THE UNIVERSITY OF WESTERN AUSTRALIA

Ethical Issues for Computing Professionals CITS3200

Alex Reid
Honorary Professorial Fellow, CSSE
The University of Western Australia

COPYRIGHT

COMMONWEALTH OF AUSTRALIA

Copyright Regulations 1969

WARNING

Some of this material has been copied and communicated to you by or on behalf of the University of Western Australia pursuant to Part VB of the *Copyright Act* 1968 **(the Act)**.

The material in this communication may be subject to copyright under the Act. Any further copying or communication of this material by you may be the subject of copyright protection under the Act.

Do not remove this notice.

Note: all Web references in these Powerpoint slides verified as at 4-Aug-16

CONTENTS

A. Why Computer Ethics?
B. Some Ethical/Moral/Social Issues
C. Intellectual Property
D. Requirements of a Professional
E. Australian Computer Society Code of Ethics
F. ACS Code of Professional Conduct
G. Case Studies

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.
6. Provide background for your essay.

Why Computer Ethics #1?

- **Computer Professionals, as Technologists, Can't Avoid Considering Social Consequences:**
  - **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?

- **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.**
  - **advances in IT will create policy vacuums.**
  - **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):**
  - **Possible policies implemented by a user's Web Browser when accessing a Web Site in regard to the user's disk:**
    a. **do not change user's disk at all.**
    b. **allow user to decide if a cookie is to be left on the user's disk or not.**
    c. **leave a cookie on user's disk but inform them it's there.**
    d. **leave a cookie on user's disk without their knowledge.**
    e. **removal of data from user's disk without their knowledge.**
    f. **arbitrary destruction of data on user's disk.**

Note that, 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. Sources of Ethical Standards:

- Utilitarian approach
- Rights approach
- Fairness or Justice approach
- Common Good approach
- Virtue approach

Framework for Thinking Ethically -2

3. Decision Framework:

- Recognise an Ethical Issue
- Get the Facts
- Evaluate Alternative Actions - Which Option 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 be 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 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

- **Software Errors** – who is responsible for errors later found in software?
- **Over-Optimistic Cost Estimation** – are such estimates just misleading?
- **Public Trust** – the fact that people trust your judgement brings a duty with it.
- **Copy Files/Music** – is it “theft” even when the owner still has the file?
- **Copy Software/Music** – is it OK if all you want to do is find out if it’s worth buying?
- **Hacking** – does lax security legitimise in any way hacking into someone’s computer?
- **Viruses** – if they help to expose system weaknesses, are they justified?
- **Chain Email** – is there anything wrong with it?
- **Spam Email** – is there something wrong with email that this has become possible?
- **Security** – why is the protection of computer data different?
- **Backups** – is there ever an excuse for not having a backup?
- **Privacy** – if someone hasn’t protected their files, isn’t that an invitation to look at them?
- **Webcams & Privacy** – are there circumstances when covert surveillance is OK?
- **Anonymity** – is it wrong to send anonymous emails, or to spoof them?
- **Company Internet** – can I use my company email address for my personal use?
- **Reverse Engineering** – you’re not *copying* the software, so is it wrong?
- **Manipulating Photographs** – isn’t it just like “selective reporting”, ie OK?
- **Intellectual Property** – some people have the idea that if it’s on the Web, then it’s free.

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.**
- **Therac-25 cancer radiotherapy machine – 4 US deaths (1985-7).**
- **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.**

STOP PRESS:
Census Website Failure… 9-Aug-16

… 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

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

Why is Software so prone to Catastrophic Failure?

- Complexity
- Error Sensitivity – non-linear, non-continuous (non-proportional)
- Hard to Test
- 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 we would use on a regular basis software known to have significant numbers of bugs.

Robbie the Killer Robot

- Industrial Robot killed its operator
- 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 www.onlineethics.org/Resources/Cases/killerrobot.aspx

More recent actual deaths:

- Volkswagen car manufacturing robot kills worker 2-Jul-15: http://www.theinquirer.net/inquirer/news/2416043/volkswagen-worker-crushed-to-death-in-robot-maintenance-accident;

- 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.

Robots throw some of these issues into strong relief:

I, Robot

Metropolis

Blade Runner

Pictures of various humanoid robots, mostly from movies.

