THE UNIVERSITY OF WESTERN AUSTRALIA

Ethical Issues for Computing Professionals CITS3200

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Aims:

1. Give an understanding of the variety of ethical issues you may confront.
2. Impart an appreciation of the complexity of many of these issues.
3. Help you to see you do have a responsibility, and to whom.
4. Introduce the Computer Society Code of Ethics/Conduct as a basis.
5. Introduce a Framework for addressing ethical issues.

Why Computer Ethics #1?

- **Technology has Consequences – You Can't Ignore Them:**

  - **Samuel Johnson, 1759:**

  Integrity without knowledge is weak and useless, and knowledge without integrity is dangerous and dreadful.

  - **Albert Einstein, 1931:**

  It is not enough that you should understand about applied science in order that your work may increase man's blessings. Concern for man himself and his fate must always form the chief of all technical endeavours.

  - **Norbert Wiener, 1950:**

  The new industrial revolution is a two-edged sword. It may be used for the benefit of humanity… It may also be used to destroy humanity, and if it is not used intelligently it can go very far in that direction.

  - **Rogerson & Bynum, 1995:**

  Computing Technology is the most powerful and most flexible technology ever devised. For this reason, computing is changing everything – where and how we work, where and how we learn, shop, eat, vote, receive medical care, spend free time, make war, make friends, make love.

Why Computer Ethics #2?

- **Computing Creates New Situations:**
  - **Walter Maner (1976):**

    Computer ethics = moral problems that are created, aggravated or transformed by the introduction of computer technology.
  - **James Moor (1998):**

    Computers are logically malleable:

    --> applied in unpredictable and novel ways

    --> situations & choices not previously arising

    --> policy vacuums.

    Values permeate our lives – help us make decisions. We don't always agree about all values, but many we do (eg what makes for a "good" program? – no universal agreement, but some convergence).

Why Study Computer Ethics? #1

- Rationale for studying computer ethics (Maner, 1995):
  - It makes us behave like responsible professionals.
  - It teaches us how to avoid computer abuse and catastrophes.
  - We need to recognise policy vacuums created by advances in IT.
  - Some problems (eg Intellectual Property) are radically and permanently altered.
  - IT creates novel ethical issues that require special study.
  - These novel issues are large enough and coherent enough to define a new field.

Why Study Computer Ethics? #2

- Example situation where moral/ethical choices have to be made (Moor, 1998):
  - A range of actions you as the owner of a Web site can take which impact a user's computer/smartphone when they use their Web Browser to access your site:
    a. do not change user's computer at all.
    b. allow user to decide if a cookie is to be left on the user's computer or not.
    c. leave a cookie on user's computer but inform them it's there.
    d. leave a cookie on user's computer without their knowledge.
    e. removal of data from user's computer without their knowledge.
    f. arbitrary destruction of data on user's computer.

Note that, starting in Europe, you are now required to get user consent before leaving a cookie on their system.

Framework for Thinking Ethically -1

1. **Be Clear What Ethics is Not:**
   - It is not the same as Feelings
   - It is not Religion
   - It is not following the Law
   - It is not following Culturally Accepted Norms
   - It is not science.

2. **Approaches to Deriving Ethical Standards:**
   - Utilitarian approach
   - Rights approach
   - Fairness or Justice approach
   - Common Good approach
   - Virtue approach

Framework for Thinking Ethically -2

3. Decision Framework:

- Recognise there is an Ethical Issue (not just a technical problem)
- Get the Facts
- Evaluate Alternative Actions & Consider Which Action Will:
  - Produce most good, do least harm? [utilitarian]
  - Best respect rights of all stakeholders? [rights]
  - Treat people equitably? [fairness]
  - Best serve the community as a whole? [common good]
  - Lead me to being the sort of person I want to be? [virtue]
- Make a Decision and Test it
- Act and Reflect on the Outcome

From: https://www.scu.edu/ethics/practicing/decision/framework.html

Why Are Computers Special?

Characteristics of Computers :

- powerful, fast => magnifying effect
- manipulate information => a new kind of tool
- new, evolving => don't understand them fully
- logically malleable => applied in novel, unusual ways
- have memory => adaptive, unpredictable
- complex => even programmers don't understand their programs
- programs can't be proven to be correct, & not 100% reliable => untrustworthy (yet we still rely on them)
- minor errors can produce catastrophic results => non-proportional effects
- pervasive, cheap => effects are very widespread
- copies that are identical to the original => ownership rights issues
- introduce spatial and temporal separation => break the chain of responsibility, facilitate anonymity
- ...

Computing Technology is the most powerful and most flexible technology ever devised

Some Ethical/Moral/Social Issues -1

- **Software Errors:**
  - Are you responsible for any and all errors found in your software?
  - What if someone else has modified your software – who is responsible then?
  - What if an error only emerges 10 or 20 years later – are you still responsible?
- **Copying Video/Music/Image Files:**
  - Is it actually "theft" even when the owner still has the file?
  - Is it OK if you just want to "borrow" the file?
  - Is it OK if you copied it to see if it was worth buying?
- **Software Ownership:**
  - Do the arguments that no-one should "own software" have any merit?
  - How much of someone else's software can you re-use without their permission?
  - Is it OK to reverse-engineer someone's software?
- **Email Issues:**
  - When is it OK to forward or broadcast someone else's email?
  - Are there situations where anonymous email is legitimate?
  - Is it ever OK to send out thousands of copies of an email?
  - Is "chain email" harmless and so OK?

Some Ethical/Moral/Social Issues -2

- **Hacking:**
  - Is there a clear line between “white hat” and “black hat” hacking?
  - If hacking reveals flaws in someone’s computer security, isn’t that a good thing?
  - If people don’t protect their files, does that mean it’s OK to copy them, etc?
- **Viruses:**
  - If your co-workers don’t update their virus protection, isn’t that their fault?
  - Is a virus that doesn’t actually damage computers ever OK?
  - If a virus exposes system weaknesses, isn’t that therefore OK?
- **Privacy:**
  - Is it OK to photograph/video someone and then distribute that photo/video?
  - When is it OK to “photoshop” a photo of someone or something?
  - If a photo or image is available on the Web, then is it OK to copy and use it?
- **Software Development:**
  - How much software testing is enough to clear you of blame for errors?
  - If your “client” wants something that is “unreasonable” can you just ignore it?
  - How important is it to stick to your estimates for how long it will take?

Catalogue of Failures - 1

Computers and/or software failure have been implicated in:

- Hole in ozone layer undetected for 7 years.
- US Air Force Blackhawk helicopter crashes – 22 deaths.
- 1st Gulf War Dhahran base Scud attack – Patriot failure (25-Feb-91).
- Hubble Telescope error compounded by computer shut-down (9-Dec-91).
- Three Mile Island (nuclear reactor) (28-Mar-79).
- Chernobyl (nuclear reactor) (26-Apr-86).
- Challenger Space Shuttle deaths (28-Jan-86).
- Mt Erebus Air NZ flight 901 crash (28-Nov-79).
- Korean Air Lines flight 007 over Sakhalin Island (1-Sep-83).
- HMS Sheffield sinking in Falklands (4-May-82).
- Iranian flight 655 shot down over Persian Gulf (3-Jul-88).
- Stock market crash due to automated trading in 1987.
- Australian Census Website Failure 9-Aug-16.
- Passport system failure delays flights 29-Apr-19 and again on 15-Jul-19.
- Robodebt – automated calculation of overpaid social security – Nov 2019.

… etc – a serious study can be made of computer disasters (eg Peter Neumann's Risks Digest - http://catless.ncl.ac.uk/Risks/).

Consequences of Computer Error

Who is to blame when computer systems fail?

Blame for Computer Errors

Cartoon depicting computer blaming human error “yet again” [www.cartoonstock.com]

Blame for Computer Errors

Cartoon depicting people committing suicide because of dramatic downturn in profitability only to discover it was caused by computer error [www.cartoonstock.com]

Blame for Computer Errors

Cartoon depicting committee being advised the computer failure was due to someone walking on a sidewalk crack
[www.cartoonstock.com]

Catalogue of Failures - 2

Why is Software so prone to Catastrophic Failure?

- Complexity
- Error Sensitivity – non-linear, non-continuous (non-proportional)
- Hard to Test for every possible situation
- Correlated failures
- Lack of professional standards – few software engineers
- Development methodologies have been inadequate
- Proving software correctness has not been successful
- Verification attempted by:
  - mathematical analysis;
  - case analysis;
  - extensive testing; or
  - combination of the three.
- Tony Hoare's "Wasted 20 Years" trying to establish a basis for proving program correctness.
- Roger Needham's "Most Surprising Development in the 50 years of Computer Science" – that, on a regular basis, we would use software known to have significant numbers of bugs.

Robbie the Killer Robot

- Industrial Robot killed its operator: who was implicated?
  - Programmer had made an error in the relevant program
  - Operator did not follow instructions correctly
  - Supervisor did not ensure operator was adequately trained
  - Management cutting corners

See https://onlineethics.org/cases/case-killer-robot

More recent actual deaths:

- Volkswagen car manufacturing robot kills worker 2-Jul-15: https://www.washingtonpost.com/news/worldviews/wp/2015/07/02/a-robot-killed-a-factory-worker-in-germany-so-who-should-go-on-trial/;
- Tesla robot-driven car driver killed 7-May-16: https://www.theguardian.com/technology/2016/jun/30/tesla-autopilot-death-self-driving-car-elon-musk.
- Uber self-driving car kills pedestrian 18-Mar-18: http://www.abc.net.au/news/2018-03-20/uber-suspends-self-driving-car-tests-after-fatal-crash/9565586
- Wikipedia self-driving car fatalities page: https://en.wikipedia.org/wiki/List_of_self-driving_car_fatalities

AI/Robot Issues -1

Robots throw some of these issues into strong relief:

I, Robot

Blade Runner

Metropolis (1927)

Terminator

Pictures of various humanoid robots, mostly from movies.

