Course Information

Description

The class will examine, reflect upon, and evaluate the role of ethics and philosophy in the practice of Computer Science. Focus will be on personal decision making and on the criteria for ethical behavior in a technological environment.

Text

Deborah G. Johnson (2001), *Computer Ethics, Third Edition*, Prentice-Hall.
ISBN 0-13-083699-0

We will also read a diversity of current technical and semi-popular articles. The course will be organized as a series of case studies, ethical and social problems cast into reasonable scenerios.

Evaluation

Students will be expected to assign themselves a grade, using ethical criteria.

Commentary

This class will have a substantively different organization than traditional skills-based classes. The content is ethical decision-making, and is centered in personal, subjective choices.

1. All classes will meet “in the round”, as a discussion group of peers.

2. We will focus on critical and ethical thinking. Shared perspectives will form most of the content, shared analysis of perspectives will form most of the evaluative component.

3. Readings prior to class time are essential. We will follow the textbook closely.

4. Students will be expected to form opinions about issues, and to express and justify those opinions in class.

Curriculum Organization

Meeting Topic

1) Introduction, curriculum planning
2) Introduction to Philosophy and Ethics
3) Overview of Ethical Issues in CS

We then have eight weeks (16 classes) to cover selected topics.

Organizational ideas

1. Discuss issues in the context of case studies. Read and analyze case studies prior to class. Discuss and debate perspectives in class.

2. In forming and analyzing opinions, considerable extra effort may be required, particularly:

a. Isolate ethical issues and points of debate and contention.
b. Determine state of the art: what do CS professionals think?
c. Literature search: what else has been published on the subject?
d. Clarification:
    Is the issue confused or confounded?
    What are the decision-making bases?
    What are the available tools for resolution?
    What are the existing precedents?
e. Argumentation mapping:
    What schools of thought support or dispute an issue?
    What are the historical and philosophical roots?
    How has the issue evolved over time?

3. Each class member might become the local expert on a particular issue.

4. We could focus on some specific problems rather than wider issues. Egs: protecting children from hate groups as a specific problem for online security; ensuring privacy through personal encryption as a specific problem in free speech; copying software as a problem in computer property rights.

5. There are many pedagogical devices to enhance critical thinking, such as debates, position papers, comparative analysis of ideas, simulated decision-making, real-time ethical dilemmas, essays, role playing, fieldwork, case study preparation, etc. What type of classroom interactions does the class prefer?

Topics

The impact of CS on society and on psychology is profound. This class is *not* about the general interface between technology and culture, it is about a particular subset of issues which are identified as *ethical*.

* professional ethics
* online etiquette
* hacking and cracking
* privacy
* property rights
* accountability, responsibility, and liability
* information integrity and security
* green computing
* cyborgs and simulacrum
* democratic values
* freedom of speech and censorship
* cognitive science and information processing models
* technological change
* societal implications

Personal comments

Since my ethical training is in Education rather than Computer Science, I will be mixing educational ethics into our case studies and their analysis.

I have a particular interest in the ethical impact of massive innovation.

I have direct experience in Virtual Reality technologies, and am quite familiar with the ethical issues associated with *virtuality*. Since this topic is broad, we will see many examples of issues which contrast physical materiality with digital virtuality.

Initial Perspectives, Johnson's Responses

Answer these questions briefly:

1. *What is ethics?*

   The evaluation of arguments, reasons, and theories that justify morality.

   Exploring what humans beings ought to do.

2. *What is ethical Computer Science?*

   Professional ethics is strongly differentiated,
   the role gives the role-holder special powers and responsibilities.

   Computer professionals owe a responsibility to their field and to society.

   Following the code of ethics for the profession.

3. *What are some major issues in Computer Ethics?*

   professional ethics
   privacy
   free speech
   property rights
   accountability
   social values

4. *What is unique about Computer Ethics as opposed to regular ethical behavior?*

   new entities: programs, software, microchips, web sites, video games
   massive scale, power and pervasiveness
   new kinds of knowledge
   new levels of complexity and unreliability
   new instrumentation for new types of human action
   virtuality

Initial Perspectives

Answer these questions briefly:

1. *What is ethics?*

2. *What is ethical Computer Science?*

3. *What are some major issues in Computer Ethics?*

4. *What is unique about Computer Ethics as opposed to regular ethical behavior?*

Course Syllabus

Meeting	Topic	Assignments
1)	Introduction to Philosophy and Ethics	
2)	Conceptual frameworks	text Ch. 2
3)	Case-study methodology	text Ch. 1
4)	Case-study practice	
5)	Psychometric methodology	
6)	Professional ethics	text Ch. 3, case analysis
7)	Uniqueness of software	final assignment
8)	Hacking and crime	text Ch. 4, UCITA case
9)	Security, encryption	
10)	Freedom of speech	text Ch. 8
11)	Regulation, content control	
12)	Privacy, data mining	text Ch. 5
13)	Privacy	
14)	Agency, accountability	text Ch. 7
15)	Netiquette	
16)	Ownership and property	text Ch. 6
17)	Intellectual property rights	
18)	Social impact	
19)	Evaluation and closure	

Ethical Issues and Case Studies

Case studies are a standard method of teaching for philosophy, law, and to a lesser extent, the social sciences. A computer ethics case study is a specific story, usually based on true events, which presents an ethical dilemma. *Dilemmas* are problems which do not have solutions based in facts; rather they call upon *principles*, general rules of morality and ethics which guide actions. Philosophical ethics is the study of these principles.

