The many dimensions of Kristen Nygaard, creator of Object-Oriented Programming and the Scandinavian School of System Development

by

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Professor Kristen Nygaard (1926 – 2002)

Alan C. Kay: "Kristen Nygaard is a guy who is larger than life in almost any possible dimension"

Early years

- 1945 National college mathematics reward
- 1948 Start military service at NDRE, working in the mathematics section
- 1952 Joined the Operations Research (OR) group at NDRE
- 1956 Master in mathematics based on his thesis "Theoretical Aspects of Monte Carlo Methods"
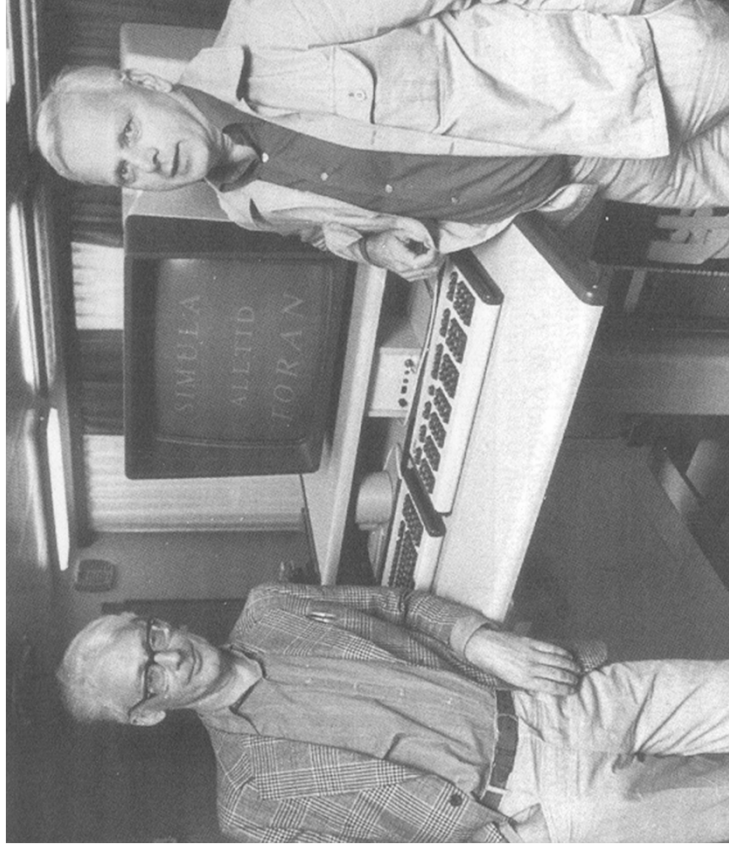
Early professional years

- Nygaards ambition at NDRE was "to build up OR as an experimental and theoretical science in Norway. I wanted our group to be reckoned as being among the top groups in the world in three to five years, and selected jobs and strategies accordingly."

- 1959 Founded the Norwegian OR Society (NORS) and chaired it the first five years

- 1960 Moved to The Norwegian Computing Center (NCC) to establish a group for civilian OR

- 1963 NORS arranged the 3rd international OR conference in Oslo (IFORS)

Introduction of SIMULA

- May 1962 first language description presented to UNIVAC on a USA tour

- August 1962 IFIP Munich, Germany: "Simula – An extension of ALGOL, to the Description of Discrete-Event Networks"

- October 1962 contract signed with UNIVAC for delivery of a UNIVAC 1107 to NCC and for development of a Simula Compiler at NCC

