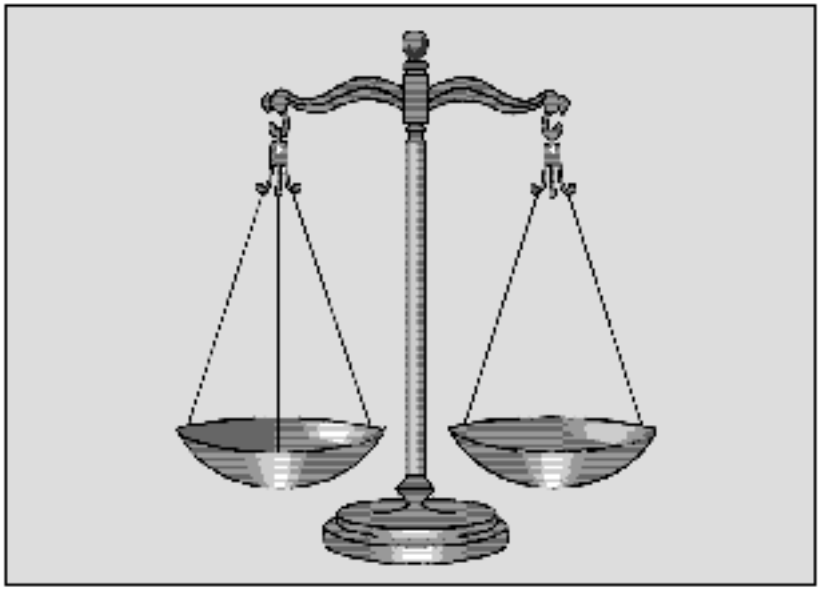


Computers, Ethics, and Public Policy

Course Description

- Reviewing the course handouts

Introductions

- Who are you?
  - What is your year?
  - What is your major?
- What is your interest in taking this short course?

A Brief History of Stanford's CS181

- Stanford graduated its first Computer Science majors in 1986
- At that time, Computer Science was the only Engineering major that did not require an ethics in society course
- That soon changed . . .

A Brief History of CS181

"All the News That's Fit to Print"

The New York Times

Late Edition
New York: Today, partly sunny, milder. High 59-64. Tonight, mostly cloudy. Low 48-54. Tomorrow, cloudy, windy, rain developing. High 57-62. Yesterday: High 58, low 41. Details, page D16.

VOL. CXXXVIII... No. 47,679 NEW YORK, FRIDAY, NOVEMBER 4, 1988 35 CENTS

Gov. Michael S. Dukakis having his picture taken by a 10-year-old fan at a town meeting in Fairless Hills, Pa., during a tour of the Northeast in which he emphasized the drug problem. Page A19. Vice President Bush addressed supporters a rally in Columbus, Ohio. Less than a week after Mr. Dukakis acknowledged being a liberal, Mr. Bush said yesterday that "this election is not about labels." Page A18.

'Virus' in Military Computers Disrupts Systems Nationwide

By JOHN MARKOFF

...tions about the vulnerability of the nation's computers, a Department of Defense network has been disrupted since Wednesday by a rapidly spreading "virus" program apparently introduced by a computer science student.

The program reproduced itself through the computer network, making hundreds of copies in each machine it reached, effectively clogging systems linking thousands of military, corporate and university computers around the nation and preventing them from doing additional work. The virus is thought not to have destroyed any files.

By late yesterday afternoon computer experts were calling the virus the largest assault ever on the nation's computers.

'The Big Issue'

"The big issue is that a relatively benign software program can virtually bring our computing community to its knees and keep it there for some time," said Chuck Cole, deputy computer security manager at Lawrence Livermore Laboratory in Livermore, Calif., one of the sites affected by the intrusion. "The cost is going to be staggering."

Clifford Stoll, a computer security expert at Harvard University, added: "There is not one system manager who is not tearing his hair out. It's causing enormous headaches."

The affected computers carry a tremendous variety of business and research information among ...military officials, ...and corporations.