The goal of philosophical ethics is not finding "correct solutions", it is identifying clear thinking and the implications of clear thinking for behavior. Clear thinking is a *meta-skill*, a skill that applies to almost all other skills. Like other skills, clear thinking requires learning, practice, discipline, and direct experience. We learn clear thinking when faced with relevant personal decisions that do not have clean answers but do have direct consequences. The objective of philosophical debate is *not* to change a person's mind, rather it is to identify the assumptions underlying a position and the quality of thought which supports that position.

You may already have noticed that discussions of philosophical ethics are *branchy*, the ideas lead quickly from one to another and it is easy to lose the focus of conversation. One role of the case study is to help focus discussion. Philosophical ethics is also *deep*, answers and intentions are difficult to identify, often requiring extensive analysis, self-observation, and argumentation.

For these reasons, this class will enforce some ground rules for group discussion and for written assignments and commentary.

Ground Rules for Discussion of Computer Ethics

1. The reasoning which leads to an opinion is important, not the opinion itself.

2. When discussing a case study, do not change the circumstances or the story of the study.

3. Apply structured techniques to formulate and clarify thinking.

4. Identify the ethical component of an issue (what part of a dilemma requires an ethical approach?)

5. Identify the Computer Science component of an issue (what part of the ethical component is unique to Computer Science?)

6. Distinguish between positive arguments (do this) and negative arguments (don't do this).

7. Distinguish between personal and professional ethical positions.

8. Distinguish between the requirements of logic, of law, of institutional policy, of personal preference, of social convention, and of ethics.

Philosophical Systems

A *philosophical system* is a consistent set of values and criteria that apply to a wide variety of issues. We have examined four systems:

Idealism

Reality is basically spirit or idea. Knowledge is gained through the mind. Value is measured by conformity to ideals.

Realism

Reality is basically matter or the physical universe. Knowledge is gained through the senses. Value is measured through conformity to nature.

Pragmatism

Reality is process or experience. Knowledge is gained through trial and error. Value is measured by what is of practical benefit to society.

Existentialism

Reality is self-defined. Knowledge is gained through personal decision making. Value is measured by responsible individual choice.

Ethical Systems

An *ethical system* is a consistent set of beliefs which can be applied to a wide variety of ethical dilemmas. Some widely argued systems include:

Virtue

Ethical behavior is that which develops moral virtues. Focus on attitudes, intentions, and character traits which enable humans to develop their potential.

Utilitarian (Bentham, Mill)

Ethical choices produce the greatest good and the least harm. Focus on consequences of actions.

Human Rights (Kant)

Human rights are interests and activities which we must respect and protect as a civilization. Every person has the fundamental right to be respected and to be treated as

a free and equal rational agent. This implies other rights, such as privacy, truth, and freedom from harm. Focus on actions which do not use people as instruments toward a goal.

Fairness/Justice (Aristotle)

Treat people consistently the same, unless there are morally relevant differences between them. Focus on fairness and consistency of actions to distribute benefits and burdens among all members of a group.

Common Good (Plato, Aristotle, Cicero)

Society is a community joined in a shared pursuit of common goals. The good of the individual is inextricably bound to the good of the group. Ethics advances the common good.

Some Techniques of Ethical Analysis

Ethical analysis tries to identify the participating parties, their respective stakes and responsibilities, and the essential issues. After this groundwork is in place, various ethical guidelines (rules of conduct) and principles (philosophical systems) are applied to the problem. Most discussion revolves around understanding the *intent* of the guidelines and principles when applied to a particular case.

When addressing an ethical dilemma or a case study, try to answer these questions:

1. What is the ethical issue? Is something morally wrong? Is the issue deeper than personal or institutional concerns?

2. Who are the involvced parties (the people and the organizations affected)? Who has an important stake in resolving the issue?

3. What are the obligations between the parties?

Fidelity	(a promise or a contract)
Reparation	(making up for a wrong)
Gratitude	(thanking for a right)
Justice	(comparative merit)
Beneficence	(helping a deserving person)
Non-injury	(avoiding harm)

4. What would each party consider to be the preferred course of action?

5. Generate several courses of action (at least three, two extremes and a compromise). Identify broad filters which might constrain the choice of options for action.

6. For any choice of action, determine the impact on each of the parties:

a. Are any ethical guidelines violated?

b. What are the best-case and worst-case outcomes? Are they tolerable?

c. What benefits and harm will be caused? Does the good outweigh the possible harm?

d. Are there rules or principles which invalidate a choice of actions?

e. List the consequences, risks, and costs.