Humans

Asimo

Star Wars

Ex Machina

AI/Robot Issues -2

Robots throw some of these issues into strong relief:

Pictures of various industrial robots, eg cars, vacuum cleaners, assembly-line manufacturing, bomb disposal, stock trading.

AI/Robot Issues -3

- **Asimov's 3 Laws of Robotics:**
  1. **A robot may not injure a human being or, through inaction, allow a human being to come to harm.**
  2. **A robot must obey orders given it by human beings except where such orders would conflict with the First Law.**
  3. **A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.**
- **Inadequacy of this Ethical Framework:**
  - ✡ **Unintended consequences.**
  - ✡ **"Greater good" aspects (humanity as a whole vs individual humans).**
  - ✡ **Failure to see long-term consequences.**
  - ✡ **Some outright failures.**
  - ✡ **Complexity of ethical judgements (and fragility of trust).**

See Kuipers, Benjamin: Towards Morality and Ethics for Robots, *2016 AAAI Spring Symposium on Ethical and Moral Considerations in Non-Human Agents*
https://web.eecs.umich.edu/~kuipers/research/pubs/Kuipers-sss-16.html

Case Study 1a

Therac-25 Radiation Treatment Machine (1985-1987)

- Machine malfunction produced overdoses (100x)
- 4 or 5 patients died as a result of the failure
- Operators ignored error messages: “Malfunction 54”
- No immediate effects noticed
- Manufacturer safety procedures inadequate
- FDA tests inadequate
- Remediation efforts paltry
- Software error eventually discovered

See http://staff.washington.edu/jon/pubs/safety-critical.html

Case Study 1b

The Classic "Trolley" Case:

A trolley is hurtling out of control along a track.

Ahead of it is a bunch of deaf children playing on the track, unaware of the trolley, and certain to be killed by it.

You're too far away to warn the children, but you are adjacent to a switch that would turn the trolley onto a siding, but there is a man there who has his foot stuck in the tracks, and he would certainly be killed if you diverted the trolley onto that track.

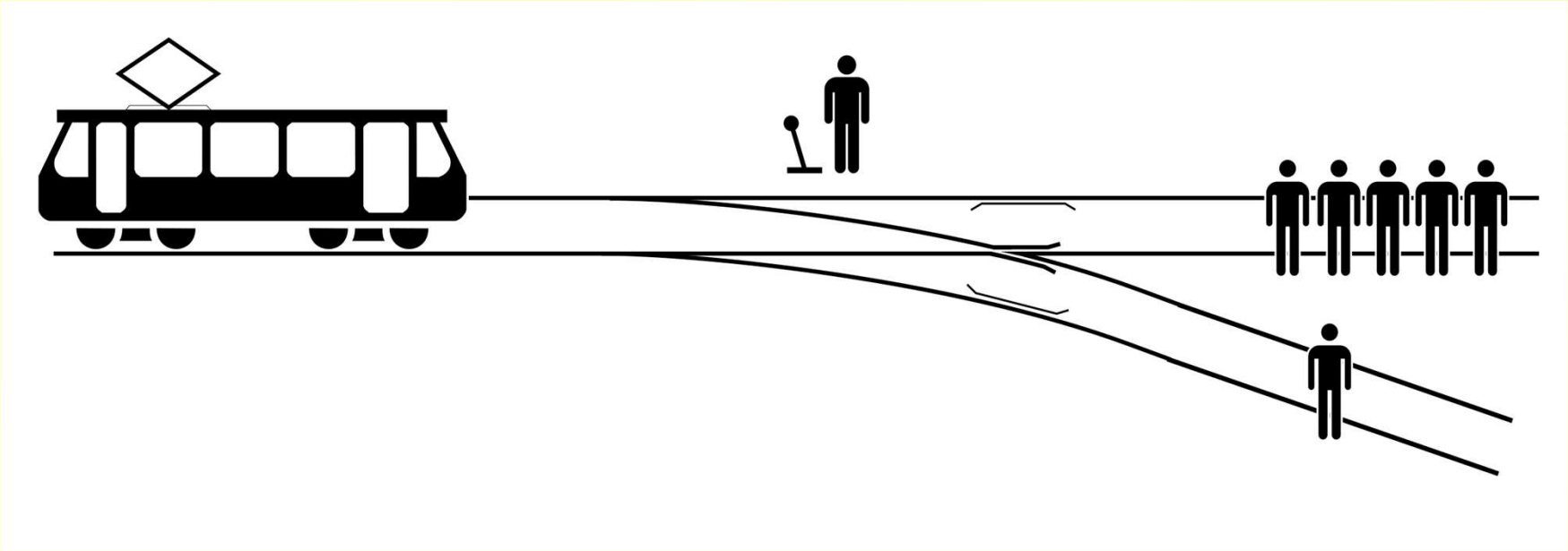
What do you do?

1. Do nothing, turn your back, don't get involved (or take a selfie with the trolley and post on Twitter!).
2. Deliberately decide to leave the switch alone and let the kids be killed.
3. Divert the trolley onto the siding, killing the man but saving the kids.

There are many variations to this, trying to balance the "value" of lives against each other.

See https://en.wikipedia.org/wiki/Trolley_problem

The Classic "Trolley" Case:



By !Original: McGeddonVector: Zapyon - Own work based on: Trolley problem.png by McGeddon This SVG diagram includes elements that have been taken or adapted from this icon: BSicon TRAM1.svg (by BjørnN). This SVG diagram includes elements that have been taken or adapted from this diagram: Rozjazd pojedynczy.svg (by Orem). This SVG diagram includes elements that have been taken or adapted from this icon: Person icon BLACK-01.svg (by MCruz (WMF))., CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=67107784

You could say "this is too hard" – leave it to your instinct at the time should you ever face such a dilemma.

A Self-Drive Car Version of the "Trolley" Dilemma:

The same dilemma presents itself with those who program self-drive vehicles, illustrating one way in which Asimov's 3 laws are inadequate.

Imagine a situation (say) where a drunk driver of a truck is about to collide head-on with a self-drive car at high speed, with a very strong chance that all 4 people in the car will be killed.

The car can avoid the collision by swerving onto a footpath, killing a pedestrian.

How should the car be programmed?

1. To just brake hard and keep the same line (even though this means multiple deaths).
2. To swerve onto the footpath to avoid the head-on collision, but killing one pedestrian.

A Self-Drive Car Version of the "Trolley" Dilemma:

This is just one possible scenario that the car must be programmed to deal with:

- **For instance if several children are on the footpath, and all would be killed, does that change the equation?**
- **How many children/pedestrians should be sacrificed to save the car occupants?**
- **What if the pedestrian had stepped (illegally) onto the roadway into the path of the swerved car.**

In contrast to the "classic" dilemma, you can't say "this is too hard" – you *have* to program the car to make some "decision" for every circumstance it may face.

AI Ethics Framework

Criteria for Determining if it is "Good" AI:

Broadly, the key concepts are:

- **Fairness to directly impacted individuals as well as the broader societal impact.**
- **Ethics or equity.**
- **Accountability.**
- **Transparency, including explainability.**

= FEAT (or FATE)

AI Ethics Framework

Australian Government AI Ethics Principles (2019):

- **Human, Social and Environmental Wellbeing:** throughout their lifecycle, AI systems should benefit individuals, society and the environment.
- **Human-Centred Values:** throughout their lifecycle, AI systems should respect human rights, diversity and the autonomy of individuals.
- **Fairness:** throughout their lifecycle, AI systems should be inclusive and accessible, and should not involve or result in unfair discrimination against individuals, communities or groups.
- **Privacy Protection and Security:** throughout their lifecycle, AI systems should respect and uphold privacy rights and data protection and ensure the security of data.
- **Reliability and Safety:** throughout their lifecycle, AI systems should reliably operate in accordance with their intended purpose.
- **Transparency and Explainability:** there should be transparency and responsible disclosure to ensure people know when they are being significantly impacted by an AI system, and can find out when an AI system is engaging with them.
- **Contestability:** when an AI system significantly impacts a person, community, group or environment, there should be a timely process to allow people to challenge its use or output.
- **Accountability:** those responsible for the different phases of the AI system lifecycle should be identifiable and accountable for its outcomes, and human oversight of it should be enabled.

https://www.industry.gov.au/data-and-publications/building-australias-artificial-intelligence-capability/ai-ethics-framework/ai-ethics-principles

Australian Federal Court Rules that AI can be an Inventor

What does this mean?

- Handed down on Friday, 30-Jul-21 for an ML system, DABUS, using which 2 inventions have been made leading to 2 patent applications.
- An inventor could legally be an AI system.
- But an AI system cannot be the owner, controller or patentee of an invention.
- Aim is to promote technological innovation, regardless of its origin.
- First recognition worldwide of an AI patent claim.

What ethical implications does this have?

- Who owns the intellectual property? Who owns the patent?
- Who is responsible if the AI system makes a mistake?
- If I utilise such an AI system belonging to someone else, who owns what it "invents"? – Me, the AI System, the Writer of the AI System, No-one?
- Who owns any money made by such an AI system?
- Can such a system be sued? Or otherwise taken to court?
- What rights could such an AI system be accorded? (already one robot has been made a citizen of Saudi Arabia, in 2017).

https://ia.acs.org.au/article/2021/federal-court-rules-ai-can-be-inventor.html
https://ia.acs.org.au/article/2017/first-robot-to-be-granted-citizenship.html

Other AI Issues

Gartner's Hype Cycle for Artificial Intelligence, July 2021

https://onesearch.library.uwa.edu.au/discovery/fulldisplay?docid=alma9979540402101&context=L&vid=61UWA_INST:UWA&lang=en&search_scope=MyInst_and_CI&adaptor=Local%20Search%20Engine&tab=Everything&query=any,contains,gartner&offset=0

Sources of Ethical Guidance

Hierarchy of Policies to Guide Conduct:

- international treaties & agreements
- national laws
- government/agency regulations
- standards of good practice (within a whole industry)
- professional codes of ethics (within a professional association)
- corporate policies (within an organisation/corporation)
- community & personal values (unwritten common practices)

Terrell Ward Bynum (1997)

Not ultimately guiding what you believe as how you act, your behaviour.