While some sensitive military data are involved, the computers handling the nation's most sensitive secret information, like that on the control of nuclear weapons, are thought not to have been touched by the virus.

Parallel to Biological Virus

Computer viruses are so named because they parallel in the computer world the behavior of biological viruses. A virus is a program, or a set of instructions to a computer, that is either planted on a floppy disk meant to be used with the computer or introduced when the computer is communicating over telephone lines or data networks with other computers.

The programs can copy themselves into the computer's master software, or operating system, usually without calling any attention to themselves. From there, the programs can be passed to additional computers.

Depending upon the intent of the software's creator, the program might cause a provocative but otherwise harmless message to appear on the computer's screen. Or it could systematically destroy data in the computer's memory. In this case, the virus program did nothing more than reproduce itself rapidly.

The program was apparently a result of an experiment, which

Continued on Page A21, Column 2

Registration Off Since 1984 Vote

There has been a pronounced decline in the percentage of eligible Americans who are registered to vote, a research group reports.

Nationally, the percentage of eligible Americans who are registered is estimated to be 78.3 percent, down 2.2 points from the 1984 level.

The group's study concluded that in many of the 30 states where final figures are available the decline was among

PENTAGON REPORTS IMPROPER CHARGES FOR CONSULTANTS

CONTRACTORS CRITICIZED

Inquiry Shows Routine Billing of Government by Industry on Fees, Some Dubious

By JOHN H. CUSHMAN Jr.
Special to The New York Times

WASHINGTON, Nov. 3 — A Pentagon investigation has found that the nation's largest military contractors routinely charge the Defense Department for hundreds of millions of dollars paid to consultants, often without justification.

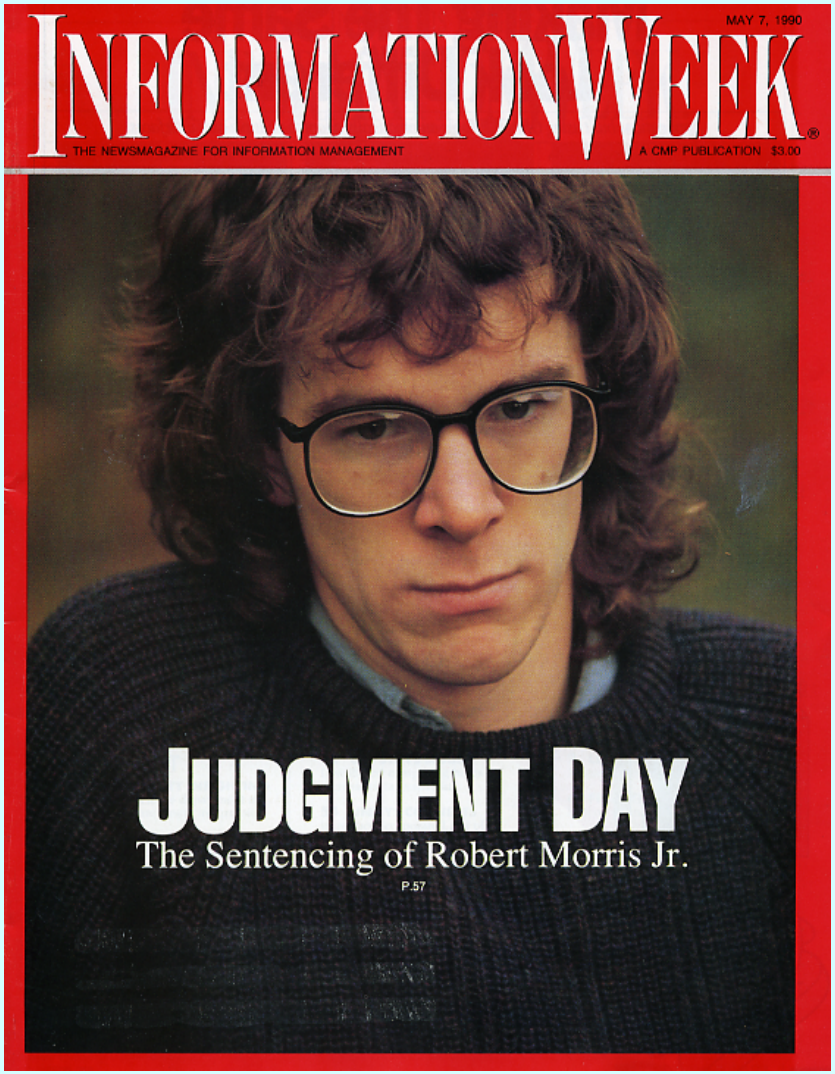
The report of the investigation said that neither the military's current rules nor the contractors' own policies are adequate to assure that the Government does not improperly pay for privately arranged consulting work. Senior Defense Department officials said the Pentagon was proposing changes to correct the flaws.

