Group 1

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Computer Ethics
and Professional
Responsibility

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Publishing
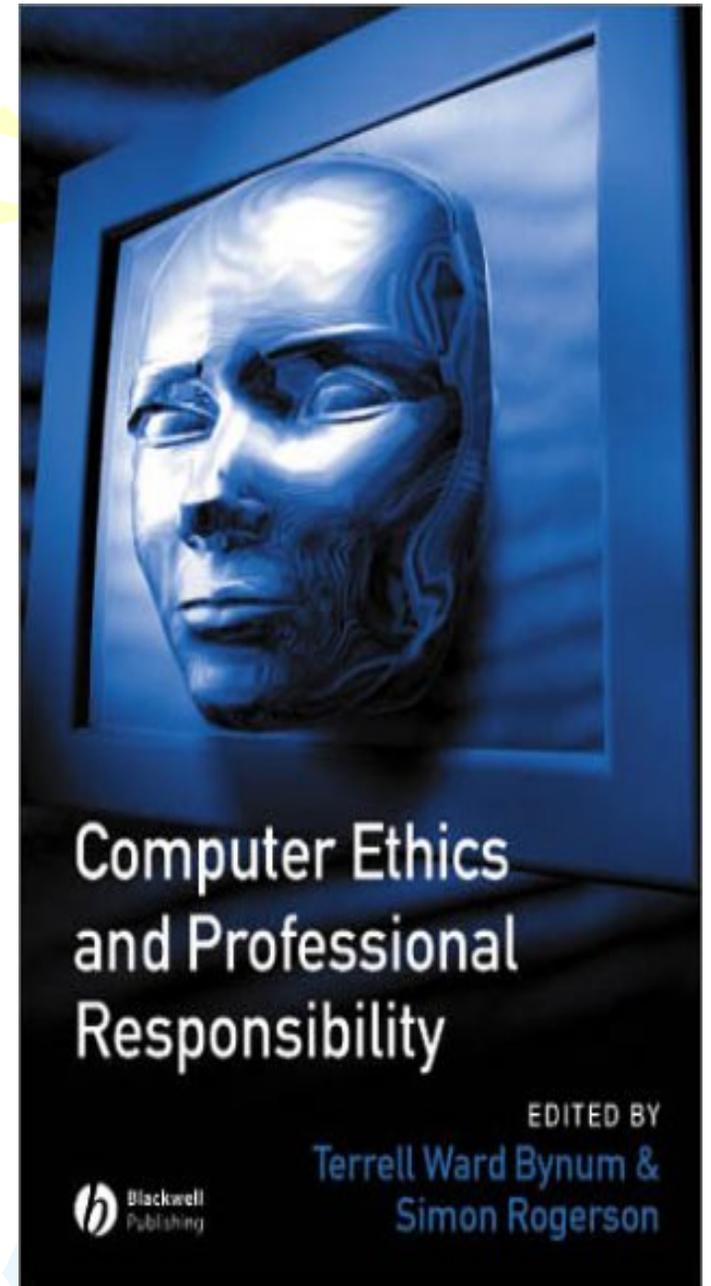
Technology and Ethics
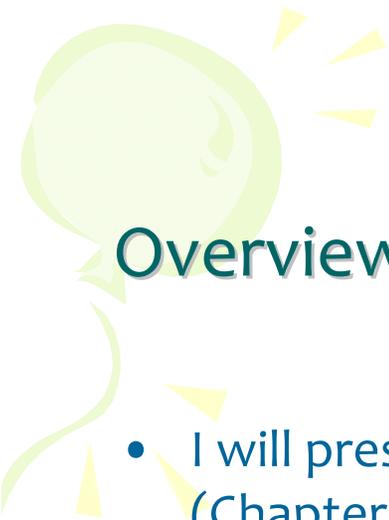
Overview

- I will present the introduction and basic layout of computer ethics. (Chapter I)

- Sultan will talk about the uniqueness in Computer ethics.
  (Chapter II)

- Break (15 min)

- Hassan will present a Suggested model for Case study with sample case.
  (Chapter III)
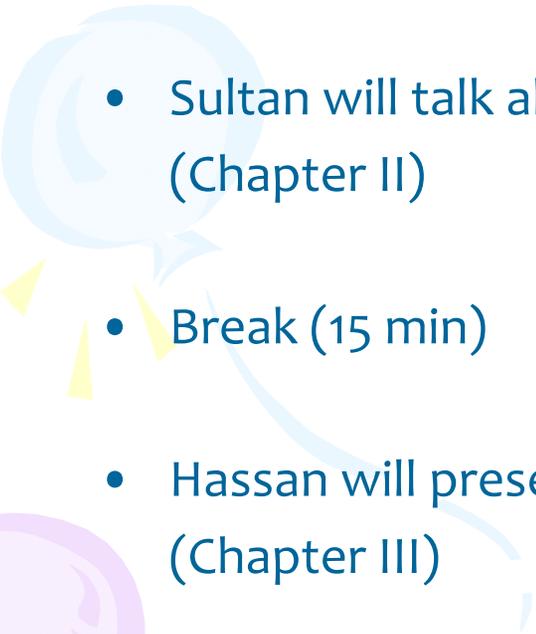
Computer Ethics?

1. Maner's Definition

    i) Computer technology caused ethical problems

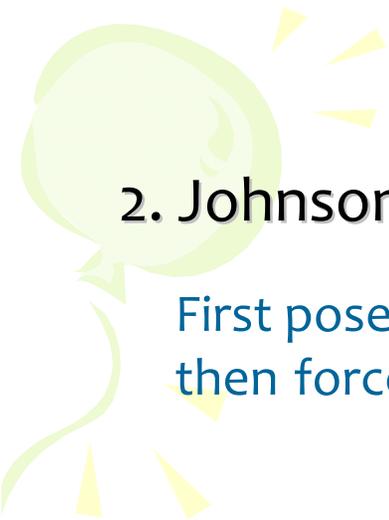   ii) Use traditional ethical theories

    a) Utilitarian ethics

    "Greatest good for greatest
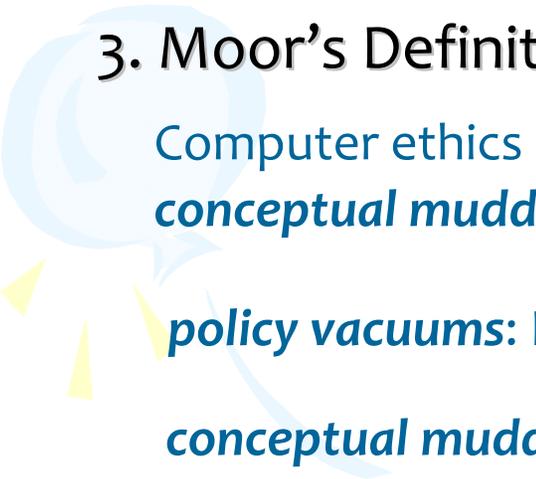   number of people"

    b) Rationalist ethics
    "Objects about which mind can think
    must confirm to its manner of thought"

I find you disgusting. But I'm going to help you anyway.

