Law and Technology

Selected Technologies

Today's Scope

- Highlight topics from second half
- Note that these are based on my innate sense of what's important, deliberately selected without reference to possible exam questions
- Answering your questions

Platforms

Network Externalities/Effects

- More buyers makes it better for sellers (positive, cross-effect)
- More buyers also makes it better for other buyers (positive, same-side effect)
- Vice-versa
- **Critical mass is critical**
  - Beyond some point, sellers/buyers attract buyers/sellers attract sellers/buyers
  - But initially, negative feedback loop – no sellers >> no buyers >> no sellers
- So is **maintaining** critical mass
  - Imagine if Grab lost 50% of its drivers overnight
- 'Regulated' by these **market forces**, how would a platform behave?

Uber v Aslam (UKSC)

Lord Leggatt (all but Lord Kitchin, who fell ill, agreed):

1. New ways of working organised through digital platforms pose pressing questions about the employment status of the people who do the work involved. The central question on this appeal is whether an employment tribunal was entitled to find that **drivers … work for Uber under workers' contracts and so qualify for the national minimum wage, paid annual leave and other workers' rights**; or whether, as Uber contends, the drivers do not have these rights because they work for themselves as independent contractors, **performing services under contracts made with passengers through Uber as their booking agent.**

If drivers work for Uber under workers' contracts, a secondary question arises as to **whether the employment tribunal was also entitled to find that the drivers who have brought the present claims were working under such contracts whenever they were logged into the Uber app within the territory in which they were licensed to operate and ready and willing to accept trips**; or whether, as Uber argues, they were working only when driving passengers to their destinations.

… I would affirm the conclusion [below]

Uber v Aslam – Holdings

- Case was actually disposed of based on close analysis of who the contracts were with
  - Uber argued that was a **mere agent** helping drivers contract with users
  - Court found that in reality **Uber contracted with the drivers to perform services for Uber's users**
- However, court went on to comment on the nature of the relationship given "the wider importance of the case"

Uber v Aslam – Power and Control

71. The general purpose of the employment legislation invoked … by the claimants in the present case, is not in doubt. **It is to protect vulnerable workers from being paid too little for the work they do, required to work excessive hours or subjected to other forms of unfair treatment (such as being victimised for whistleblowing).** The paradigm case of a worker whom the legislation is designed to protect is an employee, defined as an individual who works under a contract of employment. **In addition, however, the statutory definition of a "worker" includes in limb (b) a further category of individuals who are not employees.**

76 **it would be inconsistent with the purpose of this legislation to treat the terms of a written contract as the starting point** in determining whether an individual falls within the definition of a "worker". To do so would reinstate the mischief which the legislation was enacted to prevent. **It is the very fact that an employer is often in a position to dictate such contract terms and that the individual performing the work has little or no ability to influence those terms that gives rise to the need for statutory protection in the first place.** The efficacy of such protection would be seriously undermined if the putative employer could by the way in which the relationship is characterised in the written contract determine, even prima facie, whether or not the other party is to be classified as a worker.

Uber v Aslam – Power and Control

77. This point can be illustrated by the facts of the present case. The Services Agreement (like the Partner Terms before it) was drafted by Uber's lawyers and presented to drivers as containing terms which they had to accept in order to use, or continue to use, the Uber app. **It is unlikely that many drivers ever read these terms or, even if they did, understood their intended legal significance.** In any case there was **no practical possibility of negotiating any different terms.** In these circumstances to treat the way in which the relationships between Uber, drivers and passengers are characterised by the terms of the Services Agreement as the starting point in classifying the parties' relationship, and as conclusive if the facts are consistent with more than one possible legal classification, would in effect be **to accord Uber power to determine for itself whether or not the legislation designed to protect workers will apply to its drivers.**

Uber v Aslam – Power and Control

87. … the **vulnerabilities of workers which create the need for statutory protection are subordination to and dependence upon another person in relation to the work done.** As also discussed, **a touchstone of such subordination and dependence is (as has long been recognised in employment law) the degree of control exercised by the putative employer over the work or services performed by the individual concerned.** The greater the extent of such control, the stronger the case for classifying the individual as a "worker" who is employed under a "worker's contract".

90. **The claimant drivers in the present case had in some respects a substantial measure of autonomy and independence** … **they were free to choose when, how much and where … to work**. … The contractual arrangements between drivers and Uber London did subsist over an extended period of time. But they did not bind drivers during periods when drivers were not working: rather, they established the terms on which drivers would work for Uber London **on each occasion when they chose to log on to the Uber app**

Uber v Aslam – Power and Control

92 … **there are three parties involved: Uber, drivers and passengers. But the focus must still be on the nature of the relationship between drivers and Uber.** The principal relevance of the involvement of third parties (ie passengers) is the need to consider **the relative degree of control exercised by Uber and drivers respectively over the service provided to them**. **A particularly important consideration is who determines the price charged to the passenger. More generally, it is necessary to consider who is responsible for defining and delivering the service provided to passengers**. A further and related factor is the **extent to which the arrangements with passengers afford drivers the potential to market their own services and develop their own independent business**.