Asimo

Ex Machina

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, *AAAI Spring Symposium on Ethical and Moral Considerations in Non-Human Agents*
https://web.eecs.umich.edu/~kuipers/research/pubs/Kuipers-sss-16.html

Therac-25 Radiation Treatment Machine (1985-1987)

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

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

Developing Software for On-Line Ordering/Payment

- Estimated to take 6 mo with 2 programmers (+ you as manager/analyst).
- Clients told it will be available in 6 months.
- After 3 mo, you realise it's going to take 12 mo (ie 6 mo more), because:
  - User specifications changed (1.5 mo).
  - Regulatory requirements changed (1.5 mo).
  - Technical difficulties (1 mo).
  - Staff resignation (1 mo).
  - Too optimistic in 1st place (1 mo).
- What to do? [what things are at stake? to whom do you have a responsibility?]
  1. Resign – go work in a fast-food shop.
  2. Work unpaid double-time, you too (= 3x person-hours) => finish on time.
  3. Tell management it won't be ready and nothing can be done about it (blame it all on the user spec/regulatory changes).
  4. Combination of 2 and 3.
  5. Introduce a cut-down version after 7 months (no credit card checking, manual delivery of credit card debits to clearance house).
  6. Something else?

Intellectual Property

- Copyright Act
- Moral Rights
- Digital Agenda Amendments
- Fair Dealing, Section VA/B
- Attribution, Plagiarism
- Software Licences
- Shrink-Wrap Licences, Web Extensions
- Employer *versus* Programmer 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: 50 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 sections VA & 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

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

Website for The Shetland News

Settled out of court Nov 1997

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

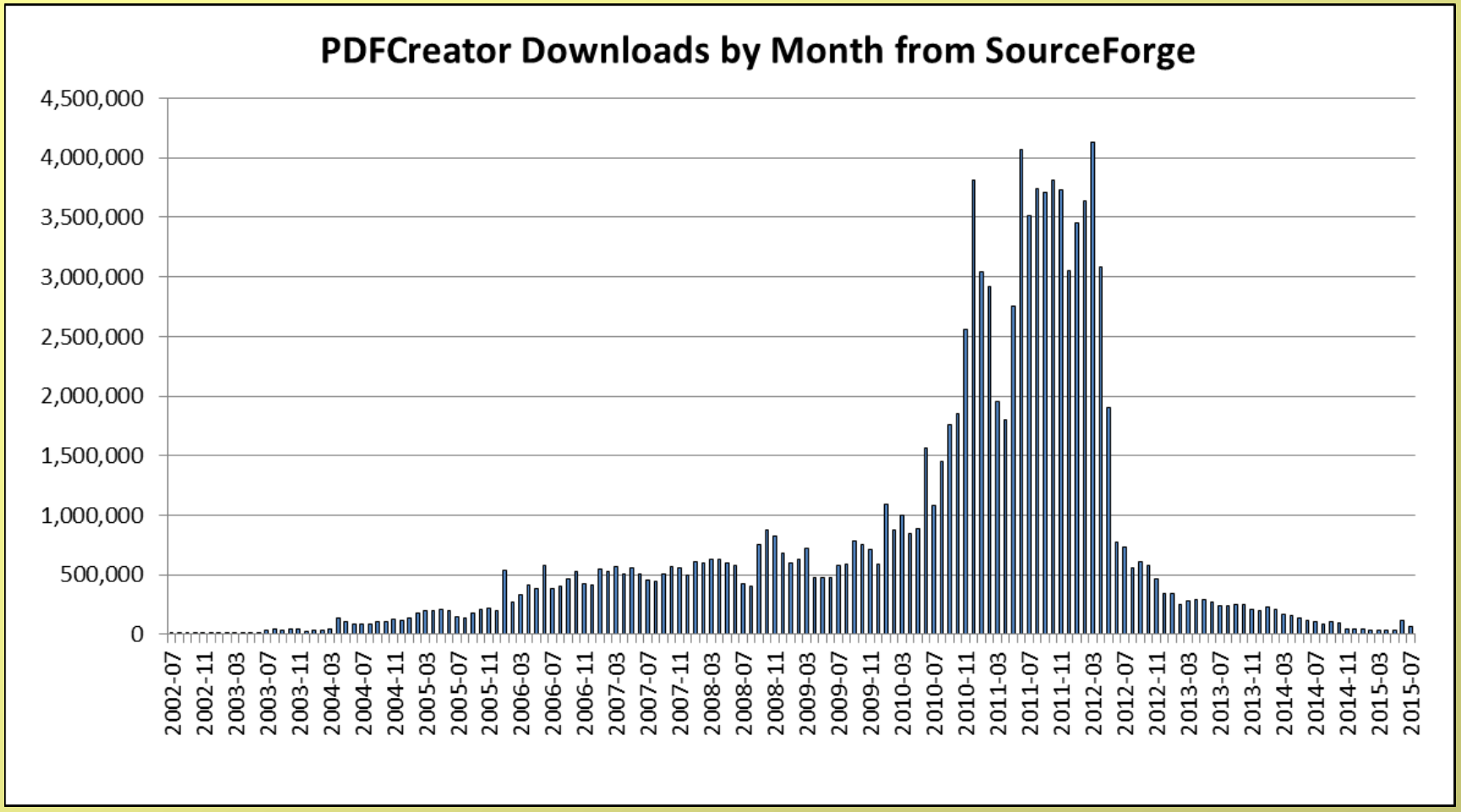
Framing: The Washington Post Co., et al. v. TotalNews Inc, et al, filed Feb. 2, 1997: see http://www.netlitigation.com/netlitigation/cases/post.htm