2. Johnson's Definition

First pose new versions of standard moral problems and dilemmas, then force to apply oridnary moral norms in uncharted realms.

3. Moor's Definition

Computer ethics is a feild concerned with *policy vacuums* and *conceptual muddles*

policy vacuums: How computer technology should be used?

conceptual muddles: Need coherent conceptual framework to formulate the policy for action.
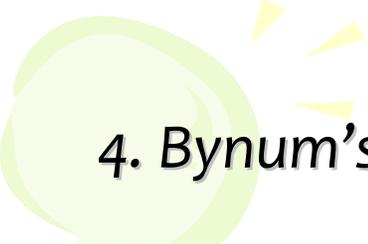
4. Bynum's Definition

computer ethics identifies and analyze the impacts of technology on social and human values i.e. Health, wealth, work , opportunity, freedom, democracy, knowledge, privacy and security etc.

5. Gotterbam's Definition

Computer ethics in context of professional ethics are concerned primarily with standards of good practice and codes of conduct for computing professional.

Note: Part I makes special use of the ideas of Moor and Maner theories.

Searching for ethics in global village

Computer ethics become more difficult and more important due to dramatic increase in applications around the global/electronic village i.e.

- Use of electronic email

- Electronic banking

- Reservation systems

- World wide web

- Millions others applications

Difficult to comprehend about the impact of digital revolution on human life. Some effects will be positive and others can be negative.

Question: To what extent computer ethics bear the computer revolution to guide us towards better world or at least prevent us from falling into worse world?

Logical Malleabilty and informational Enrichment

Computers are logically malleable:

      i) can be manipulated to do any activity which can be formulated
        in terms of inputs, outputs and connecting logical operations

      ii) can be manipulated syntactically and semantically.

      a) **Syntactically**: change in programming can alter the computer function.

      b) *Semantically*: one can use the states of computer to represent anything one chooses.

Computers are also informationally enrich:

      i) can put to many uses in diverse activities.

      ii) can be modified to enhance capabilities and overall performance.

Special Nature of computer Ethics

According to Moor's theory(1985) computer ethics has two parts:

    i) analysis of the nature and social impact of computer technology.
        (Policy vacuum)

    ii) corresponding formulation and justification of the polices for the ethical use.
        (conceptual muddles)

- *For example there are policy vacuums in following situations and we need clear conception to formulate ethical polices*

Should a supervisor allowed to read the subordinate's email?

Should govt. be allowed to censor the information on ineternet?

Question: Is computer ethics special due to uniqueness?

Depends on subject-matter

If suject-matter means computing technology then computer ethics is unique.

If subject-matter means novelity then there are many others novel situations.
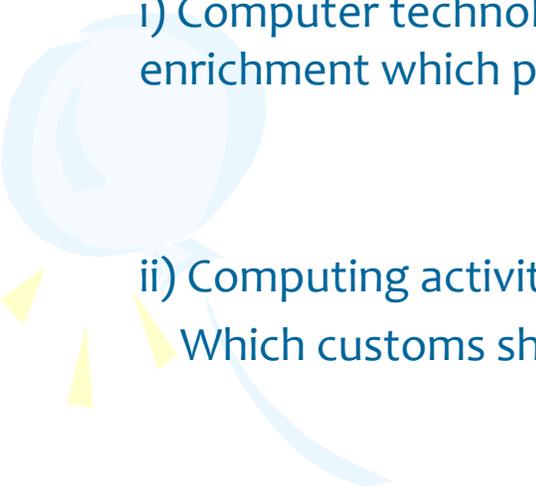
Reasons within Relative frameworks

Understanding of computer ethics in terms of routine ethics is difficult.

Two explanations for the above argument :

i) Computer technology regularly produces policy vacuums and informational enrichment which promotes conceptual shifts.

ii) Computing activity is globally interactive applealing to local customs and laws. Which customs should we apply in regulating it?

Core values

- Ethical judgments are beyond the narrow bound of special interest communities.

- Life and happiness are two of most obvious core values.

- Ability, freedom, knowledge, resources and protection are others core values which are articulated in different ways in different cultures.

- Core values provide the standards to evaluate the rationality of our actions and polices.

- Core values only a first step in the argument to ward ethical judgemnet.
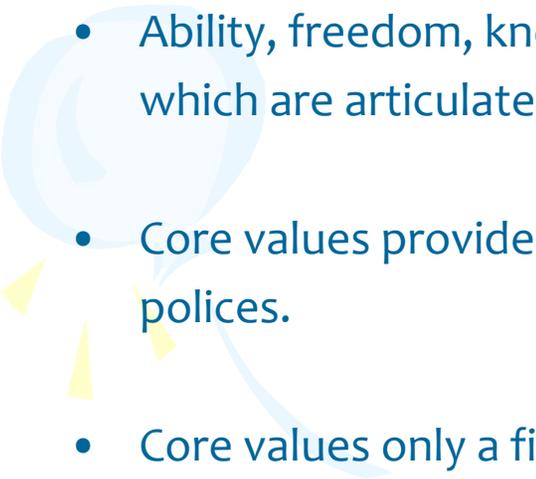
Resposibilty, Resolution and Residue

- Ethical responsibilty begins by taking the ethical point of view.We should avoid polices that results significant harm to others.

- Some of the ethical polices under dispute need further discussion and resolution.
  The major resolution technique is the empirical investigation of the actual/realistic consequences.
  Another resolution policy is to assume an impartial position to evaluate the polices.

- All resolution techniques can help to form consensus about acceptable polices but some residue of disagreement may remain.

