# INFO1111: Computing 1A Professionalism

## Week 7: Intellectual Property Ethics

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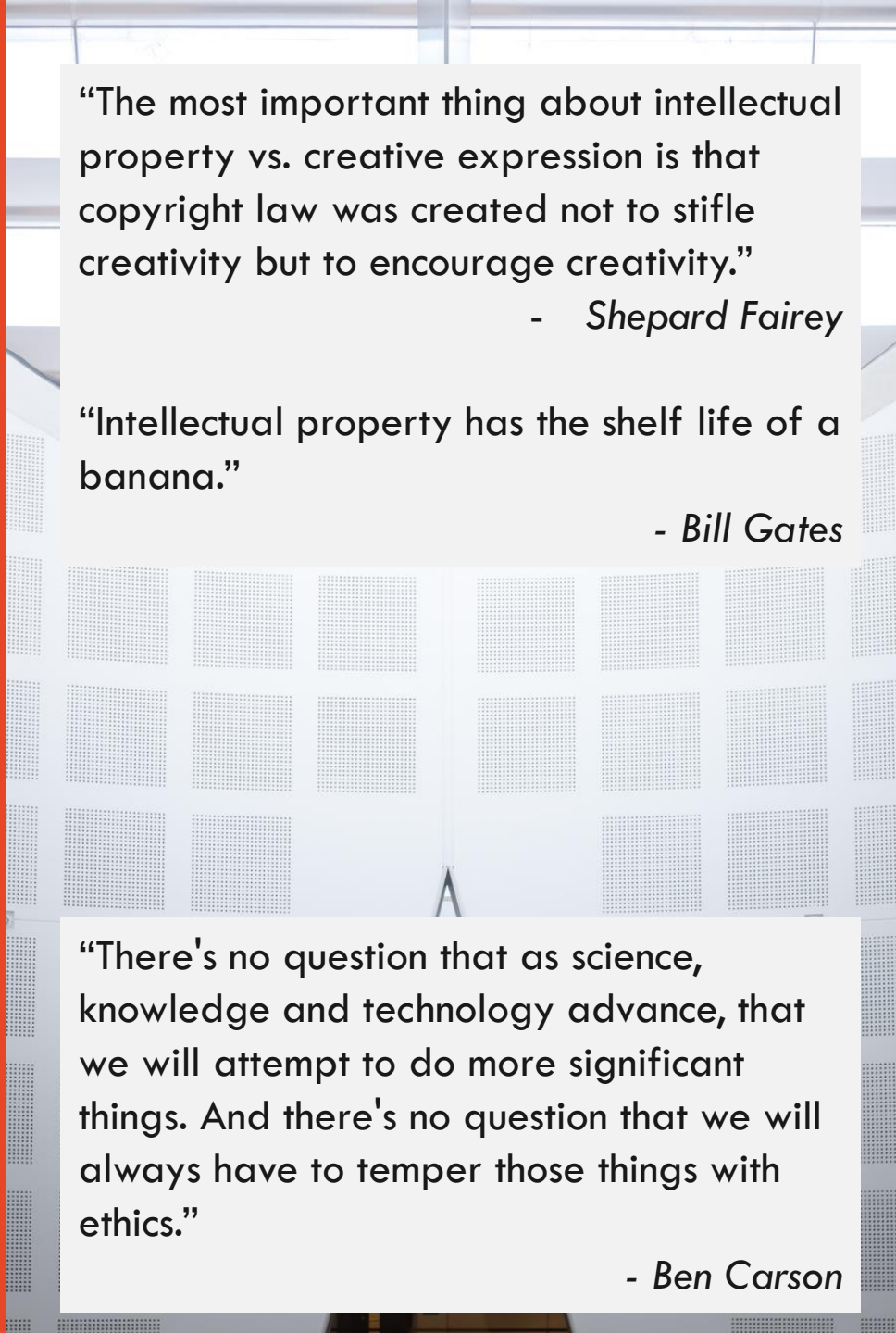

"The most important thing about intellectual property vs. creative expression is that copyright law was created not to stifle creativity but to encourage creativity."

- *Shepard Fairey*

"Intellectual property has the shelf life of a banana."

- *Bill Gates*

"There's no question that as science, knowledge and technology advance, that we will attempt to do more significant things. And there's no question that we will always have to temper those things with ethics."

- *Ben Carson*

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## Week 7: Intellectual Property Ethics

Week 6 recap
Self-Learning
Week 7 overview

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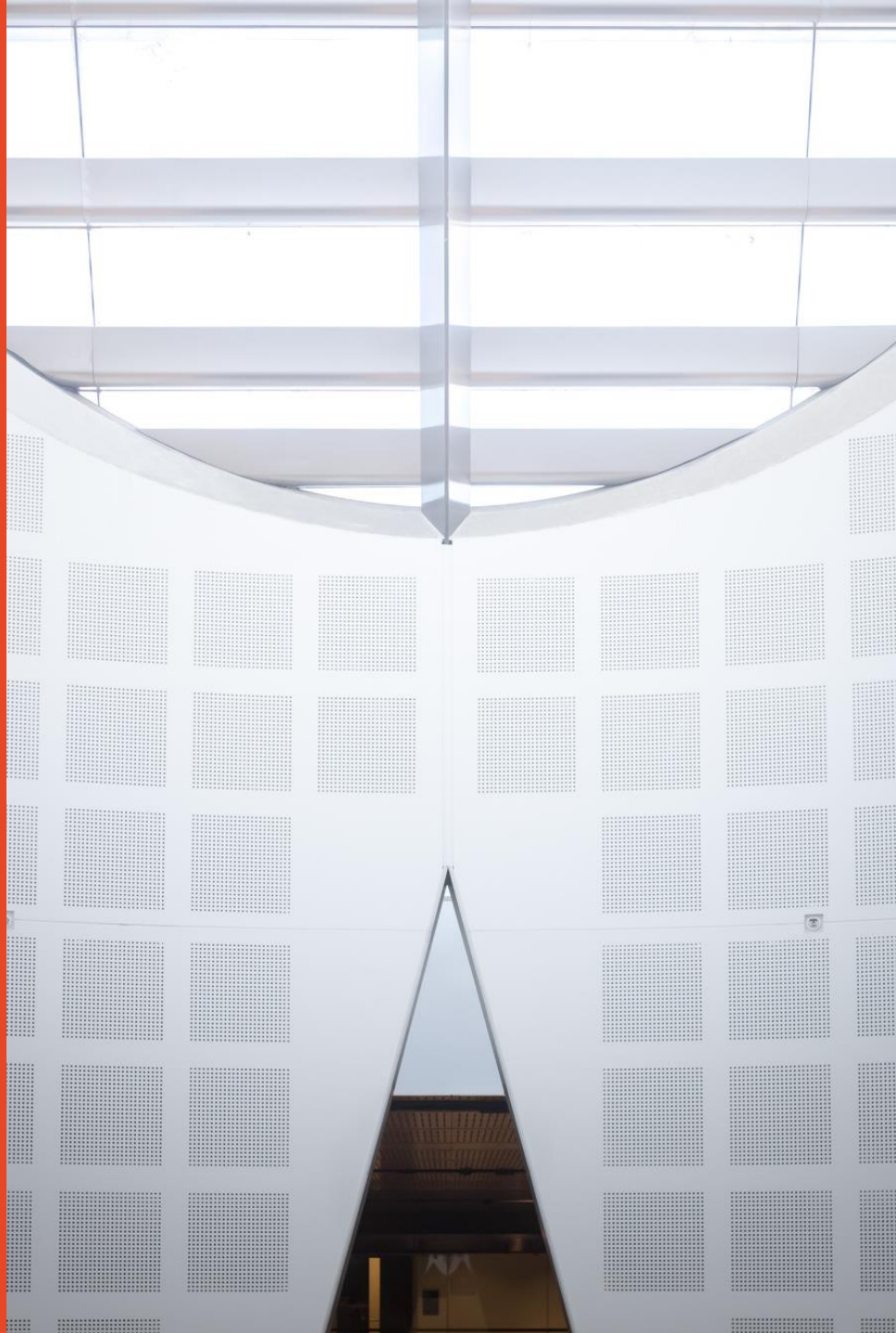


# Week 6: Recap

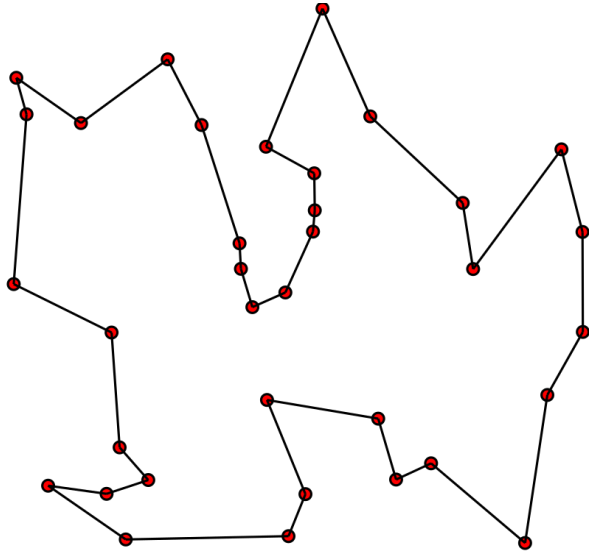
- Systems
  - Emergent behaviour
  - Complexity from simplicity
  - Systems thinking

- Problem Solving
  - Different types of problems / different approaches
  - Clear problem, but difficult solution
  - Unclear problem, but easy (or at least less difficult) solution
    - (e.g. elevator example)
  - Approaches & Strategies

# Week 6: self-learning exercise…

- Week 6 concept: *Hill climbing*
  - If I asked you to find the top of a hill as quickly as possible, in the middle of a thick fog, then how would you do it?
  - Each step, you move in the direction that is most steeply upwards.
  - Would this guarantee the correct/best solution?

- Typical example:
  - *Travelling Salesperson Problem: "Given a list of cities and the distances between each pair of cities, what is the shortest possible route that visits each city exactly once and returns to the origin city?"*



# Week 7: self-learning exercise…

- Week 7 concept: *Halting Problem*
  - What is it?
  - Why is it important?

