PHOTOGRAPHS

BIRTH:

12th October 1931in Mandal, Norway

DEATH:

29th June 2002 from Lymphatic Cancer at Asker, Norway

EDUCATION:

MS in Numerical Mathematics, University of Oslo (1957).

EXPERIENCE:

Military Service at Institute of Defense Research, Oslo, under Jan Garwiek (1952-1963); Joined Nygaard at Norwegian Computing Center (1963); Professor at the University of Oslo (1968).

HONORS AND AWARDS:

Rosing Prize, Norwegian Data Association (1999); Commander ofthe Order of Saint Olav, awarded by the King ofNorway (2ooo); ACM TuringAward (2001); IEEE von Neumann Medal (2002); Association Internationale pour !es Technologies Objets (AiTO) annually awards two prizes named in honor of Dahl and Nygaard.

OLE-JOHAN DAHL

Norway- 2001

CITATJON

With Kristen Nygaard, for ideas fundamental to the emergence of object oriented programming, through their design of the programming languages Simula I and Simula 67.

SHORT ANNOTATED BJBLJOGRAPHY ACM DL AUTHOR PROFILE RESEARCH SUBJECTS ADDITIONAL MATERIALS

Object-oriented programming is a dominant programming paradigm of this age. Fundamental to the emergence of this paradigm were core concepts such as objects, classes, and inheritance with virtual quantities, all clear1y established in Oie Johan Dahl and Kristen Nygaard's discrete event simulation language Simula I and general programming language Simula 67. The objects integrale data, procedural, and cooperating action sequence aspects into one very general and powerful unifying entity.

By embodying these core concepts in a language designed both for system description and programming, Dahl and Nygaard provided both a logical and a notalienal basis for the ideas. Software could be built in layers of abstraction, each one relying on the description and conceptual plattarm implemented by the previous layers. By defining Simula 67 to be an extension of an international standard language, Algol-60, this medium of expression was accessible and available to the entire research community. Simula shaped and sped the emergence of object-<lriented programming and the management discipline that accompanies it by many years.

Ole-Johan Dahl was bom on 12th October 1931 in Mandal, a small town on the south coast of Norway. Although now a resort, the residents of Mandal had historically looked to the sea for their livelihoods, and Dahl was descended an both sides from lang lines of sea captains and sailors. It soon became evident that Dahl was not to continue that tradition, because his ear1y interests were reading, mathematics, and playing the piano. His molher was a housewife, and neither his sister nor his brother was academically inclined.

When he was seven, his family moved to Drammen, south of Oslo. When he was thirteen, his elder cousin was shot dead by the Nazis and the whole family fled Ia Sweden. Consequently he missed the final year of elementary school and started directly in high school after taking the entrance examination as an extemal candidate. Because he was able to help his teacher explain mathematics to the other pupils, he was soon nicknamed "the professor."

Dahl heard classical music for the first time when he was 3 years old and was captivated by it. His passion for music stayed with him throughout his life, but it seems that he decided quite ear1y to make his career elsewhere. He chose an academic career focused an mathematics, because music was a personal and private affair used to enrich his life and those of his friends, rather than a field to be used as a profession.

Dahl studied numerical mathematics at the University of Oslo. During his time at the University he also worked part-time at the Norwegian Defense Research Establishment (NDRE), to which he was assigned in 1952 for his compulsory military service. He continued to work there full-time after he graduated. IIwas at NDRE !hat he was first introduced to computers. He was also fortunate to fall under the influence of Jan Garwiek (oflen called the "father of informatics" in Norway), who was able to stimulate and nurture Dahl's talents. In 1954 Dahl became Garwick's assistant.

By 1957 the NDRE had obtained an ear1y Ferranti Mercury computer. Dahl designed and implemented what was then considered to be a high-level language for the Mercury, called MAC (Mercury Automatie Coding). Dahl's university degree, while officially in the area of numerical analysis, was actually about computer science: the title of hisfhesiswas "Multiple Index Countings an the Ferranti Mercury Computer."

At NDRE Dahl also encountered Kristen Nygaard, and the partnership between these two men was to change the face of computing. Nygaard had been working on calculations related to the diameter of the uranium rods for Norway's first nuclear reactor. In 1949 NDRE started using Monte Carlo simulation, with the calculations performed by hand, instead of attempting to solve the equations exactly. "In !hat [simulation] model the physical paths and historiss of a large number of neutrons were generalad and a statistical analysis of their properlies used to estimate the proper choice of rod diameter" [Nyggard 1986]. Later Nygaard applied the same approach

to other problems, changing his focus to oparational research, and in 1956 eaming a Master of Scienoe degree with a the!lis on probability theory.

In 1960 Nygaard moved to the Norwegian Computing Center (NCC), a semi-govemmental research institute that had baen established in 1958. His briet was to axpand the NCC's resaareil capabilitiea in oomputer acience and oparational 111search. Ha wrota 'Many of lha civilian teaks tumad out to p111sant lha sama kind of mathodolcgical problems [as his earlier military worl<]: the necessity of using simulation, the need cf concepts and a language for system desaiption, lack of tools for generating simulation programs" [7]. In 1961 he starlad designing a slmulallcn languaga as a way of attaddng lhosa problems.

