Third week tutorial

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Q1

- a) Explain in terms of game theory why people are often nastier on the internet than in real life.
- b) “A Hawk-Dove model is really just a Prisoner’s Dilemma in disguise. They have the same dominant strategy, and that dominant strategy is Pareto-suboptimal.” Is this statement ever true?
- c) Do the circumstances in which is it not true indicate any strategy for mitigating unpleasant behaviour online?

Prisoners’ dilemma

- Alfie and Benjy are arrested on suspicion of planning a robbery. The police tell them separately: if neither confesses, one year each for gun possession; if one confesses he goes free and the other gets 6 years; if both confess then each will get 3 years

Benjy

Alfie

	confess	deny
confess	-3, -3	0, -6
deny	-6, 0	-1, -1

- (confess, confess) is the dominant strategy equilibrium
- It’s obviously not optimal for the villains!
- Is this a problem? If so, what’s the solution?

Game theory and evolution

- John Maynard Smith proposed the ‘Hawk-dove’ game as a simple model of animal behaviour. Consider a mixed population of aggressive and docile individuals:

	Hawk	Dove
Hawk	(v-c)/2, (v-c)/2	v, 0
Dove	0, v	v/2, v/2

- Food v at each round; doves share; hawks take food from doves; hawks fight (with risk of death c)
- If v > c, whole population becomes hawk (dominant strategy)
- What happens if c > v?

Game theory and evolution (2)

- If c > v, a small number of hawks will prosper as most interactions will be with doves. Equilibrium reached at hawk probability p setting hawk payoff = dove payoff

	Hawk	Dove
Hawk	(v-c)/2, (v-c)/2	v, 0
Dove	0, v	v/2, v/2

- i.e. $p(v-c)/2 + (1-p)v = (1-p)v/2$

  $\Leftrightarrow pv - pc + 2v - 2pv = v - pv$

  $\Leftrightarrow -pc = -v \Leftrightarrow p = v/c$

- Hence a spectrum of aggression (among people / firms / states)

Q2

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- The vendor (Xiaomi) can sell cheap cameras with factory default password and no software update
- 2024: 3m toothbrushes in a DDoS botnet!
- As before, the end users have some of their wifi bandwidth stolen for use in DDoS attacks
- The importers and retailers face no penalties
- Does the government have any leverage?

Q3

- In the US, monopolies have traditionally been measured by their effect on consumer surplus: i.e. whether customers pay vastly more than the supply cost. Google search is free, and holds over 90% of the market. So is there any negative effect on the consumer from this lack of competition in the search market?

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- Curtailed innovation is an indirect and invisible loss
- Many other losses include local newspapers...
- See Matt Stoller’s blog

Q4

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- Antivirus software is sometimes considered a “market for lemons”. To what extent is this true, and is it down to hidden information, hidden action, or both?
- Mass-market AV like Symantec and McAfee made more money than specialists like Sophos
- Do you spend money on marketers or engineers?
- It’s unclear if hidden action could be significant (do Sophos users click on more bad links? I doubt it)

Q5

- Social media networks already spend significant effort on removing some forms of content, e.g. child sex abuse material, and yet they are less willing/able to deal with other forms of abusive content from “the swamp”. Is this purely an issue of incentives, and if so might the right legal intervention be able to solve the issue?

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- Discuss the Online Harms Bill!
- What about hate speech?
- What about age verification?

Q6

- Imagine that you are designing a spearphishing attack designed to scam Edinburgh students out of money. How would you do it, who (or what) would you impersonate, how would you extract the money, and could you use Prospect Theory to increase your chances? Are there any other social-psychology tricks that might help?

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- Maybe read Jakobsson on social phishing...

Q7

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- There’s a real shortage of identifying information
- Different services make incompatible demands and leak passwords at scale that other services use
- 2FA can tighten things up but only so much once everyone is trained to turn round SMSes

Q8

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- My citation for “blame and train” is Don Norman’s book ‘*The Design of Future Things*’
- Forcing users to adapt to unsafe, insecure or poorly usable tools is clearly bad
- Ask case by case: is it engineering incompetence, abuse of power, or what?