What Is Self-Assessment Procedure XXII?
This is the 22nd self-assessment procedure. All the previous ones are listed on the next page. The first 13 are available from ACM* in a single loose-leaf binder to which later procedures may be added.

This procedure deals with ethics, in particular with the special ethical considerations in the computer field that arise from the unique characteristics of computers and their use.

This is the second procedure that deals with ethics and follows the format of Procedure IX published in the March 1982 issue and which used the scenarios of Reference 2. The scenarios and the associated questions are only the beginning of the procedure. The scenarios were selected to help the participant think about the ethical concepts and to decide whether to pursue the matter further.

The primary motivation of self-assessment is not for an individual to satisfy others; rather, it is for the participant to appraise and develop himself or herself. This means that there are several ways to use a self-assessment procedure. The only test of whether the use has been satisfactory is that if at the end of the procedure the participant can say, "Yes, this has been a worthwhile experience" or "I have gained some understanding."

How to Use this Self-Assessment Procedure
We suggest the following way of using the procedure, but, as noted earlier, there are others. This is not a timed exercise; therefore, plan to work with the procedure when you have an hour to spare, or you will be shortchanging yourself on this educational experience.

First reproduce five copies of the page of the Reader Scenario Analysis Form in Part IV.

Next read Part I, the Introduction. It explains why there is a need for special ethical considerations in the computer field and lists computer-specific ethical issues.

Then read Part II, the ACM Code of Professional Conduct. This gives the ethical principles, ideals, and rules for behavior considered to be applicable to ACM members.

Now read the first scenario in Part III, pause, deliberate, reach your own conclusion, and note your opinions on a copy of the Reader Scenario Analysis Form reproduced from the form provided in Part IV. The Committee thinks it would be particularly appropriate to add a note that would key your analysis to the ACM Code.

Consider the scenario in more detail, and try to look at it from different points of view. See if your analysis leads you to any other thoughts. Revise your analysis form or fill out a new one.

No suggested responses are provided, but Part V of the procedure gives the votes, opinions, and suggested ethical principles applied to
each scenario by the participants in a project described in Reference 1. You may compare your conclusion with theirs.

Now loop to the next scenario in Part III.

The Introduction, scenarios, and panel responses are reprinted from Reference 1, which gives the details of how the project was conducted, includes more extended remarks on ethics, and gives some guidelines for ethical conduct. Reference 3 is the publication in book form of Reference 1.

The Committee is particularly anxious to get responses. You may respond either by sending in copies of your Reader Scenario Analysis Forms or by letter commenting on any aspect of the matter.

The Committee will prepare a summary of the responses and submit it for publication in Communications and will refer appropriate responses to the ACM Committee on Professional Standards and Practices.

Self-Assessment Procedure XXII
This self-assessment procedure is not sanctioned as a test or endorsed in any way by ACM. Any person using any of the questions in this procedure for the testing or certification of anyone other than him- or herself is violating the spirit of this self-assessment procedure and the copyright on this material.

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PART I.
Introduction

We learn our basic ethical principles in the formative years of childhood. As we mature, however, ethics take on new meaning and importance, especially as we begin a professional career. In our chosen field, we are expected to augment and interpret the ethical values we learned earlier. This procedure is not intended to change people's ethical values, but rather to assist users of computer and data communications in clarifying and applying their ethical values as they encounter new, complex situations where it may not be obvious how ethical values may apply or where the appropriate application of one of these values may conflict with other ethical values.

Advancements in computer and data communications technology have resulted in the need to reevaluate the application of ethical principles and establish new agreements on ethical practices. The application of ethics in information science, technology, and business is more difficult than in other disciplines for several reasons.

First, computer and data communications alter relationships among people. Data communications take place without personal contact, without the visual and aural senses to help convey meaning. Moreover, the paperless society, in which information is transmitted at electronic speeds, functions side by side with the paper-based society, where information is shared at a snail's pace. Conveying one's intentions in a letter, which can take days to reach the recipient, is very different from instantaneous electronic transmission because of how quickly the recipient may act on them. Communication occurs so quickly that one may not have time to consider the implications of information before it has been sent and received.

