Chapter 1. Introduction to Computer Ethics

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1.1 Scenarios

A good place to start on this course is to look at the reasons why we should study it at all. To facilitate this, we look at a few scenarios. For each of these scenarios, you should write think about any questionable ethical issues about each scenario. At his point you may not be to answer them, but you might have your own opinion. Write this down as well you should revisit them after relevant section and see if your opinion has been affected.

Hopefully these typical ethical questions illustrates to you the diverse characters of ethical issues including, property rights, privacy, free speech and professional ethics. Is computer ethics different to those that came before. Partially, the answer is no since all fields have similar problems and issue. Partially, the answer is also yes, since there are issues specific to computers such as speed and programs etc.

1.1.1 Scenario 1: Should I copy software?

John invests a small amounts on the stock market. Last year he bought and successfully employed a software package to help him with his investments. Recently, he met Mary who was also interested in using the software. Mary borrowed the package, copied it and then returns it. Both vaguely knew that the software was proprietary but did not read up the details. Did John and Mary do anything wrong, if so what?

Something to consider:

- Should software package be lent?
- When is it justifiable to break the law? Bad law, inappropriate law or if the law is easy to break?

1.1.2 Scenario 2: Should a company data mine?

Inga sells hardware and software to over 100 000 customers per year. She has 10 years' experience. As part of the billing process she keeps information on customers. She buys and uses a data mining tool to derive useful information about her client's information such as zip codes, credit card numbers, ID numbers etc. Most of this

information identifies groups and not individuals. She can then use the information to market her wares more efficiently. Is this ethical since customers did not give her the information for this purpose?

Note: What is data mining?

Data mining is a process of exploration and analysis of large quantities of data, by automatic or semiautomatic means. This is done in order to discover meaningful patterns and rules. In many cases, the data was not collected primarily for the purpose of Data Mining.

Something to consider:

- Should customer be notified?
- Is there a need for establishment of a policy? What should this policy looks like.
- Professional responsibility (professional Ethics): Do professionals have a responsibility to ensure computing serves humanity well?

1.1.3 Scenario 3: Freedom of Expression

In the US, a student JB posted sex fantasies on the Internet called Pamela's ordeal. The story was fictional, but JB named the main character, Pamela, after a REAL student. In it, he described the rape, torture and murder of Pamela. He also exchanged e-mails with other people in the newsgroups, discussing sex acts. An alumnus saw this and reported it to the University. JB was then arrested and held in custody. He was charged with transmitting interstate communication of threat to injure another person. The charges were eventually dropped, but did JB really do anything wrong?

Something to consider:

- Should self-censorship be enforced. Who decides what is acceptable?
- Is there a need for a public policy?

1.1.4 Scenario 4: Professional Responsibility

Mike works for a Software development company which develops computer games for children aged 8-14. The latest game that Mike worked on, uses inferential reasoning and allows players to choose different characters, primarily macho man and sexy woman. The game is used mainly by boys. Recently Mike attended a conference on gender and minorities, where he described the above. The conference delegates discussed the issue of lower participation of women in computing and how to make the industry more attractive to women.

Back at work, Mike realised that his production team is all male. Should he refuse to work on this team? Should he ask for the team to be reviewed? Will the game sell as well if different message was given? What is his responsibility?

Something to consider:

- Should software package be lent?
- When is it justifiable to break the law? Bad law, inappropriate law or if the law is easy to break?

1.2 New Possibilities

New technologies bring with them new possibilities for both good and bad applications. Of course, this is not limited to the field of computing.

Activity 1

Think about ethical issues that are involved in carrying out your job or day to day activity. Focus on those tasks which are non-computing related. Are they any ethical guidelines for doing your job or activity? How these ethical guidelines were developed over time, and are how often changes are made to them. What are the trigger of these changes if any?

1.2.1 New Possibilities in Computing

There is no doubt that computers and related information and communication technology have introduced new possibilities to many activities that we do. In some cases, they allow people to do things that they have been doing for years, but now in a different way. For example,

- Consumers are able to buy goods on and offline using computers. The nature of the goods might be different (eg abstract data) but the principal remain the same.
- Computers allows for individual to be track without their knowledge.
- Computers eliminates human contact, for better or for worse
- Computers give wide access to data and information

There are also other activities that were hard to do without computer such as data mining. It was so hard to do that it was not done. This accounts for the lack of policy concerning data mining.