7. Choose a course of action, and identify which philosophical system it aligns with:

Ethical egoism
Utilitarianism
Human Rights
Ethical Relativism
Fairness and social justice
Common good

8. Which alternative actions produce the best overall consequences? Which respect the moral rights and dignity of all parties? Which treat people fairly, without favoritism or discrimination? Which advance the common good? Which develop moral values? Which recognize the cultural context? Which are the most consistent?

9. Do different ethical systems generate different courses of action? Are there issues to which none of the ethical systems apply? Which system is most compelling for resolving the particular issue?

10. Finally make a clear and definitive decision about a course of action. Suggest policy changes which will prevent the problem from recurring.

Summary of Ethical Analysis

1. Specify the FACTS.
2. Define the DILEMMA.
3. Identify the PARTIES and their interests.
4. Clarify the VALUES and PRINCIPLES at stake.
5. Formulate the possible ACTIONS.
6. Identify the potential CONSEQUENCES.
7. Make a clear DECISION.

Case Study Practice

Apply the guidelines and techniques of ethical analysis to the following case studies. Prepare a summary (no more than two pages) of your analysis. *Do not* try to argue or justify a position, rather try to follow the approach and the questions in the handout on ethical issues and case studies.

HAND IN YOUR WORK FOR PROBLEMS 1-3 AT THE BEGINNING OF CLASS, 1/23/01
HAND IN YOUR WORK FOR PROBLEM 4 AT THE BEGINNING OF CLASS, 1/30/01

Problem 1. Textbook, Scenario 1.4, page 3.

Problem 2. Textbook, Scenario 3.3, page 55.

Problem 3. GRAPHICS APPROPRIATION CASE

Joe wants to create a home page for himself. He knows that when he looks at a page using a web-browser, all the graphics files are downloaded and stored on his machine in the browser cache. He scans the cache and appropriates some graphics from other sites for his own home page. When Joe puts his page up, he gets a nasty letter from Jane, who writes: "How DARE you steal the graphics from my Web page?! I worked for 3 days to get that to work, and you just took it for your own use. What gives you the RIGHT to take my work?"

1. Did Joe steal anything?
2. Does Jane have any ethical grounds to stand on?
3. What if Joe takes artwork from a commercial site rather than an individual's site?
4. What if Joe takes artwork *for* a profit-making commercial site?

Problem 4. UCITA (Challenge problem)

This study involves actual debate over proposed national legislation. UCITA is the Uniform Computer Information Transactions Act. It is a proposed extension of the Uniform Commercial Code to cover intangibles such as software and information systems. Almost all of the professional organizations concerned with Computer Ethics are deeply involved with this debate.

Your task is an ethical analysis of this proposed legislation. Do not over-extend by trying to understand the entire legal picture. Do answer the ethical analysis questions. You should find your own information about UCITA over the net (teamwork is good). A good place to start is the google search engine, looking for "UCITA 2000". The sites below represent several computer professional organizations.

www.arl.org/ucita.html
www.ucitaonline.com
www.4cite.org
linuxtoday.com/stories/15948.html
www.badsoftware.com
www.ieeeusa.org/forum/POSITIONS/ucita.html
www.cpsr.org/program/UCITA/ucita-fact.html
www2.wsba.org/sections/biz/lcc/report/2000/ucita.htm
www-cs.etsu.edu/seeri/WhitePaper.htm

Resources

Leaders in the Field of Computer Ethics

Here are some names which you should be able to recognize as making substantive contributions to the field of Computer Ethics.

Philip Agre
Gary Chapman
Peter and Dorothy Denning
Robert Kling
Lawrence Lessig
Helen Nissenbaum
David Parnas
Pamela Samuelson
Brian Cantwell Smith
Joseph Weizenbaum
Terry Winograd

CPSR	(Computer Professionals for Social Responsibility)
EFF	(Electronic Freedom Foundation)
SIGCAS	(ACM Special Interest Group on Computers and Society)

Study Questions in the Text

Each chapter in the text has a list of study questions at the end. Most of the questions ask you to recite something written in the textbook. These are inherently not interesting. Some questions require thought and judgment. Below I have listed the questions which seem to me to be good for you to contemplate:

Ch 1	4, 11, 12
Ch 2	none
Ch 3	1, 6, 7, 8, 12, 15, 17
Ch 4	2
Ch 5	1, 4, 5, 6, 11
Ch 6	1, 2, 5, 9
Ch 7	1, 3, 4, 9
Ch 8	2, 3, 4, 10

Sociometric Measurement of Ethical Beliefs

-- J. Kreie & T. Cronan, Making Ethical Decisions, *CACM* 12/00. **43**(12), p66-71

I will read five scenarios. Please answer these questions for each scenario.