Being a Professional

- 2 Scenarios:
  - New medical graduate, just starting out in a medical practice:
    - expected to "act professionally"
  - New high school graduate, taking a job as a cashier at Coles:
    - expected to "act professionally"
  - What's the difference?
  - To which is a new computing graduate closest?

- Abraham Flexner (1915) on medical professionalism:
  - It is basically intellectual, carrying with it high responsibility
  - It is learnèd in nature, because it is based on a body of knowledge
  - It is practical rather than theoretical
  - Its technique can be taught through educational discipline
  - It is well organised internally
  - It is motivated by altruism

Professional Body

- **Criteria:**
  - **Established body of specialised knowledge**
  - **Formal accrediting criteria**
  - **Undertake decisions on behalf of clients (who rely on your specialist expertise)**
  - **Defined performance standards**
  - **Members committed to maintain performance standards, body of knowledge**
  - **Acceptance of responsibility**
  - **Standards of conduct/ethics (=> disciplinary procedures)**
  - **Recognition in society – high level of trust**

- **Summary:**

  professionals are people who have specialised knowledge on which others (and the public in general) have to place dependence; the public have to trust those professionals in regard to their specialised knowledge.

  Viz: TRUST => RESPONSIBILITY

ACS Code of Ethics –1

ACS Code of Ethics:

- As an ACS member you must uphold and advance the honour, dignity and effectiveness of being a professional. This entails, in addition to being a good citizen and acting within the law, your adherence to the following Society values:
    1. The Primacy of the Public Interest
    2. The Enhancement of Quality of Life
    3. Honesty
    4. Competence
    5. Professional Development
    6. Professionalism
- This Code of Ethics applies to all ACS members regardless of their role or specific area of expertise in the ICT industry.
- The Code of Ethics should be adhered to in conjunction with the Code of Professional Conduct

https://www.acs.org.au/content/dam/acs/acs-documents/Code-of-Ethics.pdf

ACS Code of Ethics –2

ACS Code of Ethics detail:

1. The Primacy of the Public Interest
   You will place the interests of the public above those of personal, business or sectional interests.
2. The Enhancement of Quality of Life
   You will strive to enhance the quality of life of those affected by your work.
3. Honesty
   You will be honest in your representation of skills, knowledge, services and products.
4. Competence
   You will work competently and diligently for your stakeholders.
5. Professional Development
   You will enhance your own professional development, and that of your colleagues and staff.
6. Professionalism
   You will enhance the integrity of the Society and the respect of its members for each other.

ACS Code of Professional Conduct –1

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

- The public interest takes precedence over personal, private and sectional interests
- Any conflicts should be resolved in favour of the public interest
- In your work, you should safeguard the interests of your immediate stakeholders, provided that these interests do not conflict with the duty and loyalty you owe to the public.
- The public interest is taken to include matters of public health, safety and the environment.

ACS Code of Professional Conduct (cont)

1.2.2. The Enhancement of Quality of Life

- The development of ICT has had a significant impact on our society and way of life.
- Whilst this impact has been beneficial to a very great extent, like all technologies, ICT has also had some negative effects, and will continue to do so.
- An ethical approach to your work will help to recognise and minimise these adverse effects.
- You should promote equal access to the benefits of ICT by all members of society.

ACS Code of Professional Conduct (cont)

1.2.3. Honesty

- Do not breach public trust in the profession or the specific trust of your stakeholders.
- Observance of utmost honesty and integrity must underlie all your professional decisions and actions.
- Circumstances will undoubtedly arise during the course of your professional career where it may appear to be beneficial for you to be deceptive in some way.
- This type of behaviour is not acceptable professional conduct.

ACS Code of Professional Conduct (cont)

1.2.4. Competence

- Accept only such work as you believe you are competent to perform.
- Do not hesitate to obtain additional expertise from appropriately qualified individuals where advisable.
- You should always be aware of your own limitations and not knowingly imply that you have competence you do not possess.
- This is distinct from accepting a task of which the successful completion requires expertise additional to your own.
- You cannot possibly be knowledgeable on all facets of ICT but you should be able to recognise when you need additional expertise and information.

ACS Code of Professional Conduct (cont)

1.2.5. Professional Development

- Keep yourself informed of such new technologies, practices and standards as are relevant to your work.
- Others will expect you to provide special skills and advice; and in order to do so, you must keep your knowledge up-to-date.
- You should encourage your staff and colleagues to do the same.
- Take action to ensure that your hard-won knowledge and experience are passed on in such a way that the recipients not only improve their own effectiveness in their present work, but also become keen to advance their capabilities and take on additional responsibilities.

ACS Code of Professional Conduct (cont)

1.2.6. Professionalism

- The ICT industry is relatively new and characterised by rapid change. It has not had the opportunity to evolve over many years and acquire its own standards and legislation.
- The ACS is endeavouring to improve public confidence in the ICT industry.
- It is imperative that members of the Society maintain professional standards that improve and enhance the industry's image, especially in the workplace.
- All people have a right to be treated with dignity and respect.
- Discrimination is unprofessional behaviour, as is any form of harassment.
- Members should be aware that the ACS can help them resolve ethical dilemmas.
- It can also provide support for taking appropriate action, including whistle-blowing, if you discover an ACS member engaging in unethical behaviour.

Ethical Values

ACS Code of Ethical Values:

1. The Primacy of the Public Interest
2. The Enhancement of Quality of Life
3. Honesty
4. Competence
5. Professional Development
6. Professionalism

This Code is currently being revised (in view of the rapid changes in ICT since it was last reviewed, in 2014).

The Revised Code (Ethical Values) may be based around the following 3 Values:

1. Honesty
2. Trustworthiness
3. Respect (for Others, and for the Profession)

Does this seem a viable way forward? Can all the characteristics of a professional (eg as in the Code of Professional Conduct) be covered by these 3 primary Values?

Case Studies Illustrating Many of these Issues:

- Each case involves various aspects of the Codes and/or ethical or social issues.
- They are mostly based on actual cases.
- Analyse each case for the following:
  1. identify those to whom you owe any kind of duty;
  2. assess the extent of harm potentially incurred by each person or category;
  3. assign priorities to the duties owed;
  4. identify possible alternatives;
  5. seek opportunities for negotiation and formation of "social contracts".
- Note that, since decisions are based on value judgements, there will be differences of opinion at times…

Social Contract Theory: http://www.iep.utm.edu/soc-cont/

Case Study 6

Aircraft Industry Quality Control Manager Quandary

- Testing on a new aircraft was possibly inadequate
- Company is pressuring QC Manager to "sign off"
- Delays may cost the company business, him his job, etc
- Test pilot knows his job is risky anyway
- Danger to the test pilot and to other victims of any crash
- "Social Contract" approach – to whom does the Quality Control Manager have a "contract of responsibility"? Which should take precedence? How to choose between them?

See McFarland, Michael C: "Urgency of Ethical Standards Intensifies in Computer Community", IEEE Computer, March 1990, pp77-81

Social Contract Theory: http://www.iep.utm.edu/soc-cont/

Case Study Survey

CITS3200 Ethics Case Studies:

- This is a set of simple Case Studies designed to help you understand some of the Ethical Issues you may face as a computer professional.
- Your responses will be recorded and aggregated with others from the 2021 CITS3200 Class (they will be kept anonymous).
- Average responses will be published in a table later this Semester (with comparisons from earlier years).
- You may suspend answering at any time and resume later.

This Survey is available here:

http://uwa.qualtrics.com/jfe/form/SV_6DnHaKB3CTTZLuZ

Or can be accessed via the CITS3200 Website

https://teaching.csse.uwa.edu.au/units/CITS3200/resources.html

Please attempt this Survey now.

END OF LECTURE 1

Lecture 2 will be delivered on 16-Aug

(in the meantime, please attempt the Case Study Survey)

Review: ACS Code of Ethics:

1. The Primacy of the Public Interest
   You will place the interests of the public above those of personal, business or sectional interests.
2. The Enhancement of Quality of Life
   You will strive to enhance the quality of life of those affected by your work.
3. Honesty
   You will be honest in your representation of skills, knowledge, services and products.
4. Competence
   You will work competently and diligently for your stakeholders.
5. Professional Development
   You will enhance your own professional development, and that of your colleagues and staff.
6. Professionalism
   You will enhance the integrity of the Society and the respect of its members for each other.

ACS Case Study 1-1

Case Study:

- **Jean, a statistical database programmer, is trying to write a large statistical program needed by her company. Programmers in this company are encouraged to write about their work and to publish their algorithms in professional journals.**
- **After months of tedious programming, Jean has found herself stuck on several parts of the program.**
- **Her manager, not recognising the complexity of the problem, wants the job completed within the next few days.**
- **Not knowing how to solve the problems, Jean remembers that a co-worker had given her source listings from his current work and from an early version of a commercial software package developed at another company.**
- **On studying these programs, she sees two areas of code which could be directly incorporated into her own program and solve her impasse.**

- **What should she do?**

ACS Case Study 1-2

Alternative Courses of Action:

1. Incorporate the code into her program; tell no-one and complete the work with a day to spare.
2. Use the ideas from the code she's seen, but write her own code to do that job; tell no-one and complete the work on time.
3. Use the ideas from the code she's seen, but write her own code to do the job; declare this to her manager; complete the job on time.
4. Ask permission to use the ideas and/or code she's seen, delaying the job significantly, and incurring a royalty payment.
5. Incorporate the ideas/code she's seen, and deliver on time, but ask permission retrospectively (incurring a larger royalty payment).
6. Explain her dilemma to the manager, and leave the decision to him.

ACS Case Study 1-3

To Whom Does She Owe Any Kind of Duty?

1. Her Manager: ultimately, he will carry the can for her actions.
2. The Owner of the code she “borrowed”.
3. Her Colleague: perhaps betraying a trust?
4. Herself: can she live with herself?
5. Her Company: they are reliant on her to develop the program.

ACS Case Study 1-4

What Parts of the Code of Ethics Apply Here?

