COURSE SUMMARY
MORAL ISSUES IN COMPUTER SCIENCE

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Since 1980, I have offered the course "Moral Issues in Computer Science" at the Illinois Institute of Technology. The title reference to "computer science" is misleading, for the course deals with issues that confront personnel in the computer and computer related industries, including systems analysts and hardware consultants, who would never be so pretentious as to call themselves "scientists." For instance, an ethical analysis of a dispute over whether a software system adequately satisfies the customer's needs is irrelevant to scientific research, but does raise interesting ethical questions on how one ought to assess responsibility when shifting standards for professional service and poorly formulated customer expectations create complex disagreements.

The course is one of several which have either been recently introduced or which are planned at universities about the country, but it differs from most others in crucial ways. IIT's course does not consider broad issues in the social impact of computers, such as are discussed in courses called "computers and society." (IIT has, in fact, offered that course for several years.) Rather the course morally assesses choices and disputes that are likely to come up in present computer use. Thus we do not ask general questions about the significance of machines that increase our intellectual power or speculate about the consequences of robotics to the work force. We do seriously ask what sorts of technical expertise a researcher may take with him when changing employers without violating confidences. The course also emphasizes problems that are likely to occur to computer professionals rather than to those outside the industry who may be adversely affected by computer use. For instance, the general public often expresses fear that the computer's capacity to compile and process huge amounts of data threatens personal privacy. Though a pressing social issue, this is less a problem for computer personnel than for those who may misuse computers to pass on personal information. On the other hand those inside the industry do worry a great deal about issues relating to proprietary protections for new discoveries, even though those outside the industry may be hardly aware of the issue. The course spends considerably more time on the piracy of computer programs than on the privacy of personal information.

Though there are no computer prerequisites for the course, the course attracts mostly students who work daily with computers. Much of the enrollment is from the departments of electrical engineering and computer science. The course is taught in the evenings and thus also attracts a large number of students who work in the day in computer related industries. All the same, I discourage computer jargon and assumptions of computer expertise. The students write papers about "computer terminals" rather than "C.R.T.s" and about "filing systems" rather than "linked lists." When technical details are unavoidable, I ask the students to write up the technical matters in technical terminology and then sum up that discussion in a manner understandable to educated laymen. Thus the course is accessible to students with a minimum of experience with computers. And the students get practice at writing for the public.

Since the course is offered by the philosophy section, it must be taught by a trained academic philosopher familiar with ethical analysis. But the instructor should also be familiar with computers. Few academics have the needed credentials. In part the problem can be solved by having two instructors. When I first taught the course, I teamed with Charles Bauer from the computer science department. In part the problem is solved by the presence among the students of experienced computer personnel, on whom I have frequently depended when I found my own training inadequate.

My own credentials for the course are somewhat odd. When the course was first proposed in 1980, I was chosen to teach it since my graduate work was in the foundations of mathematics and I am familiar with the mathematician's notion of computeability. So even though computer technology is far from mathematical theory, I was prepared to prepare myself for the course. In 1980, the Center for the Study of Ethics based at IIT sponsored the course by making it possible for me to take time off from teaching to study computers. Since I foresaw a need to study the use of computers in business, I first studied business computing and learned COBOL. Then, because it was of general philosophical interest, I also studied LISP and artificial intelligence. (The course emphasis on current issues pretty much precludes discussion of something so theoretic and speculative as artificial intelligence.) Proceeding in the philosopher's usual backwards direction, I studied low-level and compiler languages before I got around to learning languages such as BASIC. My interests in mathematical theory led me to study software, and I still have a poor sense of other aspects of the industry. The course suffers from this bias, which I shall try to correct in the future. If I continue to work in this area, I will have to seek part-time or consulting work in the industry to get more direct experience.

I do not see how the course could be taught by someone unwilling to formally study both philosophy and computer technology. Thus this single course makes an extreme demand on my time, and I would discourage most teachers from attempting it. Instructors coming to the course from a background of computers without a background in philosophy may, I fear, have even worse problems than I, for ethical theory must seem an impenetrable maze of conflicting positions to those unfamiliar with academic philosophy. I have responded to many cries for help from instructors in computer departments who attempt such courses.

The course is in normative ethics. That is, it attempts to resolve actual ethical conflicts and not abstract problems on the nature of the good or the relation between free will and responsibility. Theoretical points, when discussed, are tied to relevant issues and actual cases. This is in keeping with current trends in philosophical ethics which has turned away from overly abstract meta-ethics.