## Today – Part 1: Intellectual Property

- Who owns the code you write?
  - If you were to get an summer internship writing code for a games app developer and wrote the next killer app, what rights would you have?
  - What if the internship was unpaid? Paid?
  - Are you Sure?
- Protecting IP; Making the most of IP

## Today – Part 2: Ethics

- Do you know right from wrong? Always?
  - How do you decide?
  - What do you do about it?
  - Is it different in the work place to in your personal life?
  - What happens when your 'wrong' is someone else's 'right'?
- Theories; Scenarios

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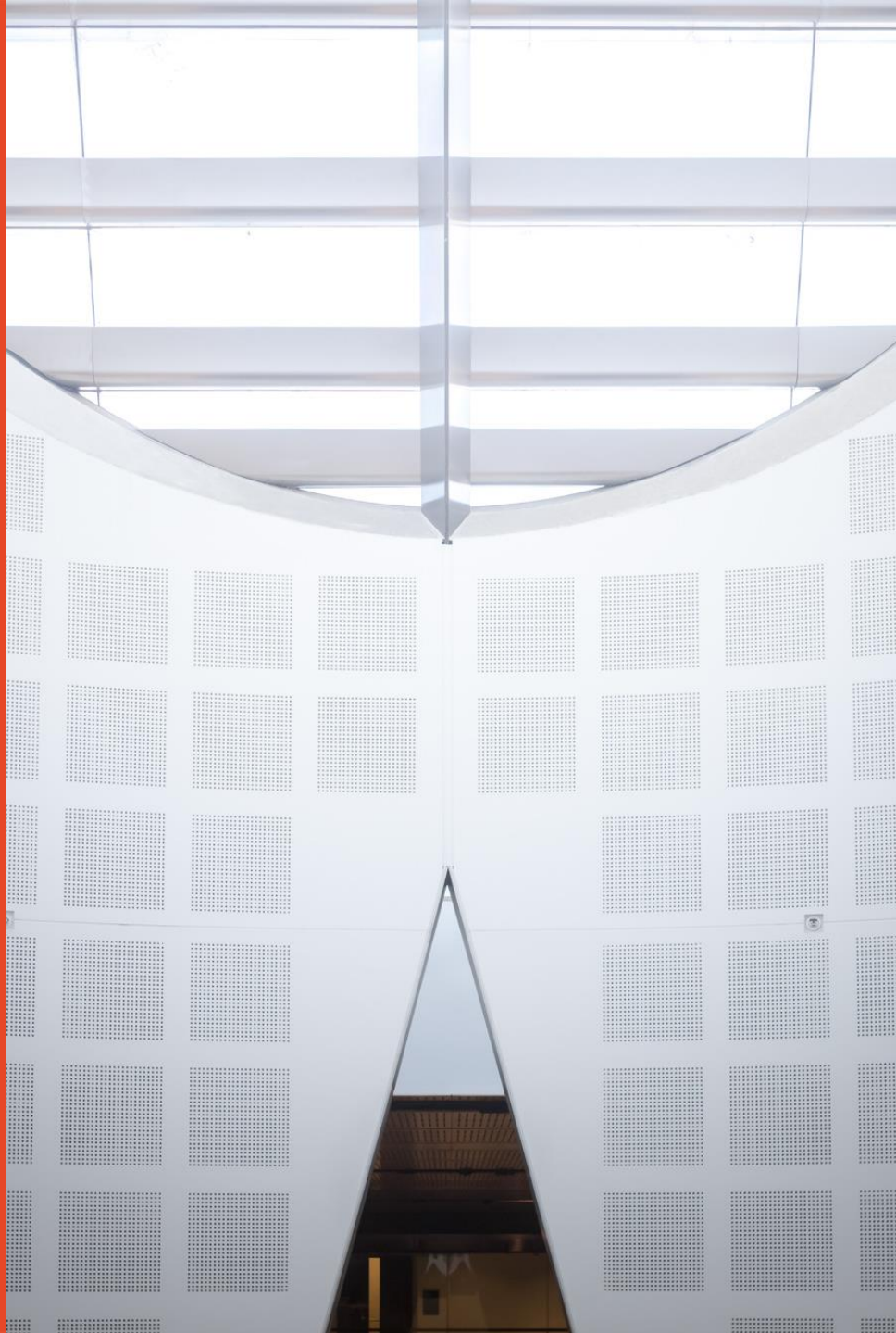
## Week 7: Intellectual Property Ethics

Intellectual Property – 1A



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# What is “Intellectual Property"

- Intellectual Property in Technology
  - (IP) The ownership of ideas and control over the tangible or virtual representation of those ideas. Use of another person's intellectual property may or may not involve royalty payments or permission, but should always include proper credit to the source.
    - *The Free On-line Dictionary of Computing, © Denis Howe 2010, http://foldoc.org*

- But then what is meant by “ownership” and “control”
  - You get to benefit
  - You get to decide
  - …

# History

- 14th C: Letters patent (letters = documented; patent = open/public)
  - Issued by monarch, etc to establish some right

- 1624: Statute of Monopolies
  - Act of the Parliament of England, to address abuses of the "patent" system (e.g. QE-I issuing patents for salt, paper, soap, …)
  - Usually seen as the first *statutory* recognition of patent law.
  - Preserved patents for "novel inventions"

- 1710: Statute of Anne
  - aka Copyright Act
  - 1662: Licencing of the Press Act: gave the authority to print literary works to *The Stationer's Company* (a printers guild). Led to censorship etc.
  - Copyright Act moved the authority to the authors of the work (for a period of 14/28 years).
  - Long title "*An Act for the Encouragement of Learning, by Vesting the Copies of Printed Books in the Authors or Purchasers of such Copies, during the Times therein mentioned.*"

# Question

- If you take a video of a street performance then who owns the copyright in that video?

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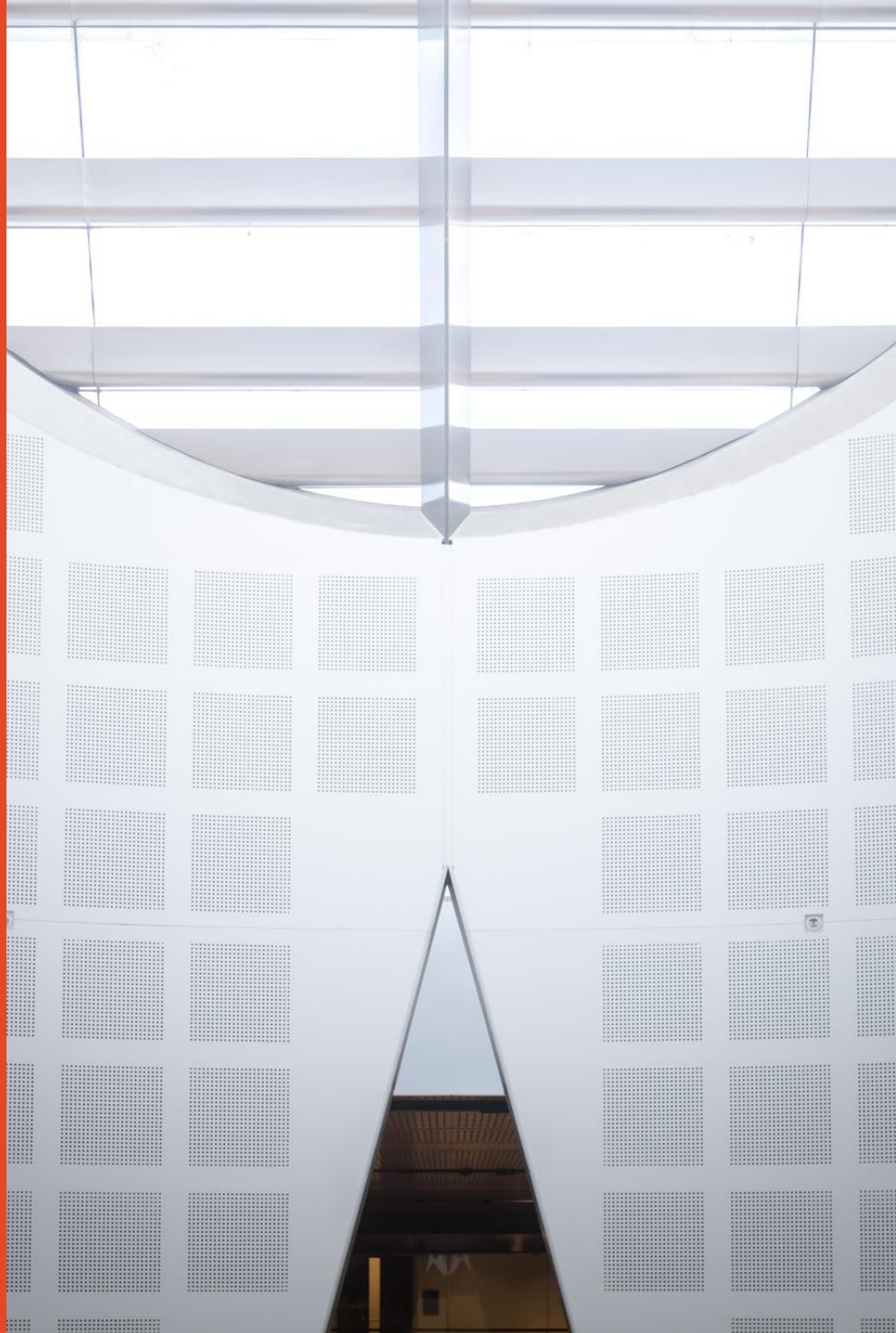
## Week 7: Intellectual Property Ethics

Intellectual Property – 1B



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# Question

- If you take a video of a street performance then who owns the copyright in that video?

- The answer is not always obvious…
  - For painted portraits the person commissioning the work is the first copyright owner
    - Under some circumstances the artist can limit the use of the work for other purposes.
  - For commissioned photographs the photographer is the copyright owner
    - Unless the photographs are of a private or domestic nature, then the commissioning party owns the copyright.
  - For films, the copyright owner is the person who made it.
    - The 'maker' is the person who undertook the arrangements necessary for the making of the film.
    - But for live performances, the performers might also be considers ‘makers’
  - For commissioned films the copyright is owned by the commissioning party.

