We cannot talk about the Internet without addressing:

Computer and Information Ethics

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Computer and Information Ethics

- This sequence is mainly based on:

  - Bynum, Terrell, "Computer and Information Ethics", The Stanford Encyclopedia of Philosophy (Winter 2008 Edition), Edward N. Zalta (ed.), URL = <http://plato.stanford.edu/archives/win2008/entries/ethics-computer/>

  - To avoid visual clutter in the presentation specific references are only included when citations besides Terrell Bynum are used.

Historical Milestone

- Mid 1940s: New branch of ethics: *Computer Ethics* or *Information Ethics*

  - At the center: Norbert Wiener, professor of mathematics and engineering at MIT

  - Wiener was a pioneer in the study of stochastic and noise processes, contributing work relevant to electronic engineering, electronic communication, and control systems.
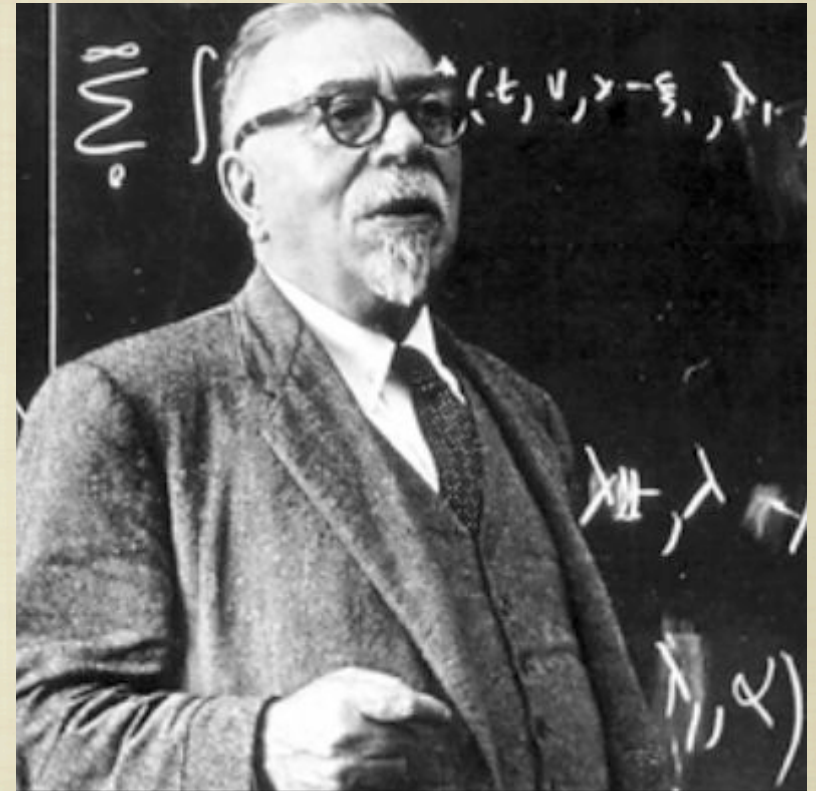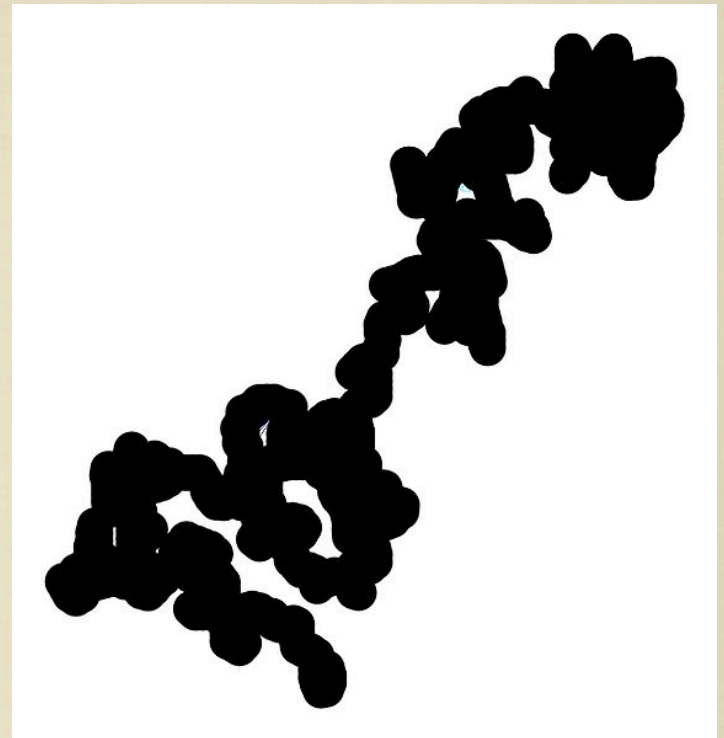
source: wikipedia