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/
- European Commission – eg "Pooling Open Source Software" Report http://ec.europa.eu/idabc/servlets/Doc740b.pdf?id=1977
- 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

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 MP3 Files

- You are the Systems Administrator for your medium-sized Company.
- Your Company has a Policy that allows “moderate” use of Company computers and Internet access for private purposes.
- In the course of monitoring traffic levels, you notice very high incoming traffic volume to one computer within the Company.
- Upon investigation, you believe that one employee is downloading large quantities of MP3 files.
- What do you do?
  1. Impose a “throttle” on the line to that PC?
  2. Take up the matter with the employee?
  3. Report the matter to your/his boss?
  4. Take some other action? What?

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**

Touching-up Graphics

Celebrity Pics

Before and After photoshoped photos of certain celebrities, Fashion Magazine cover models, etc.

Matthew McFadden
Michael Phelps
Lesley Garrett
Avril Lavigne

http://10steps.sg/inspirations/artworks/40-cool-before-and-after-photo-retouching-photos/

Enhancing Photos

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

www.tedgoff.com

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/

Use of Copied Graphics

- You are the Systems Administrator for a medium-sized Company.
- The responsibility for publishing material on Websites is distributed to many employees within the Company.
- As formal Webmaster for the Company, you receive an email from an unknown company stating that images owned by it have been mounted on your Company's Website, and that legal action will be taken if they are not removed within 24 hours.
- You locate the "offending" Website, and its owner states that the images are owned by this Company, and their presence there is essential to the Company's doing business (but he can't produce documentation within the 24-hour limit).
- What do you do?
  1. Bar that Website from external access pending further investigations?
  2. Take no action – call the other company's bluff?
  3. Advise Management, seek legal advice, but don't bar the site?
  4. Take some other action? What?

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)

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):**
  - **It is basically intellectual, carrying with it high responsibility**
  - **It is learnéd 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**
  - **Defined performance standards**
  - **Members committed to maintain performance standards, 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:

- 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/__data/assets/pdf_file/0005/7835/Code-of-Ethics.pdf

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

https://www.acs.org.au/__data/assets/pdf_file/0014/4901/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.

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:
  - identify those to whom you owe any kind of duty;
  - assess the extent of harm potentially incurred by each person or category;
  - assign priorities to the duties owed;
  - identify possible alternatives;
  - 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…

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

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

Spam - What is Our Responsibility?

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

www.tedgoff.com

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

Examining Email Contents - I

- You are the Systems Administrator at your medium-sized Company.
- Your Company does not allow its systems to be used for private email, ie only company email.
- Your boss requests you to obtain copies of all email to/from a particular employee.
- What do you do?
  1. Comply?
  2. Comply but tell the employee?
  3. Refuse without the employee's consent?
  4. Take the matter higher?
  5. Refuse?
- Would it make any difference if:
  1. The Company had no clear policy about private use?
  2. The Company policy had made it clear it could monitor employees' email?

Examining Email Contents - II

- You are the Systems Administrator at a university college.
- The university and the college have strict rules about email confidentiality.
- One of the college inmates, an under-age, 14-year-old girl, has gone missing.
- The college Warden asks you to make copies of all email to/from her account for the past month, so he can look for clues as to her whereabouts and associates.
- What do you do?
  1. Agree?
  2. Agree only with the consent of the parents?
  3. Agree only with an official request from the police?
  4. Take some other action? What?
- Would it make any difference if the parent had asked, and no-one else?

Examining Email Contents - III

- You are the Systems Administrator at a medium-sized Company.
- The Company has strict rules about email confidentiality.
- In the course of routine system checking, you come across fragments of email that appear to indicate that a workmate is having an affaire with the spouse of a friend.
- The friend is suspicious and asks you if you have seen any evidence.
- What do you do?
  1. Pretend you know nothing?
  2. Henceforth monitor all email to/from your work colleague?
  3. Confront the work colleague?
  4. Keep a record of all email, bide your time, waiting for evidence from some other source?
  5. Take some other action? What?
- Would it make any difference if the email fragment instead indicated that your work colleague was: (a) ripping off your employer? (b) compromising another workmate? (c) planning some illegal activity?

Viruses – What's Our Responsibility?