93 In all these respects, the findings of the employment tribunal justified its conclusion that, although free to choose when and where they worked, at times when they are working drivers work for and under contracts with Uber (and, specifically, Uber London). **Five aspects of the tribunal's findings are worth emphasising.**

Uber v Aslam – Power and Control

1. **Remuneration paid to drivers fixed by Uber**; drivers have no say; fares not set by regulator (unlike taxis)
2. **Terms of transportation contract dictated by Uber**
3. Once logged on, **choice on whether to accept rides constrained by Uber,** who controls information on the ride provided to driver, withholds destination, and monitors acceptance rate (enforceable by "penalty")
4. **Control over how drivers deliver their services**; vets type of car, operates the app that directs drivers where to go; ratings system used by Uber purely as an internal tool for managing performance, not publicised at time of request
5. **Restricts communication** between passenger and driver, even after trip ends

Workers or Not? Lessons for Law and Tech

- **"Control" exercised by tech platform** pivotal, and not just for labour law
- But control as a device is very fickle when up against tech
- Platforms will always cry "no control"
- But easy to see control when adopting a "code is law" lens
- In reality, tech allows far more **indirect forms of (behavioural) control** which the UKSC references somewhat
- Debate over employment status often masks larger debates over **social power hierarchies**

Singapore

- Tripartite Workgroup on Representation for Platform Worker
  - Members across government, platform companies, labour groups, and businesses
  - Consulted >20000 Platform Workers, 30 companies and associations, and 2700 users
- Key recommendations:
  - "Platform Workers should not be classified as employees"
  - "requiring Platform Companies that **exert a significant level of management control** over Platform Workers to provide them with basic protections"
  - "requiring Platform Companies [with a significant level of management control – see fn 3] to provide the same scope and level of work injury compensation as employees' entitlement under WICA"

Singapore

- **"Management control" test** to be determined by government but recommended non-exhaustive factors include:
  - Data-driven, algorithmic matching of demand and supply of services;
  - Effectively determining or setting upper limits on price and remuneration; and
  - Controlling and directing the performance of work

- **Suppose this becomes law. How would you advise/argue a case on this issue?**
  - What facts about the technology do you need to know?
  - What other facts?
  - What legal cases and doctrines may also be relevant?

6 At around 6.16pm on 7 November 2018, the defendant shared a link to the Article in the Post on his Facebook Timeline. The Timeline on a Facebook user's profile page sets out some of their Facebook activity. **Among other functions, the Timeline showcases a user's posts in roughly reverse chronological order, with the most recent post generally appearing first.** The defendant did not include any accompanying text or commentary in the Post, which simply indicated that the defendant had shared a link, with part of the Article's title and an image from the Article being displayed, as shown below:

7 By 10.16pm on 7 November 2018, the defendant's **Post had attracted 22 "reactions", five "comments", and 18 "shares". The Post had been made on the "Public" setting**, meaning that other Facebook users apart from the defendant's "friends" on Facebook would be able to view it.

LHL v LZH [2021] SGHC 66 (Aedit Abdullah J)

<u>What is the platform's role?</u>

NOTICE: A Facebook post below contains contains false and defamatory statements regarding the persons pictured therein. It is reproduced here purely for educational purposes and should not be read to imply anything about the persons below. For the correct facts, click here: https://www.elitigation.sg/gd/s/2021_SGHC_66

Fairfax v Voller and Ors (2021 HCA)

- Fairfax which runs Sky News maintains an FB page, on that page users posted content defamatory of Voller

- HCA in 5:2 split: **Fairfax** (not FB) can be liable in defamation as a **publisher** of the defamation
- **Majority**: Publication includes intentional participation and includes intentional platforming. Intentional, so long as voluntary and active. Fairfax actively maintains the FB page and encourages comments, benefits commercially from it

Fairfax v Voller and Ors (2021 HCA)

Gageler and Gordon JJ:

[62] every intentional participant in a process directed to making matter available for comprehension by a third party is a "publisher" of the matter upon the matter becoming available to be comprehended by the third party.

[66] "intentionally" within the second quotation should be understood to be directed at an intention to facilitate, or provide a platform for, communication of the allegedly defamatory matter. Enough for participation in a process that is in fact directed to making matter available for comprehension by a third party to be characterised as intentional is that the participation in the process is active and voluntary. That is irrespective of the degree of active and voluntary participation in the process. And it is irrespective of knowledge or intention on the part of the participant as to the defamatory content of the matter published.

Fairfax v Voller and Ors (2021 HCA)

[69] The strictness of the common law rule is illustrated by Webb v Bloch itself. There members of a committee who ratified a decision of another member to instruct a solicitor to prepare and send a circular were found each to have been a publisher of the circular prepared and sent out by the solicitor. That was despite some of them having been completely unaware of the contents of the circular.

(*see also Kiefel, Keane, Gleeson JJ's judgment at [32]*)

Fairfax v Voller and Ors (2021 HCA)

[98] Each appellant became a publisher of each comment posted on its public Facebook page by a Facebook user as and when that comment was accessed in a comprehensible form by another Facebook user. Each appellant became a publisher at that time by reason of its intentional participation in the process by which the posted comment had become available to be accessed by the other Facebook user. **In each case, the intentional participation in that process was sufficiently constituted by the appellant, having contracted with Facebook for the creation and ongoing provision of its public Facebook page, posting content on the page the effect of which was automatically to give Facebook users the option (in addition to "Like" or "Share") to "Comment" on the content by posting a comment which (if not "filtered" so as to be automatically "hidden" if it contained "moderated words") was automatically accessible in a comprehensible form by other Facebook users.**

Fairfax v Voller and Ors (2021 HCA)

[101] the "primary purpose" of the operation of each appellant's public Facebook page was "to optimise readership of the newspaper (whether hardcopy or digital) or broadcast and to optimise advertising revenue". Each appellant "provided the forum for its publication and encouraged, for its own commercial purposes, the publication of comments".

[102] Having regard to those findings, the appellants' attempt to portray themselves as passive and unwitting victims of Facebook's functionality has an air of unreality. Having taken action to secure the commercial benefit of the Facebook functionality, the appellants bear the legal consequences.