What is it about computers that make the computer environment different? Factors that have been raised included:

- **Speed**: Computers are able to do things at exponentially faster rate than ever before. For example, data mining was only possible (or rather made economically viable) by the advent of computers
- Storage and accessibility of data: Vast amount of data can be stored and easily accessible for processing.
- **Concept of a program**: How should one treat a computer program. Is it property or an idea. Is it something to be copyrighted or patented. We will deal with this later in the module.
- **Breadth of Distribution**: Information technologies have present consumers with a new channel of distribution that is faster and as yet not as regulated internationally as traditional channels.

Activity 2

Can you think of other factors that make the computer and IT environment different to a more traditional non-computing medium? As new technologies are introduced new factors are arising every day. Think about relatively new technologies such as cellular communication or satellite tracking devices? Have they cause new ethical questions? For each technologies you can think of, try to work out what it is about the technology that cause those ethical questions.

1.2.2 Computers Used in Social context

Another area that we should be considering is the use of computers in social context. This includes the use of a large database for governmental agency such as home affairs (to keep birth, death, address etc), police or the judiciary (for criminal records, fine etc). These agencies have always kept records in paper form long before computers came along.

Activity 3: Government Databases

1. What is the implication of keeping large databases by government agencies, ethical or otherwise?

- 2. Does introduction of these database affect Free Speech? If so how?
- 3. Consider the rights of the individual. Should they be given rights of access to their own data or the ability to change incorrect data? Also consider the impact of incorrect data even if they are changed but not propagated in a timely fashion.

1.2.3 Moral and Legal Issues

There are often many points of view to consider when it comes to dealing ethical issues. A good solution walks a fine line in balancing all these factors. However, often another factor against policymakers is time. Often there is a policy vacuum because ethical frameworks and laws are lagging behind the innovation. Sometime it takes a considerable time for the ethical framework to be developed for an innovation as the technology itself evolves so quickly. A policy vacuum is most effectively filled by introduction of appropriate laws, but this takes time. Company or personal policies or social conventions can often filled effectively filled the gap, while at the same time provide a starting point to framework creation and eventually laws.

1.3 Definitions of Computer Ethics

1.3.1 James Moor

The operation of computer systems and their associated communications systems are central to the economies of the developed world. The social impact of this technology has been immense, changing the environment in which computers are used, and in doing so giving rise to questions of right and wrong. Moor defines computer ethics as:

'.... The analysis of the nature and the social impact of computer technology and the corresponding formulation and justification of policies for the ethical use of such technology.'

He uses the phrase 'computer technology' so as to take the subject matter of the field broadly to include computers and associated technology: including concerns about software as well as hardware and concerns about networks connecting computers as well as computers themselves.

1.3.2 Deborah Johnson

Johnson defines the study of computer ethics as

The study of the ethical questions that arise as a consequence of the development and deployment of computers and computing technologies. It involves two activities. One is identifying and bringing into focus the issues and problems that fall within its scope, raising awareness of the ethical dimension of a particular situation. The second is providing an approach to these issues, a means of advancing our understanding of, and suggesting ways of reaching wise solutions to these problems.'

1.4 Are Computer Ethical Issues Unique?

There have been many arguments that have been put forward to answer the question of whether or not computer ethical issues are unique? The answer to the question will imply a different way in which these issues can be dealt with. If they are not unique, an effective solution can be derived or adapted from what existing guidelines. If they are unique then a completely new way of dealing with them may have to be derived. Of course, there are also suggestions that the answer to the above questions is not as clear-cut. The different answers (and the reasons) includes:

- No, in the sense that there is nothing new under the sun. There has always been issues of privacy, property and freedom. The introduction of computers does not necessary introduce new way of doing things. Often computers increase efficiency but fundamentally, the way of doing the task is still the same.
- Yes, in the sense that a new technology has been introduced that never existed before. An example of this is the computer program. Computer programs are unlike anything that was preceded before it. It can be (and has been) regarded as properties like cars or houses, while alternative it can also be seen as an

individual expression, not unlike a song. Yet another alternative is to regarded as an idea.

• Yes, it facilitates new human actions that were not possible (or economically viable) before. For example, virus writing is a noticeable problem with computers. While it is arguable that similar problems existed prior to the existence computers, they were not of a large enough scale to be considered an ethical issue. Another example, that have been cited many times before involve the use of data mining.

