This Talk

- Anonymity as a security problem
- Anonymity in the context of Quora product
- Review examples from Quora to illustrate how to reason about anonymity
Anonymity as a Security Problem

- Part of security is guarding against data theft
- Unintentionally releasing that data to people is a similar vulnerability
- Preventing anonymity leaks therefore has the same goal as protecting against data theft
Anonymized data that wasn’t that anonymous

- 1997 - Massachusetts Group Insurance Commission released “anonymized” health records for state employees to researchers
- 2006 - AOL intentionally released “anonymized” search logs for 650K users to the public
- 2006-2009 - Netflix released “anonymized” viewership data for its Netflix Prize
- Anonymity is a hard security problem
What is Quora?

• A continually improving collection of questions and answers created, edited, and organized by everyone who uses it
• Significantly higher quality content than Yahoo Answers
• Unlike Wikipedia, original research and subjective experiences encouraged if they help answer the question
Coffee: What are all the different types of coffee drinks?
This is a follow-up question to Coffee: What are all the different types of coffee beans?. What are the main types of coffee you can order in a cafe and how are they made?

Peter Baskerville, Started over 20 outlets serving espresso coffee
151 votes by Johan Bakken, Phil DiNuzzo, June Lin, (more)

The following are the different types of coffee drinks that you may find in a cafe that prepares coffee using the espresso coffee making method:

- **Affogato**: This is a term that literally means 'drowned'. It is the description of a shot of separately served espresso that is later poured over a the top of a scoop of vanilla ice cream or gelato. This beverage is usually served in a short drink glass and is a Italian desert favourite. Popular Affogatos include Vanilla Affogato, Mocha Affogato, and Peppermint Affogato.
History: Who is the greatest hero in history and why?
Multiple answers are OK. I'm looking for real-life individuals who did good things. The primary measure is how much good they accomplished, but there are extra points for courage, vision, or other admirable characteristics. I don't ask for the "best people" because it may be that the most important heroes were seriously flawed as people.

Juan Videla, History buff
197 votes by Achilleas Vortselas, Craig Montuori, Nathan Ketsdever, (more)
Dr. Norman Borlaug
This man saved billions of lives, more than anyone else in known history.
9/11: What did it feel like to be inside the World Trade Center at the time of the 9/11 attacks?

For reference, the North Tower (1 WTC) was hit first, at 8:46am; South Tower (2 WTC), at 9:03am.

Ashton Lee, world's crossroad

I was living and working at the World Trade Center on that day, and this is what I remember.

I was a consultant at the time and my office was in Tower Two on the 43rd floor. I had a meeting that morning that was cancelled just the night before. When the first plane struck I was on the 18th floor not yet at my office, I remember looking at a nearby digital clock that read 8:46am. You could feel the building shake, and it was scary, not because the building moved but to the degree that it did. I was used to working on the higher floors of both towers and the Twin Towers were made to sway and move ever so slightly. You could sometimes feel it just a little during periods of heavy wind.

But this time it was different. This was not caused by wind it was a sudden jolt. I looked outside the window and saw what I thought was a piece of metal flying by. My heart and my mind raced. Strange to say this now but I felt VERY ALIVE, while a deep and sudden fear also crept over me.

Fear was soon replaced by a driving need to act. My body was full of adrenaline and my mind was factoring over different scenarios within what must have been a few eye blinks. I recalled seeing a cable show a few weeks back that talked about how the towers were built, their structural make up and particularly their height. I recalled the narrative saying the buildings were so tall that if they were to tip over it would hit or shake New Jersey, I don’t recall the exact words but the meaning stuck with me. It became a dominant thought in my head.
How do judges feel when they are almost certain that a jury has made the wrong decision?
Are they more concerned that the process was good even though the result was not?

Anon User
60 votes by Marc Bodnick, Michael Wolfe, Stephanie Vardavas, (more)

This happened once, in a federal police corruption racketeering trial presided over by the judge I was clerking for. The judge was livid with the government prosecutors for their incompetence and furious with the police officers who showed up to support the defendants and intimidate the witnesses. But there was seemingly nothing he could do.

The defendants were a number of police officers who would arrest drug addicts and prostitutes, steal their cash and jewelry while they were in lockup, and let them go. No one would take the victims' word over a cop's, and the cop that did confess and cooperate with the investigation... well, he became the scapegoat.

The judge was furious when the cops were acquitted. He kept saying in chambers, the evidence was overwhelming, OVERWHELMING.