References:

- http://en.wikipedia.org
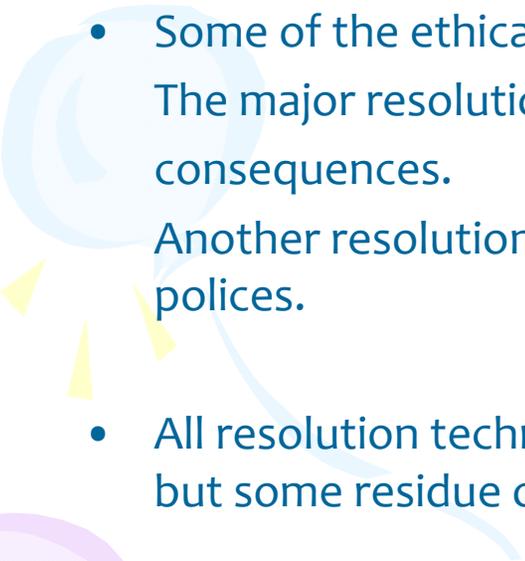
- www.normanrschultz.org/Courses/Ethics/ethics.html

- www.fashion-res.com
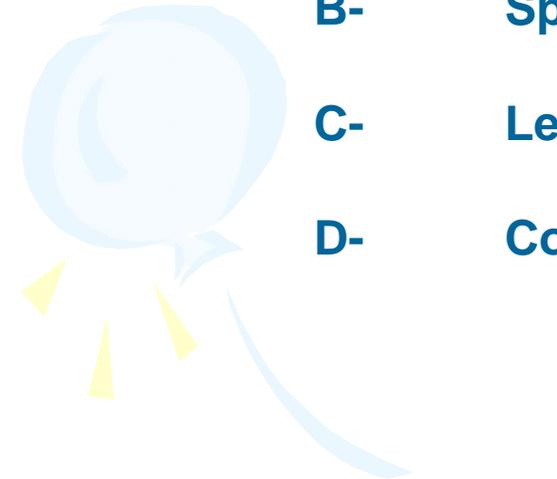
Unique Ethical Problems: IT

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PhD student
Electron Microscopy and Nano Engineering
Angstrom Laboratory.

I will divide the chapter into 4 parts

A- **Introduction**

B- **Special status of Ethics**

C- **Levels of justifications for ethics**

D- **Computer technology: Unique Examples**

Why Computer Ethics??

IT professionals may be unprepared to deal effectively with the that arise in their workplace.

Over the years, computer professionals do not recognize when ethical issues are present. The earliest work of this kind was done by Donn Parker in 1970s at SRI International (see Parker 1978).

A: To be continue….

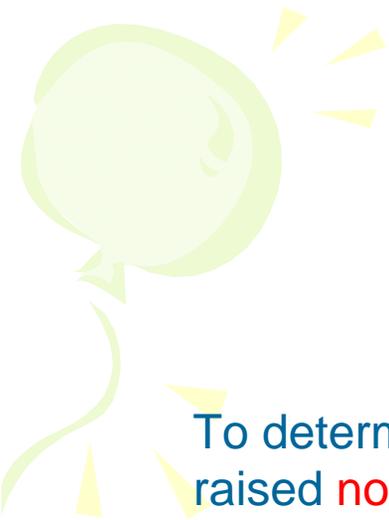# Parker Analysis

Invited highly trained Professionals

47 hypothetical cases

Based on his expert knowledge of computer abuse

A: To be continue….

Aim of discussion

To determine whether the behavior was unethical ,or not, or simply raised no ethics issue at all.
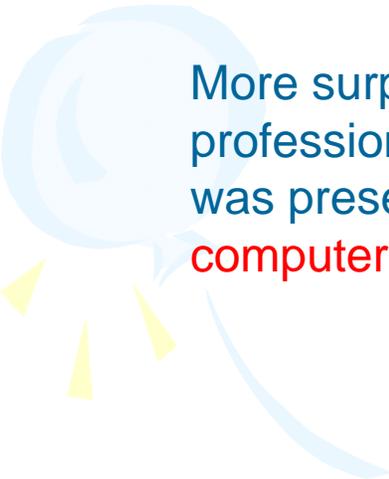
Discussion start….

A: To be continue….

Observations…..

Parker found a surprising amount of residual disagreement among these professionals even after an exhausting analysis and discussion of all the issues each case presented.

More surprisingly, a significant minority of professionals held to their no ethics issue was present even in cases of apparent computer abuse.

Some of *them* could not even recognize when ethical issues were present.

A: To be continue….

In one Scenario, a company representative routinely receives copies of the computerized arrest records for new company employees. These records are provided as a favor by a police file clerk (who happens to have access to various local and federal databases containing criminal justice information).

33 individuals analyzed this case:
9 (31%) thought disclosure of arrest histories raised no ethics issues at all.

Ethics issues

Parker's research found that they were computer professionals.!!!!

A: To be continue….

Interpretation, why it happened?

According to Parker (1976), the problem may have been promoted by computer education and training programs that encouraged, or at least failed to criminalize, certain types of unethical professional conduct.

This perception of professional inadequacy is part of a hidden political agenda that has contributed to *the* development of various curricula in computer ethics.

Others demands for ethical content: it is believed that Catastrophic (Extremely harmful) failures of computer programs are directly attributable to immoral behavior (Gotterbarn 1991c, p, 74).
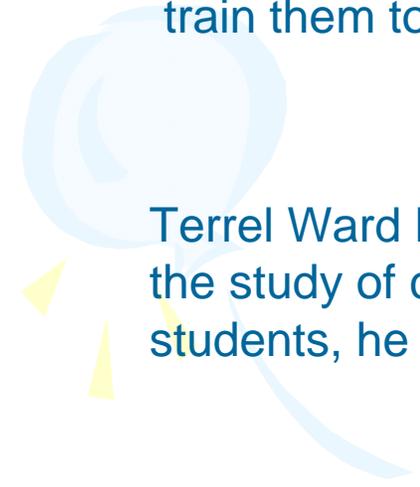
You can see in the presentation of our colleague……How

A: End
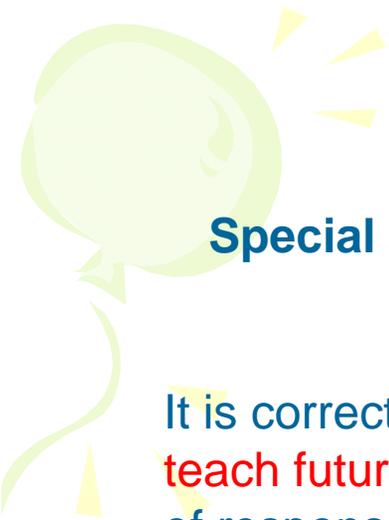
Special status of Ethics: Study for computer ethics!

It is correct belief that we ought (expresses an emotional) to teach future computer scientists and engineers the meaning of responsible conduct to the mistaken belief that we ought to train them to behave like responsible professionals,

Terrel Ward Bynum says, for example, he has hopes that the study of computer ethics will develop "good judgment" in students, he is not advocating socialization (1991, p, 24).