Discussion

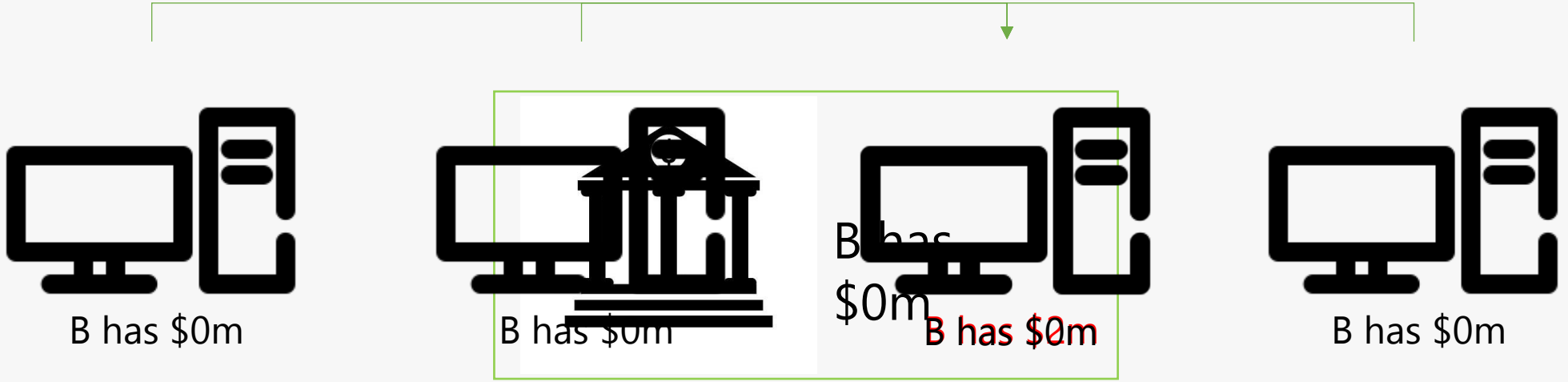
- **Key implication** from Fairfax: the **High Court of Australia has found that a business-user of a platform can be liable for defamatory content posted by consumer-users on its business page**
- **Do you agree with the outcome?**
- What implications could this have for business-users generally, including on other kinds of platforms?
- What implications could Fairfax have for platform companies, both directly and indirectly?
- **Should Singapore adopt a similar rule?**

Blockchain

The OG Definition

"a solution to the **double-spending problem** using a **peer-to-peer distributed timestamp server** to generate **computational proof** of the chronological order of transactions"

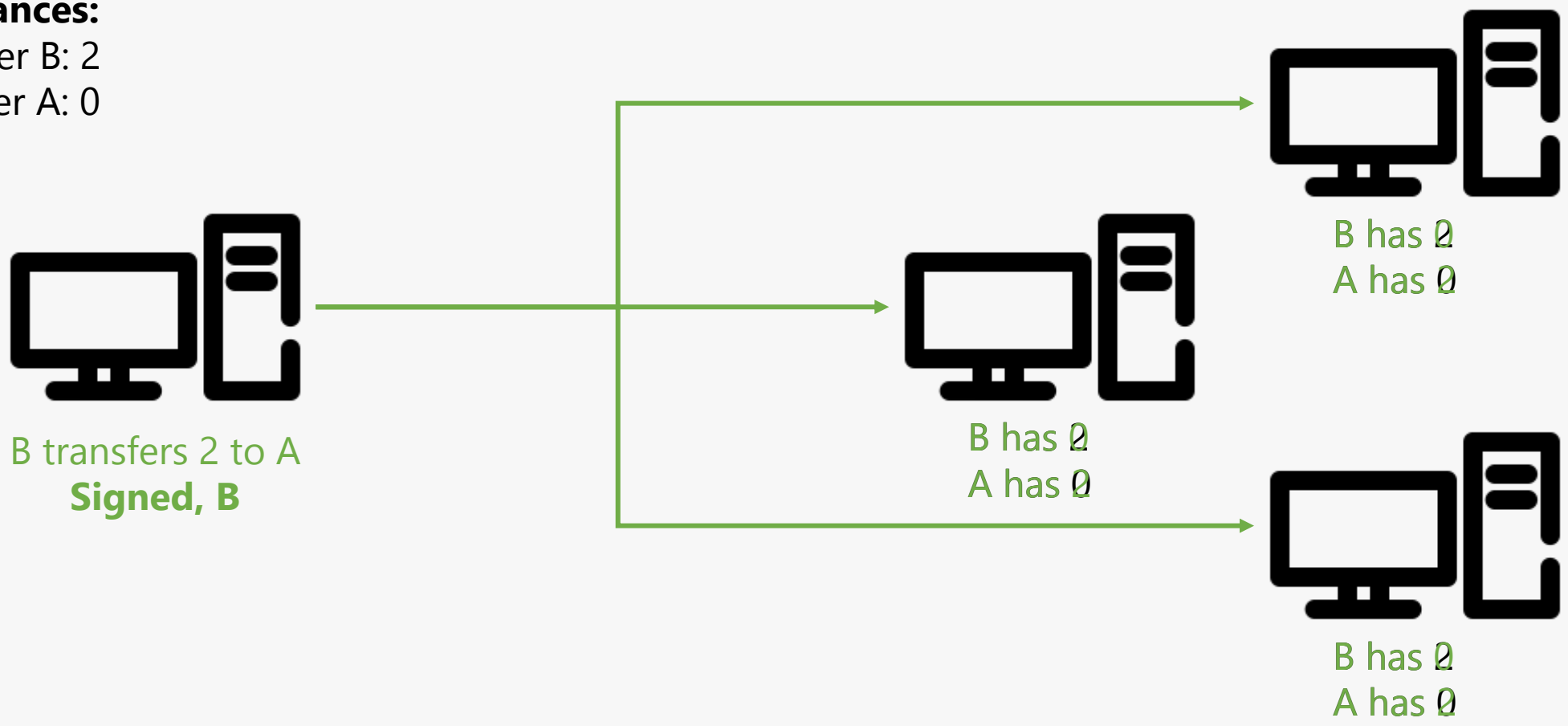
“Peer-to-peer distributed timestamp server”