- So, what do you think is the situation with software?
    - https://www.communications.gov.au/documents/short-guide-copyright

# Who owns software…

- If I was to commission you to write an App for me, who owns the copyright in that App?

(In Australian copyright law)

- Software is protected as a literary work
  - Usage is governed by licensing agreements.
  - But this doesn't cover things like titles, images, etc.…

- Ownership determined by:
  - Any agreement that is in place
  - If created as an employee in the course of employment → the employer
  - Otherwise → the creator of the software (generally the developer/s who wrote the code).

- So, do you know who owns the code you write as part of assignments or projects in your course at USyd?

  - http://www.copyright.org.au/acc_prod/ACC/Information_Sheets/Software___Apps.aspx

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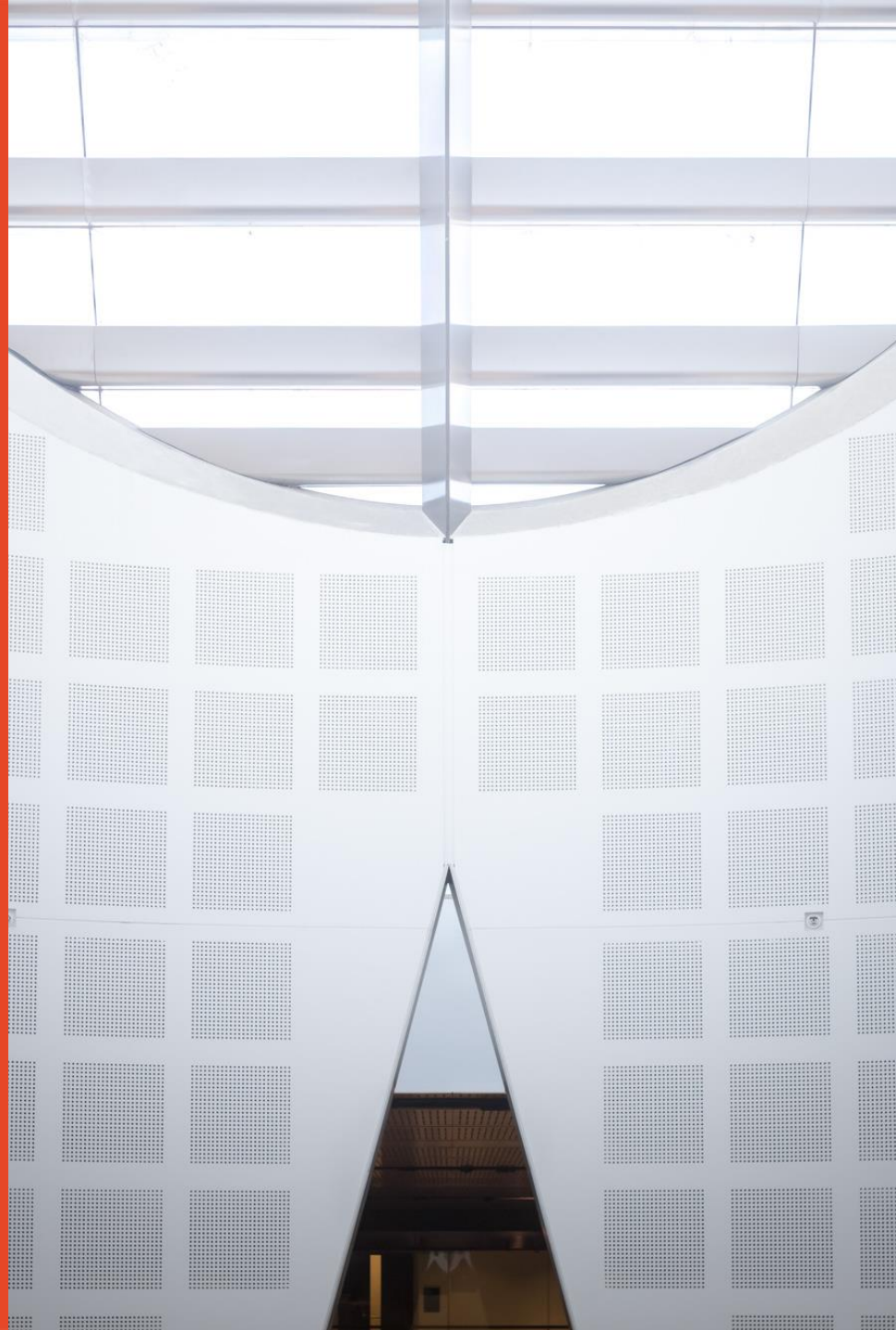
Intellectual Property – 2A



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# General principles

- Differing ways of protecting your ideas:
  - Trade Secrets
  - Copyrights
  - Patents
  - Trademarks

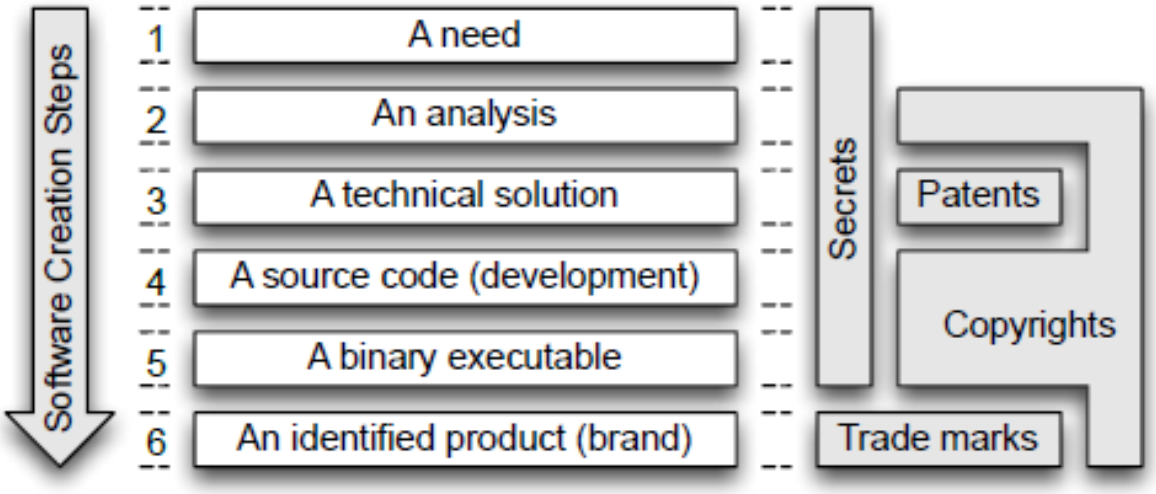


Figure 1

From:
https://www.iprhelpdesk.eu/sites/default/files/newsdocuments/Fact-Sheet-IPR-Management-in-Software-Development.pdf

# Trade Secrets

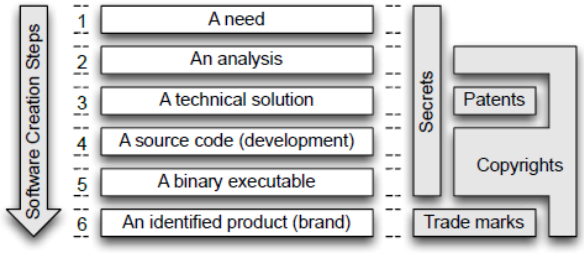

Figure 1

- Protect your ideas by hiding them
  - If something is not generally known, and you take steps to keep it secret, then it has protection under intellectual property law.

- But how do you hide software?
  - If the creation process takes time…
  - Then simply keep the idea secret and then be first to market!
  - Someone else cannot use the idea unless they came up with it independently…
- So how do you keep it a secret?
  - You must make *reasonable efforts* to maintain the secrecy.
    - Inventories that identify material; confidentiality agreements and policies; physical and electronic security, etc.
  - Only distribute executable and not source…

    - See https://my.eng.utah.edu/~cs5060/notes/tradesecrets.pdf

# Copyright

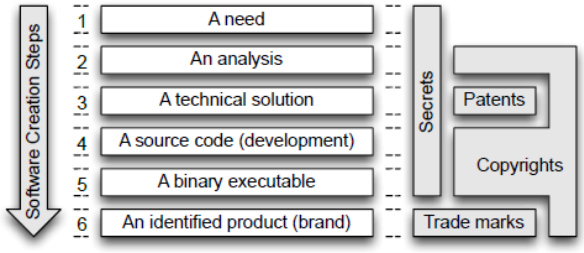

Figure 1

- (with caveats) whoever writes the code owns the copyright
  - An automatic legal right
    - Varies depending upon whether the representation is “fixed” to a tangible medium.
    - In US and Canada
      - requires that works are "fixed in a tangible medium of expression” in order to be protected
    - In France and Australia
      - works need not be in a particular form to have copyright protection

- Whoever owns the copyright, has certain rights (which others do not have)
  - Reproduce the software (both to physical media and with a computer)
  - Publish the software
  - Adapt the software
  - Communicate the software to the public

# Copyright

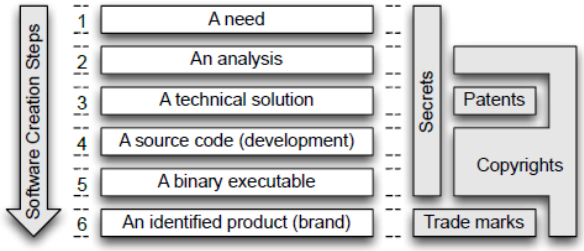

Figure 1

- But there are a number of free use exceptions
  - Fair dealing (research; criticism or review; parody or satire)
  - Flexible dealing (for use in teaching)
  - Educational exceptions (classroom demonstrations)
  - Back-up copies

    - See: http://whirlpool.net.au/wiki/australian_copyright_info
    - http://www.smartcopying.edu.au/copyright-guidelines/what-can-i-copy-communicate-/2-11-computer-software

# Copyright over APIs

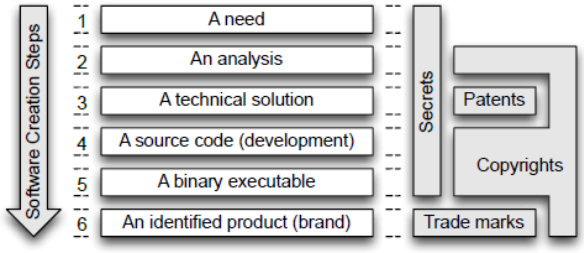

Figure 1

- Consider the Google Maps API
  - The "Application Programming Interface" defines the way in which a third party program interacts with a system.
    - (see https://developers.google.com/maps/ and https://www.w3schools.com/graphics/google_maps_intro.asp)
    - https://developers.google.com/maps/documentation/javascript/examples/elevation-simple

- But would it be acceptable for me to:
  - create a different mapping system, using my own maps;
  - and then add an interface the same as the Google API?