Good judgment mean take principled professional stand and reflective moral judgments.

B: To be continue….

The author point is that a moral education does not and cannot provide an adequate for computer ethics

There must be a unique domain for computer ethics from the domain for moral education, distinct even from the domains of other kinds of professional and applied ethics.
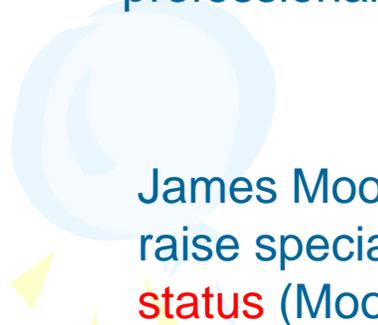
James Moor said "I believe that computers are special technology and raise special ethical Issues, hence that computer ethics deserves special status (Moor 1985).

B: To be continue….

Remarks/suggestions

Certain ethical issues are so transformed by the use of computers that they deserve to be studied.

The involvement of computers in human conduct can create entirely new ethical issues, unique to computing, that do not surface in other areas.

B: End

Levels of Justification

According to the author, there are at least six levels of justification for study of computer ethics:

1 We should study computer ethics because doing so will make us behave like responsible professionals.

2 We should study computer ethics because doing so will teach how to avoid computer abuse and catastrophes. (Reports by Parker Neumann (1995), and Forester and Morrison (1990) leave little doubt that computer use has led to significant abuse, hijinks, crime, near catastrophes, and actual catastrophes.)

3 We should study computer ethics because the advance of computing technology will continue to create temporary policy vacuums. Long-term use of poorly designed computer keyboards, for example, exposes clerical workers to painful. chronic, and eventually debilitating repetitive stress injury.

C: To be continue….

4 We should study computer ethics because the use of computing permanently transforms certain ethical issues to the degree that their alteration require independent study. I would argue, for example, that many of the issues surrounding intellectual property have been radically and permanently altered by the intrusion of computer technology

5 We should study computer ethics because the use of computing technology creates, and will continue to create, novel ethical issues that require special study. I will return to this topic in a moment.

6 We should study computer ethics because the set of novel and transformed issues is large enough and coherent enough to define a new field.

Gary Chapman, when he spoke to the Computers and Quality of Life Conference in 1990, complained that no advances had been made in computer ethics (see Gotterbarn 1991b).
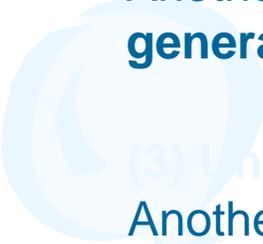
C: End

Computer Technology: Unique Examples

(1) Uniquely stored:

unique properties of computers is that they must store integers in "words" of a fixed size.

(2) uniquely malleable:

Another unique characteristic of computing machines is that they are very **general purpose machines**.

(3) Uniquely complex:

Another unique property of computer technology is its **superhuman complexity**.

(4) Uniquely fast:

The computers are very fast!!

(5) Uniquely cheap:

As computers can perform **millions of computations in each second**, the **cost** of an individual calculation approaches to **zero**. This unique property of Computers leads to interesting consequences in ethics.

D: To be continue….

(6) Uniquely cloned:

Perhaps for the first time in history, computers give us the power to make an **exact copy of some artifact**. If I make a verified copy of a computer file, copy can be proven to be bit for bit identical to the original.
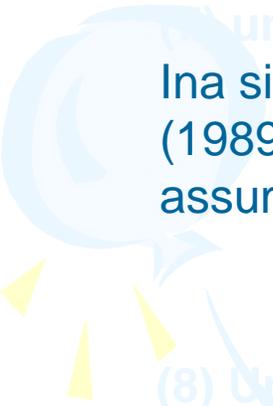
(7) uniquely discrete:

Ina simulating paper "On the Cruelty of Really Teaching Computer science" (1989), Edger Dijkstra examines the Implications of one central, controlling assumption: that computers are radically novel in the history of the world.
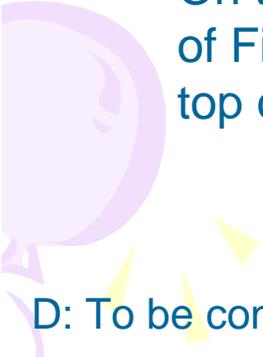
(8) Uniquely coded:

Computers operate by constructing codes upon codes upon codes- cylinders On top of tracks on top of sectors, sectors on top of records. records on top of Fields, fields on top of characters, characters on top of bytes, and bytes on top of primitive binary digits.
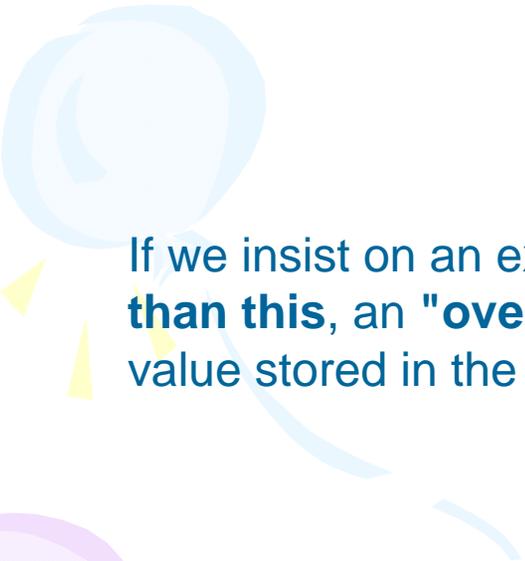
D: To be continue….

Unique storage

As we know that unique properties of computers is that they must **store integers in "words" of a fixed size**. Because of this restriction, the largest integer that can be in a 16-bit computer word is **32,767.**
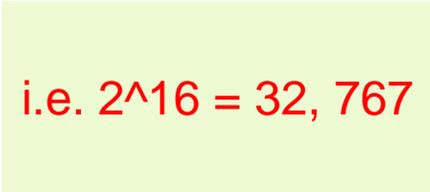
i.e. $2^{16} = 32, 767$

If we insist on an exact representation of a number **larger than this**, an **"overflow"** will occur with the result that the value stored in the word becomes corrupted.
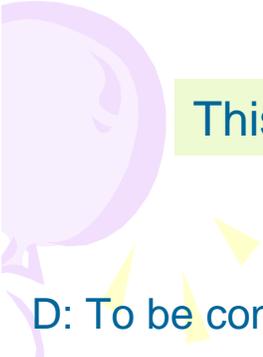
This can produce interesting and harmful consequences.

D: To be continue….