1. Judgment of behavior:

   Acceptable/ethical Unacceptable/unethical

2. Ethical importance of the issue to you:

   Very important Undecided Not very important

3. Likelihood that you would do the same as in the scenario:

   Likely Undecided Unlikely

4. If the company had a stated policy against such behavior, how likely is it that someone would do it anyway?

   Likely Undecided Unlikely

5. Which factors strongly influenced your answers to the above?

   personal values
   religious belief system
   personal environment or circumstance
   social environment or circumstance
   legal environment or circumstance
   business environment or circumstance
   professional environment or circumstance

SCENARIO	1	2	3	4	5
Judgment					
Importance					
Do the same?					
Do against policy?					
Factors					

Final Assignment

Computer Ethics is a field that covers many diverse and relevant topics. In order to anchor our skills, each student is to become a "local expert" in one particular branch of Computer Ethics.

Your assignment is to

1. Select a topic or focus area,
2. Locate and read selected articles, discussions, and case studies,
3. Formulate the ethical issues and analysis, policy needs, and moral grounds, and
4. Contribute your specialized knowledge to class discussions.

Your focus area could be any one of the following

- one wide area of Computer Ethics
  (regulation, privacy, security, property, professionalism)
- one specialized, fairly narrow topic
  (digital signatures, electronic voting, wire tapping, public encryption)
- one particular person or group
  (Deborah Johnson, Lawrence Lessig, CPSR, EFF)
- one particular dilemma or case study
  (software copying, gender bending, protection for minors, spamming)

You do *not* have to prepare a paper, talk, or presentation of your selected topic. You will be expected to contribute knowledge, opinion, analysis, current status, and other aspects of your topic during class discussion throughout the quarter.

Each class meeting will emphasize some particular aspect of Computer Ethics. Each student is expected to be able to discuss connections between their focus area and any other topic at any time during the quarter. When the class is focussed on a topic which is in your field of concentration, you will be expected to contribute more information and analysis than usual.

Students may bring in case studies, discussion topics, questions, analysis and/or opinions for class discussion at any time.

Inappropriate Computation Dilemma

A senior professional software engineer in a large firm is asked by management to make a decision about using a battery of computerized selection tests for hiring new employees. The firm has the opportunity to purchase specialized software which tests the competence of potential employees and makes predictions about their potential success as an employee of the firm.

The engineer's analysis generates the following assertions:

1. No computer program can possibly do the job of selecting new employees.

2. However, the accuracy of selecting good employees is the same for either human or computer selection; both do a terrible job.

3. The computer uses demographic information (such as owning a home, living less than five miles from work, membership in professional organizations, type of car driven) which increases accuracy of selection but is known to be bias and is technically illegal to use.

4. Removing the demographic information degrades performance of computer selection to almost random. If such information were strictly forbidden during interviews by a person, the selection accuracy of humans would also degrade to almost random.

5. Management is looking for a way to reduce selection costs. Computerized selection accomplishes this objective, while human selection does not.

6. If computerized selection is used, the personnel department can be reduced by 70%, saving the firm $80 million per year. Computerized selection costs about $20 million per year, human selection costs about $100 million per year.

Management gave the senior engineer the responsibility to make the implementation choice. There are three alternatives, all lead to the same personnel decisions and to the same overt corporate behavior.

Choice 1: Keep the personnel department and the selection processes the same.
Total cost: $100 million

Choice 2: Institute computerized selection, even though it is both bias and inefficient.
Total cost: $20 million

Choice 3: Select new employees randomly by computer.
Total cost: $1 million

What choice should he make? Is there a professional ethical issue here?

What if, instead of hiring for a job, the computerized questions were to determine whether or not a person should be given a home improvement loan (or issued a credit card)? Would your decisions be the same? Would the ethical issues be the same?

Massive Impact Dilemma

In the Walt Disney movie *Flubber*, a professor invents an anti-gravity gel. He put a little flubber in his car, and immediately had a flying car. The following dilemma is about computational flubber.

A Computer Science professor has been working for many years on a new conceptualization of what computation is. He has published very little, because he has not yet come to a clear vision. One night, the professor has a dream in which he sees a new way to build computers. All of the work over the last many years condenses, and in the next two weeks, he designs and specifies a new type of computer, call it MetaShift computation.

The professor talks to several colleagues about the new idea, all under non-disclosure, since he suspects the idea may have commercial value. The net result after six months of close and secret collaboration, using only personal resources, is that the professor's team has built a new computer chip with some unusual advantages:

1. MetaShift computation is fully backward compatible. All programs which would run on vonNeumann architectures run on MetaShift. However, MetaShift has its own unique operating system.

2. MetaShift is fully reconfigurable. One MetaShift chip can be converted into *any* functionality within microseconds. With a MetaShift chip, specialized hardware (modems, decryption, cell phones, parallel processors, video acceleration, etc) is unnecessary. Instead the MetaShift is rapidly reconfigured into the desired functionality in real-time.

3. MetaShift works for all types of hardware architecture: CPUs, DSPs, floating-point coprocessors, real-time systems, cellular phones, automobile fuel-injectors, etc.