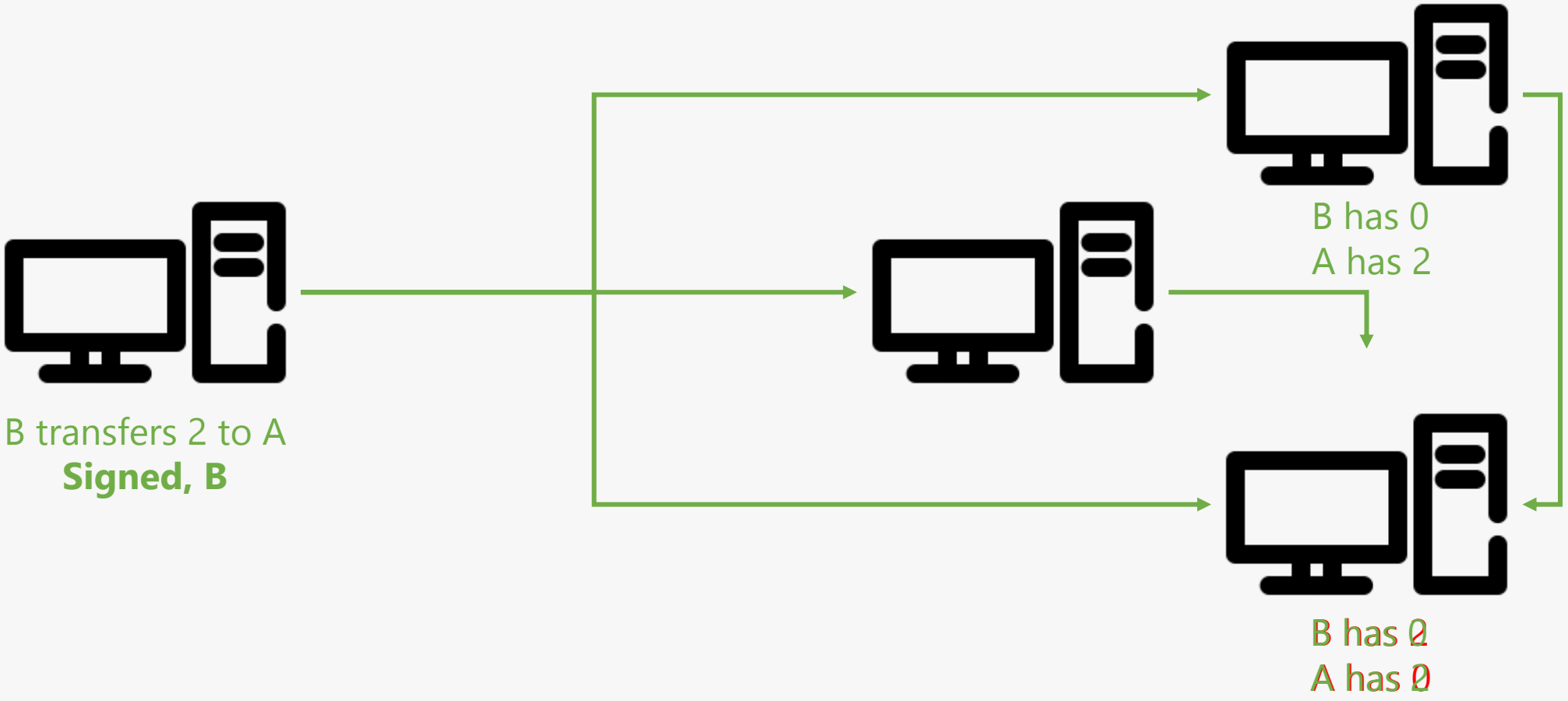
B has $0m

"Computational Proof of Transactions"

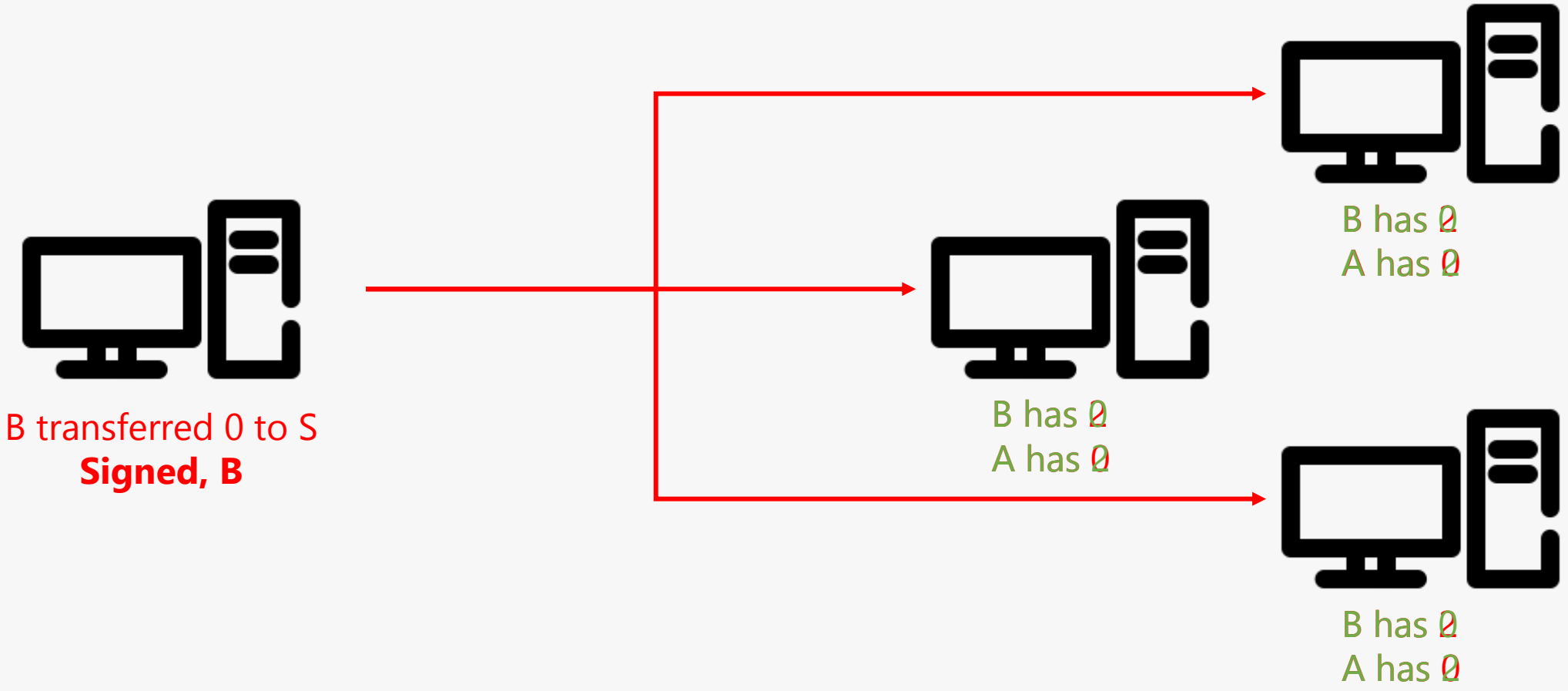
Current balances:
Buyer B: 2
Seller A: 0