Historical Milestone

Wiener equation

In the mathematical field of probability the <u>Wiener sausage</u> is a neighborhood of the trace of a <u>Brownian motion</u> up to a time t, given by taking all points within a fixed distance of Brownian motion

source: wikipedia

Brownian motion is a seemingly random movement of particles (mathematical model do describe such random movement)

Foundation of C&I Ethics

- New branch of applied science Wiener called *cybernetics*

  - book: *Cybernetics* (1948)

    - describes new branch of applied science and identifies social and ethical implications of computers

    - interdisciplinary study of structure of regulatory systems

  - book: *The Human Use of Human Beings* (1950)

    - explores ethical issues computers & information technology would likely generate

Foundation of C&I Ethics

- Computers at that time

  - *Cybernetics* (1948), *The Human Use of Human Beings* (1950)

    - ENIAC 1946
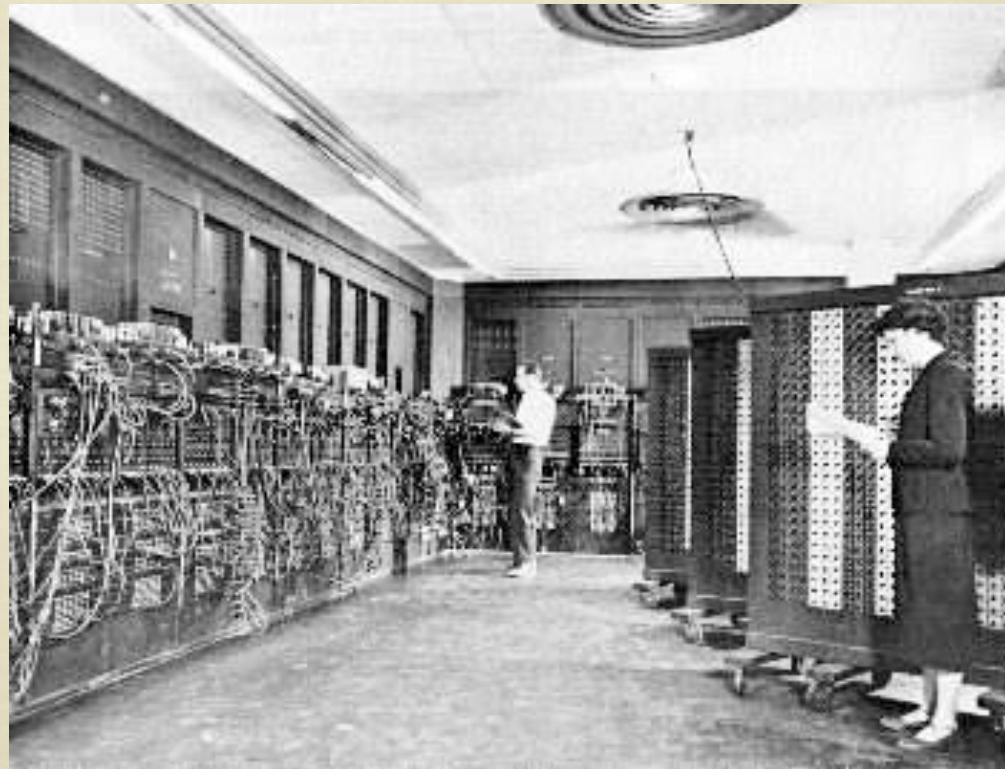
Foundation of C&I Ethics

- Wiener foresaw enormous social and ethical implications of cybernetics combined with electronic computers