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

www.tedgoff.com

Hoax Virus

- **Exploits naïve users**
- **Exploits unusual icon for system file**
- **Advises user to delete file**
- **Advises user to forward to everyone they know**
- **See www.hoaxbusters.org/ or http://www.snopes.com/**

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

- You are the Systems Administrator for your medium-sized Company.
- Your Company allows private email, and has a strong confidentiality policy.
- The volume of viruses has been on the increase, and staff are not implementing the recommended procedures (eg keeping virus protectors up to date); this is creating additional workload for you.
- You are convinced that a straightforward, and ultimately less expensive, solution would be to check all email at entry to (end exit from) the Company, but the employees and the Company object on the grounds that this would make covert email snooping easier.
- What do you do?
  1. Comply?
  2. Take the matter to the CEO?
  3. Resign?
  4. Take some other action? What?

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: but it went badly wrong because people took it as a real attack and widely distributed it, and the authors didn't clear it with the *real* company.
- 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?

Monitoring Employee Activity

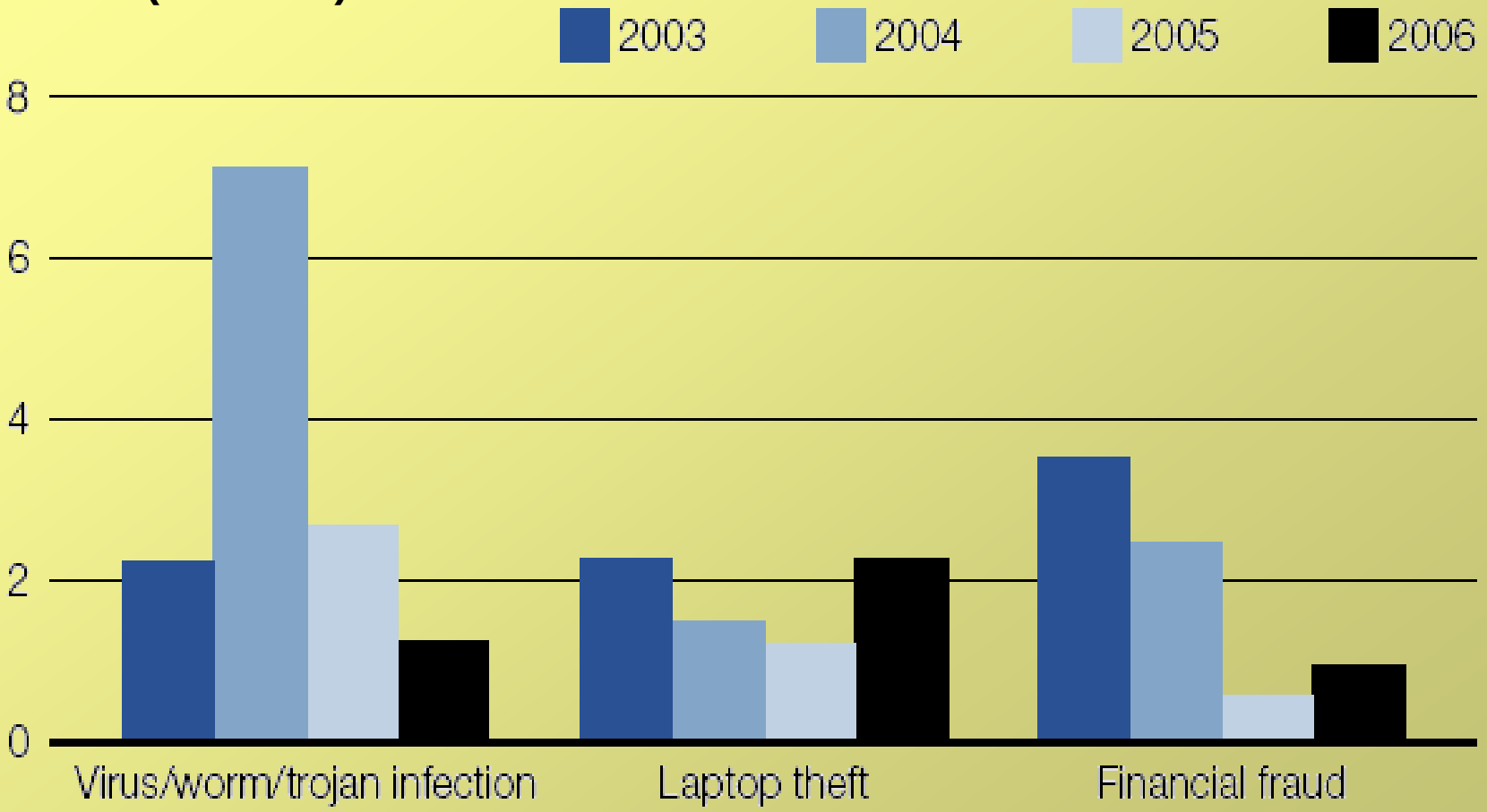
- You are the Systems Administrator at your medium-sized Company.
- You have installed a system allowing a “Common Desktop Environment” or “Standard Operating Environment, SOE” to be deployed throughout your Company, which also provides various tools for remotely monitoring desktop activity - primarily to enable you to undertake remote Helpdesk functions.
- Your boss sees the potential to monitor other aspects of employee activity, and asks you to start collecting a range of statistics, such as keystroke rates for keyboard staff, Websites visited, numbers and volumes of email created, etc.
- What do you do?
  1. Agree?
  2. Agree only if employees are notified?
  3. Agree but notify employees of the proposal?
  4. Refuse and notify employees of the proposal?
  5. Take some other action? What?