Tampering Attempt 1: Mis-repeating



Tampering Attempt 2: Re-writing Records



Cryptographic Hash (#) Functions

- **SHA (or Secure Hash Function) 256** is one (of many) algorithms available for encrypting information
- Encryption is achieved by converting or ("hashing") *human readable information*, like plain English, to some gibberish. For instance:

SHA256("blockchain") →
ef7797e13d3a75526946a3bcf00daec9fc9c9c4d51ddc7cc5df888f74dd434d1

- For the encryption to be **secure**, it is essential that given the RHS output, you **cannot easily figure out the what the original LHS output was**
- However, you can guess what the LHS was, and see if SHA([your guess]) produces the same output. If so, you have "decrypted" the info.
- As we will see later, however, the blockchain does not rely on this bit to encrypt data, because **all the inputs are transactions that should be on public record**

- For SHA**256** specifically, the output is always 256 characters regardless of input length

POW Consensus and Tamper-Proofing

B transferred 0 to S
Signed, B

Block ID 1234
Date: 28-09-2021
Time: 1600:30:30
Transactions:
- **B-0, S+0**
- Y-3, Z+3
- …

Previous block #:
abc4032
X?

Block ID 1235
Date: 28-09-2021
Time: 1605:00:00
Transactions:
- …

Previous block #:
Not cdef1234
X?

Block ID 1236
Date: 28-09-2021
Time: 1610:00:00
Transactions:
- …

Previous block #:

X?

Block ID 1237
Date: 28-09-2021
Time: 1620:00:00
Transactions:
- …

Previous block #:

X?

- While solving 1235, network adds 1236, 1237, etc,
- Attacker **must present *longest* blockchain** to win consensus
- Sets up a **race between honest and dishonest nodes**
- By naïve (Poisson) probability model, can show that chance of attacker winning diminishes exponentially as (a) more nodes added, (b) honest/attacker nodes compute faster/slower

Other Consensus Mechanisms (optional)

- Proof-of-stake
  - To mine, must put up deposit
  - The more deposit, the more ‘compute’ in a POW-like sense
  - Slashing conditions (deposit forfeiture) activate if you try to be funny
  - Code-enforced economic disincentives for security
- BFT, Hashgraphs
  - Complicated structure of broadcasts/re-broadcasts to ensure ‘right’ record is found despite attackers
  - Relies on attacker not controlling too many nodes
- See Computer Law & Security Review article

Other Blockchain Features

- Efficient ways of identification/authentication/retrieval, etc
  - Through private/public key cryptography that's a **separate** system from Proof-of-Work and which exists for lots of non-blockchain tech
- Private vs Public blockchains
- No theoretical limit

Takeaways

- Blocks are nothing special. Just **packets of data**
- **Hash chaining** **essential** to tamper-resistance
- Only **probabilistic** resistance. Attacker can still win if:
  - Very few blocks added (slow bit rate)
  - Puzzle too easy to solve
  - Honest nodes have less compute (**50+% attack**)
  - Dumb luck
- POW, POS, etc are necessary for so-called **computational proof of transactions,** but are not entirely bulletproof
- Horrendous waste but good alternative means elusive (like capitalism)
  - Bitcoin's blockchain has **not yet been hacked**
  - Other blockchains have (e.g. Ethereum classic's 50% attack)
  - Ethereum classic was a POW system, though it was thin)

Bybit v Ho Kai Xin and others [2023] SGHC 199

- [34-35] Are cryptoassets things in possession or in action (given that all personal property are either one or the other)?
- [36] My conclusion is therefore that **the holder of a crypto asset has in principle an incorporeal right of property recognisable by the common law as a thing in action and so enforceable in court.** While it might be said that **this conclusion has an element of circularity in that it could also be said that the right to enforce in court is what makes it a thing in action**, this type of reasoning is not strikingly different from how the law approaches other social constructs, such as money. It is only because people generally accept the exchange value of shells or beads or differently printed paper notes that they become currency. **Money is accepted by virtue of a collective act of mutual faith.**
- What is the court's role here? Is it recognizing the broader societal act of mutual faith in crypto? Or, is it creating one? **Is this an issue with law, tech, or both?**