A hospital computer system in Washington, DC, broke down on September 19, 1989, because its calendar calculations counted the days elapsed since January 1, 1900.

January 1, 1900

Hospital

September 19, 1989

(365)days x (89)years + 261 (1 jan-18 sep)+ 22 leap years

= 32485+261+22

=**32 768 days**

Consequence

On September 19, exactly 32,768 days had elapsed, overflowing the 16-bit word used to store the counter, resulting in a collapse of the **entire system** and forcing a lengthy period of manual operation (see Neumann 1995, p. 88).

Staff, patients, patient' relatives…

D: To be continue….

At the Bank of New York, a similar 16-bit counter overflowed, resulting in a $32 billion overdraft. The bank had to borrow $24 million for one day to cover the overdraft. The interest on this one-day loan cost the bank about $ 5 million. In addition, while technicians attempted to diagnose the source of the problem, customers experienced costly delays in their financial transactions (see ibid., p. 169).

$32 billion	overdraft

$24 million	Bank borrow

5     $ 5 million interest
(5x7.12197)~ 35 million SEK
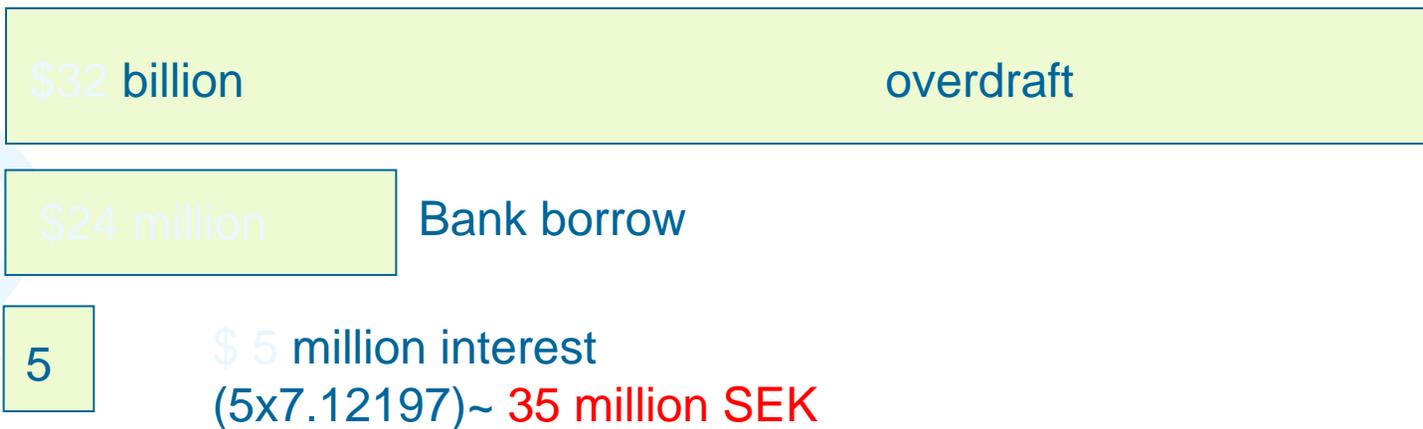
In addition, while technicians attempted to diagnose the source of the problem, customers experienced costly delays in their financial transactions (see ibid., p. 169).
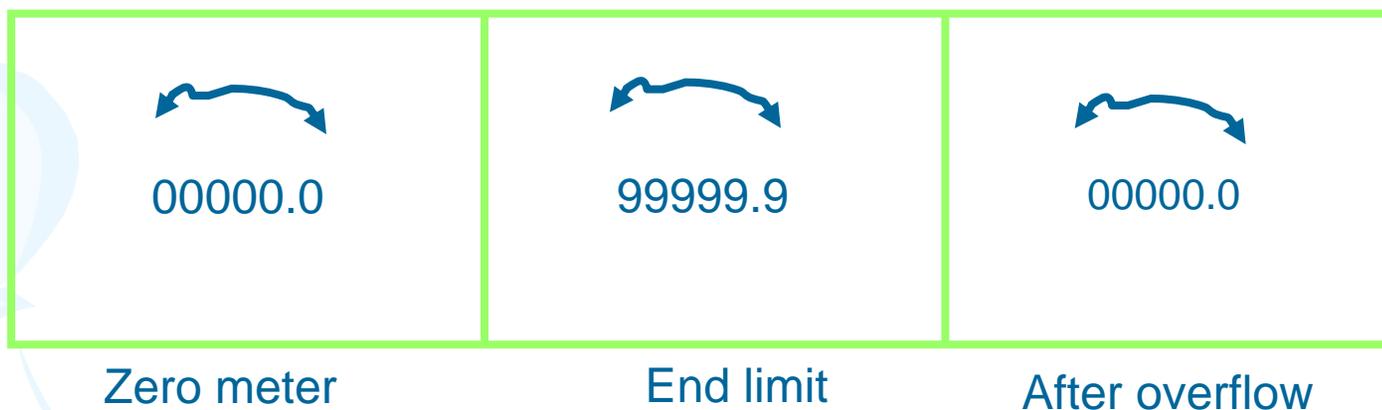
D: To be continue….

Non-computer analogy

Perhaps your automobile's mechanical odometer gauge provides a better analogy. When the odometer reading exceeds a designed-in limit, say 99,999.9 miles, the gauge overflows and returns to all zeros.

00000.0	99999.9	00000.0
Zero meter	End limit	After overflow

Those who sell used cars have taken unfair advantage of this property. They use a small motor to overflow the gauge manually, with the result that the buyer is unaware that he or she is purchasing a high-mileage vehicle.

D: To be continue….

Odometer: A meter that shows mileage traversed

This does provide a non-computer analogy, but is it a satisfactory analogy? Does it allow the ready transfer of moral intuitions (suspicious) to cases involving word overflow in computers? I believe it falls short.

Perhaps it would be a satisfactory analogy if, when the odometer overflowed, the engine, the brakes, the wheels, and every other part of the automobile stopped working.
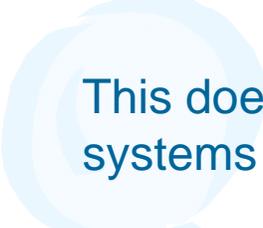
This does not in fact happen because the odometer is not highly coupled to other systems critical to the operation of the vehicle.