- See the following for an example court case (Java APIs):
  - https://en.wikipedia.org/wiki/Oracle_America,_Inc._v._Google,_Inc.
    - (Oracle is seeking US$8.8Billion in damages!)

# Patents

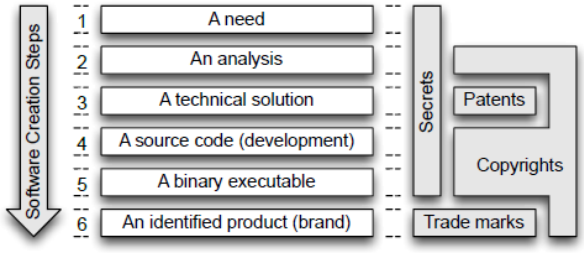

Figure 1

- Protects a technical solution / invention
  - A reward for investing in the development of the invention?
  - The invention must be new, inventive, and useful
  - Algorithms and abstract concepts cannot be patented
- Essentially gives an exclusive monopoly on an invention
  - You can stop others using your invention.
  - You can license others usage.
- Requires the "invention" to be described to the patent office (IP Australia)
  - The information then becomes public!

    - See https://www.ipaustralia.gov.au/patents/understanding-patents/types-patents/what-can-be-patented/patents-computer-related

# Trademarks

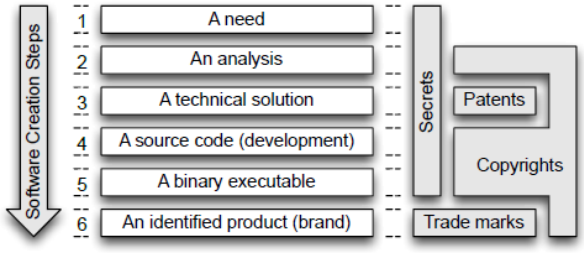

Figure 1

- Protects a specific and distinctive "brand"
  - It can be anything that represent your market position: a word or phrase, a logo or picture, a sound or smell, or some combination.
  - It must be actively used or it can rescinded
- It is distinct from the company name and the domain name!
  - Owning one does not protect the other!

- Similarly to copyright – you don't need to register a trademark
  - But it helps!

    - See https://www.ipaustralia.gov.au/trade-marks/understanding-trade-marks/trade-mark-basics

# Trademarks

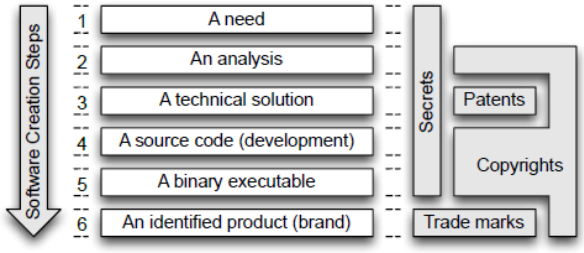


Figure 1


– From http://logoary.com/application-software-logos.htm

# Licences

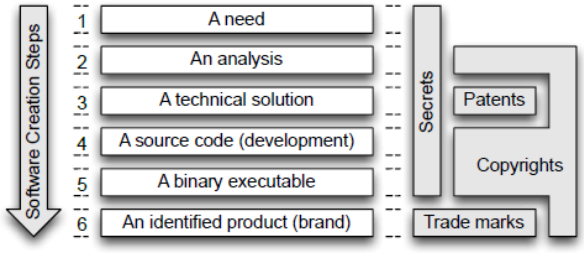

Figure 1

- Once you establish ownership (of the IP, not the software), how do you allow others to use (and benefit) from it?
- Licence agreements!
  - Proprietary
    - EULA : End-User Licence Agreement ("licenced not sold"!)
  - FOSS (Free and Open Source Software)

- Variation in the rights that are granted:
  - Right to use / copy / modify / distribute / sublicence
- But also the liabilities that are accepted!

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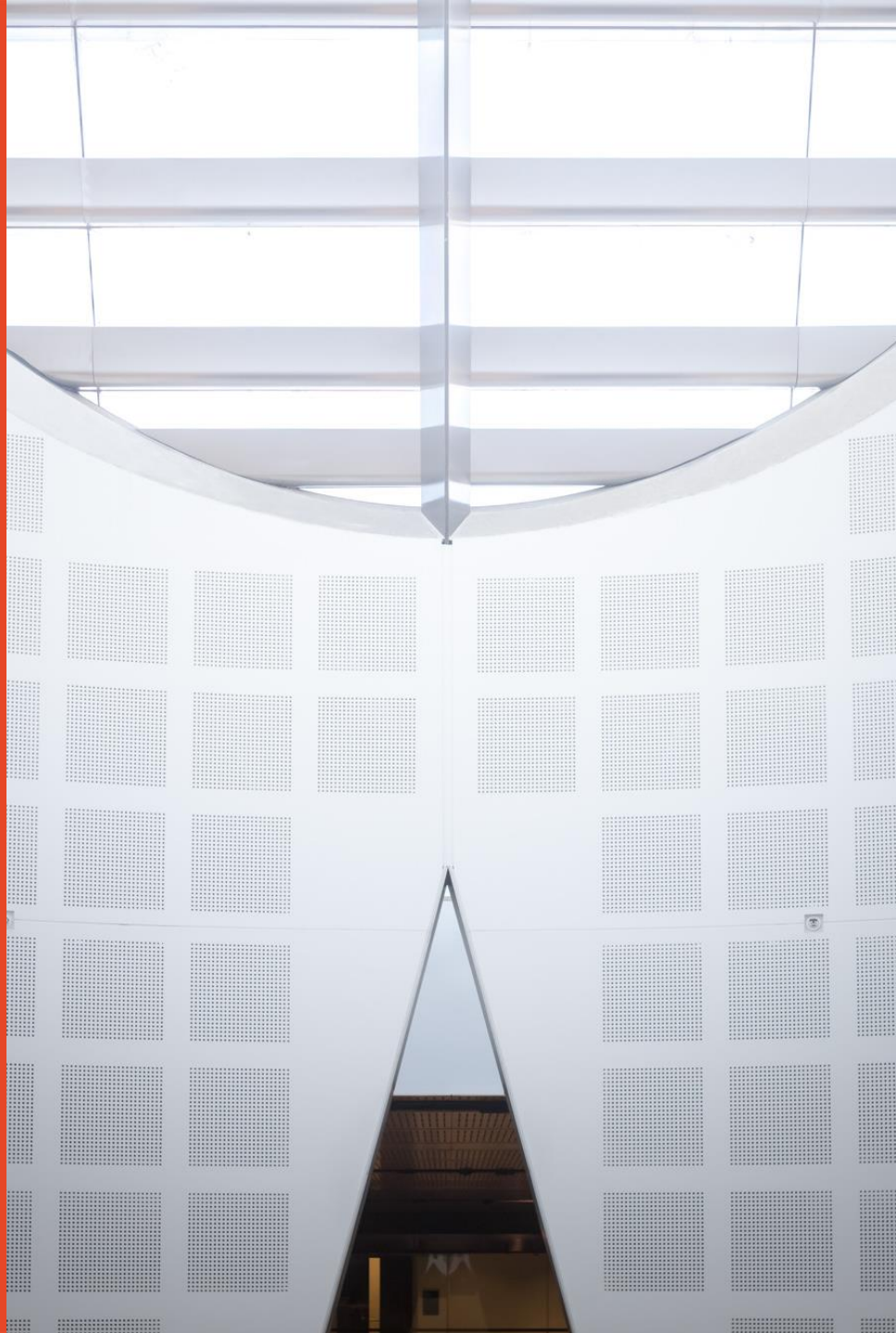
## Week 7: Intellectual Property Ethics

Intellectual Property – 3A



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# Commercialisation: Exercise

- You come up with a fantastic idea for a phone app…
  - Monitoring your car for problems (suspension? engine idle?)
  - Use accelerometers in your phone to monitor road vibration, and then compare this to other cars (or your car at other times) driving along the same section of road, to see if your car is "bumpier".

- You mention to a friend about to start their honours project and they contact me and then focus on this. They end up building a prototype under my supervision.
- They then hire someone through Freelancer to turn the prototype into a commercial app.
- It goes viral…
- NRMA makes an offer to buy the "technology" for $12M.

- Q1: What do you do?
- Q2 : How is the $12M divided up?