Artificial Intelligence

Modern AI Systems

Rules-based or **"symbolic"** AI

Machine learning or **"statistical"** AI

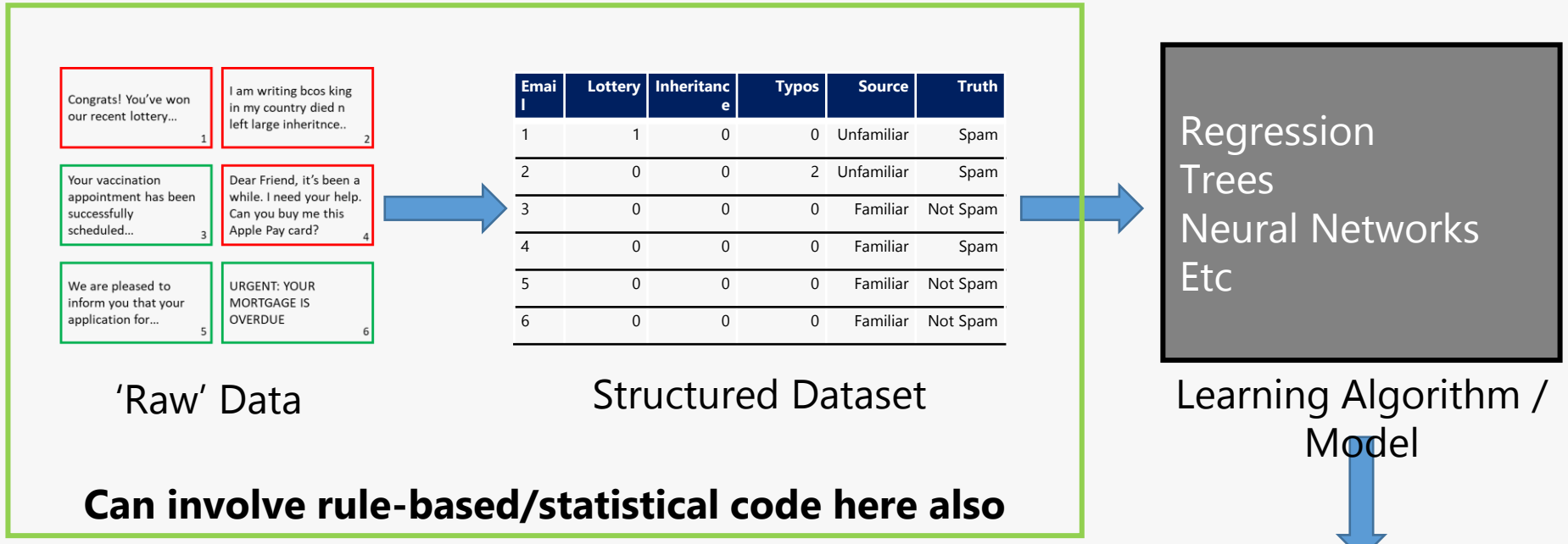
The program holds **knowledge of the Divorce (Scotland) Act 1976, of relevant judicial precedents, and also contains some legal heuristics**. It is designed, once the facts have been elicited from the user, to **inform him whether there are grounds for divorce...**

The knowledge of the legal domain was, in the first instance, culled largely from primary and secondary written legal sources, that is, from legislation, case law, and standard legal textbooks. Initial tentative representations of the field of law were refined in light of consultation with experienced legal practitioners.

The knowledge is represented in the knowledge base as a network of interrelated rules that can be altered with little fuss: it is a flexible, rule-based system. The corpus of knowledge can be regarded as a set of possibilities - a search space - which the system must explore with the guidance and direction of the user. At the beginning of the interaction, and periodically thereafter, **the user is required to enter some basic data, such as the names of parties, relevant dates, and so forth. However, the principal ways in which the user apprises the system of the facts of a case are through "yes", "no", or "don't know" responses to questions asked of him and through selections from menus.**

The order in which the system explores possible solutions to problems is conditioned by the system's inference engine, which can best be described as facilitating a "user-controlled backward-chaining" reasoning mechanism. Very broadly speaking, an expert system that backward-chains starts its reasoning process at the conclusion it is trying to reach, and moves backwards through its body of rules in search of premises that will justify that conclusion.

ML-based Systems



$$P(spam) = 0.2 \times Lottery + 0.00 \times Inheritance + 0.05 \times typos + 0.2 \times source$$

Classification Algorithm / **Trained Model** /"Hypothesis"

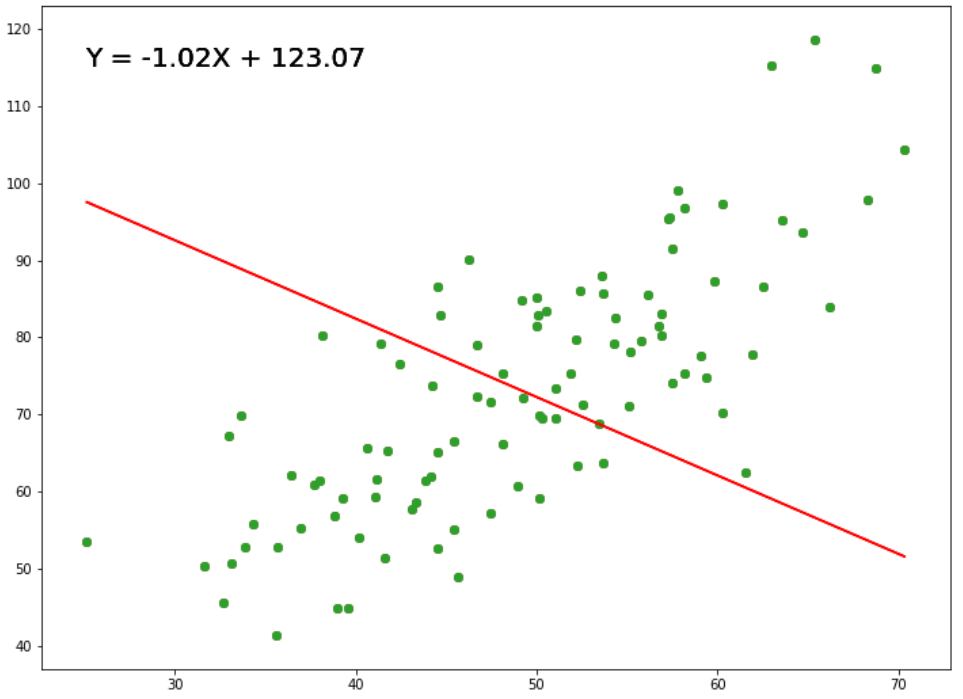
Machine Learning on Data

While humans can easily "eyeball" the line, we can't do it for more than 2 (3?) dimensions.