4. New programs written for MetaShift can be developed in a special language which is very easy to write, and provides automated debugging and program verification. Development time and cost for new programs is about 20% of that for other techniques.

5. The cost of manufacturing MetaShift is half of conventional fabrication costs.

6. The performance of a MetaShift chip is at least 5 times better than any other existing technology.

7. Because of the secrecy and uniqueness of the technology, it would be impossible for any potential competitors to market a similar product. That is, no competition to MetaShift would be possible.

When the MetaShift team did an in-depth market analysis, they discovered that within five years, MetaShift Corporation would probably take 50% market share from each of the companies listed below. Next to the company name is its market capitalization (market cap) in billions of dollars. (*Market cap* is the value of a company, the number of outstanding shares times the value of each share.) Further, when MetaShift went on the market, the market caps of these companies were likely to reduce rapidly to about 40% of current values.

COMPANY	*Market-cap ($billions)*
Microsoft	325
Cisco	270
Intel	249
IBM	196
SUN	98
TI	76
HP	72
Dell	68
Applied Materials	41
Compaq	40
Micron	27
Applied Micro	22
Xilinx	18
Altera	12
AMD	8
Apple	7
Total Impact:	$1.5 trillion

MetaShift itself would very likely reach a valuation of several trillion dollars within ten years. When MetaShift went to market, *most of the leading hardware and software operating system companies in the world will be put out of business within a few years*. As well, any company using computer technology would have to switch to MetaShift products within a few years in order to remain competitive. (This pressure is analogous to the impact of the Internet; the market dominance is analogous to any monopoly.)

The market analysis team then approached both the government and the financial sector with the commercial potential of MetaShift, disguised as a hypothetical story about innovation. After extensive consultation with the world's leading economic and regulatory authorities, MetaShift knew that if it went to market with its product, the following result was most likely:

> *Wide-spread economic chaos* would follow. The technology sectors of the world stock market would crash, losing $2 trillion in assets, and over a million people would loose their jobs. Next, several countries which were highly dependent on technology (US, Ireland, India, Germany, Japan) would enter a *moderate economic depression*.

At the same time, MetaShift would succeed spectacularly, making its first few thousand employees into billionaires.

QUESTIONS

Should MetaShift go to market with its product?
Are there ethical components to this decision?
Are there ethically appropriate compromise positions?
If MetaShift goes to market, should the government immediately intervene?

Capitalist Dilemma

[This is a *computer* ethics question since most of the computer and dotcom industry reaches evaluation through techniques somewhat similar to the extreme case which follows.]

In the United States, there are two institutions which can legally mint (that is, create) money. One is the Federal Treasury; the other is any corporation.

When a start-up is formed, it is given the right to issue stock. That stock (which can be created with almost any cash value) can be sold on the open market. Should the national stock exchanges grant the new corporation an Initial Public Offering (IPO), the stock becomes very easy to sell since it can be traded through the stock exchange to anyone willing to pay for it.

Naturally, these processes are regulated, but the basic idea is that corporations can essentially print their own money. This is one of the two major mechanisms through which the supply of money in our economy grows (the other way is for the Federal Reserve to increase the national debt by printing more money). Contrary to popular belief, incorporation is a "free lunch".

The British Vancouver stock exchange is not as tightly regulated as the US exchanges. It is known as a "highly speculative" exchange. This means that there is no strict requirement to have any actual value for a corporation to reach IPO.

Here is a strategy for making money:

1. File for incorporation (cost is around $3000) as BogusCorp.

2. Issue junk stock with no value. Claim that the *potential* of BogusCorp gives it a value of, say, $1 per share. Issue 20 million shares.

3. Take the company to IPO on a speculative exchange. In reality, you usually take the company to a venture capitalist (VC) who provides the illusion of value by infusing the new company with temporary funds. The VC then takes the company to IPO for around 80% of the profits.

4. There are always gambling and speculative investors. Assume that a few buy shares in BogusCorp, and $1M is raised.

5. Buy a company with actual value using the $1M as a deposit.

6. Now claim that BogusCorp has increased in value, the stock has actual value, and the company is succeeding. Tell your investors that their investment has increased in value, and watch the stock prices rise.

7. Cash out your own stock (which you give to yourself at incorporation for, say, 1 cent per share) as quickly as possible.

Question

Is there an ethical problem with the way our economy works?

Cyber-addiction Dilemma

From Communications of the ACM, 3/98, p11:

"Almost a fifth of college students spend more than 20 hours a week on the Internet...this amount of time qualifies as addition....a New York University study (that) correlates high student Internet use with doubled rates of academic dismissals. As a way of dealing with this problem, schools in Michigan, Maryland, Texas, and Washington have imposed limits on student Internet use. Dominant areas of user involvement: email, Web surfing, MUD interactive role-playing, and home page production."

ibid. p.128 (by Peter Neumann):

"...activities that can lend themselves to addictive or compulsive behavior include...even programming itself -- which seems to inspire compulsive behavior in certain individuals....computers intensify and depersonalize whatever activity is being done, enabling it to be done remotely, more expeditiously, less expensively, and perhaps without identification, accountability, or answerability.