2.2 Public Interest

- **a) identify those potentially impacted by your work and explicitly consider their interests;**
- **f) respect the intellectual property of others;**

2.5 Competence

- **b) not misrepresent your skills or knowledge;**
- **d) respect and protect your stakeholders' proprietary interests;**
- **g) respect, and seek when necessary, the professional expertise of colleagues in their areas of competence.**

ACS Case Study 1-5

What Parts of the Proposed New Code of Ethics Apply Here?

Honesty: 1(a) be honest in all interactions, and 1(b) do not misrepresent any capability: by implication, by employing someone else's work without giving credit, both these injunctions are being contravened.

Trustworthiness: 2(b) Exercise integrity; 2(d) Respect proprietary information: her actions violate both these values.

Respect: 3.1(g) Respect others' intellectual property: the actions are in clear violation of this injunction.

Identifying Author of Anonymous Message

- You are the Systems Administrator at your medium-sized Company.
- Your Company has set up an Anonymous on-line Discussion Forum to encourage employee discussion/participation.
- The Forum frequently receives postings which are critical of Company policies, practices, etc.
- Your boss asks you to identify the author(s) of these postings (which you are able to do, using your system privileges).
- What do you do?
  1. Just agree.
  2. Argue the toss with the Boss, but then agree.
  3. Take the matter higher.
  4. Use the existing Forum to ensure this first gets wide publicity within the Company.
  5. Go to the local Press with the story.
  6. Take some other action. What?

Anonymity

Cartoon depicting a dog surfing the Internet, saying to another dog: “On the Internet, no-one knows you’re a dog”.

The New Yorker, July 5, 1993, page 61.

Intellectual Property

Issues:

- **Copyright Act**
- **Moral Rights**
- **Digital Agenda Amendments**
- **Fair Dealing, Section VA/B**
- **Attribution, Plagiarism**
- **Software Licences**
- **Shrink-Wrap Licences, Web Extensions**
- **Employer *versus* Employee Rights**
- **Patents**
- **Public Domain: Shareware, Freeware**
- **Open Source Movement**
- **Website Contents: Linking, Deep Linking, Framing, Copying**
- **Copying Music, Movies, Images**

Copyright Act 1968

- Ownership of copyright in an original work is automatic
- May need to prove it at some time
- Rights: to make copies, sell, distribute, change, etc
- Works (expression of an original thought, idea): writing (prose, poetry, drama, etc), graphics, audio & video recordings, music, designs, software, ...
- Software made explicit in 1984
- Digital Agenda amendments 2001
- Australia is signatory to Universal Copyright (Berne) Convention
- Moral rights: authorship acknowledged, content not distorted
- Duration: 70 years after death of author, 75 after creation for corporate works ("Mickey Mouse" provisions: 70 and 95)
- Key is potential value to author/creator
- Relationship to Patent

Copyright - Complications

- **Contractual obligation** – may over-ride normal copyright
- **Employer rights** – based on terms of employment
- **Student rights** – based on University IP Policy
- **Shared rights** – where shared effort/resources are contributed
- **Using the resources of others** – gives them some rights
- **Insubstantial portions** – can quote small amounts from works
- **Quoting, Attribution** – give credit to author
- **Plagiarism** – deliberate or accidental use of others' works without attribution
- **Implied permission** – where the context suggests copying/distribution is expected
- **Temporary copying of electronically communicated works** – store-and-forward, caches, auto-backup, memory, computer screen
- **Fair Dealing** – for private use in study, research – limited amounts
- **Educational purposes under section 113P (formerly part VB)** – special provisions for use in official courses, upon payment of a fee
- **Public domain software** – freely available, distributed
- **Shareware** – free to trial, distribute, not for long-term use
- **Licences** – over-ride, extend Copyright conditions

Copyright - Digital Amendments

Digital Agenda (2000)

- Mainly didn't change anything, just clarified
- New right of "communication"
- Applies to Emails, Web pages, etc
- Is it now illegal to forward emails?

Web Pages

- A Web page is a "work"
- Linking to another Web page – not an infringement
- "Deep linking" is this an infringement?
- Framing – making it look like it's yours
- "Passing off"
- Obtaining permission of owner – is it always required?
- Web page "terms of use" – must you observe these if they exist?

Linking/Framing/Tagging Issues

Website for The Shetland Times

https://www.shetlandtimes.co.uk/

Website for The Shetland News

https://www.shetnews.co.uk/

Settled out of court Nov 1997

See http://www2.warwick.ac.uk/fac/soc/law/elj/jilt/1998_2/burk/

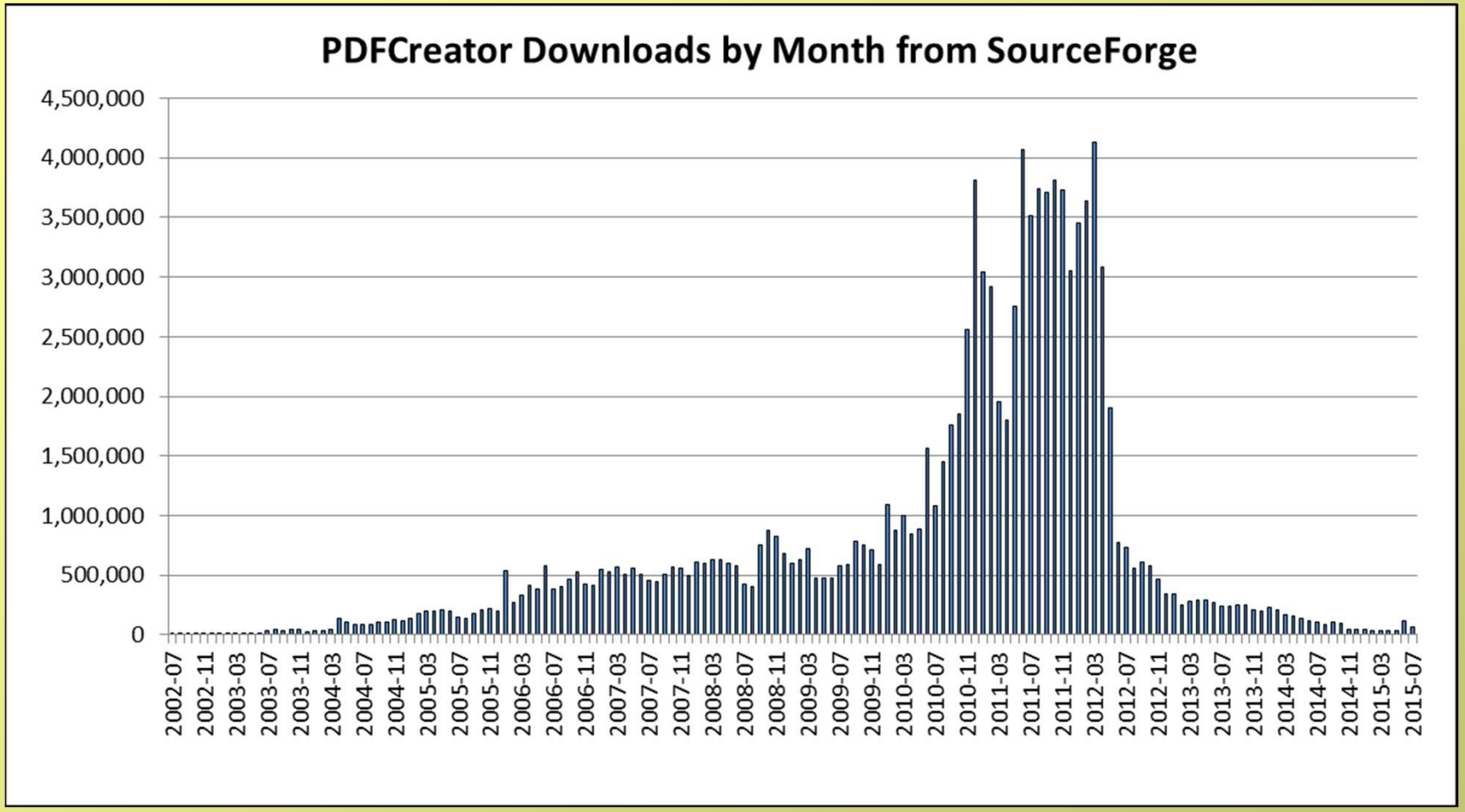
Framing: The Washington Post Co., et al. v. TotalNews Inc, et al, filed Feb. 2, 1997: see http://www.netlitigation.com/netlitigation/cases/post.htm

Copyright - Open Source

- Open Source Movement – GNU www.gnu.org/ and Free Software Foundation www.fsf.org/
- Linux www.linuxfoundation.org/
- GNU General Public Licence (GPL) www.gnu.org/copyleft/gpl.html
  - May use the software freely
  - May copy & distribute sourcecode (with notice included)
  - May modify/add to it, but mustn't charge
  - Any added software attracts the same rights/conditions
- An ideological issue?
- A better way to develop software?
- An attempt to "dethrone" Microsoft? – see Peruvian Bill discussion www.theregister.co.uk/2002/05/19/ms_in_peruvian_opensource_nightmare/
- Munich City embraces Open Source https://opensource.com/government/14/5/how-munich-switched-15000-pcs-windows-linux (more recently, reverted to Microsoft).
- European Commission – eg "Pooling Open Source Software" Report https://joinup.ec.europa.eu/collection/open-source-observatory-osor/document/pooling-open-source-software-2002
- UK Government support – eg https://www.gov.uk/government/publications/procurement-policy-note-8-11-procurement-of-open-source
- Websites to promote use of OSS – eg SourceForge http://sourceforge.net/

Open Source: PDF-Creator Statistics

Now over 430,000 products available via SourceForge; eg: PDF-Creator



From http://sourceforge.net/projects/pdfcreator/ [24-Jul-15]

Downloading Music MP3

ABC News Website 18-Nov-03

University Students Convicted of Music Piracy

From: http://www.abc.net.au/news/2003-11-18/suspended-sentences-over-music-piracy/1510900

See also http://www.smh.com.au/articles/2003/02/01/1043804571225.html

Example: Peer-Peer #1

Sample Defences of Illegal Downloads:

- Everyone's doing it
- We won't get caught
- The music industry charges too much
- They should make it impossible to copy
- It doesn't hurt anyone
- It only hurts a company, not a person
- Musicians are being exploited by multinationals
- The listening public is being exploited
- It helps increase sales
- Music should be free
- I can't afford to pay for it

Is "file sharing" always a "bad thing"?