Second, information in electronic, magnetic, and optical form is far more fragile than information on paper. Computers and data communications systems provide for high-speed, low-cost processing, communication, copying, and printing of intangible intellectual property. This capability introduces new factors in decisions about proprietary rights, residual rights, plagiarism, piracy, eavesdropping, and violation of privacy. Negative events happen so easily, sometimes without the initiators' even considering the consequences, that ethical issues are intensified. Freedom of expression is greatly leveraged and magnified to the extent that far more good may be done with the creation, use, and dissemination of information. Yet it follows that the consequences of unethical acts are equally magnified.

Among computer and data communications users, efforts to protect the integrity, confidentiality, and availability of information inevitably conflict with the apparent benefits of sharing information. The principle of "need to know," long enforced in national defense, is now prevalent in academic, research, and business environments; that principle sometimes clashes with the important value of free access to information.

Finally, business transactions rely on handwritten signatures, yet nearly all electronic transactions take place without any signatures. As automated means for transmitting legally recognized signatures become available, ethical norms will need to change.

Unlike the computer field, some sciences and professions have had hundreds of years to develop the ethical concepts that form the basis for dealing with new issues. They nonetheless continue to wrestle with new and troublesome ethical problems raised by technological advances. In contrast, computer science and technology have been in existence for only 30 years. The need for ethical standards is equally as critical in computer science, technology, and business as it is in other fields. Given the problems in the ancient sciences, it is little wonder that serious problems arise in developing ethical concepts and practices in such a comparatively new field of knowledge.

In addition, ethical issues in the computer field may be more separable and public than in medicine and law, which are well-defined professions with limited membership. In those professions decisions can often be made out of public view. On the other hand many more people in widely diverse situations decide the ethicability of computer issues. The general principles discussed in this procedure will often affect average citizens as well as the highly specialized professional.

Some of the computer-specific ethical issues that have arisen as a result of the development of computers include:

- Repositories and processors of information. Unauthorized use of otherwise un-used computer services or of information stored in computers raises questions of appropriateness, fairness, invasion of privacy, and the public's right to know (freedom of information).
- Producers of new forms and types of assets. Computer programs, for example, are entirely new types of assets that may not be subject to the same concepts of ownership as other assets.
- Instruments of acts. To what degree must providers of computer services and users of computers, data, and programs be responsible for the integrity and appropriateness of the computer output?
- Symbols of intimidation and deception. The anthropomorphic view of computers as thinking machines, infallible absolute-truth producers, that yet are sub-
ject to blame should be carefully considered.

PART II.

ACM Code of Professional Conduct (Bylaw 17 of the Constitution of the ACM)

PREAMBLE

Recognition of professional status by the public depends not only on skill and dedication but also on adherence to a recognized code of Professional Conduct. The following Code sets forth the general principles (Canons), professional ideals (Ethical Considerations), and mandatory rules (Disciplinary Rules) applicable to each ACM Member.

The verbs “shall” (imperative) and “should” (encouragement) are used purposefully in the Code. The Canons and Ethical Considerations are not, however, binding rules. Each Disciplinary Rule is binding on each individual Member of ACM. Failure to observe the Disciplinary Rules subjects the Member to admonition, suspension, or expulsion from the Association as provided by the Procedures for the Enforcement of the ACM Code of Professional Conduct, which are specified in the ACM Policy and Procedures Guidelines. The term “member(s)” is used in the Code. The Disciplinary Rules of the Code apply, however, only to the classes of membership specified in Article 3, Section 5, of the Constitution of the ACM.†

CANON 1

An ACM member shall act at all times with integrity.

Ethical Considerations

EC1.1. An ACM member shall properly qualify the member’s expressed opinion outside the member’s areas of competence. A member is encouraged to express an opinion on subjects within the member’s area of competence.

EC1.2. An ACM member shall preface any partisan statements about information processing by indicating clearly on whose behalf they are made.