The effects of compulsive computer-related behavior can involve many risks to individuals and to society, including diminution of social and intellectual skills, loss of motivation for more constructive activities, loss of jobs and livelihood, and so on. A reasonable sense of physical reality can be lost through immersion in cyberspace. Similarly, a sense of time reality can be lost through computer use that is totally encompassing and uninterrupted by external events."

Biological systems are incomprehensibly complex. Computational systems are incomprehensibly simple. Since the world we live in is beyond our comprehension, we construct projections (virtual worlds with detail removed) to support the illusion that we understand and are in control. The manufactured flat surfaces which surround us everywhere are an example of the removal of natural complexity to enhance our illusion of tractability. Computational environments are another example of this **abstraction neurosis**.

People fall into cyberspace because it is unnaturally simple and therefore supports the illusion of competence. Of course, cyberspace is not simple, it too is an artifact of biological activity. It is the illusion of potential simplicity which makes computational systems attractive.

Questions

Why have you chosen a profession which requires you to stare at a computer screen all day?

Was your mother correct when she asked you not to sit too close to the television screen?

Is the modern mind committed /addicted to representations of reality (reading-writing-arithmetic, books, films, computers, etc.) rather than to reality itself?

How do you think physical reality will respond to the competition of virtual reality for the attention of humanity?

What is the ethical dimension in these questions?

Logic Dilemma

As Computer Scientists, we may want to know: What is computation? Here are several possibly disturbing ideas about computing:

1. Formal logic defines the control structure of programs and the silicon/physical basis of computation.

2. Logic is underneath most of our culture's conceptual structures (at least in academia).

3. Logic is the simplest and most useful formal system, with the hardest computational problem (is `P=NP?`).

4. Logic has been in our language since the beginning of language.

AND

5. People do not use logic well, and have a long history of not understanding it.

6. Logic is inconsistent when self-reference is incorporated into the domain model. No program can refer to itself safely.

7. In computation, we convert the basic concept of integers into logical structures.

8. Deduction, and computation in general, consists of following meaningless tables and rules while transforming a string of characters from one form to another.

9. Natural deduction is too difficult to use for most logic problems. Machine-based resolution is too difficult to understand.

10. The if-then construct of logic is based on a confusing table mapping: if the antecedent is false, then any consequent is true.

IN FACT, computation as logic seems to be antagonistic to all the grounds of philosophy:

- *aesthetics*: Yuk, computation is difficult and confusing and meaningless

- *ethics*: Everything we program is simply timed logic, so a program's impact on culture is solely in terms of manipulating very limited digital logic forms.

- *epistemology*: How can we know anything when our basic tool is hard to understand and inconsistent?

- *metaphysics*: What is reality in an information society, where the virtual is defined by computation?

- *logic*: Ah! Logic itself is one of the five fundamental areas of *philosophy*.

Form into study groups of three members, to answer these questions:

1. Is there a problem in the above ideas?
2. If so, what is it and what can we do about it?

Triviality of Computation Dilemma

Quotes from Gian-Carlo Rota, **Indiscrete Thoughts**:

"The philosophy of mathematics carries out its work by focusing on the correlation between mathematical things and mathematicians." Robert Sokolowski, p.xiii

That is, between the object-concept of mathematical items (which may or may not exist in a Platonic world independent of our minds) and the process-concept of mathematical minds.

"Of all escapes from reality, mathematics is the most successful ever. It is a fantasy that becomes all the more addictive because it works back to improve the same reality we are trying to evade. All other escapes -- sex, drugs, hobbies, whatever -- are ephemeral by comparison." p.70

"Not only is every mathematical problem solved, but eventually every mathematical problem is proved trivial. The quest for ultimate triviality is characteristic of the mathematical enterprise." p.93

Computer Science deals with a trivial subset of mathematical triviality by excluding the sacred concept of Infinity and the mysterious concept of Void, and even by minimizing *intractable* (i.e. non-polynomial, search-based, mathematically interesting) complexity. Computer Science (at least Artificial Intelligence and Cognitive Science) pretends that the mind is like a computer, so that the issues of complexity of mind and of humanity can be conveniently ignored or forgotten.

Computer Science engages in an extreme of abstraction neurosis, let's say **abstraction psychosis**, by constructing the narrowest of worlds (binary bit-streams which interact only over timed Boolean networks), and then by suggesting that this extreme reduction is somehow whole, and somehow reflects physical reality. In fact, computation addresses only **trivial trivialities**.

Questions

How can humanity become so enamored with a technology that it forgets the reality within which it is embedded?

Why are we so ready and able to limit our experiences to a small screen of phosphors and a tableaux of a few dozen labeled keys?

How can our minds so easily confuse a pixel array with fully visceral experience? Confuse an email exchange with fully interactive human dialog? Confuse digital information processing with bodily experience?

