so forth.

I do not leave out religion entirely. For example, I sometimes make use of the Golden Rule, but my attitude is that the Golden Rule is a cosmic law that nearly everyone can accept.

Sentinel-Observer: Let's see how these concepts apply to the matter at hand. Who, in your opinion, was responsible for the death of Bart Matthews, the robot operator?

Yoder: Please forgive me for taking us back to the Harvard Divinity School, but I think one of my professors there had the correct answer to your question. He was an elderly man, perhaps seventy, from Eastern Europe, a rabbi. This rabbi said that according to the Talmud, an ancient tradition of Jewish law, if innocent blood is shed in a town, then the leaders of that town must go to the edge of the town and perform an act of penance. This was in addition to any justice that would be meted out to the person or persons who committed the murder.

Sentinel-Observer: That's an interesting concept.

Yoder: And a truthful one! A town, a city, a corporation - these are systems in which the part is related to the whole and the whole to the part.

Sentinel-Observer: You are implying that the leaders at Silicon Techtronics, such as Mike Waterson and Ray Johnson, should have assumed responsibility for this incident right from the start. In addition, perhaps other individuals, such as Randy Samuels and Cindy Yardley, bear special burdens of responsibility.

Yoder: Yes, responsibility, not guilt. Let's view guilt as a legal concept. The guilt or innocence of the parties involved, whether criminal or civil, will be decided in the courts. I guess a person bears responsibility for the death of Bart Matthews if his or her actions helped to cause the incident - it's a matter of causality, independent of ethical and legal judgments. Questions of responsibility might be of interest to software engineers and managers, who might want to analyze what went wrong, so as to avoid similar problems in the future.

A lot of what has emerged in the media concerning this case indicates that Silicon Techtronics was a sick organization. That sickness created the accident. Who created that sickness? Management created that sickness, but also, employees who did not make the right ethical decisions contributed to the sickness.

Randy Samuels and Cindy Yardley were both right out of school. They received degrees in computer science and their first experience in the working world was at Silicon Techtronics. One has to wonder whether they received any instruction in ethics. Related to this is the question as to whether either of them had much prior experience with group work. Did they, at the time that they were involved in the development of the killer robot, did they see the need to become ethical persons? Did they see that success as a professional requires ethical behavior? There is much more to being a computer scientist or a software engineer than technical knowledge and skills.

Sentinel-Observer: I know for a fact that neither Samuels nor Yardley ever took a course in ethics or computer ethics.

Yoder: I suspected as much. Let's look at Randy Samuels. Based upon what I've read in your newspaper and elsewhere, he was basically a hacker type. He loved computers and programming. He started programming in junior high school and continued right through college. The important point is that Samuels was still a hacker when he got to Silicon Techtronics and they allowed him to remain a hacker.

I am using the term "hacker" here in a somewhat pejorative sense and perhaps that is not fair. The point that I am trying to make is that Samuels never matured beyond his narrow focus on hacking. At Silicon Techtronics, Samuels still had the same attitude toward his programming as he had in junior high school. His perception of his life and of his responsibilities did not grow. He did not mature. There is no evidence that he was not trying to develop as a professional and as an ethical person.

Sentinel-Observer: One difficulty, insofar as teaching ethics is concerned, is that students generally do not like being told "this is right and that is wrong".

Yoder: Students need to understand that dealing with ethical issues is a part of being a professional computer scientist or software engineer.

One thing that has fascinated me about the Silicon Techtronics situation is that it is sometimes difficult to see the boundaries between legal, technical and ethical issues. Technical issues include computer science and the management issues. I have come to the conclusion that this blurring of boundaries results from the fact that the software industry is still in its infancy. The ethical issues loom large in part because of the absence of legal and technical guidelines.

In particular, there are no standard practices for the development and testing of software. There are standards, but these are not true standards. A common joke among computer scientists is that the good thing about standards is that there are so many to choose from.

In the absence of universally accepted standard practices for software engineering, there are many value judgments, probably more than in other forms of production. For example, in the case of the killer robot there was a controversy concerning the use of the waterfall model versus prototyping. Because there was no standard software development process, this became a controversy, and ethical issues are raised by the manner in which the controversy was resolved. You might recall that the waterfall model was chosen not because of its merits but because of the background of the project manager.

Sentinel-Observer: Did Cindy Yardley act ethically?

Yoder: At first, her argument seems compelling: she lied, in effect, to save the jobs of her coworkers and, of course, her own job. But, is it ever correct to lie, to create a falsehood, in a professional setting?

One book I have used in my computer ethics course is Ethical Decision Making and Information Technology by Kallman and Grillo.1 This book gives some of the principles and theories behind ethical decision making. I use this and other books to help develop the students' appreciation for the nature of ethical dilemmas and ethical decision making.