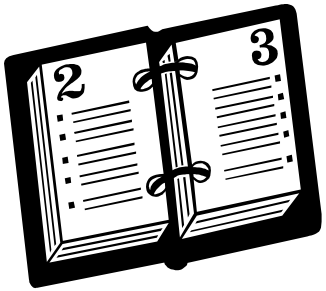
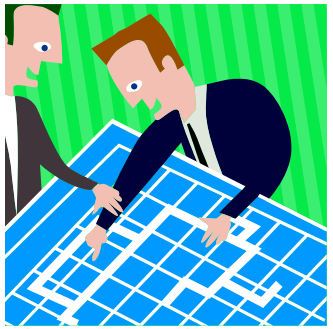
THE UNIVERSITY OF SYDNEY

INFO5990 Professional Practice in IT

Lecture 11A





Professional dilemmas in Information Technology

Will cover 3 case studies today

Team presentations

5-7 min only each !

Supplementary Slides

At the back

Group Assignment

- Marks not always what you think.
- Some critical information may be missing.
- Some very good proposals
- Some rushed – some do not come to classes – the results are there to see !! /
- Hard work does not mean marks !
  - It means meeting the requirements
- Ask who is the client / audience of your report !
- What they need to know/understand
- Marks will range between 45-90%
- Respect for the Professor in the mark you have !

By the end of this lecture you will be able to:

- Appreciate the issues raised in the professional/ethical dilemmas studied
- Make informed decisions in cases of professional dilemmas that you encounter
- Make informed decisions about the pros and cons of whistleblowing

Professional Dilemma's

To show both these

https://www.youtube.com/watch?v=A-6QnKuJs5o

https://www.youtube.com/watch?v=loXqK6D6lbk

Review: What does "*behaving ethically*" mean for IT professionals

- 'Unethical' does not necessarily mean 'unlawful' or 'illegal'
- 'Ethical' means behaving according to the code of ethics of your profession
- One way of thinking about 'ethical':

  "would you be happy to see details of your dealings on the front page of the Sydney Morning Herald"

Case study 1
The Flaw in Intel Pentium chip

Flaw in Intel Pentium chip

Dr. Thomas R. Nicely's email

It appears that **there was a bug in the floating point unit (numeric coprocessor) of many, and perhaps all, Pentium processors.**
For example, 1 / 824633702441.0 is calculated incorrectly (all digits beyond the eighth significant digit are in error).
…

By computing (824633702441.0)*(1/824633702441.0), which should equal 1 exactly. However, the Pentiums tested return 0.9999999996274709702 for this calculation.

Faulty Pentium arithmetic

(824633702441.0)*(1/824633702441.0)

= 0.99999996274709702

Result should be 1.0000000000000000

Pentium chip time line

- In 1994 the pentium processor was used in 80% of PCs
- **June 1994:** Intel testers discover a division error in the Pentium chip. Users were not notified. Deliveries continued.
- **October 19:** Dr. Nicely is certain that the error he found is caused by the Pentium processor
- No response from Intel.
  Flurry of posts to group notice boards

Pentium chip time line (ctd)

- **November 27**: Intel agrees to replace chips for users *"engaged in work involving heavy duty scientific/floating point calculations".*
- **December 12:** IBM halts shipments
- **December 20:** Intel apologizes. Agrees to replace flawed Pentiums upon request. Sets aside $420 million to cover costs.

The Flaw in the Intel Pentium Chip
The facts

- Flaw: incorrect answers given only when performing certain double-precision arithmetic
- **Intel claimed the flaw to be insignificant**
- Pressure brought to bear through the internet
- After much pressure from publicity, Intel agreed to replace all flawed chips upon request

The Flaw in Intel Pentium chip
Ethical questions

- What was the responsibility of the engineers once they were aware of the flaw?
- Would it have been sufficient to issue a warning such as:
  "This chip may produce incorrect results under some conditions".
- Was it ethical for Intel to continue selling the product once the flaw was known?
- Is it ethical to sell any product with a known flaw?

The Flaw in Intel Pentium chip
What can we learn?