What is the ethical dimension to these questions?

3D Interactive Virtual Worlds

Below is a list of several on-line virtual worlds. Your assignment:

- Select one or several virtual worlds to visit.
- Go inside a world (be careful, most are free, but some require a fee to join). You will probably have to download some specialized interactivity software (free).
- Build an avatar.
- Explore the environment.
- Make a list of the ethical issues that occur to you.

* http://habbo.com
  Very easy to explore.

* http://www.gcoj.com/english/index.html
* http://www.activeworlds.com
* http://www.everquest.com
* http://www.uo.com
* http://www.furcadia.com
  Adventure worlds

* http://www.ntts.com/ispace.html
* http://www.worlds.com
  Commercial worlds

* http://www.sics.se/dive
  One of my UW students built this world.

* http://ultravixen.com
  CAUTION: pornographic adventure world

Want to read about it?

* http://imaginaryrealities.imaginary.com/article_index.html
* http://www.rider.edu/users/suler/psycyber/psycyber.html

Virtual Reality, As Unreal As It Gets

William Bricken

Any technology which has the audacity to call itself a variety of reality must also propose a paradigm shift. In essence, a paradigm shift expands the potential of an entire discipline. For me, Virtual Reality (VR) has expanded every aspect of Computer Science. VR is coming, inevitably and rapidly. I do not propose to constrain or corral or condemn the flow of progress; I do propose that we are in a unique position to watch, with open eyes and with instruments in hand, the emergence of the next computational paradigm.

I have coordinated and recorded the initial VR experience of over 500 people in half-a-dozen contexts. Mean enjoyment, rated on a scale from 1 (yuk!) to 10 (wow!), is 9.3 (N = 280). VR taps a positive emotional core. People enjoy it, people write about it, people stand hours in line for five minutes of it, people want it, and people will buy it. Consider the comments: empowering, the feeling of freedom, dreaming while awake, vast potential in every direction.

And just what is the paradigm shift? Computers are not only symbol processors, they are *reality generators*. VR is the body of techniques that apply computation to the generation of cognitively valid realities. Display is inclusive (3D real-time, subjective perspective). Interface is defined by physiology; interaction, by natural behavior. Virtual entities can be responsive and autonomous; VR is inhabited by artificial life. Software tools include the Virtual Body, the Wand, conversational programming, and negotiated communality.

The Copernican revolution introduced a physics that differed fundamentally from appearance. VR introduces a metaphysics that differs fundamentally from the material. The following outline may help us to decide which side of the monitor we wish to stand on.

Characteristics

Inclusion: VR encapsulates the participant (formerly the user) inside information. It places computation at the closure of our senses. Simulated physical reality is a subset.

Pluralism: A digital environment is individually customized to a participant's perspective. Shared perspective is to be negotiated rather than assumed.

Cognitive integration: Unifying analytic symbolism with audiovisual imagery generates a feeling of wholeness. Computation becomes emotional, reason loses its crown. The material no longer dominates the senses.

Immaterial realism: VR is constructed, not given. It begins as Void, not as a subject/object dichotomy. It is completely representational, but not a priori rational, empirical, or verifiable.

Cornucopia: Bits are cheap. The currency of VR is organization, not possession, not accumulation, not territory.

Paradox: VR allows mutually inconsistent environments to coexist without degradation. It both separates and includes. Overlay VR mixes the real with the virtual.

Issues

Multiple concurrent realities: VR permits comparison of realities, it is the first scientific instrument of metaphysics. Does experience in VR transfer to physical reality (PR)? What is the role of PR in the information age? How graciously will PR admit competition?

Big Science: What is the scientific method, the empirical standard, of digital environments? What does cross-validation of realities do to semantics? Is Psychology the Physics of VR?

Fluid self: What are the cognitive effects of programmable Virtual Bodies, of transportable perspectives, of synesthetic sensation, of masslessness, of negotiable communalities, of complete empowerment?

Cybersocialization: What are the ethics and politics of VR? What will interaction without material impact be like? Who has the right to limit access to the immaterial? Is anarchy a natural consequence of locally definable realities? How will folks respond to explicitly penetrating world views? What emergent phenomena will we see?

"I'm sorry Dave, I can't let you do that." : The VR programmer is no longer responsible for every token, no longer the symbolic god. What are the rights of autonomous computational entities? Will there be a Virtual Environmental Protection Agency?

Intoxication: It's hard to get haughty about non-physical highs. Are there sensory channels to ecstasy? Is living in VR necessarily pathological?

Formalism

To formalize VR, we must shift from a symbolic calculus to a spatial calculus and build the participant into the axioms. For a familiar interpretation, let ( ) be the boundary between mind and body. PR on the outside, participant on the inside.

> Let ( ) be a distinction between realities.
> Let i be the participant.