Example: Peer-Peer #2

Ethical Tests:

- What laws govern the situation?
- Who gains and who suffers?
- Would you be happy for your action to be publicised?
- Would you tell your boss what you're doing?
- Would you tell your parents?
- What would you think if it was done to you?
- Does it violate Trust? Integrity? Truthfulness? Gratitude? Justice? Kindness?
- Are you treating others with respect?
- What if everyone did the same?

- Kabay: *The Napster Cantata*

http://www.mekabay.com/ethics/napster.htm

Downloading Music Can Be OK -1

Invitations to Obtain Free Music Download:

Kylie Minogue (2003), Karnivool (2010)

Downloading Music Can Be OK -2

Legal Downloads a Worldwide Hit.

Headline from IT Section of The West Australian, Tuesday, 26-Jul-05

Downloading Music Can Be OK -3

Report of 1 billionth iTunes music download, by Alex Ostrovsky in Feb-06

Report of 10 billionth iTunes music download in Feb-10

Report of 25 billionth iTunes music download along with 40 billionth App download in Feb-13

Downloading Music - Prevention

SDMI Challenge

- **Secure Digital Music Initiative**
  http://en.wikipedia.org/wiki/Secure_Digital_Music_Initiative
  - ❖ **"Unbreakable" Watermarking – 4 varieties (Steganography)**
  - ❖ **SDMI-compliant players**
  - ❖ **Make copies but not MP3-compressed copies for distribution**
- **Challenge – 6 September 2000 – Prize Money of $10,000**
- **Boycotted by some groups**
- **Princeton Group broke each coding scheme, but refused the prize**
  http://www.cs.princeton.edu/sip/sdmi/faq.html

Which approach do you think is right? Why?

1. **Boycott**
2. **Solve, publish and collect reward**
3. **Solve, publish and don't collect reward**
4. **Solve, don't publish and collect reward**
5. **Solve, don't publish, don't collect reward**

Should Music, Software be Free?

Some believe that all music should be free:

- Yes: "A true musician produces music because they love it, not because they're hoping to make money out of it."
- No: "If music were free then how will the musicians put food on their table?"

http://www.debate.org/opinions/should-music-be-free

Some believe that all software should all be free:

- Yes: "software should be written for the joy of helping others, not for money; and it costs nothing to make a copy, ie the 'cost of manufacture' is zero."
- No: "It costs time and effort to write software and developers have to make a living somehow."

http://www.debate.org/opinions/should-software-be-free-to-download

Some believe that all writing should be free…

Photoshopping Images

Celebrity Pics

Photos of various celebrities that have been "touched up".

Matthew Macfadyen
Michael Phelps
Lesley Garrett
Avril Lavigne

https://www.boredpanda.com/before-after-photoshop-celebrities/?utm_source=google&utm_medium=organic&utm_campaign=organic

Enhancing Photos

Cartoon depicting someone getting a whole range of enhancements done to his photos when developed

www.tedgoff.com

Enhancing Photos

Cartoon depicting a doctor saying the broken rib in the X-ray can be fixed by photoshopping.

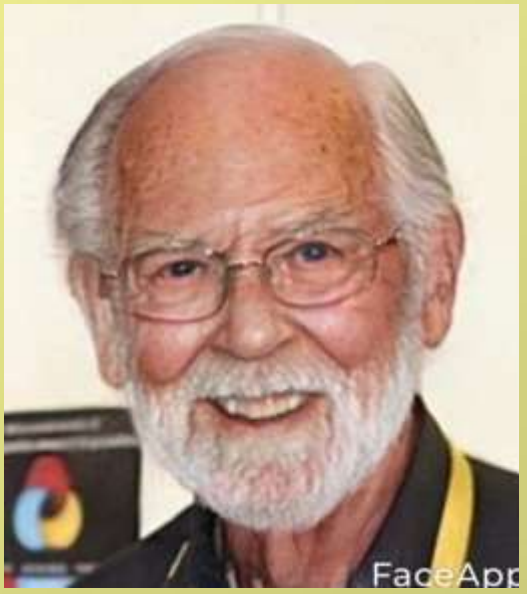
www.funny-joke-pictures.com

Enhancing Photos

Cartoon depicting a child saying the grades in his report card can be fixed by photoshopping.

www.cartoonstock.com

Doctoring Images



Using the first (real) image, FaceApp provides variations based on certain criteria…

Case Study 4

Digital Photograph Manipulation

- It's simple now for various forms of image "enhancement" to be made, eg:
  - Red-eye elimination
  - Cropping
  - Special effects (eg sepia-colour)
  - Wrinkle removal
  - Changing the contents in significant ways
- Is there anything wrong with "touching up" an image?
- What kind of "touching up" might be OK, in what circumstances? What might be wrong? Why?

"Borrowing" Graphical Logos

Combined Logos of Red Cross, Red Crescent:

the Power of Humanity

International Federation of Red Cross & Red Crescent Societies

http://www.ifrc.org/

Spam - What is Our Responsibility?

Cartoon depicting someone saying they just gave their colleague's email address to tenmillionspams.com

www.tedgoff.com

Spam - What is Our Responsibility?

Cartoon depicting someone smashing their computer in order to block spam

www.glasbergen.com

Spam Offer

From: Jeanine Harding <childrenscenter@parrishmed.com>
To: Alex Reid <alex.reid@uwa.edu.au>
Date: Wed, 25 Jun 2014 15:20:04 +0800
Subject: Re: here is the database

We provide E-mail addresses databases , email lists . and also provide bullet proof mailing server .

America 155 Million Email Address $599 US
Europe 142 Million Email Address $599 US
Asia 137 Million Email Address $599 US
China(PRC) 72 Million Email Address $499 US
HongKong 3.27 Million Email Address $300 US
TaiWan 2.31 Million Email Address $300 US
Japan 27 Million Email Address $300 US
Australia 6 Million Email Address $250 US
Canda 10 Million Email Address $350 US
Russia 38 Million Email Address $399 US
England 3.2 Million Email Address $300 US
German 20 Million Email Address $300 US
France 38 Million Email Address $399 US
India 12 Million Email Address $350 US
CENTRAL & SOUTH AMERICAN AREA 40 Million Email Address $399 US
MIDDLE EAST & AFRICA 45 million Email Address $399 US
SOUTH EAST AREA 32 million Email Address $399 US
other Country or Area , please contact us

Collecting Email Addresses

- **Gilles Plains Primary School project 10/4/02 (see below)**
- **This *could* be legitimate, but also *could* be a great scam to collect (real) email addresses.**
- **What other anti-social aspects does this have?**
- **How could it be modified to allay such suspicion and still achieve its alleged goal?**

We are Year 6 students at Gilles Plains Primary School, situated in Adelaide South Australia.

Our teacher, Mr Small is helping us with this project. We have decided to map the progress of an e-mail. We are interested in finding out "Where in the World' our e-mail will go. We are starting our project on April 8 2002 We would appreciate your help. If you receive this message, we ask that you:

1. Email us back at gillesplains@hotmail.com and tell us your location, by suburb city, state and country. We will plot these locations on our map.

2. Forward this e-mail and send it to everyone on your address list. They, in turn, they can send it to all their contacts. This will help us to reach as many people as possible. After collecting the e-mail messages and plotting them on a map, we will graph the number of responses we have received by state and country. With your help, this project will be a very exciting learning experience for us.

Thank you.
Amy Davis-Herbison and Nikolai Gor

NB a similar email on 11/3/02 claimed to come from Year 8 students at Taonui School, located near Feilding, NZ…

Spam Ubiquitous

Cartoon depicting spam falling like snow –
"a new form of spam"

www.tedgoff.com

Email Phishing

Cartoon depicting a man telling his friend that the email he deleted really was from a Nigerian wanting to give him £200m

www.cartoonstock.com

Viruses – What's Our Responsibility?

Cartoon depicting someone being dragged away by a monster, after opening an email attachment.

www.tedgoff.com

Hoax Virus

- Targets naïve users
- Advises user to delete file
- Exploits unusual icon for system file
- Advises user to forward to everyone they know

- See http://hoaxbusters.org/ (now closed, but still with some useful links) or http://www.snopes.com/ or http://www.truthorfiction.com/ or Hoax Slayer (closed 31/5/21) https://en.wikipedia.org/wiki/Hoax_Slayer

- How to identify Fake News: https://www.freedomforuminstitute.org/first-amendment-center/primers/fake-news-primer/

Subject: BAD virus - act quickly!!
Date: Tue, 29 May 2001 21:57:22 -0400
Subject: Please Act Urgently
VIRUS COULD BE IN YOUR COMPUTER
It will become activate on June 1st and will delete all files and folders on the hard drive.
No Anti-Virus software can detect it because it doesn't become a VIRUS until 1/6/2001.
It travels through the e-mail and migrate to your computer.
To find it please follow the following directions:
Go To "START" button
Go to "Find" or "Search"
Go to files and folders
Make sure to search in drive C
Type in; SULFNBK.EXE
Begin Search
If it finds it, highlight it and delete it
Close the dialogue box
Open the Recycle Bin
Find the file and delete it from the Recycle Bin
You should be safe.
The bad part is you need to contact everyone you sent ANY e-mail to in the past few months.

Will Virus Ruin Your Computer Too?

