the problem but worked out a plan to fix the problem before the meeting.

The plan involved welding thick steel plates to each of 200 bolted joints, doing the work at night when the building was empty, starting in August.



what he actually did

He also informed the City of NY and the Office of Disaster Management.

Together, they worked out evacuation plans for a 10-block radius.

He also hired 2 independent teams of meteorologists to monitor the weather.



what he actually did

On September 1, 1978, Hurricane Ella was approaching. If it continued on its predicted path, the winds would almost certainly exceed the critical limit.

Just as LeMessurier was about order evacuation, the hurricane changed its path.



what he actually did

The public and Citicorp employees were never told the purpose of the nightly welding jobs, which were completed in October.

Neither LeMessurier nor Citicorp felt it was necessary to reveal the truth to those not directly involved in the decision-making process.



what he actually did

The full story was never revealed until 17 years later, when *The New Yorker* ran a lengthy article by Joe Morgenstern.



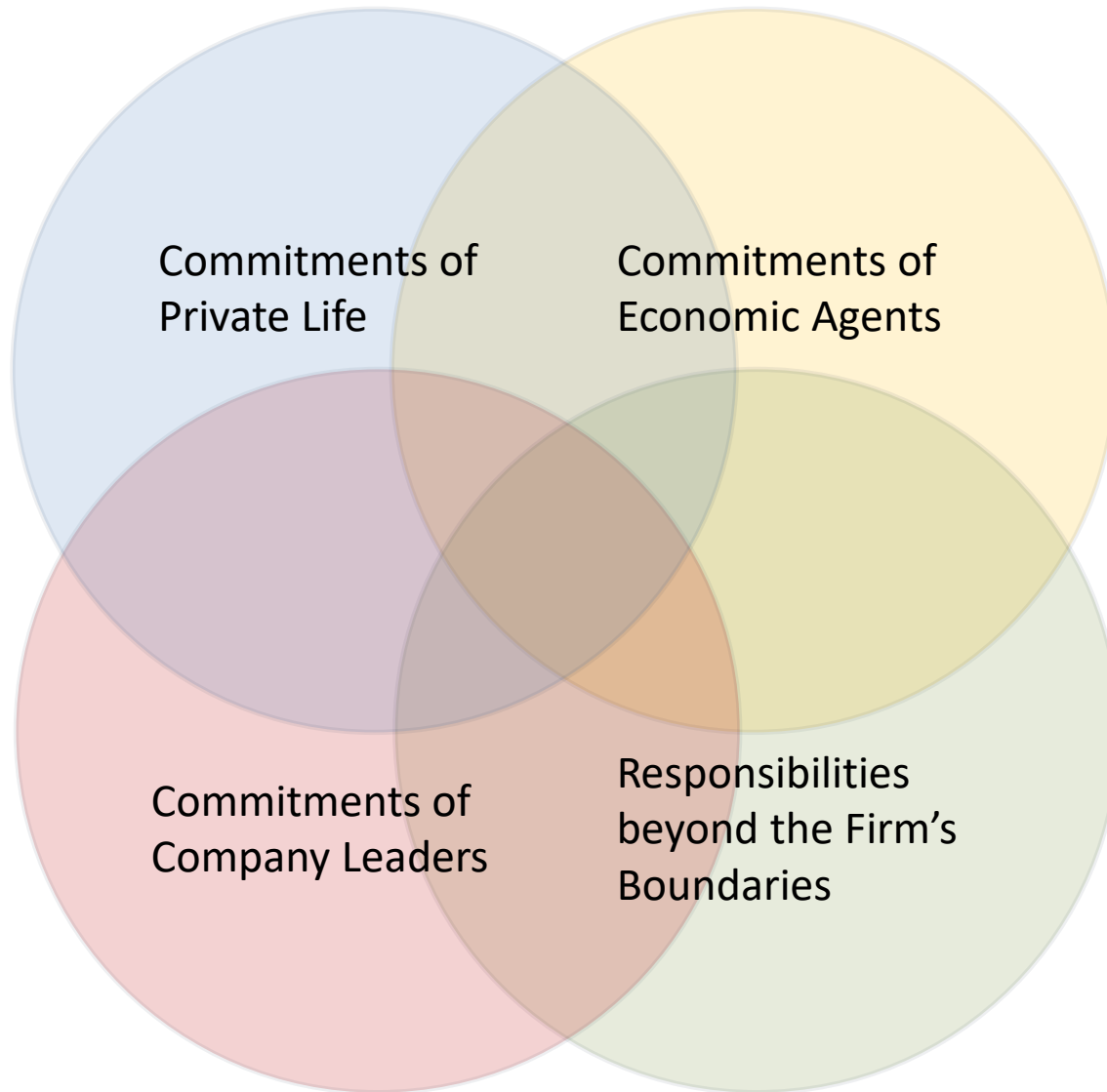
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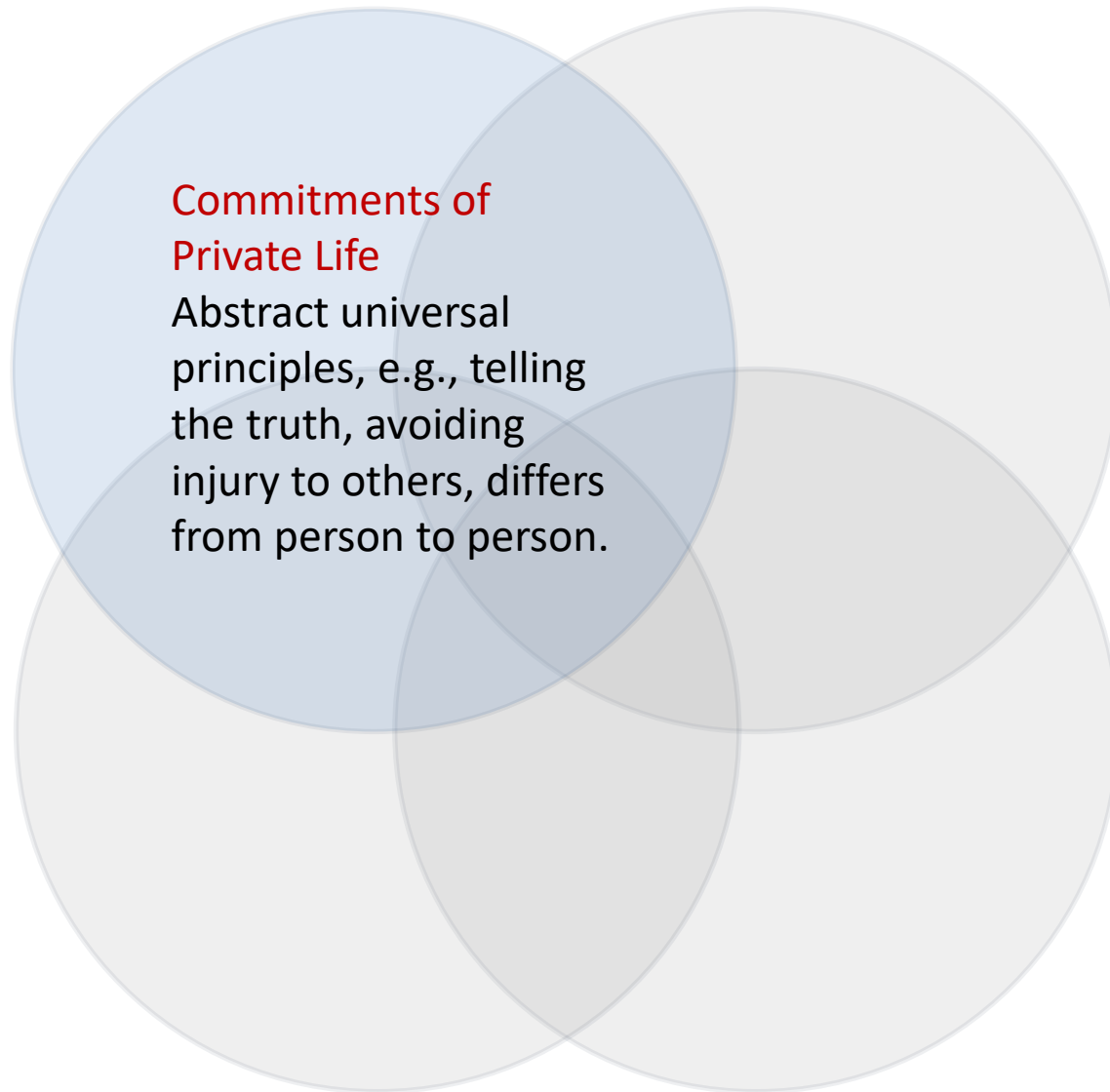
ethical spheres