Spencer Brown's *Laws of Form* provide the axiomatic basis:

> ***Observe***: i ( ) = ( )
> ***Participate***: (i) =

The right-hand-side of each equation is descriptive (objective), the left-hand-side is experiential (participatory). Logic, the strategy of reason, is symbolic by convention, not by necessity. Architectural design has a sensual, experiential semantics. It is but a quirk of typography that we have ignored the experiential semantics of computational languages. At the foundation of Virtual Reality is the Void.

Summary of Computer Ethics

Make a list of items which you consider central for each of the topics below:

- *techniques of ethical analysis*

- *central issues for computer ethics*

- *ways that computer ethics impacts society and culture*

- *how you anchor you own ethical perspective*

Summary of Computer Ethics

Make a list of items which you consider central for each of the topics below.
My answers plus class readings:

- ***techniques of ethical analysis***

  case studies and dilemmas
  utilitarianism
  idealism
  relativism
  human rights and duties
  fairness and justice
  virtue
  ethical egoism
  communal good
  psychometrics, sociometrics
  argumentation
  information mapping
  professionalism
  deep feeling
  informed discussion
  codes of ethics
    Ten Commandments for Computer Ethics
    ACM Code of Ethics and Professional Conduct
    Software Engineering Code of Ethics: Approved!
  spiritual belief

- ***central issues for computer ethics***

  privacy
    Camp, Web Security and Privacy
  ownership and property rights
    Spinello, An Ethical Evaluation of Web Site Linking
  accountability and agency
    Ulrich, IT Ethics
  trespass (hacking) and computer crime
    Tavani, Defining the Boundaries of Computer Crime
  regulation and control
    UTICA Case Study
  accuracy and digital trust
    Smith, Limits of Correctness in Computers
  instrumental, digital reasoning
    Weizenbaum, Computerized Gods
    Weizenbaum, Against the Imperialism of Instrumental Reason
  disembodiment (avatars, cyborgs, simulacrum)
    3D Interactive Virtual Worlds
  the nature of software (open-source, patentable, etc)

Walker, Programs Are Programs
Lessig, The Laws of Cyberspace
Raymond, The Cathedral and the Bazaar
access and cyberliteracy
security and encryption
freedom of speech and censorship
the differences between reality and virtuality, social values

- ***ways that computer ethics impacts society and culture***

living in virtuality
Berry, Why I Am Not Going to Buy a Computer
Virtual Reality, As Unreal as It Gets
trust in digital machines
Inappropriate Computation Dilemma
ecommerce and the new economy
Capitalist Dilemma
transformation of the work environment
Kreie & Cronan, Making Ethical Decisions
addiction
Cyber-addition Dilemma
technological utopianism
Joy, Why the Future Doesn't Need Us
corporate giants
Massive Impact Dilemma
hacktivism
Manion & Goodrum, Terrorism or Civil Disobedience: Toward a Hacktivist Ethic
ownership of virtual properties
surveillance and loss of privacy and autonomy
electronically mediated communication
digitization of cognition
administrative cluelessness
new paradigm for science
Triviality Dilemma

- ***how you anchor you own ethical perspective?***

deep feeling
ethical egoism

Lecture and Handout Evaluation

Do not put your name on this. Check one rating box for each topic or handout.

	RATING			
	didn't read don't recall	*good*	*neutral*	*not good*

Textbook

Johnson, Computer Ethics, Third Edition.

Class materials

Initial Perspectives

Ethical Issues and Case Studies

Case Study Practice; UTICA Case Study

Resources

Final Assignment (local expert)

Inappropriate Computation Dilemma

Capitalist Dilemma

Cyber-addiction Dilemma

Triviality Dilemma

Massive Impact Dilemma

3D Interactive Virtual Worlds

Virtual Reality, As Unreal as It Gets

Summary of Computer Ethics

RATING

didn't read
don't recall *good* *neutral* *not good*

Class Content

1) Th 1/4
Intro to Philosophy and Ethics
2) Tu 1/9
Conceptual frameworks
3) Th 1/11
Case-study methodology
4) Tu 1/16
Case-study practice
5) Th 1/18
Psychometric methodology
6) Tu 1/23
Professional ethics
7) Th 1/25
Uniqueness of software
8) Th 1/30
Netiquette
9) Th 2/1
Security, encryption
10) Tu 2/6
Freedom of speech
11) Th 2/8
Regulation, content control
12) Tu 2/13
Privacy, data mining
13) Th 2/15
Privacy
14) Tu 2/20
Agency, accountability
15) Tu 2/22
Hacking and crime
16) Tu 2/27
Ownership and property
17) Th 3/1
Intellectual property rights
18) Tu 3/6
Social impact

RATING

didn't read
don't recall *good* *neutral* *not good*

Articles

Ten Commandments for Computer Ethics

ACM Code of Ethics and Professional Conduct

Software Engineering Code of Ethics: Approved!

Camp, Web Security and Privacy

Spinello, An Ethical Evaluation of Web Site Linking

Ulrich, IT Ethics

Tavani, Defining the Boundaries of Computer Crime

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Manion & Goodrum, Terrorism or Civil Disobedience:
Toward a Hacktivist Ethic