- How should we deal with faults in our products?
- How much to tell end-users?
- The possible impact of bad publicity and the might of the internet
- Importance of acting ‘ethically’ at all times

Recalls in automotive industry

- 2003-2006: PEUGEOT recalled 240, 000 of its 307 hatchbac due to insufficient sealing of the antilock brakes which could lead to a short circuit.

- 2004-2008: FORD recalled Territory models due to issue with fluid leak in the front brake which could result in reduced braking effectiveness.

- Feb. 4, 2010: TOYOTA recalled 8.1 million vehicles for an issue in which accelerator pedals could become stuck in floor mats. Alleged to have caused 19 deaths in a decade.

- Oct. 10, 2012: TOYOTA is recalling 7.43 million vehicles for a faulty power-window switch which affects more than a dozen models 2005-2010.

The Bay Area Rapid Transport (BART)

The Bay Area Rapid Transport Case

The facts

- Holger Hjortsvang (systems engineer) ATS
  - concerned about processes and control
  - wrote five memos to superiors
- Max Blankenzee (young programmer)
  - several memos to superiors
  - warned not to be a “troublemaker”
- Robert Bruder (electrical engineer) Construction
  - observed ‘unprofessional’ installation and testing
  - noticed ‘unrealistic’ opening dates

What happened

- The three engineers briefed Daniel Helix (a board member), who presented a report ‘from interested persons’ at a board meeting.
- ***The report was dismissed.***
- The ‘dobbers’ were easily identified and given the option of resigning or being sacked
- Californian Society of Professional Engineers (CSPE) investigated and confirmed substance of complaints

What Happened ?

Further confirmation

- The Post Report, a study by a special panel commissioned by the California State Senate further confirmed the concerns expressed by Bruder, Hjortsvang, and Blankenzee.

- Substantial information pointing to poor engineering practice was uncovered.

- October 2, 1972 a BART train overran the station at Fremont
  - several passengers were injured
  - found to have been caused by a failed transistor in the Automatic Train Control system

Legal wrangles

- The three engineers prepared to sue BART for $885,000 in damages
- 1972 Local chapter of CSPE was charged by head office of ‘unethical behaviour’ and ‘criticising colleagues’
- Later overturned and the chapter commended
- 1973 IEEE decided on two measures:
  - ‘mechanisms to support members’ and
  - to be able to ‘interfere’ on behalf of the three
- 1975 before matter came to court the three settled out of court, reportedly for $75,000

Whistle blowing on the BART system
Dilemma - Questions

1. What was the responsibility of the engineers once they were aware of problems?
2. Did the engineers act ethically?
3. Was the company justified in dismissing them?
4. Should the professional body (CSPE) have supported them?

End of the affair

- Despite their considerable sacrifice, the plight of H, B and B was largely ignored
- Perhaps their claim was weakened by Helix making their initial report anonymous –
  a valuable precedent lost?
- H, B and B reckon it took them 2 years to get back on track
- 1978 the three received the first IEEE award for ‘Outstanding Service to the Public Interest’, with a certificate and $750 each!

The Bay Area Rapid Transport Case

What can we learn?

- Ethical behaviour is not always easy
- Quality control is an essential element of good practice
- Supervision must be thorough
- Communication between management and line workers is not always easy
- It is important to report poor practice
- ‘Whistle blowing’ takes courage

Chernobyl accident 1986

A collaborative case-control study nested within cohorts of Belarusian, Russian and Baltic Clean-up workers was conducted to evaluate the radiation-induced risk of thyroid cancer.

The study included 107 cases and 423 controls. Individual doses to the thyroid from external radiation and from iodine-131

A statistically significant dose-response relationship was found with total thyroid dose P= 0.38, 95% confidence interval.

Read up – very interesting case !