If you run a business or help create the policy and you're faced with a making a decision, you might think about the problem in in terms of several ethical spheres.

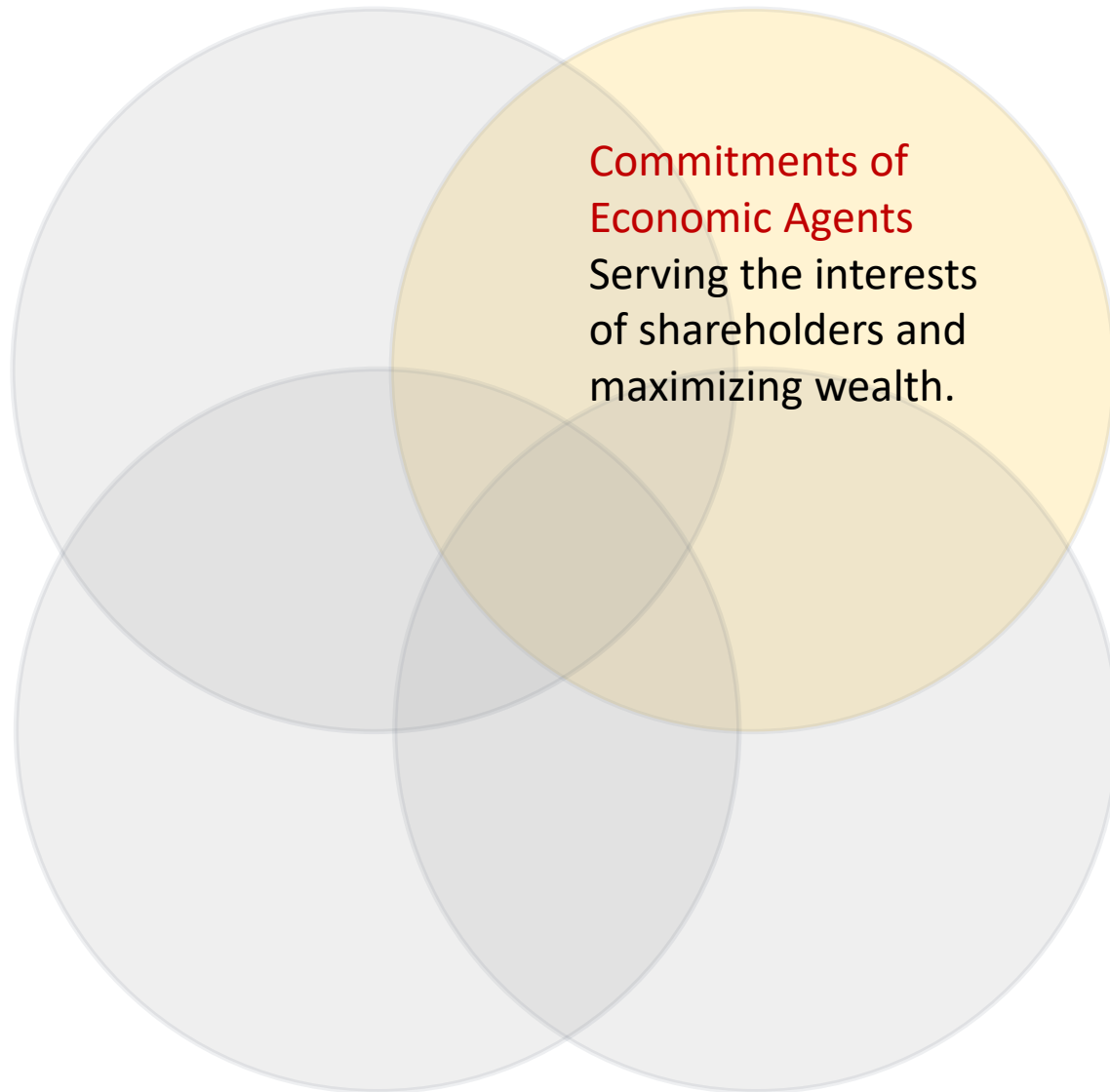
four ethical spheres



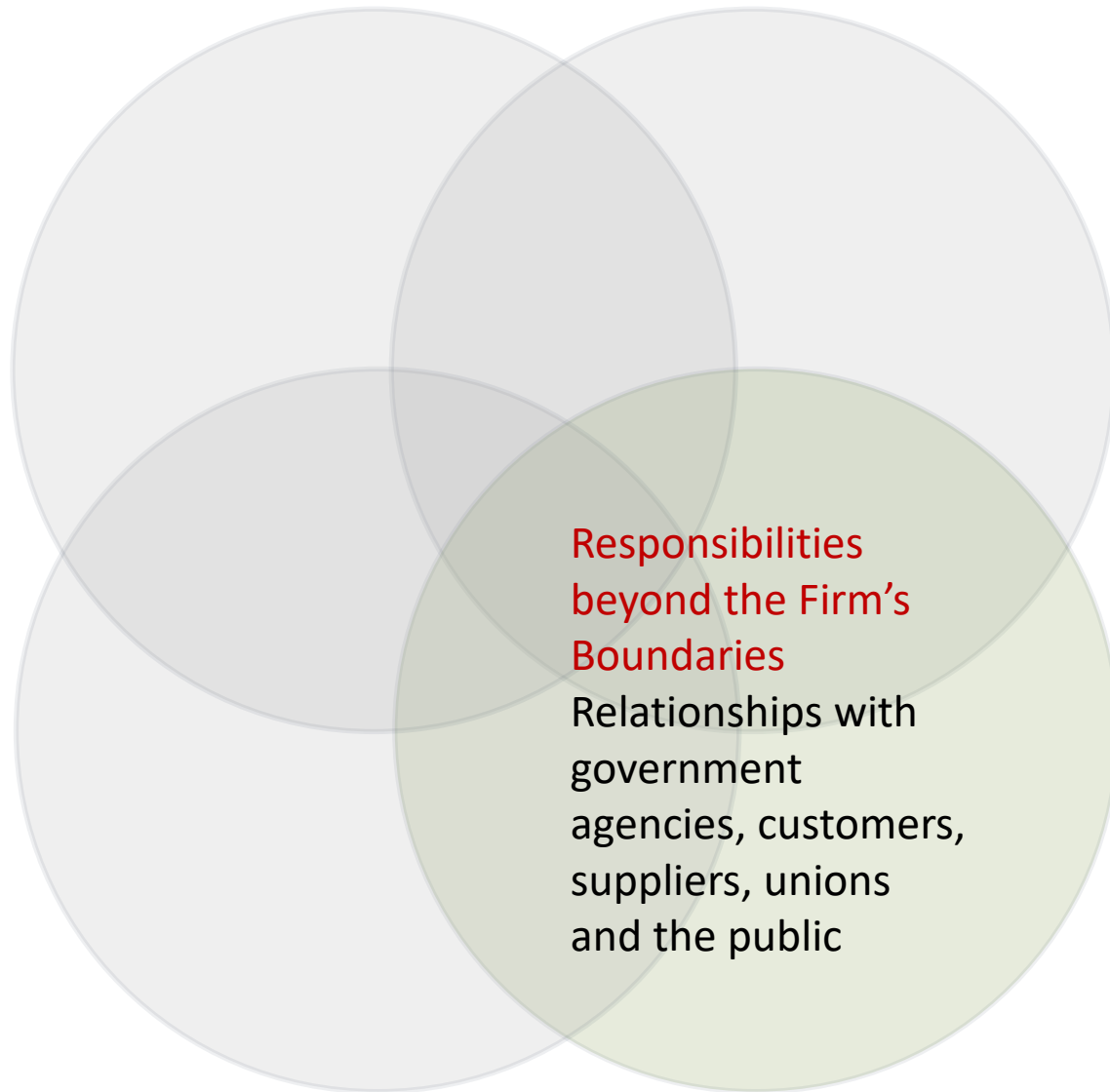
four ethical spheres



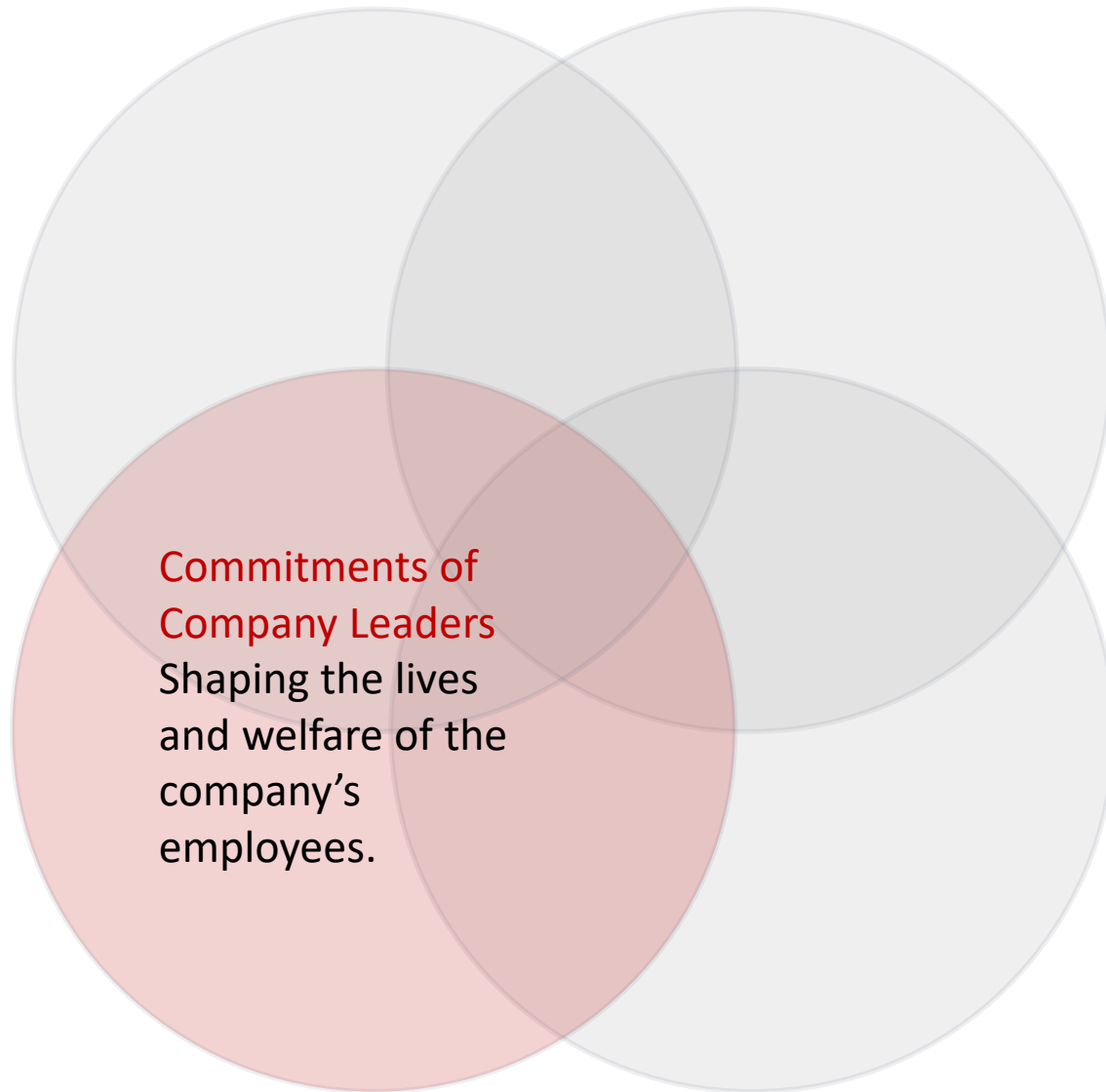
four ethical spheres



four ethical spheres



four ethical spheres



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ethical choices

A lot of decisions involve clear choices between right and wrong.

Enron (2001), WorldCom (2002), Lehman Brothers (2008), and Sam Bankman-Fried and FTX (2022) all collapsed as a result of the clearly unethical and illegal behavior.