While it is not improper for military contractors to use consultants in performing work for the Pentagon, the work must directly benefit the military if it is to be paid for by the Defense Department. Often, Pentagon investigators discovered, this test is not met.

Broader Look at Consultants

The Justice Department's continuing criminal investigation has focused attention on consultants and their role in the designing and selling of weapons, and the Defense Department has been criticized for using consultants too freely. Now the Pentagon's own inves-

A Brief History of CS181



A Brief History of CS181

San Jose Mercury News

25 cents

Serving Northern California Since 1851

March 1, 1989

Enter. What is ethical in computer use? Return

By Tom Philp
Mercury News Staff Writer

A Stanford computer scientist and a philosopher are developing the university's first course to get students to examine the ethical implications of their use of computers.

The broad-ranging course, to be taught this spring, will deal with topics ranging from the outbreak of computer viruses to privacy issues of electronic bulletin boards. While some universities have developed courses to help students prepare for the rapidly changing computer world, no other university in Silicon Valley — or the Bay Area — now offers such a course.

"We're not trying to give them the answers," said Terry Winograd, the associate professor of computer science who is developing the course. "We're trying to get them to do good thinking."

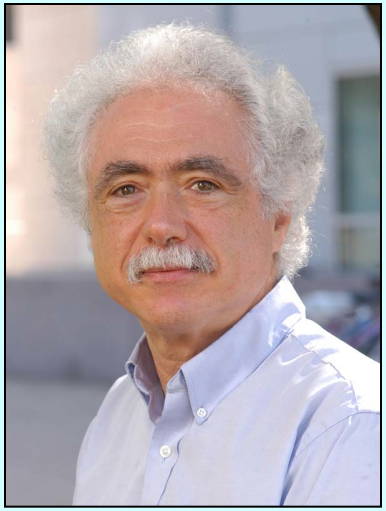
Among the questions to be pondered: should students freely share copyrighted software? Should they be concerned if their work has military applications? Should they submit a project on deadline if they are concerned that potential bugs could ruin others' work?

For two years, Stanford has offered a seminar on computer ethics, but it was for fewer than a dozen students. But the new course, which can satisfy a curriculum requirement for computer science undergraduate students, will probably be several times larger.

"The hope is, we can take students who are currently more oriented in

See ETHICS, Page 8A

The course will address issues like invasion of privacy, ownership of computer programs, and the risks they are introducing to people's lives



