



Endless Possibilities

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We started the 20th century heavily committed to the industrial revolution. We employed machines to augment our physical abilities, lifting the burden of manual labor from our shoulders. This allowed us more time to reflect upon the state of existence. Who could have predicted that our thoughts and desires, backed by generations of condi-

tioning, would prompt the consumption of massive resources to build bigger, better, and shinier possessions. Our great-great-grandparents raised 14 children in a one-room log cabin. We raise one or two in a palace that rivals that of the kings of medieval Europe. This affluence was made possible by the industrial revolution, but it pales in comparison to the information revolution that we are immersed in now.

In the information revolution, we have learned to add artificial intelligence to the machines we create. The F-16, B2, and other systems cannot function without the aid of computers. They hold the distilled human knowledge of pilots, engineers, programmers, and others who have created software to anticipate and react to every conceivable situation. Software controls our cars, microwaves, televisions, phones, and washing machines. We fantasize of a day when computers will become self-aware like Data on the Starship Enterprise.

The information revolution is dependent upon computer systems with the capacity to store, retrieve, and analyze massive amounts of data and information. Computer systems are con-

trolled by software created by humans using a higher order language to communicate their instructions to the computer. In this issue of *CrossTalk*, Dr. David Cook discusses the evolution of computer languages and how they have evolved to capture our ideas (page 7).

Ultimately, all computer languages must be broken down into patterns of ones and zeroes for the computer to execute them. In the computer world, a defective pattern of ones and zeros will lead to a programming error, such as the slowly degrading capability of the Patriot missiles during the Gulf War (described by Lt. Col. Scott Dufaud and Lynn Robert Carter in their article on page 14). Similarly, in the biological world, DNA stores our genetic makeup in a specific pattern that defines how our bodies function. One pattern out of place may communicate the wrong biological information, making our bodies susceptible to a number of diseases. Recent advances in genetic research, facilitated by computer software programs, have enabled the permanent repair of genetic imperfections in animals.

What does this mean to computer professionals? Are the lines between engineer, programmer, and geneticist becoming blurred? With advancements in software technology, the future of programming will conceivably extend beyond complex hardware and software to human design. The possibilities are endless.

Join us as we devote the last *CrossTalk* issue of the 20th century to the Evolution of Software and explore the past, present, and future of software engineering. ♦



See You in the Next Century

CrossTalk is pleased to bring this special issue to readers on the eve of a new century. Staff members, from left to right, are Kathy Gurchiek, *Managing Editor*; Heather King, *Associate Editor/Layout*; **back row**: Rudy Alder, *Publisher*; Heather Winward, *Associate Editor/Features*; and Tracy Stauder, *Associate Publisher*.