Cartoon depicting someone asking if a colleague can see if a virus on a floppy disk also ruins their computer.

www.tedgoff.com

Responsibility for Virus Protection

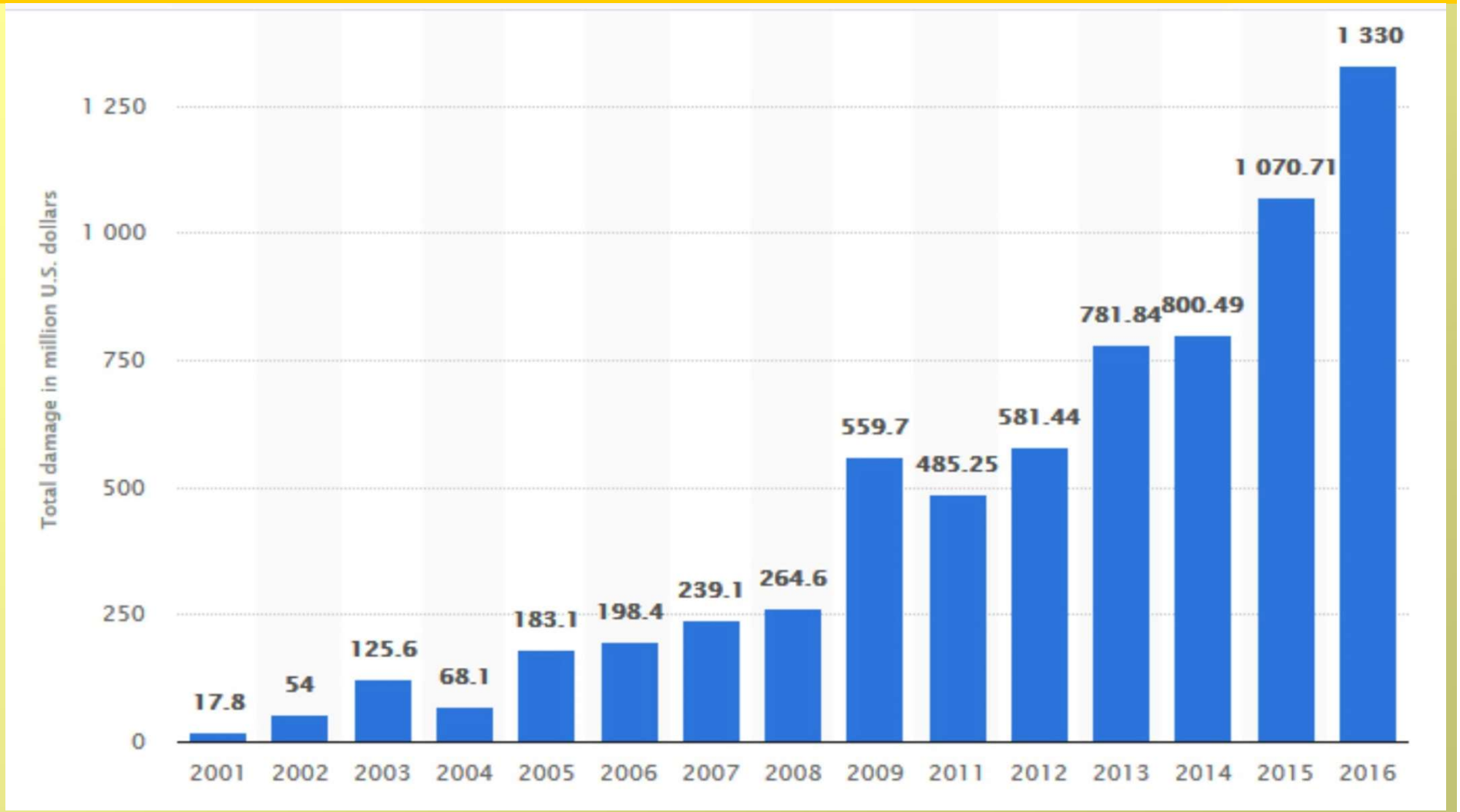
- To establish whether staff are clicking on phishing attempts or not, you could design a *test* - send a false phishing email around and see how many clicked on it.
- Eg Belgian Government in 2015: but it went badly wrong because many people contacted the "free giveaway" company to complain about being asked to provide credit card details, but that company knew nothing about it (no-one had cleared it with them).

  See http://www.networkworld.com/article/2951514/security/belgian-government-phishing-test-goes-offtrack.html
- A similar incident in the US military in 2014 - http://www.washingtonpost.com/politics/gone-phishing-army-uses-thrift-savings-plan-in-fake-email-to-test-cybersecurity-awareness/2014/03/13/8ad01b84-a9f3-11e3-b61e-8051b8b52d06_story.html

Bunratty Attack

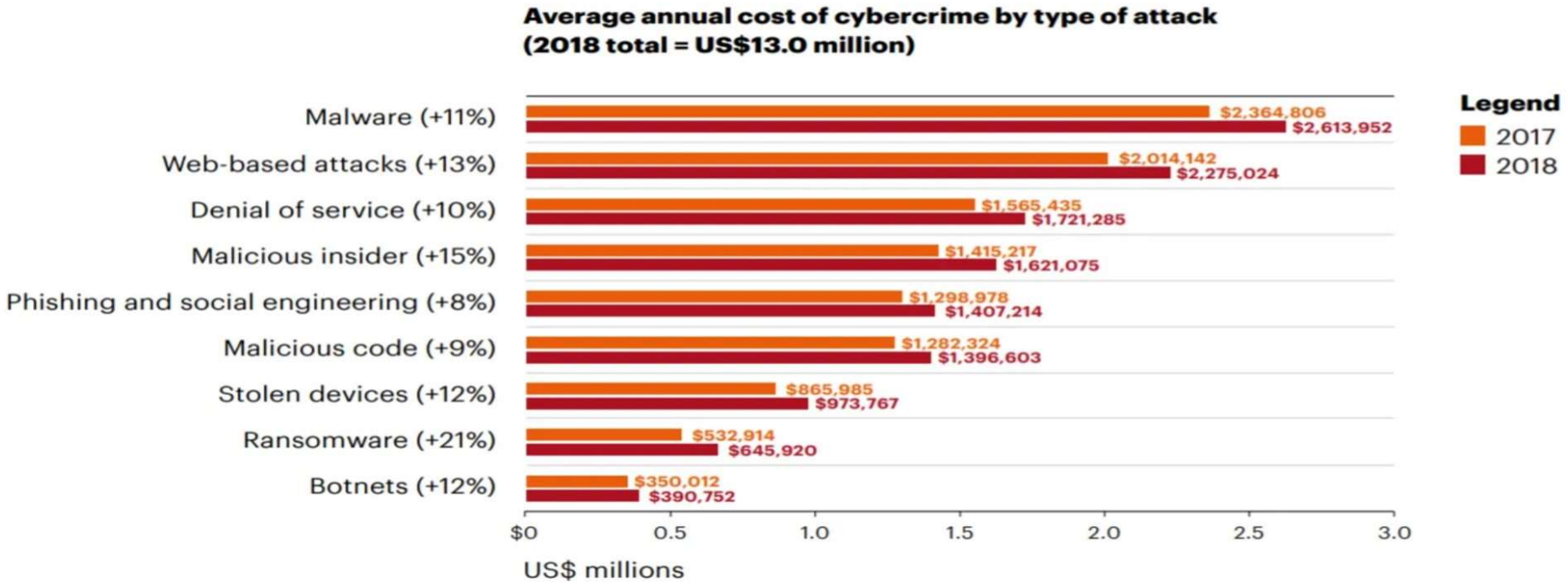
- 1997 COSAC Conference in Bunratty, Ireland (Computer Security Audit & Control Symposium).
- Standard ("innocent") email messages.
- Utilises standard Messaging API.
- Utilises hidden folders.
- All hidden from user - eg as for Calendar updates.
- Covert, asynchronous, remotely upgraded, remotely removed.
- Defence requires code on every client to identify false messages.
- I-Love-You Virus (followed by the Kournikova Virus) based on some of the same vulnerabilities, but not all.
- What would you do?
  1. Keep as quiet as possible?
  2. Tell Microsoft under a veil of secrecy?
  3. Publicise as widely as possible to ensure something is done?
  4. Take some other action? What?

Rising Cost of Security Incidents



Source: https://blog.harbinger-systems.com/2018/04/is-your-hr-mobile-app-a-gateway-for-hackers/amount-of-monetary-damage-caused-by-reported-cyber-crime/

Type & Cost of Security Incidents



Source Accenture: https://securityaffairs.co/wordpress/96531/cyber-crime/cybercrime-statistics-in-2019.html

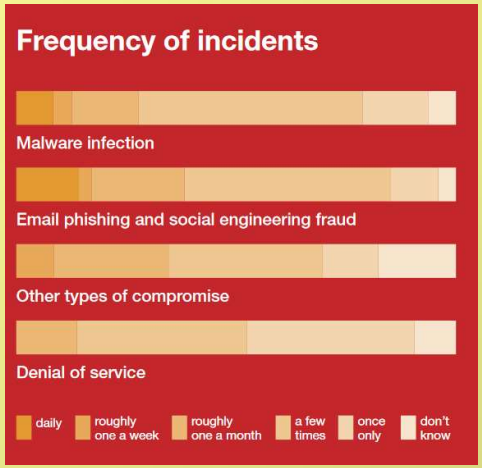
Security Incidents in Australia -1

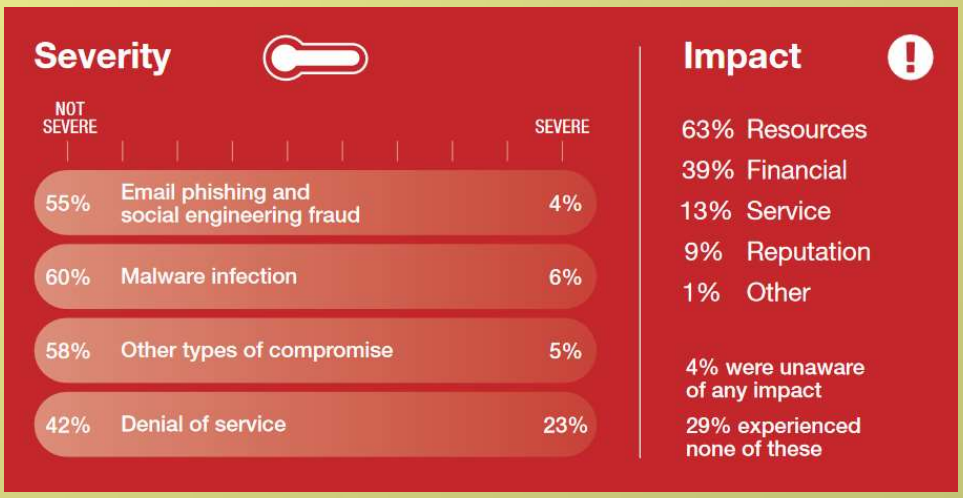
Types of security incidents experienced (2015):

90% of respondents reported that they had experienced a cyber security breach or threat that compromised the confidentiality, integrity or availability of network, data or systems.