Recent cases in IT

Facebook ruling (Aug, 2012)

- Federal investigators viewed the Facebook profile of an alleged gangster, “Colon” in the Bronx by asking his informant “friend” to show it to them.
- The informant’s Facebook friendship served to open an online window onto alleged gangster life, revealing messages he posted about violent acts and threats to rival gang members
- Colon’s legitimate expectation of privacy ended when he disseminated posts to his “friends” because those “friends” were free to use the information however they wanted-included sharing it with the Government

Cambridge Analytica 2018

Unethically using data to profit

Apple vs Samsung 2013/14

SAMSUNG

What happened ?

Recent cases – Boeing 737 Max

Questions of professional ethics

1. When it is a matter of public safety, how much expert evidence is enough?
2. What is the ethical thing to do when designing in a situation where some doubt about safety exists?
3. Must a product be engineered to be totally safe at all costs, even if the user is at fault?
4. Are warnings to the consumer enough to get the designer off the hook?

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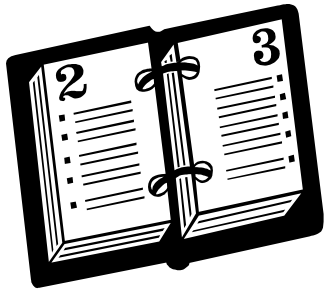
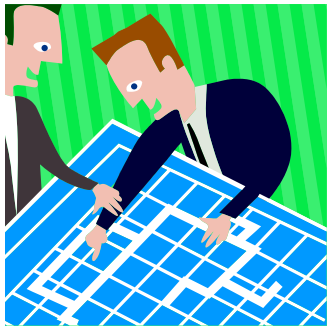
Lecture 11B





Intellectual property

Copyright and patents

By the end of this lecture you will be able to:

- Understand what is meant by “intellectual property” - a taste of some examples
- Appreciate the range of mechanisms for the protection of intellectual property
- Explain basic issues relating to copyright and patents

What is Intellectual Property (IP) ?

- Represents the property of your mind or intellect.
- It can be worth money and may be sold on to other parties to utilise
- It may give you the ‘edge’ which will make your company successful
- It may be stolen and/or used without permission

Examples of Intellectual Property

- books
- original articles
- music
- artwork
- research
- inventions
- designs
- trade marks
- proprietary knowledge or trade secrets
- circuit layouts
- plant or animal breeder's 'creations'
- software

Protecting other Intellectual Property

- Registration of IP is administered in Australia by *IPAustralia*
  www.ipaustralia.gov.au
  - Patents
  - Designs
  - Trade marks
  - Business names

Patents

- Legally enforceable
- Owner has exclusive right to commercially exploit the invention for the life of the patent
- Can only apply to technology , i.e. something that is a product, a composition or a process.
  - Must be novel, i.e. different from anything that has gone before.
  - Must be useful, i.e. have the potential for commercial return
  - Must be inventive, i.e. the result of some ingenuity on your part, not just a solution to a problem that would have been obvious to anyone.

Inventive ("non-obvious")

- **To decide whether it is "non-obvious" you must consider first:**
  - the scope and content of the prior art
  - the level of ordinary skill in the art
  - the differences between the claimed invention and the "prior art".
- In addition you must also consider:
  - commercial success
  - long-felt but unsolved needs
  - failure of others.

The patenting process

- Involves full disclosure - a full description of how the invention works
- The patent office then examines the application to ensure it fulfils the three criteria and does a patent search
- Members of the public can object if they hold patent for something similar
- Process can take more than a year
- Patent lasts for 20 years

Disclosure

- A detailed description of at least one way of carrying out the invention, addressed to a person skilled in the art
- Must disclose any feature essential for carrying out the invention and in sufficient detail to render it apparent how to put the invention into practice.
- A single example may suffice, but may need several to cover all possibilities

Disclosure: beware!

- The invention should not be made public until it has legal protection.
- If you demonstrate, sell or discuss your invention in public or publish about it before you file, you cannot get a patent.

The Cost

- The cost of an Australian standard patent including attorney fees is usually between $5000-$25000.

- Annual maintenance fees are payable from its fifth year. Over a 20-year term these will add a further to the cost.