- Wiener's predictions:

  - after war world would undergo a *second industrial revolution*

  - *automatic age* with *enormous potential for good and evil*

  - staggering number of new ethical challenges & opportunities

  - effects on information technology on key human values

    - life, health, happiness, abilities, knowledge, freedom, security, and opportunities

Computer Ethics

- Term: *Computer Ethics*   (1976 Walter Maner)

  - ethical questions in his field (medical ethics) got more complicated when computers go involved

  - studies ethical problems "aggravated, transformed or created by computer technology"

  - computer ethics "starter kit" monogram published in 1980

    - contained curriculum materials and pedagogical advice for university teachers

    - discussions of topics like privacy and confidentiality, computer crime, computer decisions, technological dependence and professional codes of ethics

Computer Ethics

- The "uniqueness debate"

  - are these really *wholly new* ethical problems?

  - Maner's view and Debora Johnson's uniqueness challenge

Computer Ethics

- *Computer Ethics* textbook, by Johnson, 1985

  - On page 1, she noted that computers "pose new versions of standard moral problems and moral dilemmas, exacerbating the old problems, and forcing us to apply ordinary moral norms in uncharted realms."

  - later versions of Johnson's book included:

    - hacking

    - computer technology for persons with disabilities

    - impact of Internet on democracy

Computer Ethics

- Maner - Johnson topic examples

    - Should ownership of software be protected by law?

    - Do huge databases of personal information threaten privacy?"

Computer Ethics

- "What is Computer Ethics", classic paper by Moor, 1985

  - broader and more ambitions than definitions by Maner or Johnson

    - went beyond descriptions and examples of computer ethics problems

    - offered explanation of *why* computing technology raises so many ethical questions compared to other kinds of technology

Computer Ethics

- "What is Computer Ethics", Moor, 1985

    - The computer is the nearest thing we have to a universal tool. Indeed, the limits of computers are largely the limits of our own creativity. (Moor, 1985, 269)

    - with computers people can do many things that could not be done before

    - question is whether one *ought* to do them?

    - implies the likely lack of laws, standards of good practices, specific ethical roles

    - Moor's term for this: *policy vacuum*

Computer Ethics

- Beyond "What is Computer Ethics", Moor, 1985

  - notion of **core human values**: *some human values — such as life, health, happiness, security, resources, opportunities, and knowledge — are so important to the continued survival of any community that essentially all communities do value them.* Moor, 1990.

  - *core values* used to examine privacy and security (Moor,1999)

Computer Ethics

- Moor's problem-solving method

  1. Identify a policy vacuum generated by computing technology.

  2. Eliminate any conceptual muddles.

  3. Use the core values and the ethical resources of just consequentialism to revise existing — but inadequate — policies, or else to create new policies that justly eliminate the vacuum and resolve the original ethical issue.

Computer Ethics

- Computing and Human Values

  - common thread: concern for protecting and advancing central human values, e.g.

    - life, health, security, happiness, freedom, knowledge, resources, power and opportunity.

  - "Value-sensitive Computer Design" introduced in late 90s

    - avoid potential computer ethics problems by *anticipating possible harm to human values and designing new technology from the very beginning in ways that prevent such harm*

    - note: this is done while new technology is under development

Computer Ethics

- Author (Terrell Bynum) expands on:

  - Professional Ethics and Computer Ethics

  - Uniqueness and Global Information Ethics

  - Information Ethics

  - Exponential Growth

Topics in Computer Ethics

- **Best way to understand the nature of the field is though representative examples**

Computers in the Workplace

Where the rubber hits the road

Computers in the Workplace

- Computers are a universal tool

  - replace humans

    - => threat to jobs

  - incentives to replace humans with computers

    - perform task faster, more accurate, does not make mistakes...

    - no sleep, does not get tired, does not get sick, no vacation

Computers in the Workplace

- Many jobs have already been replaced

  - auto workers - take a look at modern car manufacturing plant

Computers in the Workplace

- Many jobs have already been replaced

  - bank tellers - ATM

  - graphic artist - who draws, sits at the drawing board?