I always have qualms about teaching normative ethics which can too easily turn into preaching. I generally see it as my duty as a teacher to think through issues discussed in class sufficiently to have a personal view of the matter and then base class on that view. I often suspect that teachers who encourage open discussion have simply not done their homework. This does not mean that I expect that my students agree with me or take my approach, but that I cannot see teaching an issue which I have not attempted to resolve for myself. And if I have a view on the issue, it is dishonest to teach the issue without arguing for that view. This seems O.K. when I teach controversial issues in metaphysics, but it seems somehow paternalistic in normative ethics when issues demand independent decisions with individual responsibility for those decisions. It is always hard to strike a balance between an honest argument for a position which I find convincing and encouragement to the students that they think for themselves and decide as they wish. In this course that balance is doubly important.

The course has a legalistic slant. Readings are often taken from court decisions and law journals. I expect the students to be familiar with relevant legal categories and arguments. This is partly because I am impressed with the work of modern philosophers such as P. Devlin, R. Dworkin, J. Feinberg, and others who combine philosophic and legal research. Also, I believe that the decisions written by the upper courts (particularly the Supreme Court) include some of the best analyses of normative ethical issues now available. Contrary to common opinion, fundamental discussions of constitutional matters often touch on our basic social and ethical ideals and do not revert to sophistic legal points. Our law usually reflects our ethical biases and always gives insight into them. The difficulty with this emphasis is that it is easy to fall into the trap of avoiding an ethical issue by retreating into a legal assessment. We must simply guard against that.

A central problem with the course is the lack of a usable textbook. Plenty has been written on subjects relevant to the course in the popular press and trade journals. But very little of it is philosophical in the sense that would make it appropriate for a philosophy course. What is available is hard to find and scattered all over the place. Some things may be copied without violating copyrights, e.g. court decisions (a good reason to use them) and articles from the A.C.M. (a good policy by a wise editorial staff). One can attempt to order reprints that are often unavailable, attempt to get permission to photocopy articles, hire a company to put together an anthology, violate copyrights and photocopy yourself, etc. None of these is particularly pleasing. I put articles on reserve in the library where (even if I am not violating the copyrights) I expect the students to copy them anyway.

A few books may soon become available. J.T. Westermeier has just put together D.P. and the Law, published by the D.P. Management Association, Park Ridge, Ill. This is a short manuscript including several articles on exactly the sorts of issues I cover in the course. The Emory Law Journal, Vol. 30, Spring 1981, consists of articles from a symposium on computer law and is in itself a useful volume. Although I have not seen it as yet, the papers from the Bentley College conference on "The Management of Computer Technology: Values and Choices in Corporate and Public Policy" is advertised as appearing soon under the title Ethics and the Management of Computer Technology. Deborah Johnson at R.P.I. is bringing out a book on the issues with Prentice Hall. She is an insightful philosopher, and the book may be quite good. Charlie Maner at Old Dominion University keeps writing to me about some collections he is putting together, though I have not seen them. Deborah Johnson and I are now seeking a publisher for an anthology of readings. For the time being though, I primarily rely on articles which I have collected over the years. I try to provide students with articles on each issue covered in the course that include (a) a case study, perhaps from a court record, (b) a decent philosophic study that is on a subject close enough to the issue that its arguments or positions can be easily applied, (c) some discussions directly on the issue, perhaps taken from legal or professional journals.

To those who wish to research the issues covered in the course or prepare their own course, I strongly suggest use of the Funk and Scott Index to articles on business, which is available in any business library. The Rutgers Journal on Computers, Technology, and the Law is a valuable source, and does periodically publish a bibliography of articles on computers and the law. Many topics in computer ethics are closely related to the currently popular study of ethics for business and engineering. There are several anthologies of articles available in this broader area which could be helpful as sources of general background articles. In "business ethics", and the best are (1) Tom Beauchamp and Norman Bowie, Ethical Theory and Business, Prentice-Hall, and (2) Thomas Donaldson and Patricia Werhane, Ethical Issues in Business, Prentice-Hall. In "engineering ethics", the

only anthology is Robert Baum and Albert Flores, Ethical Problems in Engineering, available through the Center for the Study of Human Dimensions of Science and Technology at Rensselaer Polytechnic Institute. For general background readings on the legal and philosophical issues, I recommend Joel Feinberg and Hyman Gross, Philosophy of Law, Dickenson Publishing Company.

The course, as I teach it, consists of four separate areas: intellectual property, professionalism, responsibility, and public policy. These certainly overlap. For instance, in the section on responsibility, we discuss public policy decisions on how best to write liability law that covers harms done through negligent use of computers. I will here describe each section and the reading I expect to use next time I teach the course. This is already revised from the course I taught last spring.

I. Intellectual Properties

At question is who owns what right over basic research techniques and discoveries. Issues include: (a) an employee's use of information and techniques learned at one employer after a change of employment, (b) rights to market new discoveries (c) forms of property protections most appropriate to computer software, (d) any right of the scientific and technological community to new discoveries, etc. The issues are particularly interesting due to a perceived inadequacy in present protection for software.