EC1.3. An ACM member shall act faithfully on behalf of the member’s employers or clients.

Disciplinary Rules

DR1.1.1. An ACM member shall not intentionally misrepresent the member’s qualifications or credentials to present or prospective employers or clients.

DR1.1.2. An ACM member shall not make deliberately false or deceptive statements as to the present or expected state of affairs in any aspect of the capability, delivery, or use of information processing systems.

DR1.2.1. An ACM member shall not intentionally conceal or misrepresent on whose behalf any partisan statements are made.

DR1.3.1. An ACM member acting or employed as a consultant shall, prior to accepting information from a prospective client, inform the client of all factors of which the member is aware which may affect the proper performance of the task.

DR1.3.2. An ACM member shall disclose any interest of which the member is aware which does or may conflict with the member’s duty to a present or prospective employer or client.

DR1.3.3. An ACM member shall not use any confidential information from any employer or client, past or present, without prior permission.

CANON 2

An ACM member should strive to increase the member’s competence and the competence and prestige of information processing, and to oppose any false or deceptive statements relating to information processing of which the member is aware.

EC2.2. An ACM member shall not use the member’s professional credentials to misrepresent the member’s competence.

EC2.3. An ACM member shall undertake only those professional assignments and commitments for which the member is qualified.

EC2.4. An ACM member shall strive to design and develop systems that adequately perform the intended functions and that satisfy the member’s employer’s or client’s operational needs.

EC2.5. An ACM member should provide opportunity and encouragement for professional development and advancement of both professionals and those aspiring to become professionals.

Disciplinary Rules

DR2.1.1. An ACM member shall not use his professional credentials to misrepresent the member’s competence.

DR2.3.1. An ACM member shall not undertake professional assignments without adequate preparation in the circumstances.

DR2.3.2. An ACM member shall not undertake professional assignments for which the member knows or should know the member is not competent or cannot become adequately competent without acquiring the assistance of a professional who is competent to perform the assignment.

DR2.4.1. An ACM member shall not represent that a product of the member’s work will perform its function adequately and will meet the receiver’s operational needs when the member knows or should

†Article 3, Section 5, Definition. Hereinafter in this Constitution, the terms “Member(s)" and “Member of the Association" appearing without a qualifier shall exclude members of classes which do not have voting rights.
know that the product is deficient.

**CANON 3**
An ACM member shall accept responsibility for the member's work.

**Ethical Considerations**
EC3.1. An ACM member shall accept only those assignments for which there is reasonable expectancy of meeting requirements or specifications, and shall perform his assignments in a professional manner.

**Disciplinary Rules**
DR3.1.1. An ACM member shall not neglect any professional assignment which has been accepted.
DR3.1.2. An ACM member shall keep the member's employer or client properly informed on progress of his assignments.
DR3.1.3. An ACM member shall not attempt to exonerate himself from, or to limit his liability to clients for the member's personal malpractice.
DR3.1.4. An ACM member shall indicate to the member's employer or client the consequences to be expected if the member's professional judgement is overruled.

**CANON 4**
An ACM member shall act with professional responsibility.

**Ethical Considerations**
EC4.1. An ACM member shall not use the member's membership in ACM improperly for professional advantage or to misrepresent the authority of the member's statements.
EC4.2. An ACM member shall conduct professional activities on a high plane.
EC4.3. An ACM member is encouraged to uphold and improve the professional standards of the Association through participation in their formulation, establishment, and enforcement.

**Disciplinary Rules**
DR4.1.1. An ACM member shall not speak on behalf of the Association or any of its subgroups without proper authority.
DR4.1.2. An ACM member shall not knowingly misrepresent the policies and views of the Association or any of its subgroups.
DR4.1.3. An ACM member shall preface partisan statements about information processing by indicating clearly on whose behalf they are made.
DR4.2.1. An ACM member shall not maliciously injure the professional reputation of any other person.
DR4.2.2. An ACM member shall not use the services of or membership in the Association to gain unfair advantage.
DR4.2.3. An ACM member shall take care that credit for work is given to whom credit is properly due.