But math can:

- **Define a measure of "fit"**
- E.g. "least squares" distance between points on the line to data points
- Specify line equation – **determined by "coefficients"** (the changing numbers >>)
- See how well it fits
- See if changing the equation improves the fit
- If so, move to new equation
- Repeat until stable

Most ML algorithms operate on the same principle



https://dphi.tech/blog/tutorial-on-linear-regression-using-least-squares/

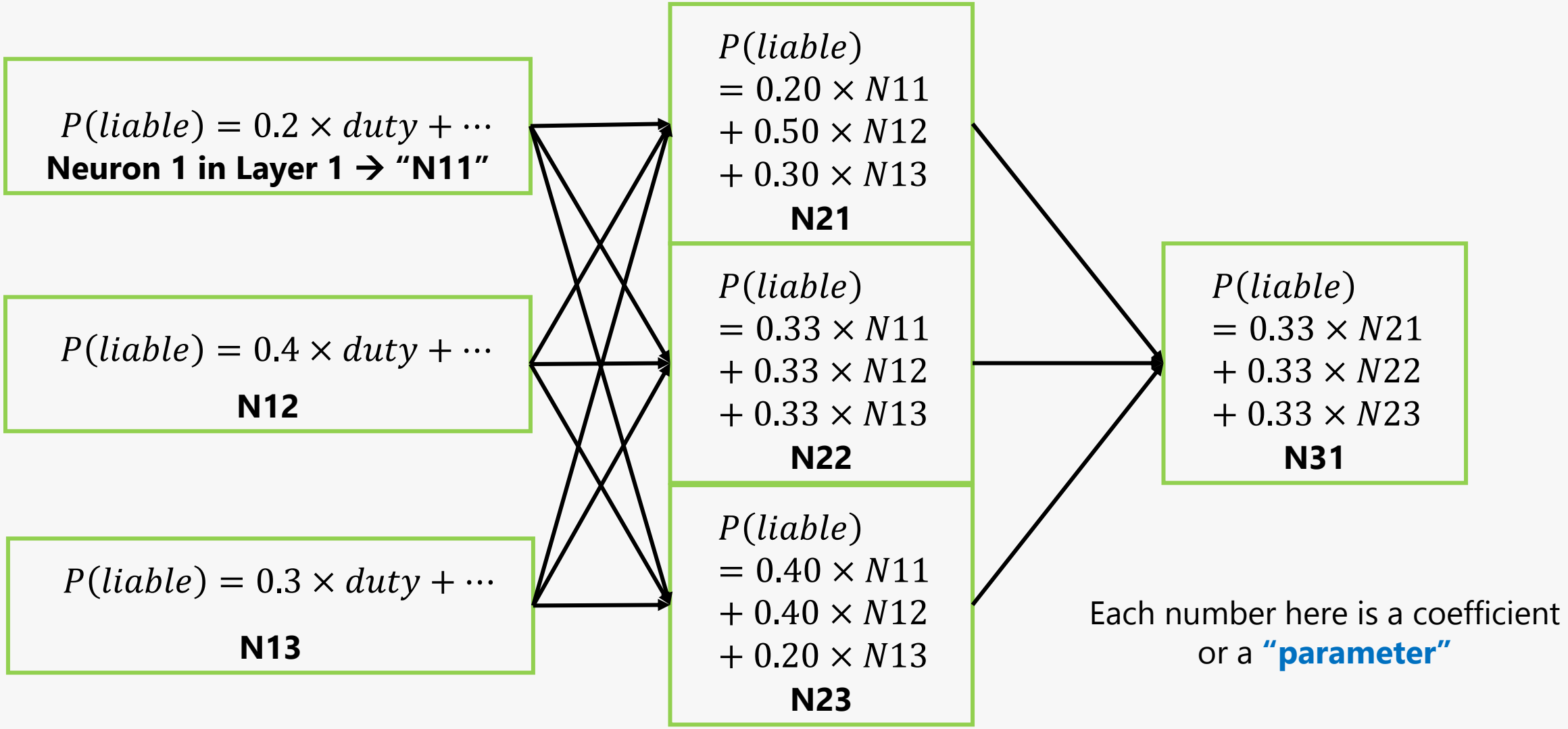
Legal "Predictions"

Plaintiff is a 4-year-old girl. On 27 July, 2020, she visited the defendant's drive-thru with her mother…

$$P(liable) = 0.2 \times duty + 0.2 \times burnt + 0.05 \times badly + \cdots$$

Score = 0.7. Prediction: **Liable**.