(1) Morris Cohen, "Property and Sovereignty", in Law and Social Order. This includes a nice survey of various philosophical views of the nature and legitimacy of property claims. The view that property is defined by the laws governing its acquisition, transferal, etc. is useful in a discussion of the appropriateness of traditional notions of property to software.

(2) Diamond v. Diehr, 101 S. Ct. 1049 (1981). This is the recent controversial case on patents for software. Steven's dissent is particularly important both for its fine historical survey and its clear presentation of the intuitions against software patents.

(3) Joseph Scafetta, "Computer Software and Unfair Methods of Competition", John Marshall Journal of Practice and Procedure, Vol. 10, 1977. This article nicely sums up trade secret law, contrasts it with patent and copyright law, and gives case citations in an elementary discussion understandable to undergraduates.

(4) Calvin Mooers, "Computer Software and Copyright", ACM Computing Surveys, March 1975. This is a bit old now and I am looking for a more recent article to use next year, but it has the advantage that it is written for computer users and not for lawyers.

(5) Karl Dakin and David Higgins, "Fingerprinting a Program", Datamation, April '82. The article suggests programming techniques which will make it possible to establish ownership under copyright and trade secret laws.

(6) Stanley Lieberstein, Who Owns What Is In Your Head, Dutton, 1979. I ask the students to read Chapters 5 and 6 from this text for business managers who wish to preserve trade secrets. These chapters explain the use of contracts to bind employees and their work to their employer.

(7) John Snapper, "Ownership of Computer Programs". This is a philosophical discussion of some of the issues. It is currently submitted for publication and only available from me. I do not use it for I do not approve of teaching from one's own work. But others may wish to use it.

II. An Ethics For A Computer Profession

We look at the various codes of ethics that have been proposed for the profession. The question whether a decision based on an organization's code is legal or ethical will lead into a general discussion of the nature of ethical decisions. Issues here include the authority of professional organizations to establish and enforce standards, the appropriateness of particular codes, etc. Finally, we confront the question whether there are any special ethical demands on computer personnel, or whether the usual ethics of everyday life can be applied to computer use without special qualification. (Some students have suggested that this study should come at the beginning of the course for the sake of an introduction to ethics, but I like to look at a particular issue before turning to this general discussion.)

(1) The Codes. The ACM, the DPMA, the IEEE, the ICCA, all have "codes". It is important that the codes, the preambles or statement of purpose, and enforcement procedures all be read with care.

(2) Fashion Originator's Guild v. F.T.C., 615 S.Ct. 703 (1941). The Fashion Guild attempts to enforce a code rule against the piracy of clothing patterns through a boycott of offending businesses. This is found in violation of antitrust law. The case makes a good transition from the discussion of intellectual properties, for the Fashion Guild was responding to a problem similar to the problems with software protection. The general issue is the authority of private organizations to enforce codes.

(3) John Ladd, "The Quest for a Code of Professional Ethics", in Chalf, Frankel, and Chafer, AAAS Professional Ethics Project, AAAS Publication 80-R-4, 1980. Ladd argues that "codes of ethics" is a misnomer, for decisions based on codes are legalistic, not ethical.

(4) Phillip C. Kissim, "Antitrust Law, the First Amendment, and Professional Self-Regulation of Technical Quality", in R. Blair and S. Rubin, Regulating the Professions. This lays out the antitrust restrictions on professional codes, and gives all the basic citations.

(5) Kant, Foundations of the Metaphysics of Morals, #1 (393-406) and #2 (412-440). I think that in all philosophy courses, students should struggle with some really difficult texts. I sneak the Kant in here because of the general characterization of ethical decision making.

(6) Bernard Williams, Morality: An Introduction to Ethics, Harper and Row, 1972. This short book provides a decent introduction to ethical theory and is particularly relevant to the present course because of the emphasis on the ethical consequences of professional roles.

(7) Zecharia Chafee, "The Internal Affairs of Associations not for Profit", Harvard Law Review, May 1930. Students tend to argue that private societies may set membership rules as they wish. This enjoyable article shows the error of that intuition. But it is a long article, and I may drop it to shorten the reading list.

III. Responsibility and Liability

The questions center on the correct assessment of personal and corporate responsibility for harms effected by computer use. Although many of the issues are similar to those confronting other high-technology industries, the following can be asked with special emphasis on computers: (1) is there a responsibility of computer personnel to keep up with new technology and how is it assessed? (2) Are there special duties owed to clients who contract for a technology beyond those specified in the contract if the client is advised prior to contract on the nature of new technology? (3) When is there a responsibility to guard against any imaginable misuse of computer facilities? (4) How should blame be distributed when a complex variety of factors contribute to a real harm? There are also legal questions on how best to assess liability for harm. It is worth asking both (1) what sorts of criteria for assessing liability are most in keeping with our ethical intuitions and (2) as a matter of social policy, which criteria will most encourage industrial care without placing undue burden on the industry?