Supervisory Powers

- You are the Systems Administrator at your medium-sized Company.
- You have installed a system allowing a "Common Desktop Environment" or "Standard Operating Environment, SOE" to be deployed throughout your Company, which also provides various tools for remotely monitoring desktop activity – primarily to enable you to undertake remote Helpdesk functions.
- Your boss requests you to install this "supervisory" capability also on his PC; with this he could monitor all sorts of employee activity, including "snooping".
- What do you do?
  1. Agree?
  2. Agree only if employees are notified?
  3. Agree but notify employees of the proposal?
  4. Refuse and notify employees of the proposal?
  5. Take some other action? What?

Security Incidents in Australia -1

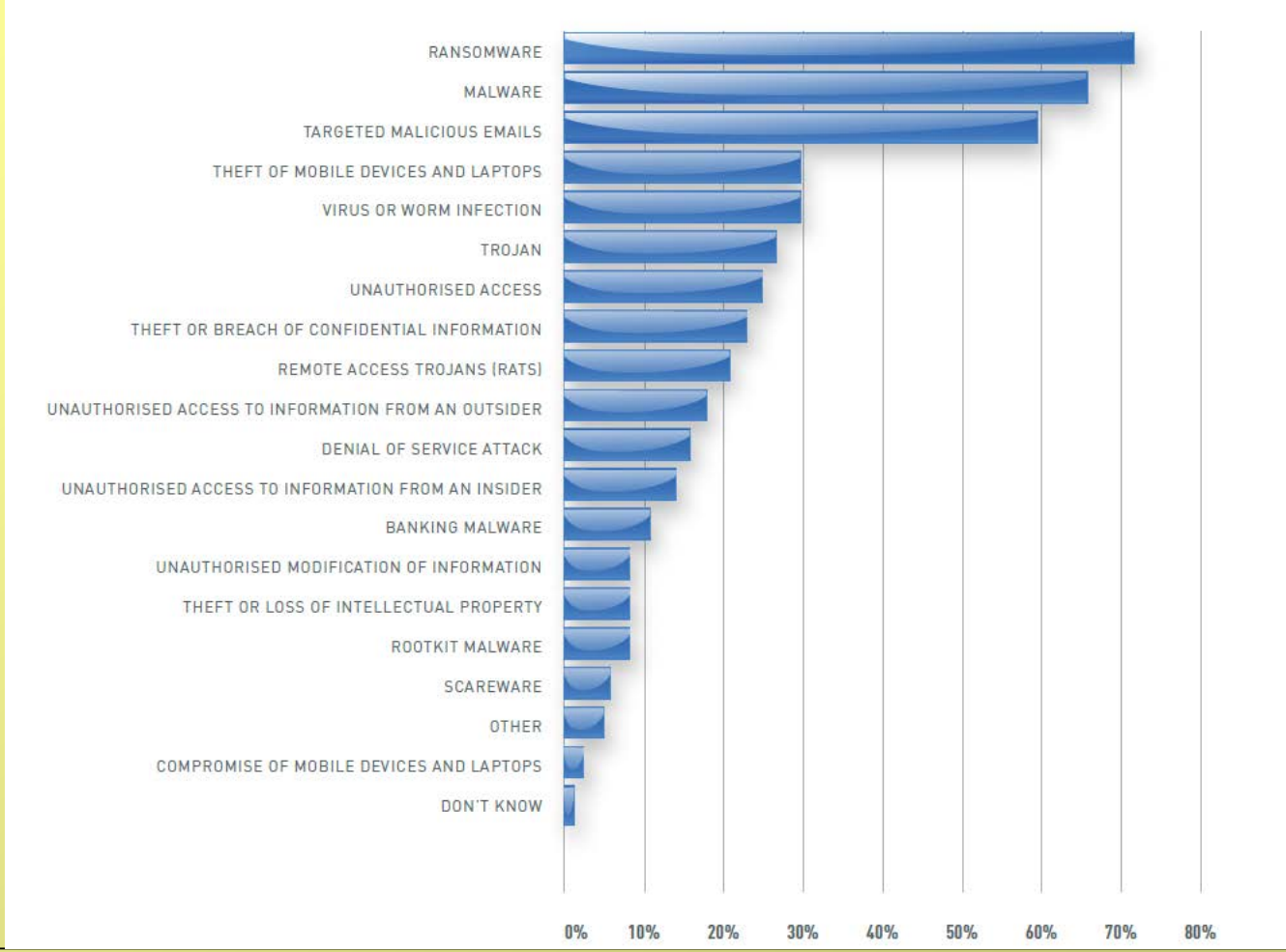
Major sources of financial loss due to computer crime and security breaches, 2003-06 ($ million)



AusCERT Survey, May 2006, Figure 51.
See http://www.aic.gov.au/publications/current%20series/facts/1-20/2006/3%20crime%20victimisation.html.

