GOODS to Appear on the Stage

Invited Speech at ECOOP 97

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Abstract. The lecture will trace the development of some important object-oriented concepts and point out the analogy between performances at the stage of a theatre and the operation of information systems (and program executions). This metaphor will be used in a description of the ideas pursued and developed in the GOODS Project (General Object-Oriented Distributed Systems), a three year project supported by The Norwegian Research Council, starting January 1997. GOODS aims at extending the framework of object-oriented programming to include a multi-layered approach to the organisation of the relationship between people, computer hardware, organisational rules and programs in general distributed systems. GOODS also aims at introducing general tools for specifying visibilities of objects (scopes) and the precise dealing with the identities of objects that exist in many versions in a distributed environment.

1 Introduction

1.1 Back to Research

When the ECOOP '97 organisers invited me to give this speech, they offered me the choice between giving my overview and evaluation of the first thirty years of object-oriented programming 1967-1997, or talking about my own current research and views about the future of object-oriented programming. Since I now have passed seventy years, the attraction of presenting nostalgic and grandiose reflections on the past has considerably diminished. Rather exasperated reactions: "What! Even more new crazy ideas!" than: "Impressive! The old man still has an audible voice and is capable of standing on his feet a full lecture."

My six-year political assignment as national leader of the campaign against Norwegian membership in the European Union was finished with our victory on the 28th November 1994. I was very much looking forward to returning to research. Research is more exciting than politics, but sometimes politics is more important. The first thing to do in 1995 was to get hands-on experience with the new generation of workstations and with multimedia hardware and software that had appeared since 1988. The second was to decide what kind of research I should engage in and then try to compose a new team.

I commented in a recent paper [Nygaard, K. 1996]: "Many people have observed that the research teams in which I have been active, usually have contained people
much younger than me. I have been asked if that is so because I prefer to work with young people. The answer is no. I prefer to work with people who believe that my newest ideas are worth while working on, and themselves have ideas that fit in. Older, more established people usually did not believe that, and don’t. There are exceptions, like the people in the BETA team. In the EU battle I was working in many teams, most teams composed by people from a wide age bracket. In research it has been different, as I have told.” [IRIS 96]

During my six “political years” (1988-1994) I still was not inactive in research. I could see that ideas about the “theatre metaphor” that I had worked on (with Professor Dag Belsnes at the Norwegian Computing Center and the BETA team) in the late 1970s and early 1980s, became more and more relevant, and I made some efforts to generalise these ideas and integrate them with other ideas.

In 1991 I was asked by Professor Brian Randell to present my subjective views on the “Past, Present and Future of Programming Languages” at The 25th Anniversary Newcastle Conference in 1992. I had, of course, to put quite much effort into the lectures, and as a result a program for future research started to emerge. In 1995 it turned out that audiences were particularly interested in just the main points of that program. Not surprising, because of their relevance to distributed systems. It was time to start assembling a team and to apply for funding.

1.2 Overview

The format of an invited speech may be rather different from that of an ordinary reviewed paper. Many styles are allowed, and a personal note is expected. Strong opinions and postulated facts may be stated in absolute earnestness or with a tongue-in-cheek. The interpretation may be left to the audience. In these senses this is a typical invited speech.

The lecture starts (Section 1.3) with some quotations from the application that gave us some funds for my current project, the GOODS project. You will probably observe that we have embarked on a very ambitious endeavour: To extend the conceptual framework of object-oriented programming as in the SIMULA, DELTA and BETA-tradition to include also a joint description of the performances (program executions) according to their given scripts (by programs, constraints and other kinds of rules) by ensembles (of human actors and information processing equipment linked by connectors (communication channels)).

In Section 2 the most relevant elements for the GOODS conceptual platform are selected from earlier SIMULA, DELTA and BETA papers from 1963 on. In an article for a journal this would have had to be cut down to a series of references, tacitly making the assumption that the reader had these references available and, even more unrealistically, would have the interest and energy to look them up. The presentation is brief, but should at least give some clues to the world view of our understanding of object-oriented programming.

The theatre metaphor is introduced (in Section 3) through the system generator (process generator, phenomenon generator) concept from DELTA together with our definition of the model concept. The extension and initial exploration of this metaphor