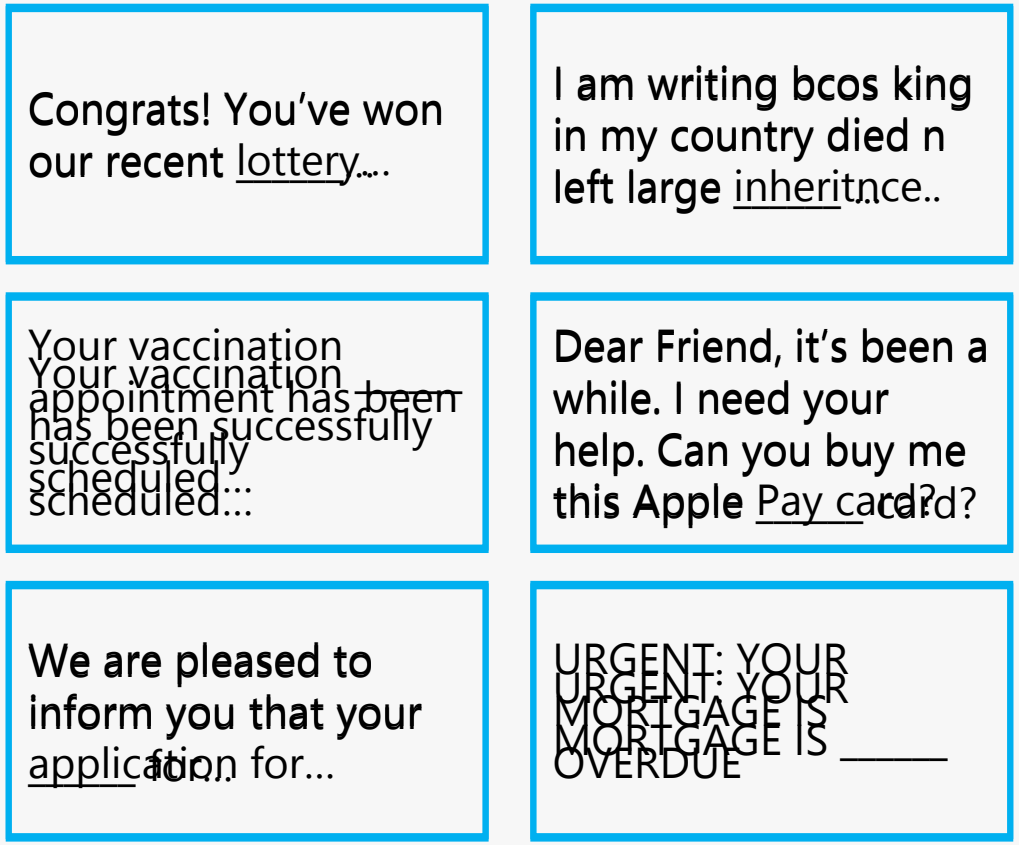
Neural Networks



Each number here is a coefficient or a **"parameter"**

Language Modelling and Generative AI

- Say we want to **write emails, not label them**
- **A "language model"** is created by taking a large corpus of text, deleting words, and training the model to **predict** missing words
- Generative AI is really a subset of predictive AI
- Given word 1, predict word 2
- This scales easily: Given sentence 1, predict sentence 2. Then now that you have predicted sentence 2, use that and predict sentence 3…
- If sentence 1 is a question, then sentence 2 is the predicted answer
- **Everything else we saw previously holds**



Getting to ChatGPT

- **1990s – "Bag-of-Words**": representing docs via simple word counts
- **2013 – Word Vectors:** a better way to represent docs using vectors trained on actual texts
- **2017 – "Attention"**: a new network module type that allows for variable rather than fixed parameters
- **2019 – Transformers**: NN archetype built on attention modules that better model long texts and allow parallel computation → the first LLM "BERT"
- **2020 – RLHF**: a way to fine-tune LLMs towards producing outputs rated highly by humans using a separate rater network
- **2021 – GPT3**;
- **2022 – InstructGPT/ChatGPT; late 2022 – GPT4**
- **Generative AI is not new**

https://towardsdatascience.com/all-you-need-to-know-about-attention-and-transformers-in-depth-understanding-part-1-552f0b41d021#4c16

Legal Implications

- All machine learners/NNs/LLMs are matrix multiplications
  - **Parameters are numbers computed from data**, will necessarily reflect what the data says (and does not say)
- **"Learning"** is a metaphor for updating parameters
- **"Machine"** is a metaphor for the mathematical matrices and algorithms
  - Or, ChatGPT is an Excel table writ (very) large
  - And by the way, LLMs are more than just ChatGPT
- The power behind LLMs is that next word/sentence estimation really encompasses a wide range of (legal) tasks
- But the fact that **it is really just math** does not mean it is nothing to worry about (quite the contrary)

Questions from you - Content

- Regarding the distinction between applicability of a law on a tech issue and the application, can you give some examples to illustrate the difference? I am wondering if there is really a difference. For a judge, or lawyer, they must find some law to apply; they will dismiss inapplicable law. As you pointed out, academics is more interested in applicability. But are they using application in the same meaning? By asking about applicability, it seems to me that academics are asking if there is not a better way of regulating tech. Essentially the difference between rule proof and rule app?
  - See also 'constitutive' vs 'regulative' rules:
    - Does Bitcoin *count as* a security? vs *How* do we value cryptosecurities?
  - There are overlaps, but not identical

Questions from you – Content

- Please break down Internet Defamation and Choice of Law for us. The Australian case is clear enough. The tort of defamation was downloaded, hence published, in Victoria. The damage was in Victoria. Hence applicable law is Victorian and Victoria has jurisdiction. In this day and age, every tort will have multinational elements.
  - Whether Q is a **substantive** tort/crime when committed overseas is NOT the same as whether the Singapore courts have the **procedural** power (jurisdiction) to hear a case, regardless of whether it is a tort/crime
  - Not examined for this, but look up the SCJA
  - Clearer if we imagine a test case: say punches another on a Singapore-registered ship docked in the UK
  - Consider also jurisdiction/choice of law clauses: must say submit to Singapore courts AND ALSO apply Singapore law. Else SG courts can apply UK law (exceptionally).

Questions from you – Exam related

- To what extent do we need to understand the academic discussions for blockchain, and AI given that the part B course focuses on the practice of law?
  - Unclear what is meant by “academic discussions” as the technologies explained in this segment are practical ones in use today.
  - For this exam, you will need to understand whatever has been marked out as important in the reading lists, slides, videos, and contact sessions. This includes working understanding of how the technologies work.
  - Of course, just as Rousseau said “men must be forced to be free”, I believe people should be free to fail (and learn from it, hopefully). If you believe that your practice of law will not require knowledge of these technologies, and its quite possible, you can pay less attention to this part

Questions from you – Exam related

- Possible for you to provide pin cites of exact paragraphs for the cases you want us to read? Especially for the foreign cases. This subject is interesting but unfortunately there is just way too much to read with everything else in Part B going on...
  - I understand Part B is challenging
  - The existing slides already have some of the key paragraphs from several judgments set out, not sure how much more you are expecting
  - I'd like to help but am not sure providing even more pincites will really help you in the long run
- Where does the Article by Whalen on "Defining Legal Technology and its Implication" fit to the entire Module?
  - This wasn't covered substantively in the main course materials and should be seen as an optional, albeit informative, read

Thank You

All the best of luck for your future careers.