Security Incidents in Australia -2

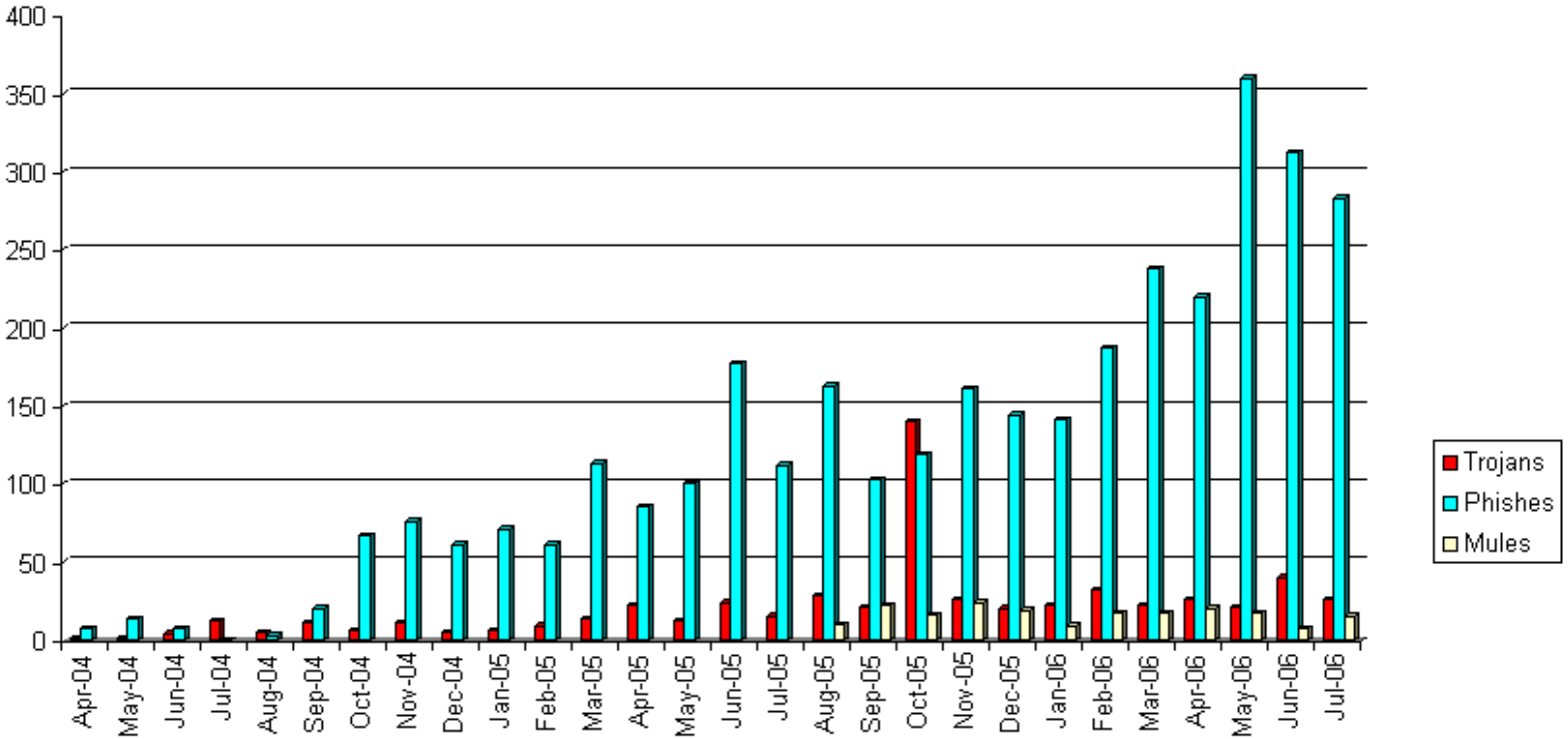
Types of security incidents experienced



CERT Survey, 2015. See https://www.cert.gov.au/system/files/614/691/2015-ACSC-Cyber-Security-Survey-Major-Australian-Businesses.pdf page 18.