The judge was livid with the government for screwing up the case. I don't remember exactly what they did wrong, but I think they failed to disclose some exculpatory evidence. He said he knew that one of the jurors was going to acquit.

Most of all, he was disgusted by the off-duty cops (some of whom who were on paid desk leave pending the investigation) for showing up every day in court to sit in the front row to support the defendants and intimidate the witnesses. He kept saying over and over how disgraceful it was.

One thing I do remember was that during jury selection, the judge got really, really...
Sometimes people want to share but stay anonymous.
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Sometimes people want to share but stay anonymous.

Joe Lawson, Just a poor boy...

I was a heroin addict for 14 years. From the age of 18 to the age of 32. I tried to get off of the drug via the methadone clinic to no avail. I would go to the clinic for a while and do well, but would always end up with a needle in my vein within a few months. I don’t think the clinics are set up to help people quit using drugs. I believe they are there to get people addicted to methadone. That way the government gets their cut, or tax if you will. But I digress...

After going to the clinic a few times and failing at varying degrees, I decided to try cold turkey. There is more to it than that, but it’s a long story.

I bought one last dose of heroin, obtained some valium, and vodka, then moved into a little one room apartment my uncle had in the mountains of North Carolina. Making sure, I had no way to contact anyone, or get to anyone. The closest phone was about 13 miles away. I did my shot, and counted down the minutes till the inevitable sickness would begin.

About 4 or 5 hours after my last dose I started to feel antsy. I don’t know how else to describe it. I started to bounce my legs up and down on my toes while sitting there. I couldn’t focus my attention on anything, except the fact that I had no more dope. My arm muscles felt as if they fly out of my skin, and my skin was crawling. About 8 to 10 hours after my last dose I started to feel nauseated, and started to sweat heavily. These feelings would persist for the next week or so.

Heroin, and opiates in general make you constipated. This side effect started wearing off about 48 hours after my last dose. Unfortunately it was replaced by mental health issues such as anxiety, panic attacks, depression, and jumpy legs which would last for weeks.

Heroin: What happens to heroin addicts when they quit cold turkey, and why is it so unbearable?
Anonymity on Quora is important

- Policy of using real names on the site to establish reputations for good users
- Many people want to share answers but don’t want their name associated with certain answers
- Therefore allow people to answer questions anonymously in the product
Basic rules on how anonymity works in the product

• Users can go anonymous with respect to a particular question
• While anonymous, user shows up as “Anon User” everywhere on the site with respect to that question
• Action is reversible -- toggling anonymity switches your identity on that question from your name to “Anon User”
• We still keep track on the server who the person is
Basic software protection to check anonymization

- Use end-to-end testing
  - Render entire pages that have a question
  - Make sure anonymous user’s name doesn’t appear as token
- But, anonymization is not enough
- Design reviews and code reviews for any anonymity-related changes
Design Review: Spot the anonymity hole

• Pretend that you’re an attacker
  • Goal is to infer the identity of someone anonymous on a question
• In each scenario,
  • You’re given a set of rules about how a certain feature behaves
  • Suppose that we didn’t take anonymity into account when building the feature
  • Try to spot the anonymity hole
• Similar to the type of thinking that we do when we build and review features
1 - URLs for Search Engine Optimization

- Use search-engine-friendly URLs to increase ranking on Google
- Software Engineering: What makes a good engineering culture?
1 - URLs for Search Engine Optimization

• Each individual answer on a question also has its own URL:
  • http://www.quora.com/Software-Engineering/What-makes-a-good-engineering-culture/answer/Trevor-Austin

• How might we leak anonymity if we didn’t take it into account?
2 - Top answerers on a topic

- Each question can be tagged with a set of topics
- Any user can create a new topic or apply an existing topic to a question
2 - Top answerers on a topic

- For every topic, list users with highest scoring answers on all questions of that topic
- How might an attacker figure out the identity of anonymous users if we included anonymous answers in computing scores?
3 - Commenting

• Users can comment on each other’s answers
• You can’t comment anonymously unless it’s on your own answer
• You can block individual users
  • Blocked users can’t message you or comment on your answers
• How might you use this to infer that I wrote an anonymous answer?
Lessons

• Many opportunities to unintentionally leak anonymity
  • Anonymity can interact with features in subtle and unexpected ways
  • Sometimes tricky to ask the right questions
• Still some known aspects of anonymity that aren’t part of user expectations right now
  • Protecting against analyses of writing style similarity
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