(1) Joel Feinberg, "Sui Culpa", from Doing and Deserving. Feinberg's much-reprinted discussion lays out basic criteria for determining who is to blame when there are a number of contributory causes for a harm. The criteria that he argues for are in fact close to the legal criteria for liability. The article is exemplary of philsophic argument addressed to legal points.

(2) Palsoraf v. Long Island RR, 248 N.Y. 339 (1928). Cordozo's majority opinion remains the classic statement of when acts that can be viewed as contributing to harm do indeed create liability.

(3) Jim Prince, "Negligence: Liability for Defective Software", Oklahoma Law Review, Fall 1980. This is a short note that lays out the basic distinction between a strict liability treatment of software as a product and a lesser criteria of liability for software viewed as a service.

(4) Susan Nycum, "Liability for Malfunction of a Computer Program", Rutgers Journal of Computers and the Law, Vol. 7, 1979. The article provides a fairly readable, though superficial look at the basic legal problems. The discussion of product liability (pp. 16-19) provides a nice transition from earlier discussions of the status of software.

(5) Susan Nycum and William Lowell, "Common Law and Statutory Liability for Inaccurate Computer-based Data", Emory Law Review, Spring 1981. This article considers slightly different grounds for liability than the above, and is easily readable.

(6) James Moor, "Are There Decisions Computers Should Never Make?", Nature and System, Vol. 1, 1979. The question is whether we can put any restriction on the sorts of decisions that may be left to computers independent of human control.

(7) Vincent Brannigan, "Liability for Personal Injury Caused by Medical Computer Programs", paper for the 4th Symposium on Computer Applications in Medical Care, Washington, Nov. 1980. This is a very nice discussion, written for non-lawyers, of responsibility in a very sensitive area of computer use.

(8) Triangle Underwriters, Inc. v. Honeywell, Inc., 604 F2d 737 (1979). When Triangle Underwriters went broke they in part blamed Honeywell and the bug-ridden computing system they provided.

IV. Public Policy and Regulation

We consider attempts to regulate various aspects of the computer industry according to social ideals. We discuss and compare different means to affect social policy such as government agency, legislated statute, and economic pressure. This provides an opportunity to look at social issues ignored earlier in the course that have all the same been the target of regulation, such as the standardization of computer languages, the electronic transference of funds and securities, the maintenance of a free market economy in the industry, the use of computers to gather information leading to criminal prosecution. Although I think that the in depth studies of the first part of the course are generally more worthwhile for students, it is nice to make students aware of the wide range of remaining issues at the end of the course. In the past, I attempted to lead class discussions on the major antitrust cases, but I find that my weak preparation in economics holds back the class. So I plan to look at other issues in the future.

(2) Rob Kling, "Models for the Social Accountability of Computer", Telecommunications Policy, September 1980. This is an excellent introduction to the study. It "examines the social dilemmas of computer use and strategies for ensuring the accountability of computing to the public."

(2) Computer-Based National Information Systems: Technology and Public Policy Issues, U.S. Government Printing Office: 1982-359-926. This provides a superficial overview of the variety of public policy issues that an OTA study found to be important for possible future regulation.

(3) L. Movshin and R. Wheatley, "The FCC's Computing Devices Rules--A Case Study on the Regulation of the Computer", Emory Law Journal, Spring 1980. It is often hard to distinguish between the use of computers and the use of transmitting devices in information transference and retrieval. This brings the Federal Communications Commission into the regulation of certain computer technologies. The article looks at one aspect of that regulation.

(4) Robert Bigelow, "The Computer and the Tax Collector", Emory Law Journal, Spring 1981. In the tax law there turn out to be problems that follow from the ways in which software is defined that are just like the problems that occur for liability and intellectual property law.

(5) Sam Erwin, "The First Amendment: A Living Thought in the Computer Age", Columbia Human Rights Review, Vol. 4, 1972. This article is a bit out-dated now and I would like something more recent. I do like however to look at some issues as constitutional issues.

The course outlined here clearly reflects my own very specialized interests. I repeatedly return to issues that follow from difficulties in defining software. I am fascinated by how software slips between the cracks of our established notions of products and services, or machines and information. And the failure of the legal categories highlights the interesting ethical issues that the legal notions attempt to codify. I, however, ignore the one issue that occurs first of all to almost everyone who worries about computers and ethics--the possibility that computer use will lead to a loss of privacy in our personal lives. In part I give my reasons for this glaring omission in paragraph 2 above. I admit also that I could not face up to the huge and largely mediocre literature on the subject. But most of all, I am perversely pleased that I can teach a good course on topics in computers and ethics while passing over the one obvious topic.