Security Incidents in Australia -3

ID Theft Incidents Handled by AusCERT 1-Apr-04 to 24-Jul-06

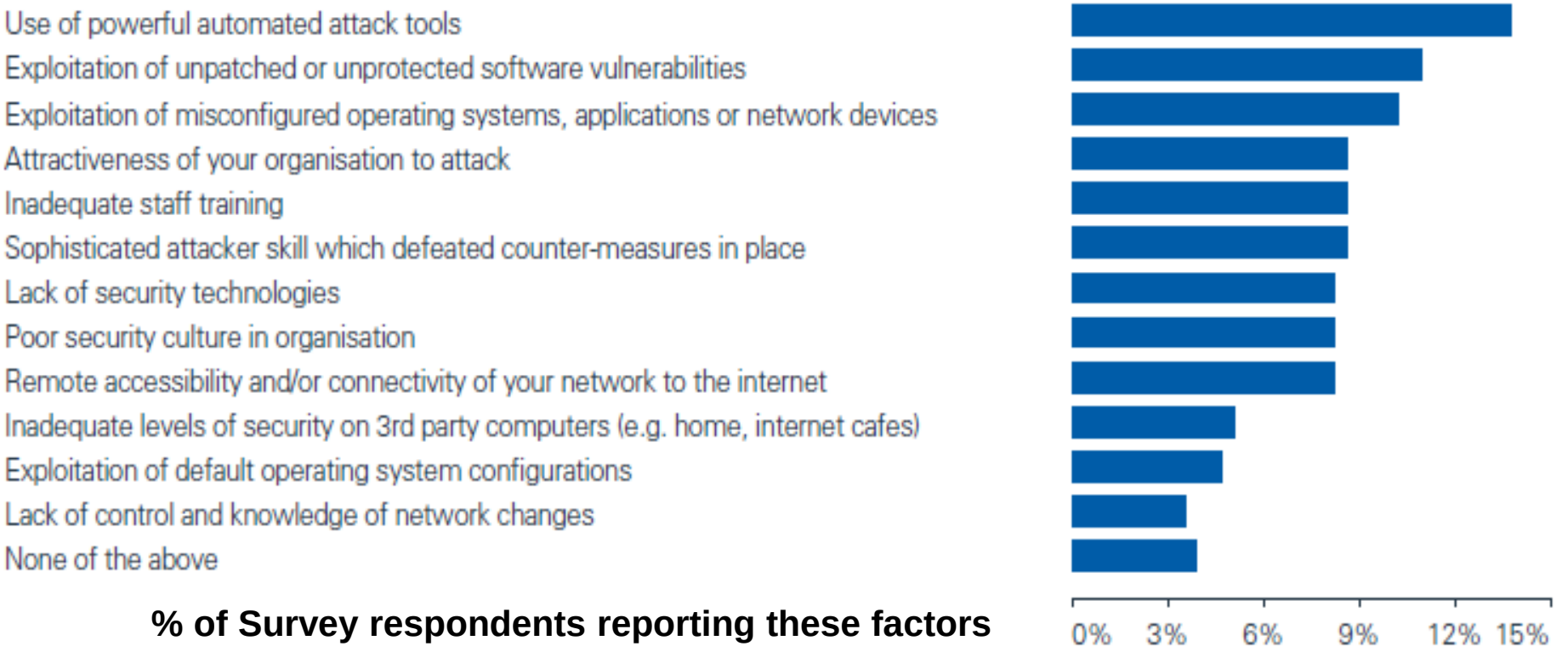


Each incident represents a single unique URL or domain name that is hosted by one or more hosts in a distributed approach to stealing sensitive information and access credentials from computers. The number of distributed IPs associated in a single attack is variable but can range from 1 to around 100.

Source: AusCERT (private communication 15-Jul-06)

Security Incidents in Australia -4

Factors Contributing to Security Incidents:



CERT Cyber Crime & Security Survey Report, 2012, Figure 12. See https://www.cert.gov.au/system/files/614/679/Cyber%20Crime%20and%20Security%20Survey%20Report%202012.pdf page 24.

Security Competence

- You are the Systems Administrator at your medium-sized Company.
- Your Company is subject to increased (but not yet disastrously high) levels of hacker attacks.
- The IT Committee agrees that a Firewall should be installed ASAP, and it falls to you (as the most competent person) to do so - you see this as a great career opportunity.
- But you have no experience/knowledge at all with Firewalls.
- What do you do?
  1. Ask for time and funds to attend a suitable course (but none is available for some months)?
  2. Scan the Web for suitable information to enable you at least to be able to use the correct jargon (eg www.webopedia.com or http://foldoc.org/ or http://whatis.techtarget.com/)?
  3. Quickly buy and devour a suitable textbook?
  4. Recommend employing a firm of technical consultants?
  5. Take some other action? What?