After being caught cheating on EPA diesel emission tests (2015), Volkswagen lost market capitalization and took a reputational hit.

harder choices

The harder choices are right-vs-right.

These are choices between competing virtues. Each alternative is the right thing to do, but there is no way to do both.

backdoor to the iPhone

It's February 2016. Apple has been ordered by a US Federal Court to assist the FBI in accessing the encrypted data on a terrorist's iPhone.

The FBI demanded that Apple build a “backdoor”, essentially a new version of Apple's iOS.

Tim Cook, Apple CEO, refused, citing Apple's commitment to customer privacy and security.

what did the terrorists do?

On December 2, 2015, a married terrorist couple shot and killed 14 people and injured 22 others in San Bernardino. They were employees of the health department gathered for a holiday party. One of the terrorists was a co-worker.

Both terrorists were killed in a gun battle with police. The Islamic State and ISIS claimed they were supporters.

The terrorists had tried to destroy their computers and other cellphones, but a locked iPhone owned by San Bernardino County was found in the couple's vehicle.

the iPhone

The phone was locked with a four-digit password and set to eliminate all its data after ten failed password attempts.

Apple responded to subpoenas and search warrants and made Apple engineers available to the FBI to advise them.

But the FBI wanted Apple to build a “backdoor” to the iPhone.

Talks went on for 2 months between Apple and the Obama administration until Apple finally refused.

guest speakers

I'd now like to introduce some guest speakers to explain the administration's and Apple's positions.



<https://www.youtube.com/watch?v=ZjvX5zq7BXg>



<https://www.youtube.com/watch?v=BZmeZyDGkQ0>

why was this right-vs-right?

The government had a legitimate interest in national security and fighting terrorism.