What is different about computer words is that they are deeply embedded in highly integrated subsystems such that the corruption of a single word threatens to bring down the operation of the entire computer.
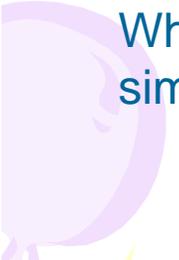
What we require, but do not have, is a non-computer analog that has a similar catastrophic failure mode.
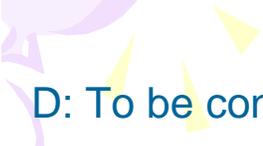
D: To be continue….

Summary

So the incidents at the hospital in Washington, DC and the Bank of New York meet by basic requirements for a unique issue or problem. They are characterized by the primary and essential involvement of computer technology, they depend on some unique property of that technology, and they would not have arisen without the essential involvement of computing technology.

Involvement	Computer technology	Unique property
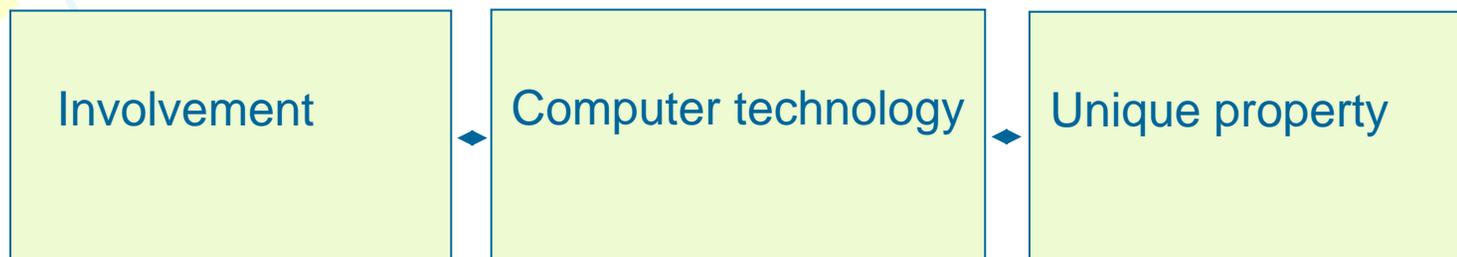
D: End

Ethical Decision-Making and Case Analysis in Computer Ethics

1. What is a *"policy* for conduct" or a "policy to guide our actions?

2. How does one determine whether there are existing policies that ad*equately* cover the *situation* in *question?*

3. *How does* one *formulate new* policies to *deal* with new situations that existing policies are *unable* to *resolve?*

4. 4 *How does* one ethically justify *newly formulated* policies?

What are policies to guide one's conduct

Ethical principles and practices are social phenomena created and sustained by complex social processes.

- *International treaties and agreements*

- *Laws*

- *Regulations*

- *Standards of good practice*

- *Professional codes of ethics*

- *Corporate policies*

- *Community and personal values*

A suggested method of Case Analysis
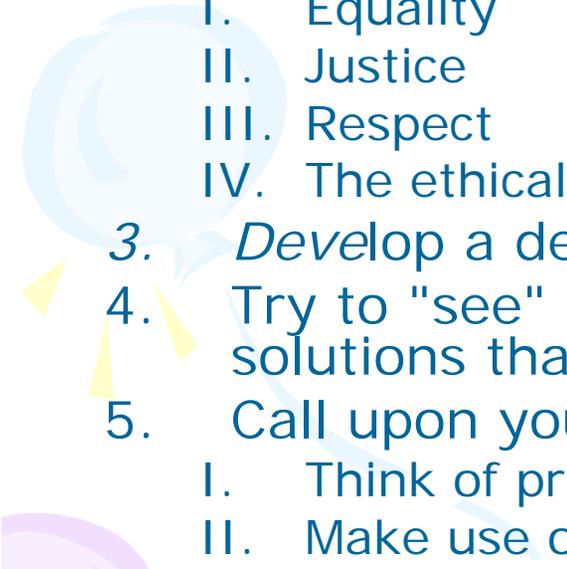
1. Make Ethical analysis log
2. Take ethical point of view
    I. Equality
    II. Justice
    III. Respect
    IV. The ethical point of view
3. *Deve*lop a detailed description of the case to be analyzed
4. Try to "see" the ethical issues and any "traditional" solutions that fit the case
5. Call upon your own ethical knowledge and skills
    I. Think of precedents and analogies
    II. Make use of your natural sensitivity about giving offense
    III. Engage in role-playing and apply your natural ability to sympathize
6. Take the advice of others
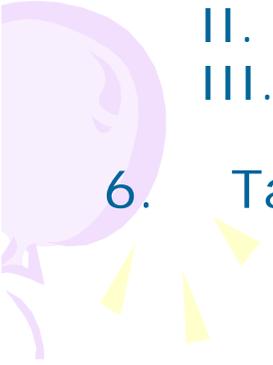
Systematic analysis techniques

Perform a

1. *"professional standards analysis"*
2. *"roles and responsibilities analysis"*
3. *"stakeholder analysis"*
4. *"systematic policy analysis"*
5. *"ethical-theory analysis"*
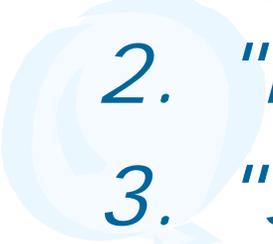
Ethical Theories

Jeremy Bentham

John Stuart Mill

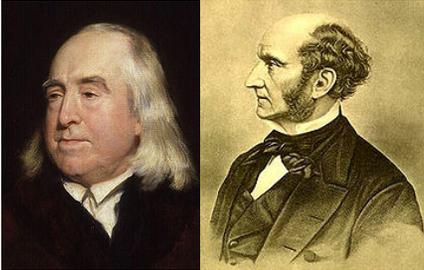*Utilitarian ideas: - Based on two principals i.e. Principal of utility (good ethically promote benefit) and Principal of Equality*

Key ideas in *the* ethical theories of Aristotle and followers are virtues and vices. The virtues include positive character traits such as *courage, integrity, honesty, fidelity, etc….* given appropriate experiences, they will come to recognize examples of virtue and vice.
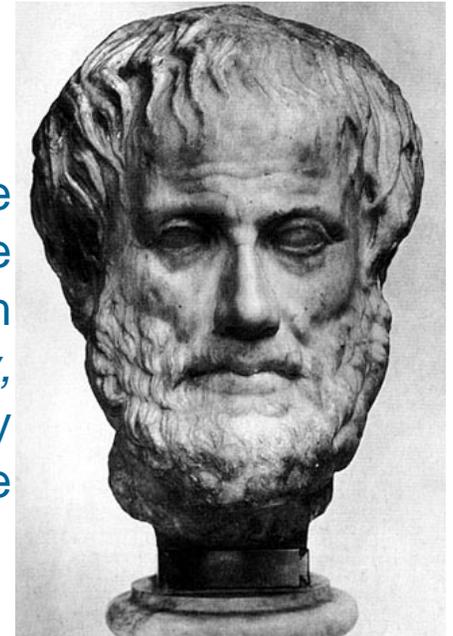
According to Kant, "THE CATEGORICAL IMPERATIVE"
Always treat every person, including yourself, as a being that has worth in itself, never merely as a being to be used to advance someone else's goals.
One must always respect the worth dignity of a person, and never merely use him or her

