



THE UNIVERSITY OF ARIZONA  
TUCSON, ARIZONA 85721

DEPARTMENT OF COMPUTER SCIENCE

**Icon Newsletter #7**

Ralph E. Griswold

August 4, 1981

**1. Version 4 of Icon**

Version 4 of the C implementation of Icon is now available for distribution. There is a form for requesting a copy at the end of this Newsletter.

The major changes and new features of Version 4 are:

- new control structures and the generalization of the contexts in which goal-directed evaluation may occur.
- stack and queue access methods for lists in addition to the traditional positional access.
- support for external procedures written in C than can be used to extend the Icon repertoire of built-in functions.

Version 4 is also somewhat faster than Version 3.

An interpreter for Version 4 programs is now available as an alternative to the compiler. Since the interpreter does not have assembly and loading phases, it gets into execution much more quickly. Although the Version 4 interpreter is slightly slower than the Version 4 compiler, it is faster than the Version 3 compiler. The interpreter should make Icon much more attractive for program development and experimental applications.

There is a short document, *Version 4 of Icon*, that describes the main changes from Version 3. There is also a new reference manual and a new guide to the implementation. See the document request form at the end of this Newsletter.

**2. Other Implementation News**

An implementation of Version 2 is now available for the Data General MV8000. Contact

Terry Dowling  
Data General Corporation  
Route 9  
Westboro, Massachusetts 01581

An implementation of Version 2 also has been completed recently for the Honeywell 66/70. For information, contact

Professor Thomas A. Cargill  
University of Waterloo  
Waterloo, Ontario N2L 3G1

The contact for the IBM 370 and VAX-11/780 implementations of Version 2 has changed. It is now

Lois Morton  
Systems Analysis Center  
Box 50298  
North Carolina State University  
Raleigh, North Carolina 27650

John Polstra at UNIDOT has successfully installed Version 3 on a PDP-11/34. In order to do so, he had to reduce the sizes of the stack and heap by half, but was nonetheless able to write useful Icon programs. He is also working on converting Version 3 to run on an Onyx C8002, a Z8000-based system that runs UNIX.

### 3. Programming Corner

The Programming Corner is short this time, since this Newsletter was produced primarily to announce Version 4. There is just this problem: Write the shortest possible self-reproducing Icon program; i.e., a program, which when run, writes its own text. If you are not familiar with this problem, see the references below.

SNOBOL4 buffs may be interested in the shortest known self-reproducing SNOBOL4 program:

```
S = ' OUTPUT = " S = 0" S "0"; OUTPUT = REPLACE(S,+"","0");END'  
OUTPUT = " S = "" S """; OUTPUT = REPLACE(S,+"","");END
```

Send me your Icon solutions (use the address on the attached document request form), being sure to note the applicable version of Icon. The best solutions will be published in the next Newsletter.

### References

Wetherell, Charles. *Etudes for Programmers*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 1978. pp. 34-35.

Bratley, Paul and Jean Millo. "Computer Recreations; Self-Reproducing Automata", *Software — Practice & Experience*, Vol. 2 (1972). pp. 397-400.

Hofstadter, Douglas R. *Gödel, Escher, Bach: an Eternal Golden Braid*. Basic Books, Inc., New York, New York. pp. 498-504 (*et al.*)

**Request for Icon Documents**

Please send the documents checked below to:

---

---

---

---

---

- "Generators in Icon" (reprint of paper from *TOPLAS*, April, 1981)
- Version 4 of Icon*
- Reference Manual for the Icon Programming Language; Version 4*, TR 81-4
- A Tour Through the C Implementation of Icon; Version 4*, TR 81-11

Return this form to:

Ralph E. Griswold  
Department of Computer Science  
University Computer Center  
The University of Arizona  
Tucson, Arizona 85721  
USA

**UNIX Icon Distribution Request; Version 4**

*Note:* Version 4 of Icon is designed to run under Version 7 of UNIX on PDP-11 computers that have separate I and D spaces.

**Contact Information:**

name: \_\_\_\_\_

address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

telephone: \_\_\_\_\_

cable/telex: \_\_\_\_\_

**Magnetic Tape Information:** All magnetic tapes are written in 9-track format.  
Please specify your preferred tape recording characteristics:

- |  |   |
|--|---|
| <input type="checkbox"/> 1600 bpi          | <input type="checkbox"/> 800 bpi          |
| <input type="checkbox"/> <i>tar</i> format | <input type="checkbox"/> <i>tp</i> format |

Return this form to:

Ralph E. Griswold  
Department of Computer Science  
University Computer Center  
The University of Arizona  
Tucson, Arizona 85721  
USA

Include either a magnetic tape or a check for \$15.00 payable to the University of Arizona.