58% were successful:

- **42% Malware infection**
- **42% Email phishing and social engineering fraud**
- **20% Other types of compromise**
- **19% Denial of service**

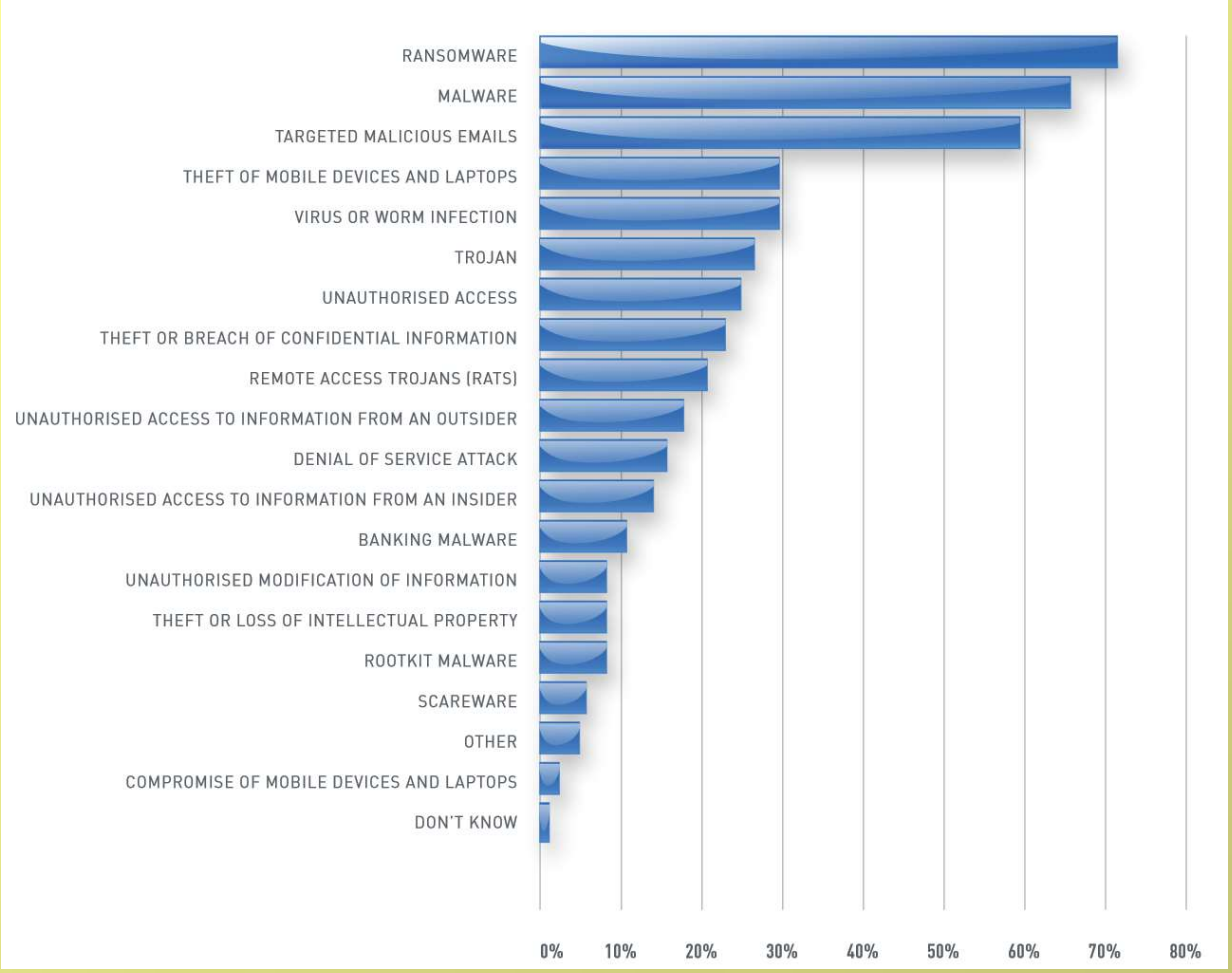




Australian Cyber Security Centre Survey, 2016, figure 9, page 32. See https://www.cyber.gov.au/sites/default/files/2019-03/ACSC_Cyber_Security_Survey_2016.pdf

Security Incidents in Australia -2

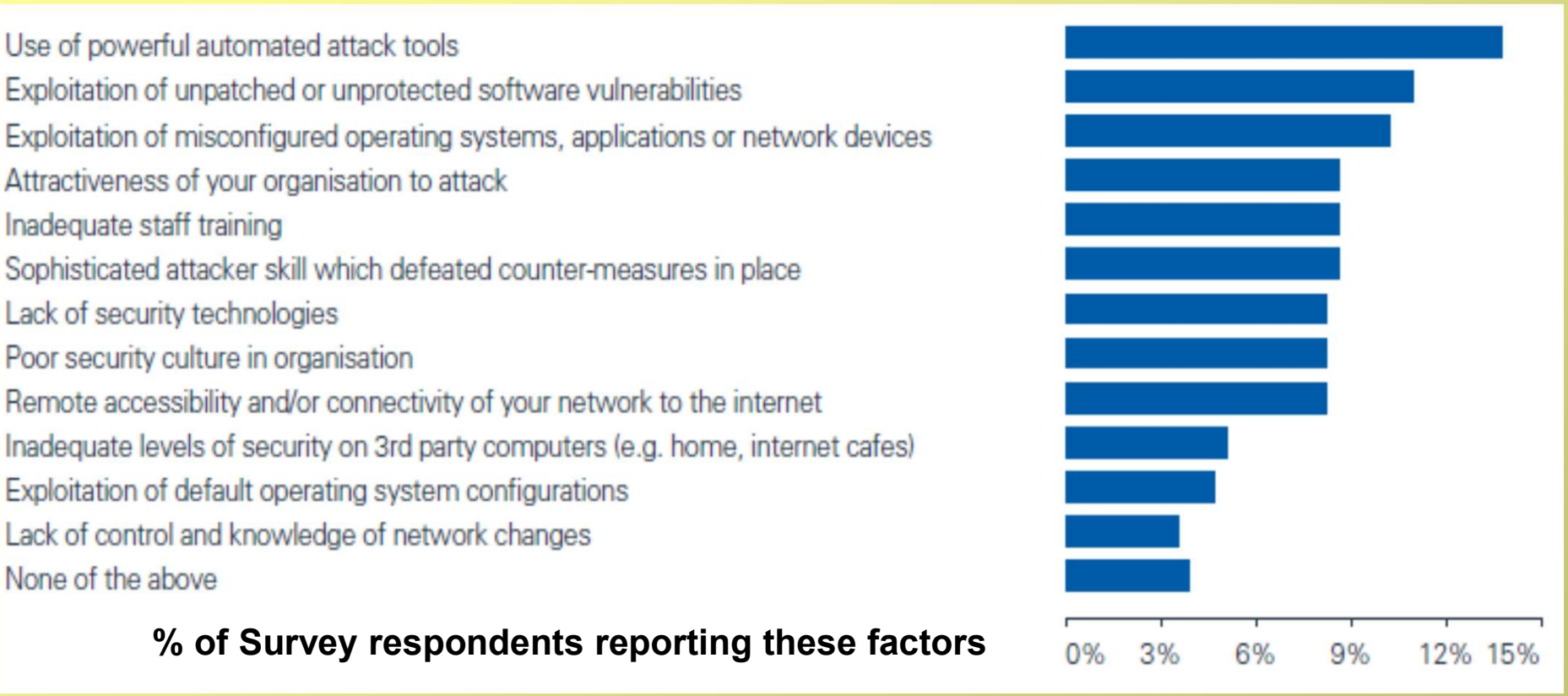
Types of security incidents experienced (2015)



CERT Survey, 2015. https://www.cyber.gov.au/sites/default/files/2019-03/ACSC_CERT_Cyber_Security_Survey_2015.pdf **page 18.**

