“serious” errors before we put software into use. The sad answer is that we cannot. What matters, too, is whether we could ever be confident that we had found the last serious error. Again, the sad answer is that we cannot. Software systems become trustworthy after real use, not before. They become trustworthy only when the operating conditions are known and stable, not when they are unknown and subject to change by an opponent.

The architectural issues raised by the SDI supporters and reported by Myers are also irrelevant diversions. Some claim that progress has been made by switching from a centralized architecture to a decentralized one. Examination of the original study, the Fletcher Report, shows that SDI designers always had planned a decentralized architecture. Some claim that a hierarchy modeled on a military command structure is an improvement over the Fletcher design. Examination of the Fletcher Report shows that they, quite wisely, rejected such a hierarchical scheme as having an Achilles heel, the computers at the root of such a hierarchy.

All of the architectures that have been discussed propose a collection of subsystems, each controlled by a large, and largely untestable, software package. Confidence in either the individual packages, or their successful cooperation, cannot be established. The mathematical properties that make software the biggest source of trouble in large systems are shared by all software systems. Physical distribution is often useful but it does not simplify the development task.

I am happy to see professional journals such as Computer discussing the SDI software, but I hope future contributions will avoid the trap of discussing the non-issues introduced by politically motivated persons.

David L. Parnas
Queen's University
Kingston, Ontario

Author: But the public has been “hooked”

To the editor:

I am pleased that Dave Parnas—the originator of the thought that SDI software will present serious problems—has seen fit to expand his argument as a response to my article. My article had a narrow focus: Will there be errors? Essentially all authorities agree that there will be errors, but there is one authority, namely the President, who has sold SDI to the public on the basis that it will render nuclear weapons “impotent and obsolete.”

Some 60 to 70 percent of the people are said by polls to support this program. I think they expect perfect perfection. A dozen or so weapons getting through as a result of errors, destroying most of a dozen or so areas, would not be considered by the average citizen to be even adequate protection, let alone perfect. The fact that all the technical authorities in the engineering and defense communities would be pleased with a system of such high capabilities would cut little ice with the average citizen.

My article gathered up evidence from both those opposing SDI and those working on it and concluded that there will be errors. The fact of errors changes the nature of the debate on the political level over whether we should have such a system. Given the fact that there will be errors, it is then up to the citizens, the political community, strategic thinkers—whomever—to consider next steps. That is probably a discussion outside the area of expertise of Computer.

Ware Myers
Claremont, Calif.