While there are many answers to the question, it is clear that when an ethical issue arise, part of it may be analogous to existing framework, while part of it may be entirely new. It is the role of the policymakers to consider this question thoroughly before deciding on a solution. If the issues in question has an appropriate analogy, it could be employed as a starting point.

1.4.1 What Make Computer Ethics Different?

Moor (1985) claims that computer ethics is not like any other; it is described as a new area of ethics and as a unique kind of it. The arguments for such are based on the logical malleability of computers, the computer's impact on society and the invisibility factor.

The logical malleability of computers

Moor (1985) argues that what is revolutionary about computers is logical malleability. Computers are viewed as being logically malleable in that they can be shaped and molded to do any activity that can be characterised in terms of inputs, outputs and connecting logical operations. The logic of computers can be shaped in infinite ways through changes in hardware and software.

'Just, as the power of a steam engine was the raw resource of the Industrial Revolution so the logic of a computer is a raw resource of the Information Revolution. Because the logic applies everywhere, the potential applications of computer technology appear limitless. 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 defines the driving question of the Information Revolution as 'How can we mould the logic of computers to better serve our purposes?'

The computer's impact on society

As computer technology encompass more and more of our society, Moor sees more and more of the transforming effect of computers on our basic institutions and practices. Although nobody can know for sure how our computerised society will look fifty years from now, Moor argues that it is reasonable to think that various aspects of our daily work will be transformed.

'Computers have been used for years by businesses to expedite routine work, such as calculating payrolls. However, as personal computers become widespread and allow executives to work at home, and as robots do more and more factory work, the emerging question will not be merely "How well do computers help us work?" but "What is the nature of this work?"

The invisibility factor

An important fact about computers is that most of the time and under most conditions computer operations are invisible. Moor (1985) mentions three kinds of invisibility that can have ethical significance. The first variety of the invisibility factor is invisible abuse. James Moor defines invisible abuse as "the intentional use of the invisible operations of a computer to engage in unethical conduct." Moor suggests that a classic example of this is the case of a programmer who realised that he could steal excess interest from a bank.

'When interest on a bank account is calculated, there is often a fraction of a cent left over after rounding off. This programmer instructed a computer to deposit these fractions of a cent to his own account.'

Although Moor views this as an ordinary case of stealing, he sees this pertaining to computer ethics because computer technology has provided the opportunity for such activities to go more often than not unnoticed.

Another possibility for invisible abuse is invasion of the property and privacy of others. For example, Moor identifies how a computer can be programmed to contact another computer over phone lines and 'Surreptitiously remove or alter confidential information'.

Another example of invisible abuse is the use of computers for surveillance. Classic examples of such use are computerised employee monitoring and Closed Circuit Television (CCTV) technologies.

The second variety of the invisibility factor is the presence of invisible programming values, those values that are embedded into a computer program. Moor draws an analogy between writing a computer program and building a house.

No matter how detailed the specifications may be, a builder must make numerous decisions about matters not specified in order to construct the house. Different houses are compatible with a given set of specifications. Similarly, a request for a computer program is made at a level of abstraction usually far removed from the details of the actual programming language. In order to implement a program, which satisfies the specification, a programmer makes some value judgements about what is important and what is not. These values become embedded in the final product and may be invisible to someone who runs the program.'

The third and final variety of the invisibility factor is the invisible complex calculation. Moor argues that "Computers today are capable of enormous calculations beyond human comprehension. Even if a program is understood, it does not follow that the respective calculations are understood. Computers today perform and, certainly, super computers in the future will perform, calculations, which are too complex for human inspection and understanding."

Moor argues that the issue is how much we should trust a computer's invisible calculation. This becomes a significant issue as the consequences grow in importance. He illustrates this with an example:

'Computers are used by the military in making decisions about launching nuclear weapons. On the one hand, computers are fallible and there may not be time to confirm their assessment of the situation. On the other hand, making decisions about launching nuclear weapons without using computers may be even more fallible and more dangerous. What should be our policy about trusting invisible calculations?'

1.4.2 Similarities of Computer Ethics to Other Ethics

The computer ethicist Gotterbarn in (Johnson, 1995) argues that the issues invoked by computers are not new or unique. Historically, there are many devices that have had a significant impact on society. Gotterbarn cites the example of the printing press, for which he argues that *We did not develop a new or unique ethics called printing press ethics'*.

He further argues that the flexibility of the computer is due to the 'Underlying strengths of the logical and mathematical capabilities implemented in the computer. The underlying flexibility of math and logic is greater than that of the computer, but we did not develop logic ethics and mathematics ethics.'

