

On Behavioral Programming

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The talk starts from a dream/vision paper I published in 2008, whose title, "Can Programming be Liberated, Period?", is a play on that of John Backus' famous Turing Award Lecture (and paper). I will propose that --- or rather ask whether -- programming can be made a lot closer to the way we humans think about dynamics, and the way we somehow manage to get others (e.g., our children, our employees, etc.) to do what we have in mind. Technically, the question is whether we can liberate programming from its three main straightjackets: (1) having to directly produce a precise artifact in some language; (2) having actually to produce two separate artifacts (the program and the requirements) and having then to pit one against the other; (3) having to program each piece/part/object of the system separately. The talk will then get a little more technical, providing some evidence of feasibility of the dream, via LSCs and the play-in/play-out approach to scenario-based programming, and its more recent Java variant. The entire body of work around these ideas can be framed as a paradigm, which we call behavioral programming.

Biography

Prof. David Harel has been at the Weizmann Institute of Science in Israel since 1980, and is incumbent of the William Sussman Professorial Chair. He was Head of the Department of Applied Mathematics and Computer Science from 1989 to 1995, and was Dean of the Faculty of Mathematics and Computer Science from 1998 for seven years. He currently heads the John von Neumann Minerva Center for the Development of Reactive Systems.

He received a BSc from Bar-Ilan University (1974), an MSc from Tel-Aviv University (1976) and a PhD from the Massachusetts Institute of Technology (1978). He has spent two years at IBM's Yorktown Heights research center, sabbatical years at Carnegie-Mellon University, Cornell University and the University of Edinburgh, and shorter visiting positions at IBM, Lucent Technologies Bell Labs, DEC, NASA, University of Birmingham, Verimag, the National University of Singapore and Microsoft Research Cambridge. From 1991 to 1999 he was an adjunct professor at the Open University of Israel. He was also co-founder of I-Logix, Inc. in 1984, which was acquired by Telelogic in 2006, which, in turn, was acquired by IBM in 2008.

In the past he has worked in several areas of theoretical computer science, including computability theory, logics of programs, database theory, and automata theory. Over the years, his activity in these areas diminished, and he has become involved in several other areas, including software and systems engineering, object-oriented analysis and design, visual languages, layout of diagrams, modeling and analysis of biological systems, and the synthesis and communication of smell. He has published widely on these topics, including several books. He is the inventor of the language of statecharts, and co-inventor of live sequence charts (LSCs) and of the idea of reactive animation (2002). He was part of the team that designed the tools Statemate (1984-1987), Rhapsody (1997) and the Play-Engine (2003). His work is central to the behavioral aspects of the UML. He has put forward grand challenges for liberating programming, for modeling an entire multi-cellular organism, and for a system of odor communication and synthesis.

He has received honorary degrees from the University of Rennes, the Open University of Israel, and the University of Milano-Bicocca. He is a Fellow of the ACM, the IEEE, and the AAAS, and is a member of the Academia Europaea and the Israel Academy of Sciences and Humanities.

His awards include the ACM Karlstrom Outstanding Educator Award (1992), the Stevens Award in Software Development Methods (1996), the Israel Prize (2004), the ACM SIGSOFT Outstanding Research Award (2006), the ACM Software System Award (2007), the ACM SIGSOFT Impact Paper Award (2008), and the Emet Prize (2010).