- August 1963 UNIVAC 1107, the largest computer in Northern Europe, arrived
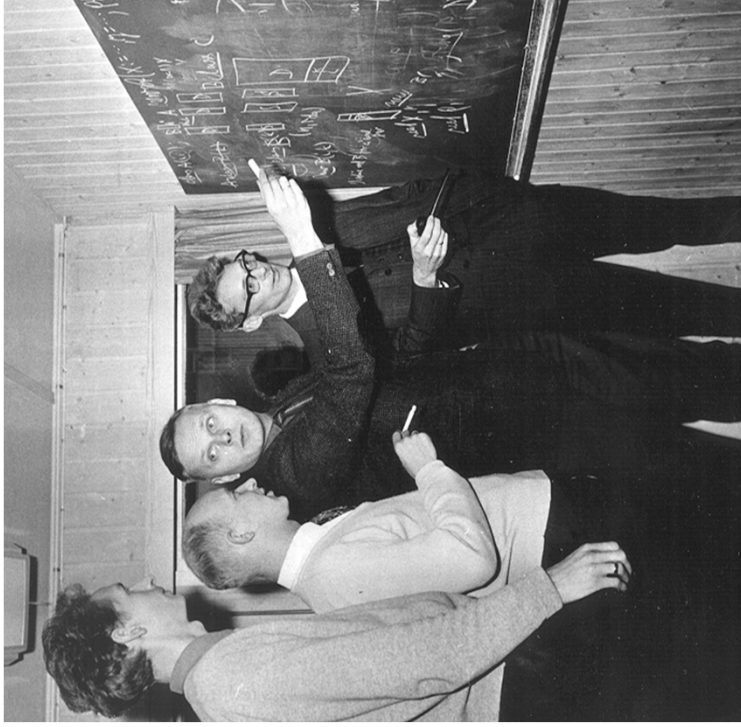
The fathers of Object-Orientation

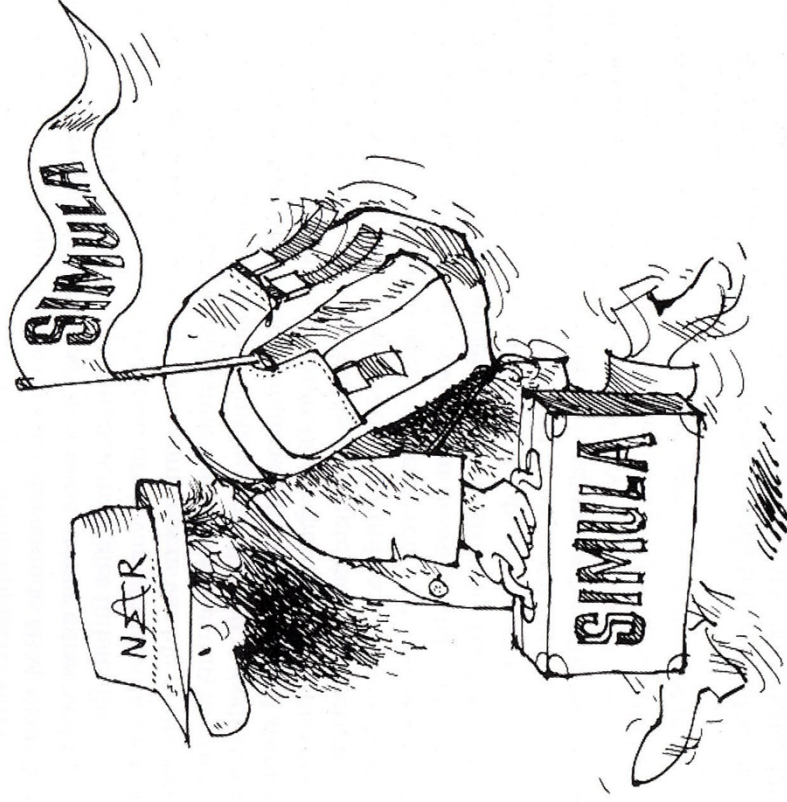

Professor Ole Johan Dahl
Professor Kristen Nygaard

SIMULA

A language for programming and description of discrete event systems

- 1965 SIMULA I compiler for Univac 1107
- SIMULA 67 presented at IFIP TC-2 Working Conference in Norway
- SIMULA 67 Common Base / Simula Standards Group

SIMULA 67

1970 – Compilers for Univac, IBM, CDC, Dec...

1973 Simula Begin textbook

Object-Oriented programming with Simula (UiO)

ASU – Association of Simula Users

Simula at Broken Hills Newcastle Steelworks in Australia

System Description Tools

Nygaard saw SIMULA

as a language that would give him the concepts he needed for expressing system properties and discuss his understanding with others

Nygaard was concerned that computers should not only be used for the benefit of the owners and the employers

Working with Trade Unions

- The Iron and Metal Workers Union (NJMF) decided after an initiative of Nygaard, in 1970 to apply for a 3 year research project

- Aim of the project:

- " Strenghten the influence of trade unions and employees on the introduction and use of data systems and data technology in the work place"

Was this funding of research?