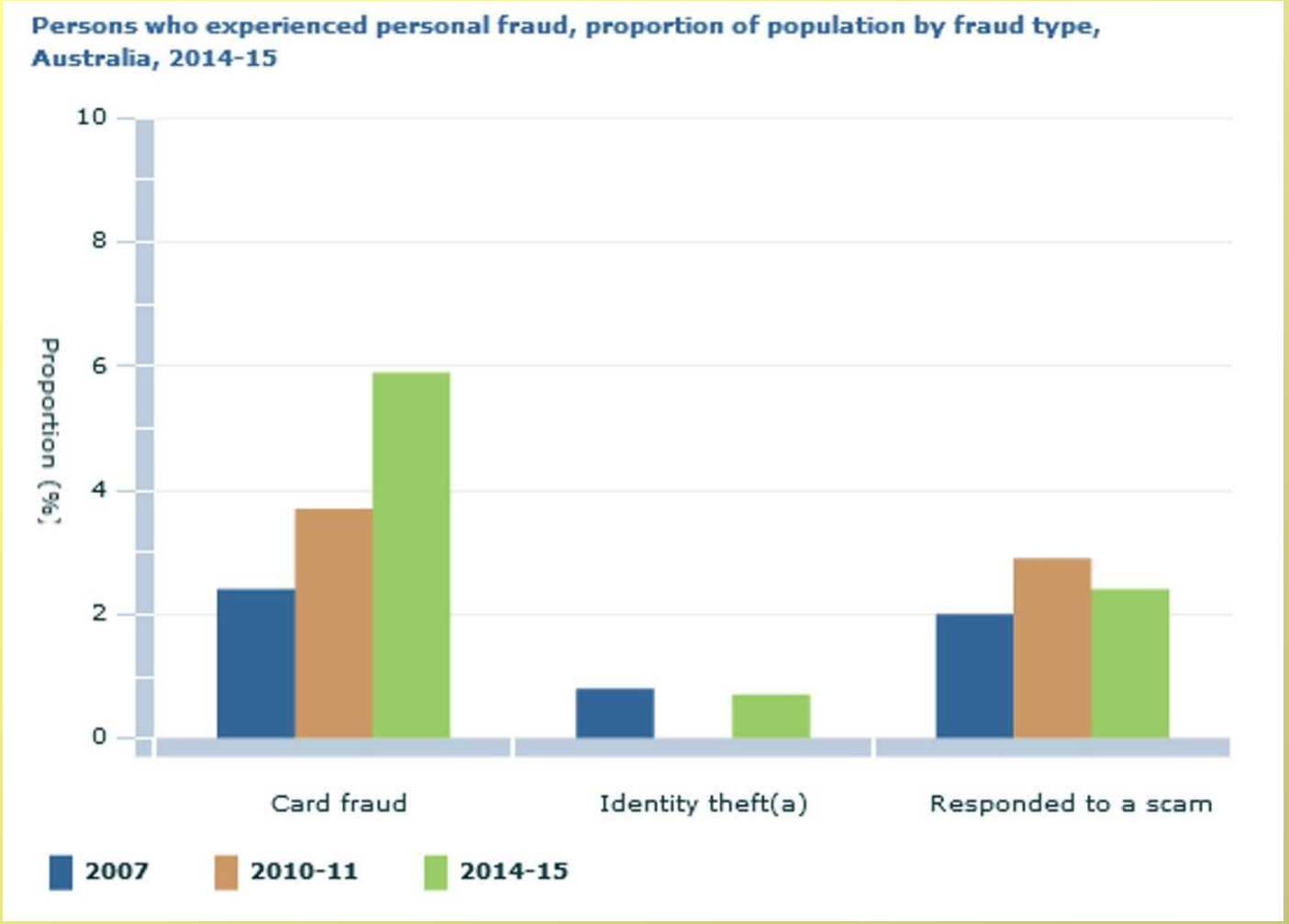
Security Incidents in Australia -3

Factors Contributing to Security Incidents (2012):



CERT Cyber Crime & Security Survey Report, 2012, Figure 12. See https://issat.dcaf.ch/download/18140/211925/Cyber%20Crime%20and%20Security%20Survey%20Report%202012.pdf page 24.

Identity Theft in Australia



(a) Comparable Identity theft data not available for 2010-11

Source ABS: https://www.abs.gov.au/ausstats/abs@.nsf/mf/4528.0

Competent Advice

Cartoon depicting a janitor answering the Tech Support phone after hours, offering a range of technical advice.

www.tedgoff.com

Incentives to "Do the Right Thing"

Destruction of World Trade Centre, 11-Sep-01.

All tenants had adequate information/system backup arrangements in place, as a result of a previous bomb attack.

Photo of World Trade Centre burning 11-Sep-01

Picture: From The Times, 12-Sep-01

2 Types of Hacker

- OLD-TIME ("white hat"):
  - Clever, addicted, insatiable quest for knowledge, a cooperating community, advancing the cause of effective computer programming, development and use.
  - CERT – Computer Emergency Response Team
  - "Hackathons"
- MODERN (generally "black hat"):
  - Gaining access to "private" computers
  - Beating the "system"
  - Electronic graffiti
  - Personal gain, theft, data alteration, etc
  - The Hackers Handbook (1985) – Cornwall/Sommer
  - International crime
  - Espionage
  - The Cuckoo's Egg (1990) – Clifford Stoll
  - Vandalism
  - "Denial of Service" attacks

Hacker "Ethics" and Rationale

- **Ethics:**
  - **All information should be free**
  - **Access to computers should be unlimited and total**
  - **Mistrust authority – promote decentralisation**
  - **Judge hackers by their skill**
  - **True hackers create art and beauty**
  - **Computers can change your life for the better**

  - Levy: *Hackers*

  (see Open Source Initiative)

- **Rationale:**
  - **We're helping to improve security**
  - **It's the fault of the software vendors**
  - **It's the fault of slack security**
  - **We're not doing any harm**
  - **No-one will listen unless we take action**
  - **It helps keep Big Brother at bay**

  [cf justification offered by Assange, Snowden]

Blaming the Computer

Cartoon of computer taking the blame for a sales nose-dive (jumping out the window).
From ENTEC Catalogue, UK, Oct 95

Clients Adding Features

Cartoon of client arriving with a huge pile of last-minute specification changes.

www.tedgoff.com

Use of Spare PC Capacity

- Setting up idle PCs so their CPU capacity can be used for "community" projects, eg:
  - SETI
  - Cancer Research
  - Anthrax Research
  - Search for Prime Numbers
  - Analysing radio-telescope data
- Harnesses dramatic amounts of processing power
- Potential breakthrough in AIDS Research already made
- Unauthorised use

What steps should be taken before using Company computers for this purpose?

UWA adopted a policy covering use of spare capacity of its PCs in 2002 [this particular policy is no longer extant]

Spare PC Capacity -1

From Edupage, January 23, 2002

RESEARCHERS RECRUIT PC USERS FOR ANTHRAX PROJECT

The Anthrax Research Project has launched a distributed computing project to try to develop a cure for anthrax, using computer-aided molecular analyses. Individuals can download a screen saver program and contribute some of their PC's unused processor cycles to the effort, creating a supercomputer that analyzes billions of molecules, the group said. Members of the group, including Intel, Microsoft, United Devices, the National Foundation for Cancer Research, and Oxford University, promise users that the system is secure and private. The screen saver operates whenever resources are available for computation; results are sent back to a data center run by United Devices.

(Reuters, 22 January 2002)

Spare PC Capacity -2

From Edupage, January 18, 2002

CRIMINAL CHARGES SETTLED IN DISTRIBUTED-COMPUTING CASE

David McOwen, a former systems administrator at DeKalb Technical College in Georgia, faces a $2,100 fine and 12 months probation for linking a number of the college's computers to Distributed.net in order to break a code using idle computing cycles. McOwen had originally faced criminal charges, because the state had determined that McOwen had used up hundreds of thousands of dollars worth of the college's computing time since installing the software in 1999. The criminal charges came as a nasty surprise to a lot of participants in distributed-computing initiatives, who are also often members of college or university computing departments. McOwen's advocates, including the Electronic Frontier Foundation, said the agreement reached between McOwen and state prosecutors was a lot better than if McOwen had been convicted in a criminal trial. Such a conviction could have landed the former systems administrator in jail for several years, on top of hundreds of thousands of dollars in restitution and fines.

(Newsbytes, 17 January 2002)

Spare PC Capacity -3

THES News Round-up: Thursday, 13 March 2003

Scientists fine-tune hunt for ET

Radio astronomers are to focus on 150 locations in space next week in the search for ET. They have narrowed the hunt for extra-terrestrial civilisations to a selection of star systems, thanks to Seti@home, a screensaver package downloaded by more than 4 million computer users that is the world's biggest computing exercise. When no one is using their computer, it works on data from the radio telescope at Arecibo in Puerto Rico, which is sent to it over the internet.

(Guardian)

Spare PC Capacity -4

Article dated 30-May-11 entitled "Largest Telescope in the World to Rely on Crowdsourced Computing Power".

http://www.news.uwa.edu.au/201202224371/volume-7-edition-1/skys-limit-users-theskynet

Other Relevant Case Studies

- A number of actual situations can be found in ACS Code of Professional Conduct Case Studies, with relevant sections of the Code identified – see https://www.acs.org.au/content/dam/acs/elected-members/pab/EthicsCommittee/ACS%20Code%20of%20Professional%20Conduct%20Case%20Studies.pdf.
- Several good case studies are presented in the context of the ACS Code of Ethics in the *Information Age* article below.
- Students are strongly encouraged to read these case studies.
- Burmeister, Oliver K: "Applying the ACS Code of Ethics", *Information Age*, Feb/Mar 2001, pp54-59, and in the subsequent 3 issues (Apr/May, Jun/Jul, Aug/Sep, 2001). Also published as: Burmeister, Oliver K: "Applying the ACS Code of Ethics", *Ethics in Computing*, v32, n2, May 2000, pp107-119.
- This analysis is based on that which first appeared in 1993 as follows:

  Anderson, Ronald E et al: "Using the New ACM Code of Ethics in Decision Making", *Communications of the ACM*, v36, n2, Feb 1993, pp98-106.
- A selection of thought-provoking case studies were published in *Information Age* in Oct/Nov 2018 – see https://ia.acs.org.au/article/2018/ethics-part-1--artificial-influencers.html.
- Other helpful case studies can be found in Bynum, Terrel Ward & Rogerson, Simon, eds: "Computer Ethics & Professional Responsibility: Introductory Text & Readings", Blackwell, 2004

Case Study Survey

CITS3200 Ethics Case Studies:

- This is a set of simple Case Studies designed to help you understand some of the Ethical Issues you may face as a computer professional.
- Your responses will be recorded and aggregated with others from the 2021 CITS3200 Class (they will be kept anonymous).
- Average responses will be published in a table later this Semester (with comparisons from earlier years).
- You may suspend answering at any time and resume later.

This Survey is available here:

http://uwa.qualtrics.com/jfe/form/SV_6DnHaKB3CTTZLuZ

Or can be accessed via the CITS3200 Website

https://teaching.csse.uwa.edu.au/units/CITS3200/resources.html

Please attempt this Survey now.

END OF LECTURES

Bibliography

http://www.alex-reid.com/Computer-Ethics-Bibliog.html

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https://teaching.csse.uwa.edu.au/units/CITS3200/resources.html