Innovation patent
(called ‘petty patent’ prior to 2001)

- 'no frills' patent, but still requires examination and search by the patents office to be effective
- takes between one and three months.
- lasts for only 8 years.
- suited to inventions with a short commercial life or that are under development

What cannot be patented

- ideas, concepts or facts
- discoveries, scientific theories and mathematical methods;
- schemes, rules and methods for performing mental acts, playing games or doing business,
- programs for computers
- presentations of information
- aesthetic creations, literary, artistic, dramatic or musical works - these are protected by copyright;
- something that occurs naturally, natural events

Some classic cases

Some Famous Australian Patents

- Refrigeration, 1868
- 'Sunshine' Stripper Harvester 1885
- Hills Hoist 1945
- 'Victa' Lawn Mower 1952
- Wine cask 1973
- Dynamic Lifter 1970
- Cochlear Bionic Ear Implant 1978*

*10 Oct, 2012
Medical firm *Cochlear* have won $100 million contract to supply 2,283 implants to Chinese Government over next 5 years

http://www.ipaustralia.gov.au/patents/ex_index.shtml

What if you don’t patent?

- Frank Bannigan, of Kambrook appliances found out the hard way.
- The electrical power-board, invented in 1972, was not patented and many other manufacturers made similar devices.
  - Bannigan says, 'I've probably lost millions of dollars in royalties alone. Whenever I go into a department store and see the wide range of power-boards on offer, it always comes back to haunt me.'

Copyright

Copyright: The Berne Convention

- Signed in Berne, Switzerland, in 1886.
- In 1997 delegates from160 countries discussed digital media, films, music, software, and television and distribution via the Internet
- Automatic copyright protection is the central feature of the Berne accord.
- 121 countries including USA are signatories

IP Case study in R&D

- Radiata (bought by Cisco)
- Wifi : founded 802.11a
- More information :http://tmt-transactions.com/cisco-systems-to-acquire-radiata-inc-for-us295m-stock/
- I know the 2 of the 3 guys ! (worked with 1 of the guys)

- More on supplementary Slides

Last week is final presentation week

2 teams to present

Supplementary Slides

Articles of the Berne Convention

- **Article 1**: Protected Works
  - *“Literary and artistic works”;*
  - *Derivative works;*
  - Official texts;
  - Collections;
  - Works of applied art and industrial designs;
  - News

10 Copyright myths

Art Majlessi, 2004,
http://www.legalmetro.com/library/copyright-law-explained.html

1. "If it doesn't have a copyright notice, it's not copyrighted."
   - False. According to the Berne copyright convention, anything created privately after April 1, 1989 is copyright.
   - It does not need the © symbol or anything else.
2. "If I don't charge for it, it's not a violation."
   - False, but it may matter if the court decides to award monetary damages.
3. "If it's posted to the internet it's in the public domain."
   - False. Copyright law still applies and the copyright still belongs to the author.

10 Copyright myths (2)

4. "My posting was just fair use!"
   - False. “Fair use,” applies only to parody, commentary, news reporting, and some educational purposes.
5. "If you don't defend your copyright you lose it."
   - False. This regulation applies to business names only.
6. "If I make up my own stories, but base them on another work, my new work belongs to me."
   - False. There is a specific section in copyright law that refers to “derivative works.”
   - If you use the same settings and characters in a new story, those characters still belong to the original author, so you need to seek permission.
   - Parodies are the only exception in this case.

10 Copyright myths (3)

7. "They can't get me; defendants in court have powerful rights!"
   - Copyright violations don't end up in court unless the copyright holder sues the offender.
   - But, it is easier to get a judgment in a civil court because the “beyond proof of a reasonable doubt” requirement doesn’t apply to civil suits.
8. "Copyright violation is not crime"
   - The copyright owner can sue.
   - In the US, copyright infringements valued at over $25,000 are classed as a felony, so you can go to jail for it.

10 Copyright myths (4)

9. "It doesn't hurt anybody -- in fact it's free advertising."
   - False. The author has to want that publicity to make it legitimate.
   - Permission must always be obtained.
10. “Someone e-mailed me a copy, so it is all right for me to use it as I will."
   - The copyright is still protected and belongs to the author.