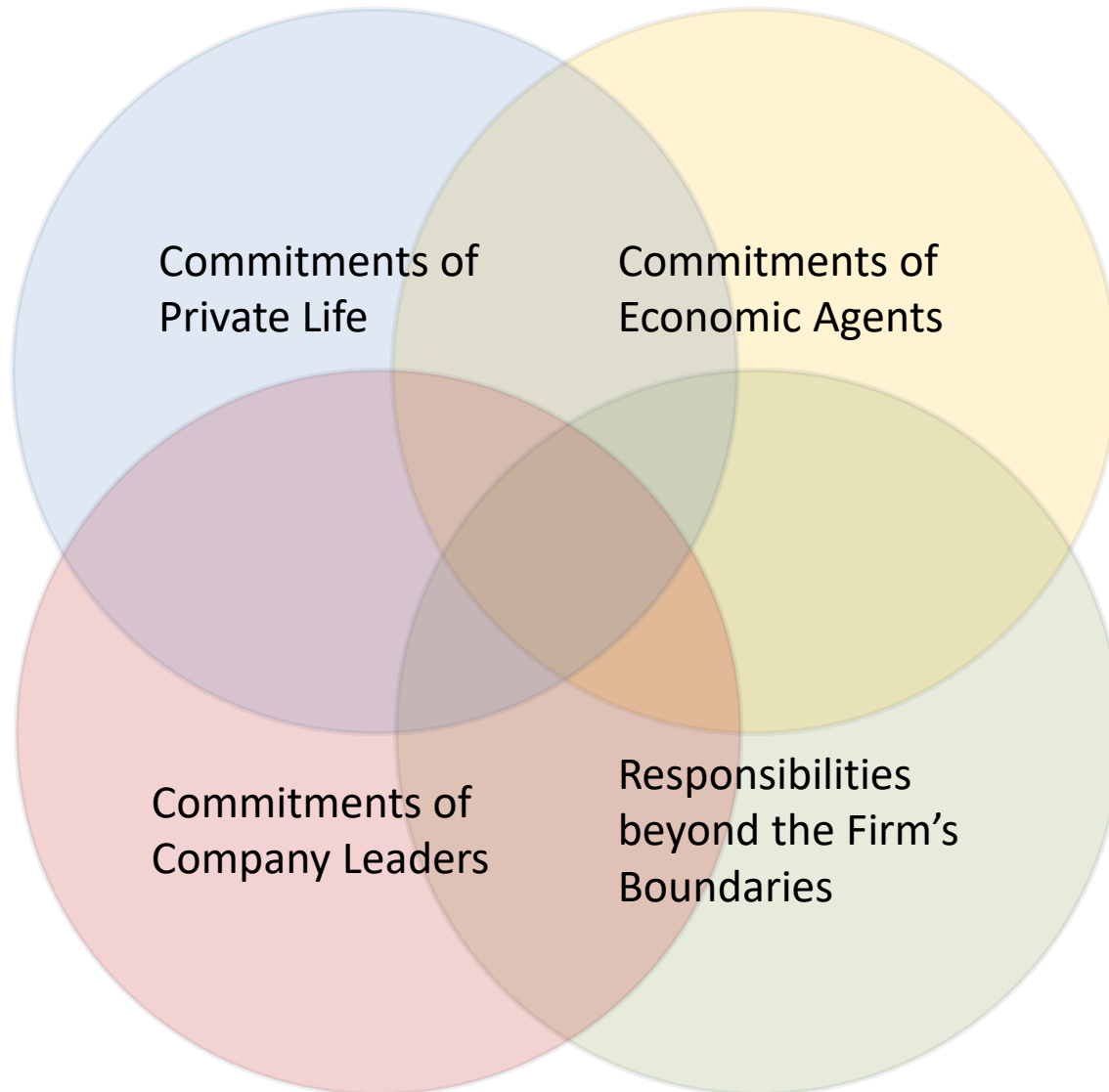
Terrorists use encryption to hide evidence.

The phone didn't even belong to the terrorists, it belonged to the county, which also supported breaking into it.

