

# Computer Science: A Historical Perspective and a Current Assessment

Niklaus Wirth

wirth@inf.ethz.ch

**Abstract.** We begin with a brief review of the early years of Computer Science. This period was dominated by large, remote computers and the struggle to master the complex problems of programming. The remedy was found in programming languages providing suitable abstractions and programming models. Outstanding was the language Algol 60, designed by an international committee, and intended as a publication language for algorithms. The early period ends with the advent of the microcomputer in the mid 1970s, bringing computing into homes and schools. The outstanding computer was the Alto, the first personal computer with substantial computing power. It changed the world of computing.

In the second part of this presentation we consider the current state of the field and the shift of activities towards applications. Computing power and storage capacity seem to be available in unprecedented abundance. Yet there are applications that ask for even faster computers and larger stores. This calls for a new focus on multiprocessing, on systems with hundreds of processes proceeding concurrently. The invention of programmable hardware opens new possibilities for experimentation and exploring ways to design new architectures. Codesign of hardware and software becomes mandatory. The days of the general purpose von Neumann architecture seem to come to an end.

Finally, we will look at the present state of the art, the problems and the tools with which the engineer finds himself confronted today. Not only have computers become faster and storage bigger, but the tasks have become accordingly more demanding. The mass of tools has grown, programming is based on huge libraries, and the environments appear monstrously complicated and obscure. The most basic instruments, programming languages, have not improved. On the contrary, outdated languages dominate. They, and their tools, belong to the apparently irreplaceable legacy, and sometimes it seems that we have learnt little from the past. What can we do?