- P.S. http://www.roadroid.com/

# Commercialisation

- Apple 1976=$0 → 2021=~$2200B (Market cap.)
- Microsoft 1975=$0 → 2021=~$1930B
- Amazon 1994=$0 → 2021=~$1680B
- Google 1998=$0 → 2021=~$1520B
- Facebook 2004=$0 → 2021=~$860B
- eBay 1995=$0 → 2021=~$43B

- Atlassian 2002=$0 → 2021=~$57.9B
- Afterpay 2017=$0 → 2021=~$37.0B
- WiseTech 1994=$0 → 2021=~$10.5B
- Freelancer 2009=$0 → 2021=~$292M

- BHP Billiton 1800's → ~$135B
- CommBank 1911 → ~$156B
- Woolworths 1924 → ~$52B

- You might like to read:
  - http://aswathdamodaran.blogspot.com.au/2015/02/the-aging-of-tech-sector-pricing.html
  - https://www.businessnewsaustralia.com/articles/australia-s-top-50-fastest-growing-tech-companies-revealed.html
  - http://www.afr.com/technology/australias-top-32-startup-tech-successes-and-why-they-matter-20151217-glpt9c

# Commercialisation – learn the language

- Funding
- Investors
- Angels
- Start-ups
- Incubator
- Accelerator
- Seed funding
- Due diligence
- Licensing
- NDA
- Technology Transfer
- R&D
- Beta products
- Markets
- IPO
- R&D Tax incentives
- Business plans
- Pitches
- Value proposition
- Business model
- Outsourcing agreements
- CrowdSourcing
- PolicyHack
- Launch
- Adoption
- Confidentiality

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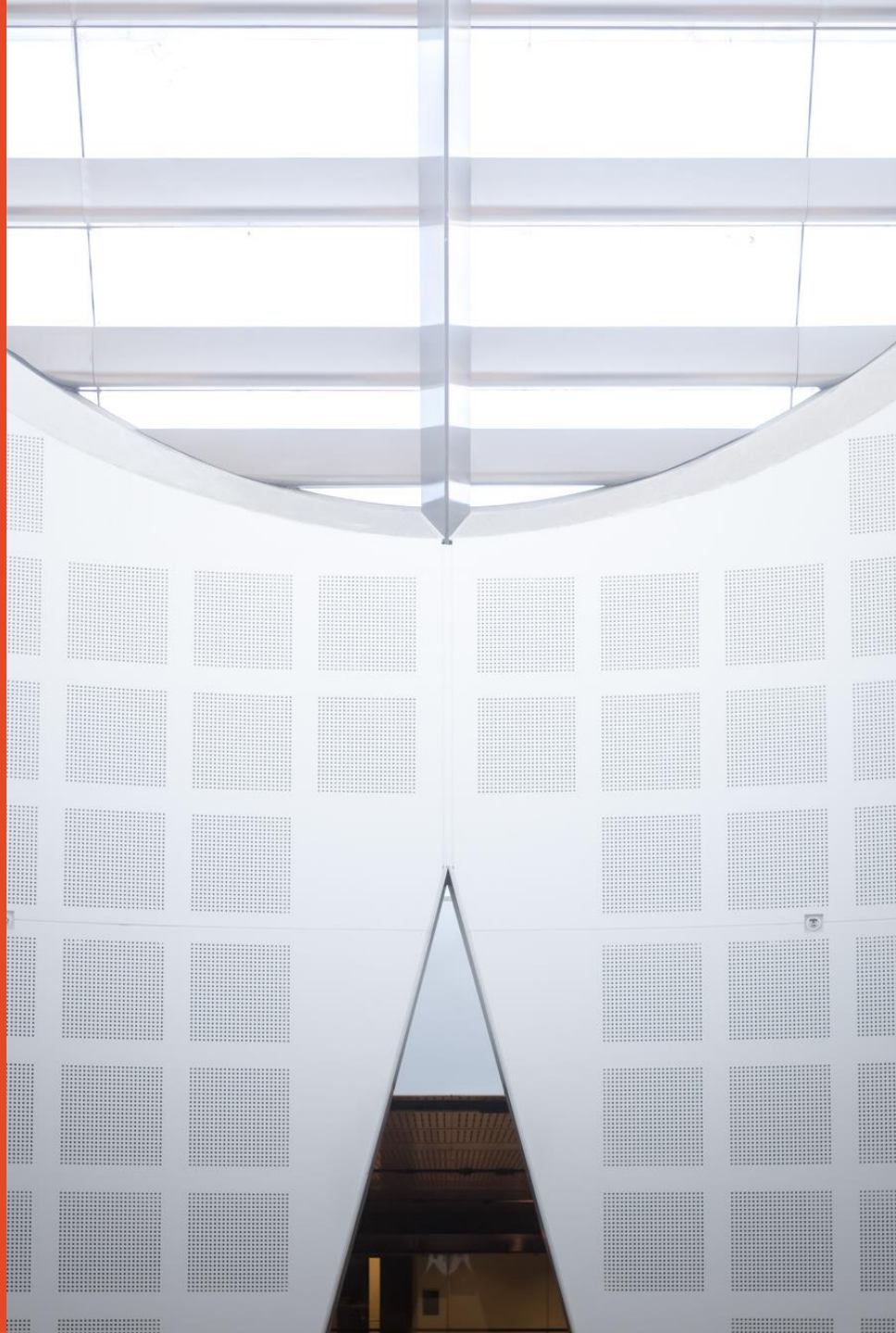
Intellectual Property – 3B



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# Business Models

From http://digitalenterprise.org/models/models.html

- Brokerage (market makers)
  - Marketplace
  - Auction
  - Transaction broker
  - Virtual marketplace
- Advertising
  - Portal
  - Classifieds
  - User registration
- Infomediary
  - Advertising networks
  - Audience measurement
  - Incentive marketing
- Merchant
  - Virtual
  - Click-and-mortar
  - Bit vendor
- Manufacturer
  - Direct sales
- Affiliate
  - Pay-per-click
  - Revenue-sharing
- Community
  - Open content
  - Social networking
- Subscription
  - Content services
  - Networking
- Utility
  - Metered usage
  - Metered subscriptions

# Business Models

From http://digitalenterprise.org/models/models.html

- Brokerage (market makers)
  - Marketplace → Freelancer
  - Auction → eBay
  - Transaction broker → Paypal
  - Virtual marketplace → Amazon
- Advertising
  - Portal → Yahoo
  - Classifieds → Gumtree
  - User registration → SMH
- Infomediary
  - Advertising networks → Doubleclick
  - Audience measurement → Nielsen
  - Incentive marketing → Scoopon
- Merchant
  - Virtual → Amazon
  - Click-and-mortar → Woolworths
  - Bit vendor → iTunes
- Manufacturer
  - Direct sales → Dell
- Affiliate
  - Pay-per-click
  - Revenue-sharing
- Community
  - Open content → Wikipedia
  - Social networking → Flickr
- Subscription
  - Content services → NetFlix
  - Networking → Classmates
- Utility
  - Metered usage
  - Metered subscriptions → Slashdot

*And just as a thought-starter, what business do you think McDonalds is in?*

*See https://qz.com/965779/mcdonalds-isnt-really-a-fast-food-chain-its-a-brilliant-30-billion-real-estate-company/*

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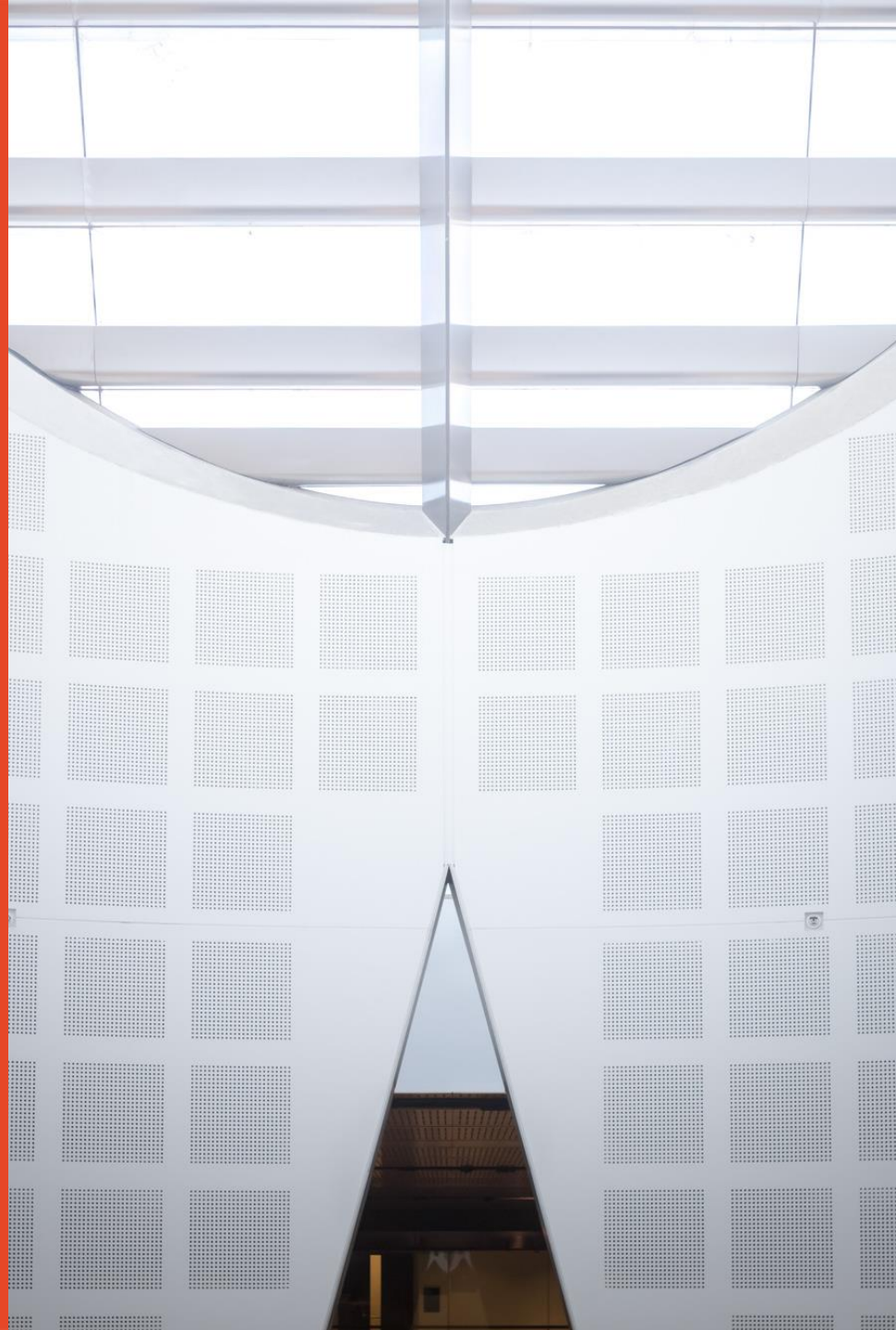
Ethics - 1