**CANON 5**
An ACM member should use the member's special knowledge and skills for the advancement of human welfare.

**Ethical Considerations**
EC5.1. An ACM member should consider the health, privacy, and general welfare of the public in the performance of the member's work.
EC5.2. An ACM member, whenever dealing with data concerning individuals, shall always consider the principle of the individual's privacy and seek the following:
- to minimize the data collected,
- to limit authorized access to the data,
- to provide proper security for the data,
- to determine the required retention period of the data, and
- to ensure proper disposal of the data.

**Disciplinary Rules**
DR5.2.1. An ACM member shall express the member's professional opinion to the member's employ-
tion at all, however, the software to be developed required inputs from other units in the system. Someone gave the professional an article by an eminent software specialist that convinced him that the inputs from other units could not be trusted. Thus, neither the software he was designing nor the unit his company was providing could correctly accomplish their task. The professional showed the article to his supervisor and explained its significance. The supervisor's response was, "That's not our problem; let's just be sure that our part of the system functions properly." The software professional continued to work on the project.

Pause, deliberate. Is there an ethics issue involved? Was the software professional's action unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Scenario I I I.1**

SOFTWARE COMPANY: IGNORING VOTING MACHINE MALFUNCTIONS

Company XYZ has developed the software for a computerized voting machine. Company ABC, which manufactured the machine, has persuaded several cities and states to purchase it; on the strength of these orders, ABC is planning a major purchase from XYZ. XYZ software engineer Smith is visiting ABC one day and learns that problems in the construction of the machine mean that one in ten is likely to malfunction soon after installation. Smith reports this to her superior, who informs her that that is ABC's problem. Smith does nothing further.

Pause, deliberate. Is there an ethics issue involved? Was Smith's action unethical or not unethical? Was her superior's action unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Scenario I I I.3**

MICROCOMPUTER USER: INADVERTENTLY CONVEYING COMMERCIAL SOFTWARE IN VIOLATION OF LICENSING AGREEMENTS

A microcomputer user purchased and legitimately used numerous commercial software packages protected by a typical license agreement. He wrote his own programs that called for the use of the commercial packages. Because his friend wanted copies of his programs, the programmer copied them and inadvertently, without noticing, also copied the commercial program onto diskettes. His friends proceeded to use his program and, without knowing, also used the commercially available programs.

Pause, deliberate. Is there an ethics issue involved? Were the programmer's or his friend's actions unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Scenario I I I.5**

PROGRAMMER: PRODUCING NEW SOFTWARE BUILT ON AN EXISTING PROGRAM

Searching for new product ideas, an independent commercial programmer purchased a highly popular copyrighted software package and studied it thoroughly. He concluded that he could produce a new package that would be faster, have greater capacity, and offer additional features. He also concluded that the market would be users of
the commercial package that he had studied; his new product would replace the older one. The programmer realized that in some respects he could not improve the existing product and that compatibility between his product and the existing one would attract users and minimize the transition to his new product.

The programmer went ahead and developed the new product, meeting the higher performance and new feature capabilities that he had envisioned. The keyboard codes and screen formats (except for the additional features) for the new product were the same as those for the existing product. The computer program, however, was different and independently produced. The new manual was also entirely different from the existing product manual in content and style. The programmer gave his product a new name but advertised the value of its compatibility with the existing product.

The new product was highly successful. The company that produced the existing product, however, complained that the programmer had acted unethically in producing the new product. Although the company threatened criminal and civil and legal action, it never followed through with litigation.