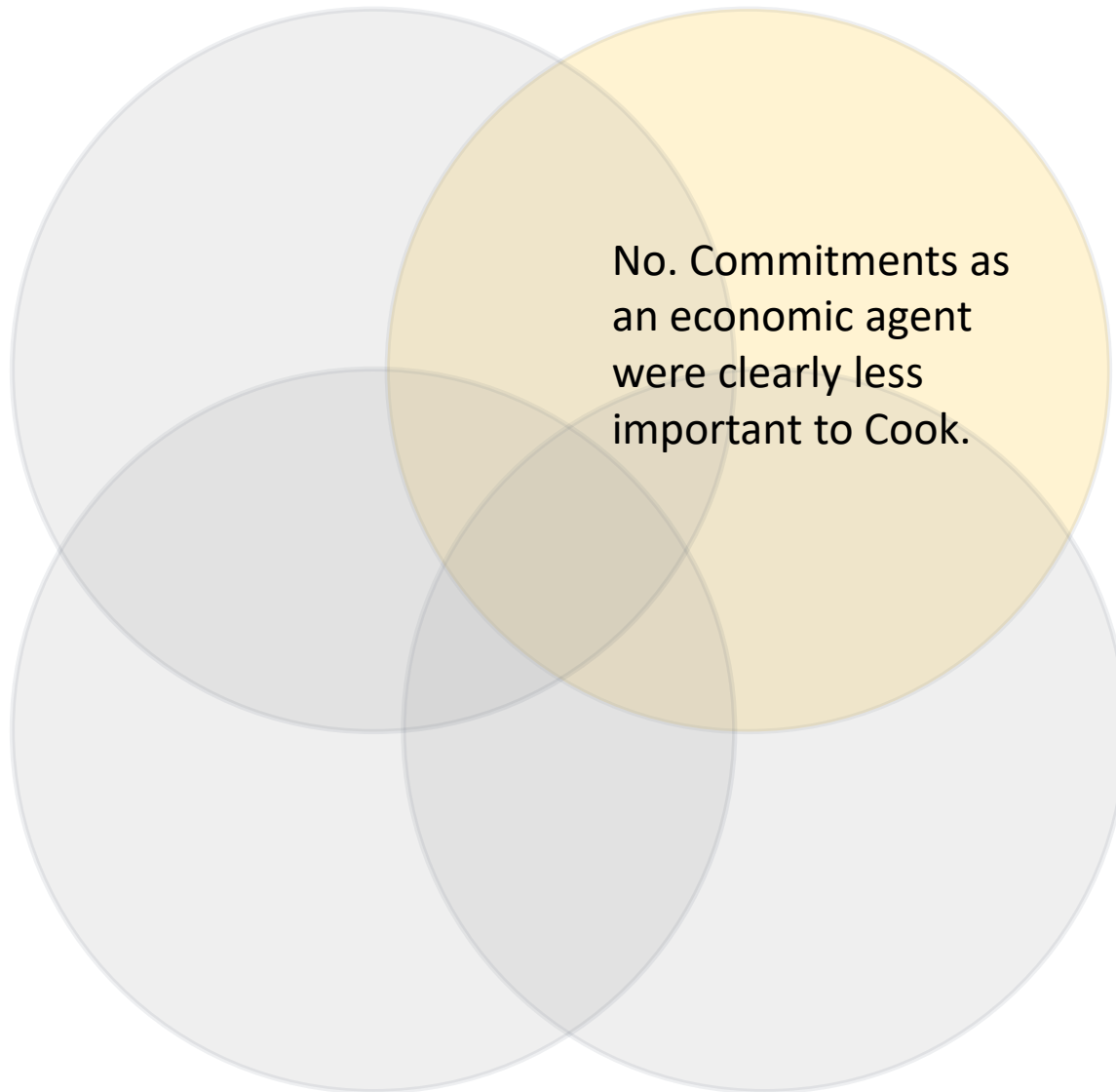
Apple had a legitimate concern that any backdoor could be misused by the government or others and would compromise the security of customer data.

After the Snowden revelations, Apple didn't want to be seen as aiding the government in spying.

were these equally important to Cook?



were these equally important to Cook?



what would you have done?

what happened

A hearing was scheduled for March 22, 2016.

On March 21, the government obtained a delay, saying it had found a third party able to assist in unlocking the iPhone.

On March 28, the government announced that the FBI had unlocked the iPhone and withdrew its request.

Director Comey confirmed that the FBI had paid \$1.3M for a zero-day exploit but would not identify the source.

what happened

Two years later, the Los Angeles Times reported that "the FBI eventually found that Farook's phone had information only about work and revealed nothing about the plot."

The hackers have been speculated to be either an Israeli or an Australian firm.

<https://www.youtube.com/watch?v=BZmeZyDGkQ0>