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# Ethics

- Do you know right from wrong? Always?
  - How do you decide?
  - What do you do about it?
  - Is it different in the work place to in your personal life?
- How do you judge other people/ companies/ groups ethics?
  - What happens when your ‘wrong’ is someone else’s ‘right’?
- Today:
  - Theories
  - Scenarios
  - Case Studies
  - A broader look at ethics in Computer Science

# Ethics in professional life

- Boss who arranges for company to employ their relatives, lovers etc.
- Manager who fires staff who complain about wages
- Lawyer who writes a will for elderly client, in which money is left to a charity the lawyer cares about
- Banker who recommends customer borrow money to invest, with commission paid to the advisor
- Doctor who prescribes medicines made by a company that paid for doctor to attend a conference

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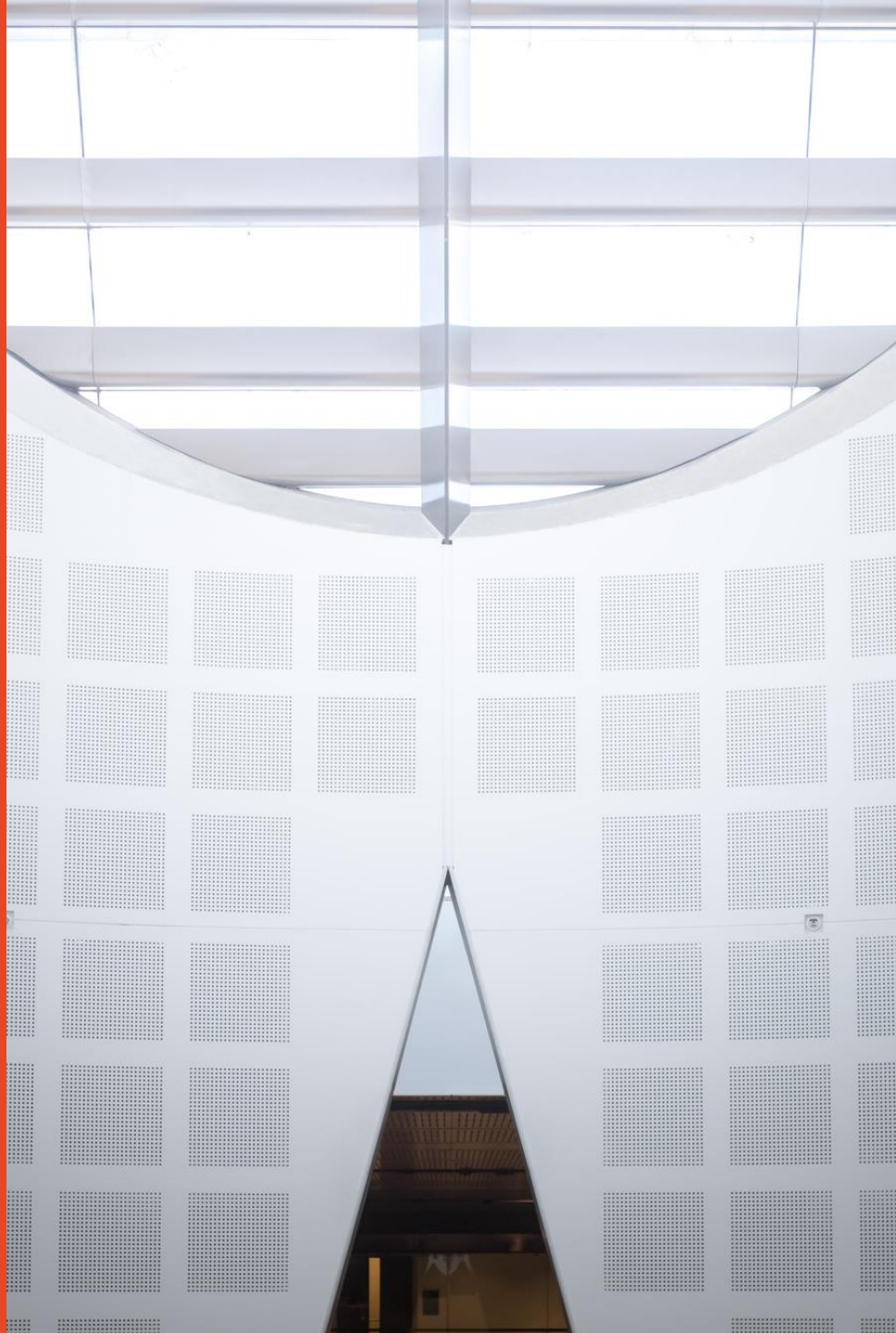
Ethics – 2A



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# What would you do?

- You work for a small company, Googalzon Consultants. The company's only contract at present is a $6M year-long project for Bluestone Mining to write a software system to analyse geological data.
- You discover a way of designing the system that means that the project can be completed in 2 months, rather than 1 year, and at a cost of only $1M.
- Your boss tells you to keep quiet and ignore the "better solution" as they want to keep the team working on the project as long as possible (otherwise he would have to sack most of the staff), and Bluestone has already indicated they are happy to pay the $6M as they believe the project is worth that much.

- What do you do? …

# What is Ethics?

- Ethics is a branch of philosophy. Whole courses devoted to it.
  - What is right? What is wrong?

- Ethics vs Morals?
  - Not simple, but…
  - Morals: Principles of right and wrong that guide personal behaviour – your personal compass. Internal.
  - Ethics: Rules of conduct accepted within a social context. External.
    - See http://www.diffen.com/difference/Ethics_vs_Morals

- … your morality may say "always tell the truth" but is it ethical to tell the truth in every situation?

# Theory: Terminology

- How do undertake ethical reasoning? Frameworks for making judgements…
  - Ethical pluralism
  - Teleological ethics
  - Deontological ethics
  - Egoism
  - Utilitarianism
  - Contractarianism

# Teleology

- "State of the World"
- Egoism
  - Value of a state is based on your individual situation
  - … but think about flow-on effects
  - E.g. how other people will respond, and how that will in turn effect you
- Utilitarianism
  - Value of a state is based on total situation of all people
  - "Greatest good of the greatest number"
  - Who is included? How are their situations weighted?
  - E.g. Tradeoff between a few people suffering much, vs many people suffering a little

# Deontology

- Decide on actions based on duty
  - rather than on determining the consequences in the particular case

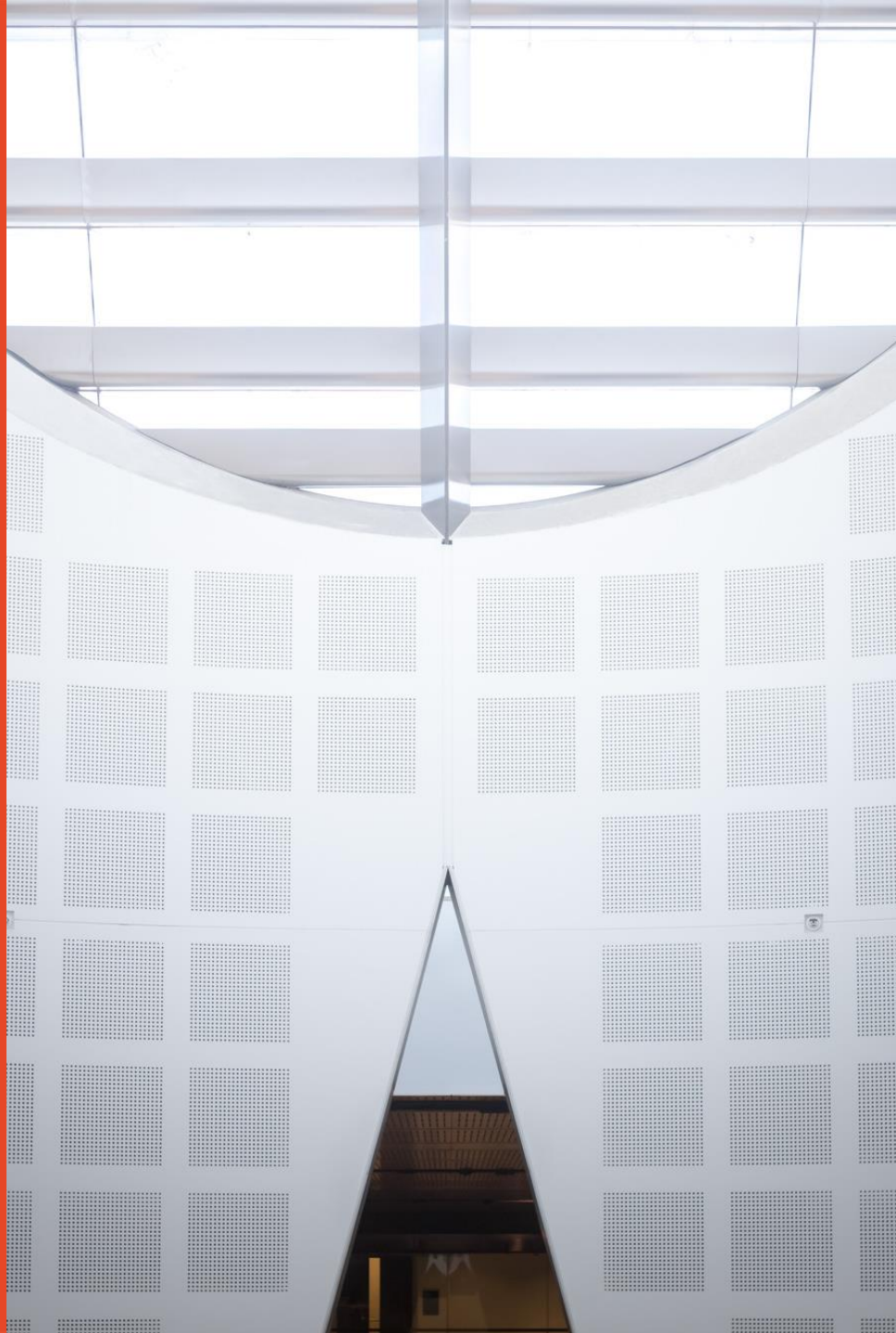
- There are many duties, and they often conflict!
- Ross' prima facie duties:
  - Fidelity (promise-keeping, truthfulness)
  - Reparation (recompense for previous wrongs)
  - Gratitude (thankfulness for previous services)
  - Justice (happiness should reflect merit)
  - Beneficience (help others)
  - Non-maleficience (don't hurt others)
  - Self-improvement

» http://people.wku.edu/jan.garrett/ethics/rossethc.htm

# INFO1111: Computing 1A Professionalism

## Week 7: Intellectual Property Ethics

Ethics – 2B



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# Professional frameworks

- Most professional associations have “frameworks” guiding professional conduct
- These typically include consideration of ethical conduct as it applies in professional activities
  - Linking possible outcomes to duties
  - Guidance in setting priorities
  - Penalties?