Sample Case: -
The Extortionist Softbot

- **Software Robot**
  - Inside network of computer and performs actions

- **Planner-based softbot**
  - Intelligent agent
    - Assigned goals by user
    - Then employ AI
    - Create and carry user's goal

- **charityBot.com**
  - Planner based softbots
    - Raise money for charity Organization
  - Successful product
    - Softbot template called EMAILFUNDER
    - Charitable organization, own customized softbots for soliciting donations over the internet

Softbot agents

- E_RESEARCHER
  - Crawls through internet gather knowledge about individual

- E_PROFILER
  - Create profile of individuals e.g. employment records, economic status, credit rating and leisure-time

- E_MAEL_WRITER (USE AI) "Major selling point"
  - user provides a sample email message to this e_writing agent, which then uses information from E_PROFILER to generate emailed solicitations asking people to donate money. It can play upon interest of recipients to produce email

- MESSAGE_TESTR
  - Check success rate of generate email and if high success rate, send its many more thousand copies

- E_BANKR
  - Receive credit card information and deposit them electronically into charity's bank account.
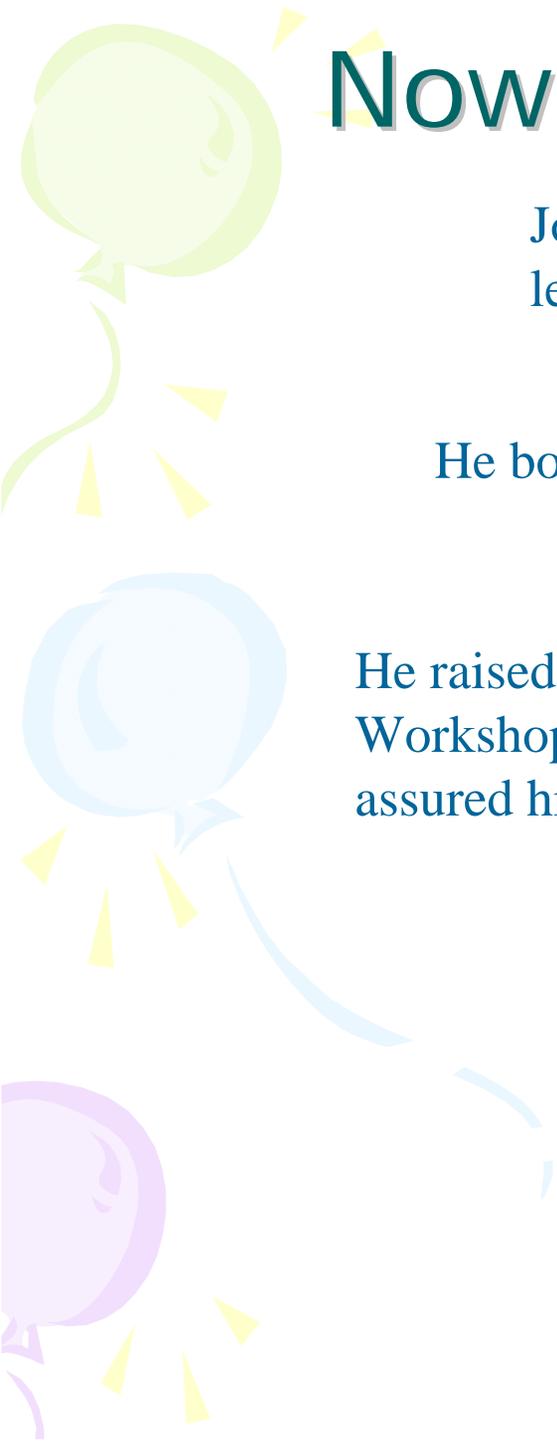
Now Story continues…..

Joe Biggheart, chief fundraiser for a child cancer treaty. He learned about software and decided to try software

He borrowed a copy and attended a workshop

He raised concerns about the E_MAEL_WRITER. Workshop leader seemed annoyed by question and assured him that his worries baseless

Though he was surprised that they were annoyed and quickly changed the subject.

He ultimately dismissed his worried and decided to use software

Now ……… He wrote Sample mail

Dear {Recipient},

We recently learned of your interest in children and health, and so we are writing to ask you to consider making a donation to the Children's Anti cancer Fund. We hope that you will be able to make a generous gift; and if you find it possible to give $1,000 or more, we will list your name on our "Web Site of Excellence" to honor you for your commitment to children and health.

After three days, he found that he got donations of USD 1000………He was pleased

Then.....He went away for few days

But when he came back, found large amount of money in charity account and he read computer generated variation of e-mails of his fund raising letter, He found ………….

Dear {Recipient},

We recently learned of your interest in children and lust, and so we are writing to ask you to consider making a donation to the Children's Anti cancer Fund. We hope that you will be able to make a generous gift; and if you find it **impossible** to give $1,000 or more, we will **list your name on our "Web Site of Excellence"** to honor you for your commitment to children and **lust**.

He found that softbot using EMAILFUNDER, has sent this letter to thousands of wealthy men who were regular visitor of pornographic website and most of them donated large sums of money…………………………

The End

He received a lot of angry emails.

Consequence

- Lawsuit
- Extradition
- Out of business

An Example case Analysis

1. Take ethical point of view (What is necessary)
   a. Bias, prejudice, fair and even handed
2. Develop a detail case description (facts, identify roles)
   a. Humans and their role
   b. Non Human Agent
3. See the ethical issue (spot problem and issue)

Ethical questions

Joe's softbot created an email message that resulted in serious harm to lot of people. Who is responsible for this situation? Did anyone intentionally cause harm, or was it unintended?

If the harm was unintended, can anyone be blamed for being negligent or irresponsible? Or was this simply an unfortunate accident that could not have been foreseen or prevented?

Worries

Joe used a product created by CharityBot.com, and now he faces very serious problems, He was only trying to do good, It doesn't seem fair Joe should bear all the blame by himself.

E_RESEARCHER and E_ROFILER, working together, can gather and list sorts of information about people and their personal lives. This doesn't seem right.