Further examples of IP protection (1)

- Registered Business Name: A search of Business Names database costs $40
- Registered Design: a product's unique overall appearance, shape, configuration, pattern and ornamentation can be protected, regardless of function
- Registered Trade Mark: a word, phrase, letter, number, sound, smell, shape, logo, picture, aspect of packaging or a combination of these

Success rate of patent litigation

- In Australia between 1997 and 2003:
  - Only 15 claims out of 29 (55%) upheld
  - Similarly in the US courts the success rate was between 54 and 67 per cent
- The most common grounds for invalidity of claim were
  - lack of novelty,
  - obviousness, or
  - no fair basis for comparison

Patenting Software

- A claim containing a mathematical formula may be patentable
  - "if it implements or applies the formula in a structure or process which, when considered as a whole, is performing a function which the patent laws were designed to protect"
- You can patent computer software, if it can be shown to have practical use that results in commercial returns
- in practice most software developers prefer to rely on copyright to protect their programs

First software patent

- On 21 May 1962, a British patent application entitled "A Computer Arranged for the Automatic Solution of Linear Programming Problems" was filed.
- The invention was concerned with efficient memory management for the simplex algorithm, and could be implemented by purely software means.
- The patent was granted on August 17, 1966 and seems to be one of the first software patents.

When is software patentable?

- If it provides a new and non-obvious technical solution to a technical problem:
  - a way of making a computer run faster or more efficiently in a novel and inventive way.
  - a way of making the computer easier to use
- Since 1978, some 30,000 patents for computer-implemented inventions have already been issued by the European Patent Office

The Smart card (2001)

- 1998 State Street Bank ruling that "business methods are potentially patent-eligible".
- 'Street test' states that '*anything which produces a useful, concrete and tangible result is patentable*'.
- A credit smart card containing a computer chip to record various loyalty and reward points offered by different traders was therefore patentable as a business method …
- … because the scheme included a means for putting the scheme into effect.

The Bilski case (2010)

- In 1997, Bernard Bilski had filed a patent application in relation to hedging risks in commodity trading.
- The United States Patent & Trademark Office rejected the application.
- Bilski appealed in November 2009.
- 28 June 2010, the US Supreme Court handed down decision: …
- "**not patentable if it falls into either categories of (i) laws of nature (ii) physical phenomena or (iii) abstract ideas".**

And so it goes on …

- **Computer-implemented inventions which only solve a business problem using a computer, rather than a technical problem, are considered unpatentable as lacking an 'inventive step'.**
- In Australia, pure or abstract methods of doing business are not considered to be patentable, but if the method is implemented using a computer, it can avoid the exclusion applying to business methods.

Some Software Patents (1)

- Patent #4,965,765: covers “the use of different colors to distinguish the nesting level of nested expressions” . It is held by IBM.

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=if(B1<5,(c1<10,(d1<15,(e1<20,(f1<25,(g1<30)))))))
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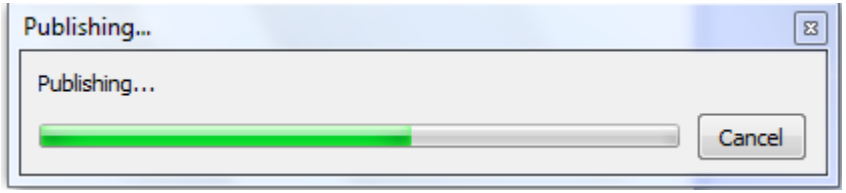
- Patent #5,249,290: covers assignment of client requests to the server process having the least load.
- Patent #4,941,125: covers using a digital camera in conjunction with character recognition software to store and index documents on a CD ROM.

Some Software Patents (2)

- Patent # 7,415,666, granted August 19, 2008.
  Title: “Method and system for navigating paginated content in page-based increments”
  (= “Page Up, Page Down” navigation keys)
- Patent # 6,727,830, granted April 27, 2004 to Microsoft.
  Title: “Time based hardware button for application launch” (=“Double click”)
- Euro Patent #394160: covers the progress bar



Next week Lecture 12

Any Volunteers teams to present ?