- ACS: Code of Ethics, and Code of Professional Conduct
- ACM / IEEE-CS: Code of Ethics and Professional Conduct

# Professional frameworks

- ACS: Code of Professional Conduct
  - https://www.acs.org.au/content/dam/acs/rules-and-regulations/Code-of-Professional-Conduct_v2.1.pdf
  - 1.2.1. The Primacy of the Public Interest
  - 1.2.2. The Enhancement of Quality of Life
  - 1.2.3. Honesty
  - 1.2.4. Competence
  - 1.2.5. Professional Development
  - 1.2.6. Professionalism

- Detailed guidelines
- ACS has a procedure to handle complaints about members actions

# Professional Frameworks

- ACM / IEEE-CS: Code of Ethics and Professional Conduct (International)

- ACM recently revised its code (2018)
  - Addressed "the significant advances in computing technology and the growing pervasiveness of computing in all aspects of society since it was last updated in 1992"
  - https://www.acm.org/code-of-ethics

  - A computing professional should...
  - 1.1 Contribute to society and to human well-being
  - 1.2 Avoid harm.
  - 1.3 Be honest and trustworthy.
  - 1.4 Be fair and take action not to discriminate.
  - 1.5 Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.
  - 1.6 Respect privacy.
  - 1.7 Honor confidentiality.

  - 2.6 Perform work only in areas of competence.
  - 2.9 Design and implement systems that are robustly and usably secure.
  - 3.1 Ensure that the public good is the central concern during all professional computing work.
  - 3.7 Recognize and take special care of systems that become integrated into the infrastructure of society.

# Corporate Ethics

- How much does a company's ethical approach affect your choice.
  - Would you work for a tobacco company?
  - What if you were paid far more?

- Corporate Social Responsibility
  - an organization's responsibility for the impacts of its decisions and activities on society and the environment.

- Fourth Bottom Line
  - Profit, people, planet and progress/ purpose/ principles

# INFO1111: Computing 1A Professionalism

## Week 7: Intellectual Property Ethics

Ethics – 3

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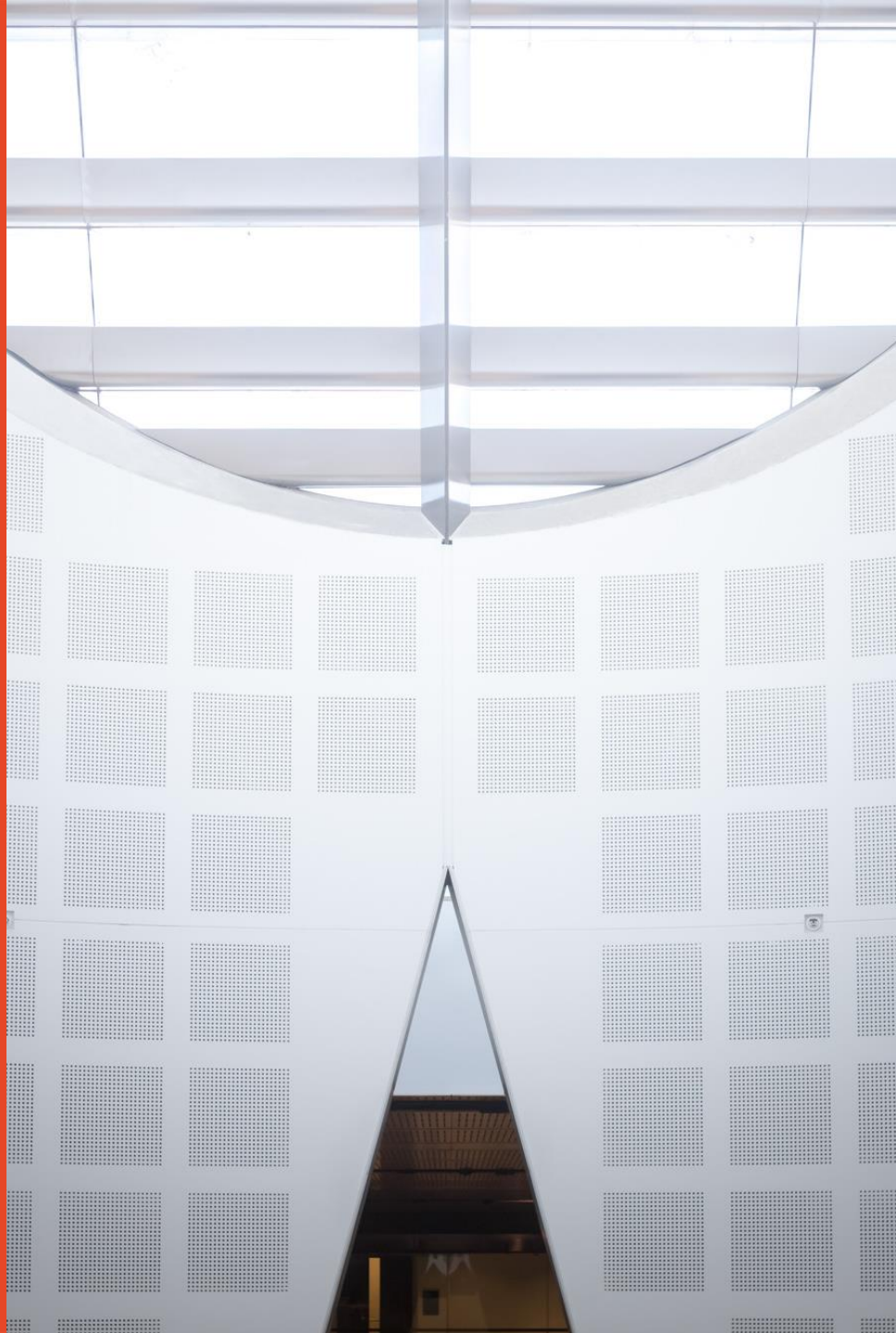

# Case study: Data Mining

- Facebook mood enhancement
  - Manipulated the feed of users to show posts with more 'positive' or 'negative' words
  - After a week, these users were more likely to post positive or negative words themselves.
  - Others have monitored Facebook data for this ''emotional contagion''

  - Q: Is this a problem with Facebook's research? Why?

  - See:
    - https://www.theatlantic.com/technology/archive/2014/06/everything-we-know-about-facebooks-secret-mood-manipulation-experiment/373648/
    - http://www.computerworld.com/article/2596456/e-commerce/opinion--toysmart-case-can-set-bar-for-online-privacy.html

# Case study: Data Mining

- Facebook – how powerful is its algorithm
  - Psychometric profile from Facebook profiles and posts
  - How well does Facebook know you?
  - Key words for marketing, decision making for businesses?
  - Cambridge Analytica → Political Advertising

  - Q: Is this a problem? What if it is used for benefits?

  - See:
    - https://player.fm/series/the-inquiry-1301456/how-powerful-is-facebooks-algorithm-a9lELMOpfbTcvSjy

# Case study: Privacy

- Toysmart vs FTC
  - Online Toy store in Waltham, Mass.
  - Privacy policy on website: would not share details…
  - Filed for bankruptcy – and then sought permission to sell assets.
    - *Including customer information: names, addresses, billing info, browsing and purchasing history….*
  - Original FTC proposal was to allow this – but only selling to a buyer in a related market, who adhered to the original privacy policy
  - Disney bought the assets and destroyed the consumer information!

  - Q: Is this a problem? Why?

  - See:
    - http://itlaw.wikia.com/wiki/FTC_v._Toysmart.com
    - http://www.computerworld.com/article/2596456/e-commerce/opinion--toysmart-case-can-set-bar-for-online-privacy.html

# Case Study: Privacy

- Google WarDriving
  - Google cars capture Street View information!
  - *But also captured WiFi data worldwide!*
    - *SSID, MAC address, signal strength, but also any unencrypted data packets.*
  - Google blamed a "rogue engineer"
  - *But later shown that Google managers had commissioned the wardriving program, to help them build Wi-Fi maps.*

  - Q: Aren't they just capturing data that is freely available anyway? And surely it helps them provide a better service?

  - See:
    - http://www.darkreading.com/risk-management/google-wardriving-how-engineering-trumped-privacy/d/d-id/1104126?

# Scenario: Privacy

- You work as a system administrator, running the IT systems for a high school. The school principle comes to you concerned that some students had told him they had seen a teacher accessing pornography on his school-owned computer. The principle asks you to break into the teachers computer to see whether there is any problematic material?
- Would you do it?  Under what circumstances?

- You run the IT systems for a contract cleaning company that cleans offices. Your boss tells you that he thinks one of the cleaners is leaving the site early and visiting a nearby friend, but still billing the extra hours. He wants you to add an app to the employee's company-provided mobile phone so he can track where it is.
- Would you do it?  Under what circumstances?

# Case study: Intellectual Property

- Kim DotCom
  - 2005: Founded MegaUpload
    - DotCom described it as "a provider of cloud storage services"
  - 2012: US indictments: racketeering, conspiring to commit copyright infringement, and conspiring to commit money laundering.
    - Arrested in Auckland. Assets seized/frozen
    - Currently fighting extradition
  - Q: What responsibility does a developer have to stop people using their system in illegal or unethical ways?
  - See:
    - https://en.wikipedia.org/wiki/Kim_Dotcom

# Scenario: IP

- You accept a 6-month short term contract job, working for a small start-up that is creating a new App that locates the cheapest place near your current location to buy consumer items. Whilst working on the project you accidentally discover that they have obtained access to proprietary code from another company (that analyses web pages to find product price information). They aren't using the code directly, but they are analysing it so they can understand the algorithm and then duplicate it in their system.