  - not limited to the obvious jobs

    - professionals can be replaced as well

    - doctors, teachers, accountants, etc.

Computers in the Workplace

- Opportunities

  - computer industry creates many new jobs

    - HW/SW engineer, sys. admin, web programmer/master

    - computer service sector, computer sales force, etc.

Computers in the Workplace

- Short term

  - computer-generated unemployment

- Long term

  - IT jobs are created

Computers in the Workplace

- Computers alter the jobs radically

  - computers cause de-skilling

    - e.g., pilot vs auto-pilot

    - e.g., creative workers -- not button-pusher

  - new jobs with sophisticated skills

    - e.g., computer assisted drafting

    - e.g., keyhole surgery

Computers in the Workplace

- Health & Safety Concerns

  - introduce computers: consider likely impacts on health and job satisfaction

    - stress of trying to keep up with technology

    - injuries resulting from repeating same physical movement

    - radiation from computer monitors

    - etc.

Computers in the Workplace

- Do you feel threatened or overwhelmed?

- Are you re-trainable?

- Can you compete or are perhaps getting a bit old?

Who is asking?   Who is being asked?

Computer Crime

- The area of computer viruses, hackers, etc.

  - computer and network security is a main concern in the field of computer ethics

  - the issues

    - privacy & confidentiality

    - integrity

    - unimpaired service

    - consistency

    - controlling access to resources

Computer Crime

- Malicious software

  - from viruses to who-knows-what

- Trusted computer users

  - many crimes originate from trusted users

  - the insider

- Hacker

  - motivation

  - consequences

Computer Crime

- How big are the problems?

- http://www.csl.sri.com/users/neumann/illustrative.html#2

Privacy and Anonymity

- Privacy is one of the earliest computer ethic topics

  - who is collecting data

    - governments

    - organizations

    - even individuals

Privacy and Anonymity

- 1960s US government created large DB about citizens

  - US congress passed bill to issue personal identification number and start collecting information

  - public outcry: "big-brother government"

  - consequence: Congress scrapped plan

    - US president appoints committees to recommend privacy legislation

Privacy and Anonymity

- 1970s - present
  - major computer privacy laws passed in USA
  - process of collecting
    - ease and efficiency of collecting
    - is it getting out of control?
  - dealing with sensitive information
    - e.g. medical record, what is sensitive and what is public?
    - data-mining, data matching, etc.

Privacy and Anonymity

- Philosophical issues

  - Privacy => "control over personal information" (mid-60s)

  - Privacy => "restricted access, not control"

    - Tavani and Moor (2001), Moor (1997)

  - Privacy => there is a sense of privacy in public spaces

    - privacy in public [Nissenbaum 1998]

  - Debate about meaning of *privacy* is likely to continue [Introna, 1997]

Privacy and Anonymity

- Anonymity

  - "anonymity on the internet" discussed in the same context with "privacy and the internet"

    - e.g., use internet to obtain medical or psychological counseling

      - AIDS, abortion, gay rights, venereal disease, etc.

    - privacy and anonymity can be exploited

      - e.g., money laundering, drug trading, terrorism, or preying upon the vulnerable (see [Marx, 2001] and [Nissenbaum, 1999]).

Intellectual Property

- Controversial area in computer ethics: **Software ownership**

Intellectual Property

- Different views

  - Software ownership should should not be allowed [Richard Stallman, 1993, who started the Free Software Foundation]

    - all info should be free

    - all programs should be available for copying, studying, modifying

  - Companies and programmers will not invest if there is no return of investment from license fees or sales [Johnson, 1992]

Intellectual Property

- Different views (cont.)