- First time a trade union had applied for funding of this kind of project

- Purpose of application:

- *" to build a base of knowledge at least equal to that which is available to the employers"*

- Nygaard and NCC were considered too radical for the Research Council

- Nygaard was appointed projectleader

The NJMF Project

- Four local union shops in companies in Southern Norway took part in the project

- Definition of results from the project:

"Results are all actions from NJMF, centrally or at the local level, that with support from the project aims to give the organization and its members a larger influence an data processing and control tools in their workplace."

"From this viewpoint, working papers and research reports from the project will be useful only to the extent that they lead to actions of the organization leadership, divisions or local shops."

Project Results

- "Planning, Control and Data Processing. A basic textbook for trade unions" 1972

- The shops themselves studied important questions within their workplace with assistance from a few experts from outside and personnel from the company itself.

- 120 people took part in the project

- 50% of the reports came from the local shops

- Better training programs and improved working environment for the operators of numerical controlled machines

- Better collaboration with the employers on the design of new workplaces in a new factory.

Data Agreement

- In 1974 the local trade union at Viking/Askim asked Kristen Nygaard for help during negotiations about a new data system. As a result the first local Data Agreement between workers and employer was established, introducing data shop steward and necessary training

- An Agreement that gave employees a right to information and participation in the design, introduction and use of datasystems in the enterprise

- In 1975 a Data Agreement was established on the national level between organizations of employers and employees.

Working Environment Act (1977)

§12, The Organization of Work, section 3 states Concerning systems for control and planning

- Workers and their elected representatives shall be kept continously informed of systems used in planning and systems that are necessary to accomplish work, including planned changes to such systems.

- They shall be given the training necessary to familiarize themselves with the systems, and they shall take part in designing them.

Career as University Professor

- 1974 Guest professsor at University of Aarhus in Denmark. Worked on an alternative curriculum in system development, called the "Scandinavian School of System Development" which includes Participatory Design.

- Object-Orientation should be available in a system description and programming language because of its capability for system modelling and linking with the systems' environment.

Professional activities

- 1975 DELTA System description language

- 1980 BETA Programming language

- 1984 Professor at University of Oslo, Norway

- 1987 Visiting professor at Stanford University, visiting scientist at Xerox PARC and Apple

- 1988 – The second European Conference on **O**bject-**O**riented **P**rogramming, ECOOP in Oslo

- 1996 – 1999 GOODS project (**G**eneral **O**bject-**O**riented **D**istributed **S**ystems)

- 2002- 2005 COOL project (**C**omprehensive **O**bject-**O**riented **L**earning)

Engagement in Politics

- - 1969 Member of the Liberal Party Venstre
- Worked to establish alternative institutions for the alcoholics and the homeless
- 1971 Member of the Labour Party
- 1972 Coordinator for youth organizations that worked against EU membership
- Member of Labour party subcommittees on research and data policy
- 1988-1994 Leader of the organization "Nei til EU" – No to European Union Membership for Norway
- 2001 Left the Labour Party

Conflicts

- He once asked: *"Has anyone resented the content of your work recently? If not, what is your excuse?"*

- His views on the relationship between research, science and politics were controversial, in particular in conservative circles

- Many turned down applications for research funding

Recognition

- 1990 Norbert Wiener prize from the American Association of Computer Professionals for Social Responsibility

  With professor Ole Johan Dahl

- 1999 First Rosing Honorary prize from the Norwegian Data Association

- 2000 Commander of the Order of Saint Olav by the King of Norway

- 2001 ACM Turing Award

- 2002 IEEE John von Neumann Medal

Recognition

- Nygaard appointed Doctor Honoris Causa, University of Lund, Sweden (1990) and University of Aalborg, Denmark (1991)

- 2002 Association Internationale pour les Technologies Objets (AITO) Dahl/ Nygaard Prize

- 2004 Simula Research Laboratory established. Now a government funded ICT lab with 120 employees

Summary of Nygaard's Engagements

Democracy

Mathematics

OR Simulation
Infantry
Endu-rance
Monte Carlo

Computer languages
Simula I
Simula 67
BETA
GOODS

System Description
DELTA
Participatory Design
COOL

Empowerment
NJMF, Data Agreement
Scandinavian School
UNITE

Direct Political Engagement
No To EU

Started: 1950 1960 1965 1970 1988

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