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.**
- **MODERN (“white hat” and “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**
  - **CERT – Computer Emergency Response Team**
  - **“Hackathons”**

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]

Systems Security Responsibility

- You are responsible for Computer Systems Security at your medium-sized Company.
- You have formulated and received Company approval for a backup policy, requiring all PC owners to undertake backups at least once per week.
- However, you are continually asked to retrieve lost files, which have not been properly backed up; you do not have the time to do this, nor to constantly badger employees to undertake backups.
- What do you do?
  1. Just put up with it?
  2. Continue nagging, without much hope of improvement?
  3. Complain officially to Management, perhaps fingering some individual(s)?
  4. Request approval to spend large amounts of money on automating it (centrally)?
  5. Resign and join a company that does take this seriously?
  6. Take some other action? What?

Unintelligible Reports to Management

- You are responsible for Computer Systems Security at your medium-sized Company.
- You identify some areas of vulnerability, and prepare a Report to Management setting out the measures that need to be put in place to address these; the Report is largely written in terms of which ports to be barred via a Firewall.
- Management cannot understand the Report and will not act until it knows what steps you are advocating. You cannot think how else to express what you had to say. There is no-one else in the Company that might be able to help.
- What do you do?
  1. Refuse to rewrite it – "be it on their own heads"?
  2. Take a course in "clear English expression"?
  3. Contact a colleague at another Company and ask for help?
  4. Ask for funds to engage an external consultant?
  5. Ask for funds to engage a technical writer to rewrite it?
  6. Take some other action? What?

Blaming the Computer

- You are the IT Manager at a small government department.
- A recent computer problem resulted in many regular cheques to pensioners being delayed for several days.
- The Minister has prepared a Press Release in which he blames the problem on a "Computer Malfunction".
- However, you know that the following factors (only) were involved:
  - a rapid change to an operational system in order to accommodate a "refinement" required by the Minister;
  - a poor system specification;
  - a consequent programming error.
- What do you do?
  1. Keep quiet?
  2. Complain to the Minister's Office that it is misleading?
  3. Take up the matter with your Head of Department?
  4. Take some other action? What?

Blaming the Computer

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

Quick Patch *versus* Full Rewrite

- You are the IT Manager at a small government department.
- You have been requested by the relevant Government Minister to make some changes to a key operational computer system, and to make them within 2 weeks.
- It has already been agreed that this system cannot be patched any further, but must be completely rewritten; this will take at least 6 months, and work has already commenced.
- Any further patching of the existing system carries a very high risk of the whole system failing.
- What do you do?
  1. Refuse the Minister's request (with all the political fallout that would produce)?
  2. Endeavour to comply as best you can?
  3. Comply, but make sure you have on record that you only did so under sufferance?
  4. Take some other action? What?

Clients Adding Features

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

www.tedgoff.com

Project Estimation Errors

- You are the IT Manager for a medium-sized Company.
- Your team has been embarked for 4 months on the development of a major system of critical importance to the Company.
- You discover that progress is about 50% of what you had planned, mainly because your estimates had been greatly optimistic, in order to ensure your team was awarded the contract.
- Many other parts of the Company are dependent on delivery of this system on-time.
- What do you do?
  1. Keep quiet and hope it “goes away”?
  2. Encourage your team to redouble their efforts to catch up for lost time?
  3. Take on more staff to help speed up development?
  4. Blame the delays on “external factors”, like programmer sickness, specification creep, etc?
  5. Frankly discuss/confess the matter with Management, thus risking losing much credibility?
  6. Take some other action? What?

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?

See http://www.is.uwa.edu.au/it-help/policies [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)

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

Investigate Suspicious Activity

- You are the Systems Administrator for your medium-sized company.
- Someone reports to you (anonymously) that Person X has been using company computers and access to the Internet to download hard-core pornographic material.
- If you go to Person X and confront them (or raise the matter in a delicate manner), they'll almost certainly deny it and remove the evidence.
- What do you do?
  1. Using your system privileges, first check this out, then confront Person X?
  2. Using your system privileges, first check this out, then take it to your or Person X's boss?
  3. Ignore the allegation?
  4. Go to your or Person X's boss first, even though this may be a hoax?
  5. Take some other action? What?
- Would it make any difference if it was (a) soft-core pornography? or (b) child pornography?

Moderating Employee Discussion Forum

- You are the Systems Administrator at your medium-sized Company.
- Your Company has set up an on-line Discussion Forum to encourage employee discussion/participation.
- Various employees repeatedly post comments which are critical of Company policies, practices, etc.
- Your boss asks you to change it to become a Moderated Forum, with him as the Moderator (this will enable him to refuse any postings he wishes).
- You believe this is designed to stifle criticism.
- 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?

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.

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://acs.org.au/__data/assets/pdf_file/0004/30964/ACS_Ethics_Case_Studies_v2.1.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.
- Other helpful case studies can be found in:

  Bynum, Terrel Ward & Rogerson, Simon, eds: "Computer Ethics & Professional Responsibility: Introductory Text & Readings", Blackwell, 2004

QUESTIONS?

Bibliography

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