Pause, deliberate. Is there an ethics issue involved? Were the actions of the programmer unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

Confidentiality of Information and Personal Privacy

Scenario IV.6
PROGRAMMER: DEVELOPING MARKETING PROFILES FROM PUBLIC INFORMATION
An enterprising programmer used publicly available information stored in a variety of places or avail-
being denied an educational opportunity offered to others. These students insisted that the instructor discontinue the experiment and allow them to use the CAI package for the remainder of the term. The instructor refused the students' request on the grounds that ending the experiment prematurely would vitiate the results of the experiment. The instructor pointed out that only by chance were they in the control group and, because free inquiry and research are the nature of the academic world, students should take part willingly in such experiments for the sake of advancing knowledge. At the end of term, the grades in the experimental group were significantly higher than the grades in the control group.

* * * * *

Pause, deliberate. Is there an ethics issue involved? Were the instructor’s actions unethical or not unethical? Consider the following actions:

—Using students as subjects of experiments.
—Refusing students' request to discontinue the experiment.

What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

Scenario IV.8

UNIVERSITY STUDENT: OFFERING LIMITED ACCESS TO A PORNOGRAPHIC QUESTIONNAIRE

Students at a university were each given small personal computer accounts on the university-owned mainframe. Through the student chapter of the Association for Computing Machinery (ACM), a forum system was set up. Any student with an account could sign on, read what had been entered into the forum, and add his or her comments. A discussion of sexual behavior developed. One student briefly described a pornographic questionnaire that had been distributed among students. The questionnaire asked in graphic detail whether the individual would or would not do certain things on a first date. The student also announced that he had put the questionnaire in one of his files and had authorized access to a particular sign on ID. He revealed the sign-on ID only to those who wanted to see the questionnaire. He warned those who might be offended that the questionnaire was crude. Several weeks later, the student was called into the Dean of Students’ office and threatened with expulsion. The university had heard about the questionnaire and had traced it to him through his comments in the forum.

* * * * *

Pause, deliberate. Is there an ethics issue involved? Were the actions of the student and the dean unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

Business Practices, Including Contracts, Agreements, and Conflicts of Interest

Scenario V.2

COMPUTER SCIENTIST: DIVERTING RESEARCH FUNDS

A computer scientist was the manager and principal investigator of two related research projects. He worked hard on both projects, but the funds on one were depleted before the final report was written. Believing that each project benefited from the work done on the other, the computer scientist allowed his assistant to charge the time required to complete the first project to the second one, but did not inform his manager of this. Subsequently, the scientist also completed the second project by doing considerable unpaid overtime work. The results of both projects were well received.

* * * * *

Pause, deliberate. Is there an ethics issue involved? Were the computer scientist's actions unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

Scenario V.6

SOFTWARE DEVELOPER: ENCROACHING ON A CONSULTANT'S BUSINESS WITH AN EXPERT SYSTEM APPLICATION

A software developer produced an expert system shell and offered to hire a consultant to build an application of the systems in his field of expertise. The developer sold the expert system application extensively among the consultant's potential clients. The expert system performed well enough that they did not have need for the consultant. As a result, the consultant lost his client market and had to terminate his business.

Variation: The consultant agreed to build the application, but purposely held back some of his expertise in order that the result of his work for the software developer would not destroy the future need for his consulting services.

* * * * *

Pause, deliberate. Is there an ethics issue involved? Were the software developer's and the consultant's actions unethical or not unethical? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

Scenario V.7

PRESIDENT OF SOFTWARE DEVELOPMENT COMPANY: MARKETING A SOFTWARE PRODUCT KNOWN TO HAVE BUGS

A software development company has just produced a new software package that incorporates the new tax laws and figures taxes for both individuals and small businesses. The president of the company knows that the program probably
has a number of bugs. He also believes that the first firm to put this kind of software on the market is likely to capture the largest market share. The company widely advertises the program. When the company actually ships a disk, it includes a disclaimer of responsibility for errors resulting from use of the program. The company expects it will receive a certain number of complaints, queries, and suggestions for modification. The company plans to use these to make changes and eventually issue updated, improved, and debugged versions. The president argues that this is general industry policy and that anyone who buys version 1.0 of a program knows this and will take proper precautions. Because of bugs, a number of users filed incorrect tax returns and were penalized by the IRS.