The newness claim, argues Gotterbarn, "Leads people to think that computer ethics has not yet found its primary ethical standard; so the discussion of computer ethics is not yet directed by any 'guiding principle' from which we can reason. This is different from our understanding of the older more established professions. Medicine, for example, is viewed as having a primary ethical principle - prevent death - which physicians can use to guide their reasoning."

Journalism is viewed as having a primary ethical principle - report the truth - which journalists can use to guide their reasoning. The inference from the newness claim is 'That we cannot make ethical decisions in computer ethics because we have not yet found a primary ethical principal.'

Gotterbarn argues that the uniqueness claim is even more dangerous: 'It leads one to think that not only are the ethical standards undiscovered, but the model of ethical reasoning itself is yet to be discovered; that is, even if we find a primary principle, we will not know how to reason from it.'

Gotterbarn concludes that 'We have mistakenly understood computer ethics as different from other professional ethics. When we look at medical ethics, legal ethics, journalistic ethics, we have to distinguish the practitioners of those ethics from the ethical principles they affirm. The three professionals work in different

contexts: medicine, law and journalism. However, when we talk of their professional ethics we do not consider them three different kinds. The distinguishing characteristics among professional ethics, is the context in which they are applied. Because there are three contexts, it does not follow that there are three distinct sets of ethical rules or three different kinds of moral reasoning. Nor does it follow that computer ethics is another unique set of ethical principles which is yet to be discovered.'

Spinello (1995) is another computer ethicist who argues that the issues invoked by computers are not new or unique. He states that it would be a mistake 'To consider the ethics of computer technology as unique, separate from general business and social ethics.' His premise is that these 'Revolutionary problems can be confronted with the same analytical tools and ethical categories used for more traditional concerns. It will be illuminating to regard these new dilemmas from the perspective of rights or duties or maximisation of consequences.' He argues that our 'ethical tradition' is rich enough to provide ample background for the thoughtful and comprehensive treatment of these new problem areas. However, it may be necessary to 'Revise our definition of certain rights such as privacy in light of the new realities created by the phenomenon of digital disclosure. Although we need to reinterpret what the right to privacy means on the frontiers of cyberspace, it is important to underline that the notion of a right to privacy, a right to control of information about oneself, has not lost its intelligibility.'

1.5 Traditionalist Approach to Resolving Ethical Issues

A way of dealing with new ethical issues is to take a traditionalist approach. This involves identifying a moral norm and principles on which the issue is based, then apply them to the new situation.

For example, we can extend or adapt property law of ownerships such as copyright, patent and trade secrecy to that of computer software.

Activity 4

E-mail is another technology that has an equivalence that one can consider applying the traditionalist approach on.

- 1. Identify the issues that might be of concern to e-mails include confidentiality (communication is private) and authentication (sender is who he or she claim to be).
- 2. How does traditional snail-mail deal with such issues? Are there any issues that does not have a snail-mail equivalence? Concerning these issues, what is it about e-mail that make it differ from snail-mail? (If you cannot think of anything, you can also start by first identifying the difference between e-mail and snail-mail, and then go on to say how each factors can raise new issues that were not applicable to snail-mails)

There are also problems with employing the traditionalist approach. This approach can result in oversimplification of issues, as it implies a routine way of dealing with ALL problems. The computing process is fluid with technology over changing.

Another issue is that different people will employ different analogies which can lead to different solutions. For example, the Internet can be thought of as a network of highways as well as a shopping mall. Choosing which analogies to used may lead to unsuitable solutions to some of those involved. How should computer program be considered? Is it property, idea or something else?

Activity 5: Analogy for Hacking

Compare and contrast the different between a hacker breaking into a computer system and a thief breaking in to a house. Is this a reasonable comparison? Is it a good analogy to employ while considering the issue of hacking?

Consider a scenario where a person walks down a street trying each door. If he founds and unlocked door he goes in and looks around. Is this situation analogous to a hacker scanning ports on a computer and find an opened port and goes in a look around and take a few things. However, also consider that in computer terms, some ports are considered public ports (for example, port 80 where web pages are served from). For example,

is it reasonable to assume that if port 80 is available, the owner of the site gives you permission to access the site.

How far can you take this argument. For example, if a wireless signal is available, could you derived from that the owner gives you permission to access it? In some culture, a public water well or tap, is considered to be freely available to all that come passed. Should publicly accessible wireless signal then falls under the same category?