In January 1962 N)'98ard wrota a letter dascrlblng hls prograss, addrassed tc Cha as Salzmann, a Franch specialist in oparational researt:h. Nygaard wrote:

> *The status of the Simulation Langusge (Monte Carlo Compi/er1 isthat I have rather cleer ideas on how tc describe queueing systems, and have developed concepts which I feel allow a reasonably easy description of lwge cla-of situations. I* believe *that these f"fi6Uits have* scme *inte18Sl even iso/atad from the oompilet; since the presentty usad* ways *of desctibing* such systems atll *not V9tY* satisfactol}(…
>
> The t1011r *an the oompiler could not statt* before *the language* was *fairty weil developed, but this stage* seems *now to have been 1'88ched.* The axpett *programmer who* is *inte18Siad in this palt of the job will* meet me *tomorrow. He* has *been rather optimistic during our previous* meetings. [7].

The "e p rt programmer" was Ole-Johan Dahl. Werking with Nygaard, Dahl produced lhe inilial ideas for object-oriented programming, which is now the dominant style of programming for oommercial and industrial applicatlons. Dahl jolned the NCC In 1963 and stayacl there unlll1968, when he was lnvlted to become a full prcfessor at the University of Oslc

The languages that Dahland Nygaard develcped logetherwere, first (1962-1964) a simulaticn language called SIMUL.A, now usually raterred lo as SIMUL.A I, and subliequantly a general-purpo68 languaga called SIMUL.A 67.

SIMULA I was lntended to be used both for dascrlblng oomplex systems and for programmlng stmulallons of thair behavicr. Nygaard wrola:

> *SIMULA [I] should give* its *usel\9* a *set of ooncepts in* tenns *of which they could oomprahend the syst9111 considerad, and a language for* preciS9 *and oomplate desctiption of* its *propfllfti&s. It should thus be a tool both for the peraon writing the description and for* peop/e *with whom* he *wantad to oommunicate about the* system.
>
> *At the* same time *this system desctiption should, with the* neceSSlllY *input/output and data analysis infonnation added, be oompilab/8 into a oomputer simulation program, prcviding quantitative infotmation about the* system's *behaviour.* [8].

Although designed as a simulaticn language, almest from lhe beginning SIMUL.A I was used not cnly fcr simulalion but also for ganarai1Jurpcse programming. IIlnlroduced ils users to tha idea cf crganizing their programs as a system of lnteractlng, executlng components, and thls ldea proved useful for a wlde range of applications. These interacting components became the "objects" cf SIMULA 67.

SIMUL.A 67 was dasigned from tha beginning as a general-purpo68 language, bulDahl and Nygaard invented a machanlsm (dass preflxlng) that mada tha slmulallon-spaclflc features of SIMULA I avallabla ln SIMULA 87 as a special kind cf library. Prefllling could be used in two rather different ways. which have given rise tc two of the most impcrtant ideas in modern programming languag88: inharitance, which makas it easy to reuse coda in unanticipaled ways, and modulas, which ara used for extending tha wcabulary of a programming language.

These ideas-objects, inheritance, and modularily — are among lhe major conlributions of Dahl and Nygaard tc the discipline of programming. SIMULA also oontributed the prcoess ooncept, which enabled programmers to exprass activities going cn concummlly. With wondarful aconcmy, all of thasa idaas wara raalizsd as variant uses of a single linguislic mechanism, the dass.

Part of the success of Dahl and Nygaard in aeating lhe ideas of object-orientation is clearly due to their extraordinary talants. But part is also due to their ery differing backgrounds, which made –ry language featura proposad by cna tha subjact of aiticism by tha othar. Ona story has it thalin tha spring of 1967 a naw amployaa told the switchboard cperalor in a shocked voice: "Two men are fighting violently in front cf the blacldload in the upstairs oorridor. What shall we do?" The operator came out of lhe offioe, listened for a few seoonds and then sald: "Relax. It's only Dahl and Nygaard dlscusslng SIMULA."

After Dahl moved tc tha Unlvarslty of Oslc ha dallberataly stcpped wortc: on further davalopmanbf SIMULA and Iook on lhe respcnsibilily, almest single anded, cf building up computer science in Ncrway as an acedernie disciplina. Fcr lha first 10 }'9111& ha waslhe only profeiiiiOl"cf compuler science althe Univenlily. Halaught durlng the day, wrote textbooks at night, and supervised up to 20 graduale students aba time. He workad on programming methodology, and produced, with Tony Hoara, a chapter callad "Hierarchical Program Structures" that became part cf the celebrated book "Structured Programming• [2].

Dahl's latar worlc: was influanced by Hcara's systam fcr reasoning malhematically abcut programs. Ha startad using and teaching these reascning techniques. and feit that they would improve even infonnall)'1lroduced programs. In 1992 Dahlpublished *Verifiable Programming,* which includes many of his 0WN research results [9]. In the 1990s he retumed to object-orlentated programmlng through deslgn of the ABEL language and hls research on reasoning about object-oriented systems.

Dahl died in 2002 after a leng baltle with Lymphatic Cancer. He and his wife Tove had two children, Fredrik and Ingrid.

Ole-Johan Dahl on the Web

Many artidas on Dahl are available cn tha wo d-wida web. Soma of tham hava baen used as source& in praparing this artide.

Tha homepage for Ola-Johan Dahl.

Bartrand Meyer, "In memory of Ola-Johan Dahl and Kristan Nygaard", and Nygaard's 0WN eulogy for Dahl.

Virtual Exhibition. In People Behind Informatics.

ACM press release abcut the 2001 Turing award

Author: Andrew P. Black

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