* * * *

Pause, deliberate. Is there an ethics issue involved? Were the president's actions unethical or not unethical? Consider the following actions:

—Marketing product with a disclaimer of responsibility.
—Arguing that his action is general industry policy.

What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Employer/Employee Relationships**

**Scenario VI.3**

**RESEARCH TEAM MEMBER:** CIRCUMVENTING FEDERAL REGULATIONS

A supercomputer center research team has been working on an important problem involving computerizing air traffic control. A visiting computer scientist from an Eastern Bloc nation appears to have the requisite theoretical knowledge to be of great assistance, however, federal regulations prohibit his involvement. One of the team members discusses the problem informally with him, however, and gains important insight into potential solutions.

* * * *

Pause, deliberate. Is there an ethics issue involved? Was the team member's action unethical or not unethical? Does it make any difference if the member did not know of the prohibited regulation? What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Scenario VI.6**

**INFORMATION SECURITY MANAGER:** MONITORING ELECTRONIC MAIL

The information security manager in a large company was also the access control administrator of a large electronic mail system operated for company business among its employees. The security manager routinely monitored the contents of electronic correspondence among employees. He discovered that a number of employees were using the system for personal purposes; the correspondence included love letters, disagreements between married partners, plans for homosexual relations, and a football betting pool. The security manager routinely informed the human resources department director and the corporate security officer about these communications and gave them printed listings of them. In some cases, managers punished employees on the basis of the content of the electronic mail messages. Employees objected to the monitoring of their electronic mail, claiming that they had the same right of privacy as they had using the company's telephone system or internal paper interoffice mail system.

* * * *

Pause, deliberate. Is there an ethics issue involved? Were the information security manager's, the employees', and top management's actions unethical or not unethical?

What general principles apply? Record your responses on the form in Part IV. (Panel responses are given in Part V.)

**Scenario VI.7**

**EMPLOYER:** MONITORING AN INFORMATION WORKER'S COMPUTER USAGE

An information worker in a large company performed her assignments on a workstation connected to the company's mainframe system. The company had a policy of allowing employees to use the computer services for personal purposes as long as they had the explicit approval of management. The woman had such approval to use the system for the extracurricular recreational activities of the employees in her department.

The company suspected a rising amount of employee unrest because of its potential acquisition by another company. Management had the security department monitor all computer service activities of the information worker. Memos, letters, email messages, bulletin board notices, collections and expenditures of money, and budgets were all carefully scrutinized for evidence of employee unrest. In addition, the security department prepared reports detailing the information worker's use of the computer services—both her regular work and her employee recreation work. These reports were read and analyzed by a wide range of company managers and were stored indefinitely in company vital records facilities. All of this took place unknown to the information worker.

* * * *

Pause, deliberate. Is there an ethics issue involved? Were the actions unethical or not unethical? Consider the following actions:

—Allowing employees to use computer services for approved personal purposes.
—Directing security departments to monitor computer services activities.

COMMUNICATIONS OF THE ACM / November 1990 / Vol. 33, No. I


10. Moor, J. *What is Computer Ethics?*


Epilogue: Now that you have reviewed this self-assessment procedure, have compared your responses to those of the panel, and have filled out and mailed in copies of Part IV, you should ask yourself whether this has been a successful education experience. The Committee suggests that you conclude that it has only if you have:

—discovered some concepts that you did not previously know about or understand, or
—increased your understanding of those concepts which were relevant to your work or valuable to you, or
—turned your mind to a consideration of ethics.

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**Part IV. Reader Scenario Analysis Form**

Return to: Eric A. Weiss
P. O. Box 15943, Honolulu, HI 96815

SCENARIO NO. 

PARTY  

ACT  

unethical ☐  not unethical ☐  no ethics issue ☐

General Principle:

Canons, professional ideals, or mandatory rules influencing your judgment

Comments

---

SCENARIO NO. 

PARTY  

ACT  

unethical ☐  not unethical ☐  no ethics issue ☐

General Principle:

Canons, professional ideals, or mandatory rules influencing your judgment

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