It doesn't seem right that Joe should have to worry about laws in other countries besides his own

Use your ethical skill
"In other person's shoe"

Precedents and similarities :-

1. Is it a case of extortion and blackmail?
2. What you think about E_MAEL_WRITER and Joe?

Objectors :-People who were harmed are likely to raise objection

1. People who received the "extortionist" email
2. People work for the Children's Anti-Cancer Fund
3. children with cancer who were expected
4. Joe Biggheart
5. many family members and friends of all these other objectors.
6. Staff members and owners of CharityBot.com

"In other person's shoe"

1. Recipients of the softbot's email
   a. Never involved in pornography
   b. Involved in pedophilia or child pornography
2. Joe Bigheart (He bought reliable and safe **PRODUCT**)
3. Supporters of the Children's Anti-Cancer Fund, children with cancer and their families

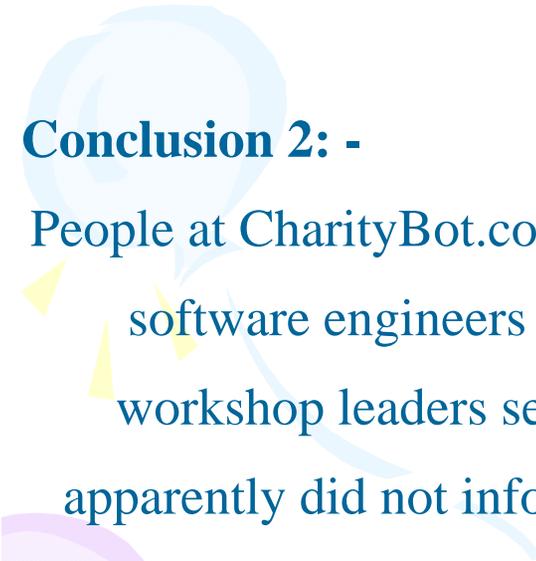**Important: - Discuss case with other people e.g. lawyers**
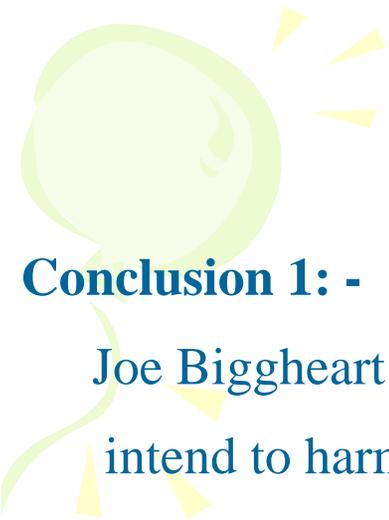
Interim Conclusion

What are your interim conclusions?????

Conclusion 1: -

Joe Biggheart was trying to do good for children who have cancer, and he did not intend to harm anyone; but Joe had some worries about risks and privacy that he dismissed too easily. He should have followed up on these.

Conclusion 2: -

People at CharityBot.com did not take the risks of using softbots seriously enough. The software engineers may not have been concerned enough about such risks, the workshop leaders seem to have dismissed the risks too easily, and the company apparently did not inform its clients about the risks of using their products or similar ones from other companies. These problems may result in lawsuits against CharityBot.com filed by people who were harmed.

Unresolved Computer Ethics

Ethical Issue 1: -

Softbots are not ethically aware of what they do, yet they are given the capacity to perform all kinds of "actions". Society needs to figure out how to make softbots behave as if they were ethical agents, even though they aren't. Could there be "ethical rules" for softbots? We apparently have identified some important "policy vacuums" here.

Ethical Issue 2: -

When people (and softbots) from one country engage in actions on the Internet, they might be violating laws and rules in many other countries. Since no one can know all the laws and rules of all the countries of the world, how can anyone know whether he or she (or his or her softbot) is acting ethically on the Internet? A large set of "policy vacuums" seems to be lurking here.

Perform standard analysis

Several key ethical question concern actions of ICT professionals working for CharityBot.com.

From Software Engineering code of ethics and professional practices

PRINCIPLE 1.03: -

"approve software only if they have a well-founded belief that it is safe, meets specifications, passes appropriate tests, and does not diminish quality of life, diminish privacy, or harm the environment. The ultimate effect of the work should be to the public good."

Responsible ?????????

PRINCIPLE 1.04: -

"disclose to appropriate persons or authorities any actual or potential danger to the user, the public, or the environment, that they reasonably believe to be associated with software or related documents".

Again Responsible is?????????

Roles and responsibility Analysis

- Roles of software engineer created EMAILFUNDER
- Joe's roles and responsibilities
- Workshop leaders roles and responsibilities
- Non-human Agents

Stakeholder Analysis

No one significantly benefited in this case, but a number of people were seriously harmed.

1. Joe Biggheart,
2. Recipients of the emailed message,
3. Children with cancer and their families,
4. Staff members and stock holder of CharityBot.com,
5. Staff members of the Children's Anti-Cancer etc

Systematic policy Analysis

International extradition treaties, laws regarding extortion and negligence and ethical principles included in professional codes of ethics e.g.
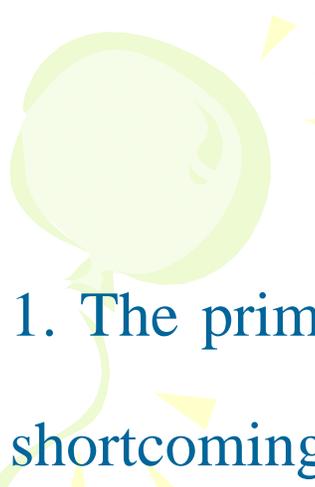
- International agreements
- Corporate policies

Ethical theory Analysis

Traditional ethical theories of the "great philosophers

- Utilitarian
- Aristotelian
- Kantian

Ethical Conclusion

1. The primary Cause of the disaster appears to be a number of ethical shortcomings at CharityBot.com. The software engineers, workshop leaders, and others in the company seem more concerned with profits than with the quality of their products and services.

2. A contributing cause of the disaster appears to be a lack of sufficient care and attention by the staff of the Children's Anti-Cancer Fund. The organization either lacked or failed to enforce policies that demand excellence and responsibility in carrying out one's duties..

Lesson for future

- Privacy will continue to be a major issue in computer ethics. (Softbots on the Internet can gather personal information assemble it into revealing profiles).

- There seems to be an urgent need for the development of "agent ethics" to help regulate. As softbots and other software agents become more sophisticated and empowered to make more decision

- The Internet is truly global and connects most countries of the world, When a person (or robot) is acting on the Internet. whose laws apply and whose values should be respected?