- Is this OK? Why? What would you do about this?

# Theory: IP Management

- Proprietary / Commercial
  - Protection: Copyright? Obfuscation?
- Shareware / Freeware / Open-Source
- Free Beer (no cost) vs Free Speech (no constraints)
- Licencing issues:
  - Still retains a copyright holder?
  - Various models for usage: Creative Commons; BSD; GNU; …
    - Distribution; modification; sub-licensing; …
    - See https://en.wikipedia.org/wiki/Comparison_of_free_and_open-source_software_licenses

- Is it good to release? When? Why?

- Read:
  - Gates Open Letter: https://en.wikipedia.org/wiki/Open_Letter_to_Hobbyists
  - Open Source Movement: https://en.wikipedia.org/wiki/Open-source_movement
  - About Creative Commons: https://creativecommons.org/about/

# Case study: Unauthorised Access

- Hacking - Garry McKinnon
  - Scottish SysAdmin
  - 2002: One of the biggest Military Hacks of all time! → "Your Security is Crap"
  - Claims he was looking for information related to "Free Energy" and UFO cover-ups ???
  - UK has blocked his extradition to the US.

  - Q: Is hacking a good way to hone your skills?
  - Q: Is there a role for "White hat hackers" / ethical hacking?
  - Q: Would you have supported *Anonymous*' action against IS?

  - See:
    - https://www.wired.com/2015/10/cfaa-computer-fraud-abuse-act-most-controversial-computer-hacking-cases/
    - http://list25.com/25-most-notorious-hackers-to-ever-get-caught/

# Scenario: Unauthorised access?

- Next semester you get a part-time job working for the University's ICT unit doing testing on development changes to Sydney Student. As part of this you have access (for testing purposes) to a copy of all course and student data.

- Is it OK for you to see unit of study results for your friends as part of your testing?
- Is it OK for you to see the results of other students who you don't know but who are in your course?
- Is it OK for you to see the results of students in other courses?
- Is it OK for you to see real results / personal information, if the names have been removed?

# Case study: Fairness and Discrimination

- See https://www.youtube.com/watch?v=YJjv_OeiHmo

- Facebook / UTexas
  - 2012: Queer Quorus – added members to their Facebook group
    - Members' Facebook friends then knew they were members!
    - Loophole: anyone can be added to a group by a friend without their approval!
    - http://www.wsj.com/articles/SB10000872396390444165804578008740578200224

- Accessibility
  - 2014: Blind woman launches claim of unlawful discrimination against Coles regarding its website!

  - Read:
    - https://www.humanrights.gov.au/news/speeches/software-accessibility-its-everybodys-business
  - And see:
    - http://www.washington.edu/doit/designing-software-accessible-individuals-disabilities

# Case study: Liability for Unreliability

- Therac-25
  - Medical radiation therapy machine.
  - Mid-1980's : At least 6 accidents of massive overdose of radiation, and at least 3 deaths.
  - Subsequent commission found:
    - Primary reason: bad software design and development practices
    - Code was not independently reviewed
    - No analysis of possible failure modes
    - Poor documentation of error codes, and ability to override
  - Q: Should the programmers have been held criminally liable? Why?
  - Q: How do you avoid hubris?

# Scenario: Liability

- *Caveat Emptor?*

- In your spare time you write a game app. This includes a simple function called *left-pad*, which just pads out a string. You make your entire code open source.
- Someone uses your *left-pad* in their string manipulation library. Someone uses the string manipulation library in their data logging toolkit. Someone uses the logging toolkit in a traffic control system.
- Your code has a bug. It crashes the traffic control system and 3 people are killed in ensuing car accidents.

- Q: Are you liable? Why or why not? Q: Who then is responsible?

  - Read:
    - http://www.thejournal.ie/programmer-break-internet-code-2679793-Mar2016/
  - See:
    - http://www.badsoftware.com/theories.htm
    - http://www.law360.com/articles/544453/when-it-fails-software-vendor-liability-is-expanding
    - https://newrepublic.com/article/114973/bad-code-should-software-makers-pay-part-1

# Theory: Liability

- Criminal: breach of the criminal codes (e.g. Vault corp worm?)
- Intentional tort: sue for damages
- Strict liability
- Negligence
  - Is Windows bug free? What has MS done to avoid problems? What is their testing approach?
- Fraud
- Negligent misrepresentation
- Deceptive trade practice
- Unfair competition
  - Misrepresentation of what your systems can achieve?
- Breach of contract
  - How good are you at judging what might be feasible?
- Malpractice
  - Judged against a professional standard!

- From http://www.badsoftware.com/theories.htm

# Theory: Practicing within your abilities?

- *Who here is a good programmer?*
  - *How do you know?*

- Professionalism – what does this mean?
- ACM Code of Ethics:
  - 2.2 Acquire and maintain professional competence.
  - 2.3 Know and respect existing laws pertaining to professional work.
  - 2.4 Accept and provide appropriate professional review.

  - Read:
    - http://science.raphael.poss.name/programming-levels.html
  - See:
    - http://programmers.stackexchange.com/questions/41473/how-can-i-know-whether-i-am-a-good-programmer
    - http://www.joelonsoftware.com/articles/HighNotes.html
    - http://www.halogensoftware.com/blog/self-appraisal-examples-to-use-as-guidance-or-inspiration

# Case study: Intentional wrong doing

- Volkswagon Emissions Scandal
  - 2009-2015: VW programmed diesel engines to activate emissions controls only during lab testing.
  - 11 million cars worldwide!
  - CEO Horne said "it was a couple of software engineers"
  - Read:
    - http://www.newyorker.com/business/currency/an-engineering-theory-of-the-volkswagen-scandal
- StuxNet
  - 2010: Worm designed to attached industrial PLCs. Claims it was developed by the CIA to sabotage Iran's nuclear program.
- Morris Worm
  - 1988: One of the first computer worms that spread via the internet. Intended to be benign, but ended up causing significant damage.

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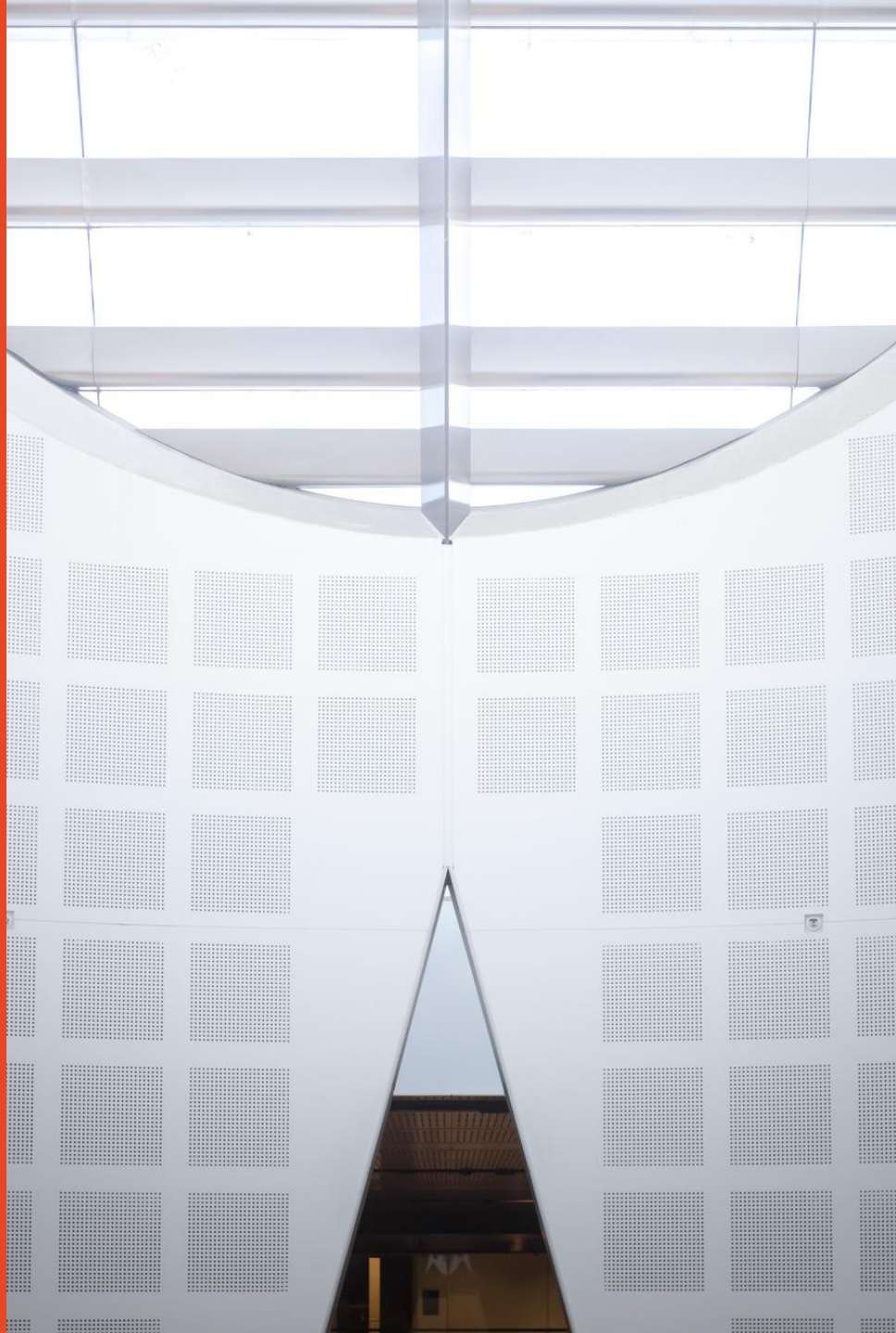
## Week 7: Intellectual Property Ethics

Wrap-up



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