Three Views of Computer Ethics

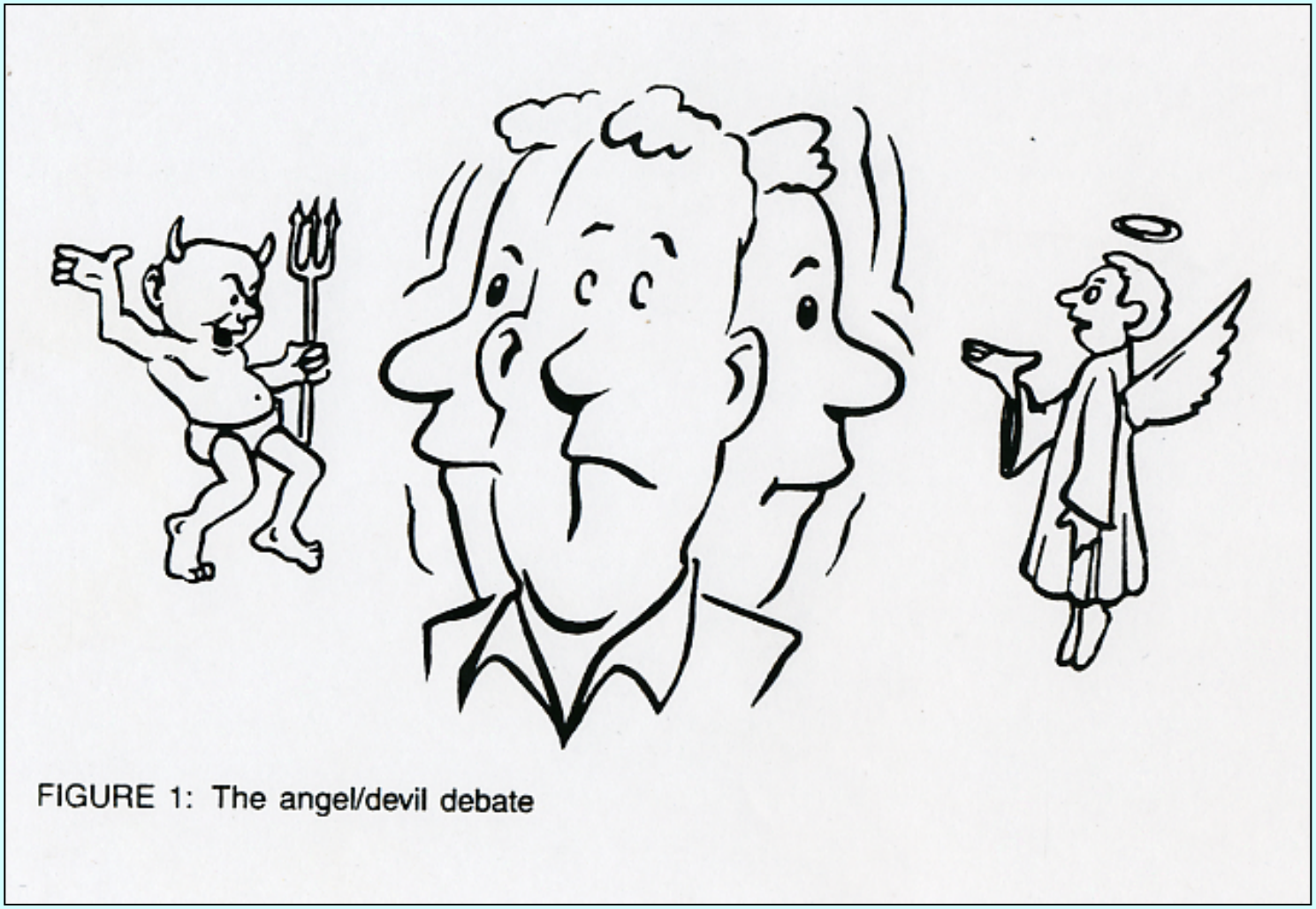


FIGURE 1: The angel/devil debate

Source: Terry Winograd, Computers, Ethics, and Social Responsibility, 1991.

Three Views of Computer Ethics

FIGURE 2: The morality computer

Three Views of Computer Ethics

FIGURE 3: A troupe of jugglers

What Makes Computing Different?

- Computing is used to solve hard problems.
- The discipline of software engineering has not had centuries in which to mature.
- Software has high "system complexity" and is therefore difficult to distribute among members of a large team.
- Bugs are ubiquitous and inevitable.
- Software systems are discrete rather than continuous: it is impossible to "over-engineer" such systems.
- Software systems are inherently chaotic: small changes in initial conditions generate massive changes in results.
- The economics of software systems means that even flawed products can have tremendous economic value.

Thought Questions for Today

1. What ethical decisions have you faced or do you expect to face in your own career?

2. What public-policy issues involving computing do you feel are likely to prove most important over the next few decades?