  - many people thing that

    - software should be ownable,

    - but "casual copying" of personally owned programs for one's friends should also be permitted

    - [Nissenbaum, 1995]

  - SW industry claims huge losses due to such copying

Intellectual Property

- One can own the following aspects of a program

1. The "source code" which is written by the programmer(s) in a high-level computer language like Java or C++.

2. The "object code", which is a machine-language translation of the source code.

3. The "algorithm", which is the sequence of machine commands that the source code and object code represent.

4. The "look and feel" of a program, which is the way the program appears on the screen and interfaces with users.

Intellectual Property

- Big issue: owning a patent on a computer algorithm
  - patent provides exclusive monopoly on use of patented item
    - owner can deny other use of mathematical formulas that are part of the algorithm

Intellectual Property

- Big issue: owning a patent on a computer algorithm

  - mathematicians & scientists outraged

    - algorithm patents remove parts of mathematics from public domain

    - cripple science

    - running preliminary patent search: who can afford this?

      - only large companies with big budgets

      - effectively eliminates many small software companies, stifling competition and decreasing the variety of programs available to the society [The League for Programming Freedom, 1992]

Professional Responsibility

- Computer professionals

  - specialized knowledge

  - position with authority and respect in community

- With power comes responsibility

  - they are able to have a significant impact upon the world, including many of the things that people value. Along with such power to change the world comes the duty to exercise that power responsibly [Gotterbarn, 2001]

Professional Responsibility

- Variety of professional relationships [Johnson, 1994]

  - employer — employee

  - client — professional

  - professional — professional

  - society — professional

- Diversity of interests

  - includes conflicting interests

  - awareness of possible conflict of interest

Professional Responsibility

- ACM and IEEE

  - have established codes of ethics

  - curriculum guidelines

  - accreditation requirements

  - to help computer professionals understand and manage ethical responsibilities

  - 1991 a Joint Curriculum Task Force of the ACM and IEEE adopted a set of guidelines ("Curriculum 1991") for college programs in computer science.

Professional Responsibility

- ACM Code (1992) includes

  - general moral imperatives, e.g., "avoid harm to others", "be honest and trustworthy"

  - specific professional responsibilities, e.g., "know and respect existing laws pertaining to professional work"

- IEEE Code of Ethics (1990) includes

  - "avoid real or perceived conflicts of interest whenever possible"

  - "be honest and realistic in stating claims or estimates based on available data."

Professional Responsibility

- Accreditation Board for Engineering Technologies (ABET)

  - requires ethics component in CS/CE engineering curriculum

- Computer Sciences Accreditation Commission/Computer Sciences Accreditation Board (CSAC/CSAB)

  - adopted the requirement that a significant component of computer ethics be included in any computer sciences degree granting program that is nationally accredited

Globalization

- Global Information Ethics

- What does globalization have to do with CS ethics?

  - the Internet and world-wide-web are connecting people all over the planet

Globalization

- "The Computer Revolution and the Problem of Global Ethics" [Gorniak-Kocikowska, 1996],

  - for the first time in history, efforts to develop mutually agreed **standards of conduct**, and efforts to advance and defend human values, are being made in a **truly global context**

  - ethics and values are debated and transformed with **no limit to geographic regions**, or constrained by specific **religion** or **culture**

  - may be one of the most important social developments in history

Globalization

- Global Laws

  - Assume computer user in US wants to protect his freedom of speech on the internet -- Whose laws apply?

  - over 200 countries connected to the Internet

    - the First Amendment protection for freedom of speech is just a "local law" on the Internet.

    - how about controversial topics like pornography, intellectual property, invasion of privacy

    - can I be tried in some country where certain dealings are illegal?

Globalization

- Global Cyberbusiness

  - It is up and running, e.g. eBay, Amazon, etc

  - What will be the political and economic fallout from rapid global cyberbusiness?

  - Will accepted business practices in one part of the world be perceived as "cheating" or "fraud" in other parts of the world?

  - Will this contribute to "the winner takes all" and widen the gap between rich and poor?

Globalization

- Global Education

  - World-wide student growth is by far surpassing availability o universities

  - Largest impact in parts of the world with high population growth

  - Impact of global education on

    - political dictatorships

    - isolated communities

    - coherent cultures

    - religious practices

Globalization

- Information Rich & Information Poor
  - disturbingly wide gap between
    - information rich and poor citizens
    - information rich and poor nations
  - will gap widen as result of
    - educational opportunities
    - business opportunities
    - medical services
    - ect.

Conclusions

- I encourage you take a look at the article *Computer and Information Ethics*

- Wealth of resources