ary (see Ref. 4) which demands more complicated cells and control flow.

It remains only to point out that although the double pipe arrays are slower than the Weiser-Davis array they still produce a significant speed-up over the sequential form of the computation. One would favour their use where the space requirement was highly restricted such as military applications. Initially one might favour the Double Pipe Weiser-Davis version because it is slightly faster and requires no additional delays, but this is only a superficial difference. When $n \gg w_1$ or w_2 the speed of the arrays is virtually identical and one needs to consider the problems of loading data from the host machine. In this case, the array described here requires only a single pass and the repeated matrices can be generated easily by simple delays and switches added to the array inputs. In the Weiser-Davis double pipe a number of accesses to the host for the same data is required because of the different passes. As data loading is often of key importance in determining final performance our array is preferable.

REFERENCES

1. H. T. Kung and C. E. Leiserson, Systolic arrays (for VLSI), in *Sparse matrix proceedings SIAM*, pp. 256–282, Eds Duff & Stewart (1978).
2. U. Weiser and A. Davis, A wavefront notation tool for VLSI Array design, pp. 226–234, proc VLSI Systems + Computations, Eds Kung H. T. *et al.*
3. G. M. Megson and D. J. Evans, Improved matrix product computation using Double-Pipeline Systolic Arrays. *The Computer Journal* **31** (6), pp. 567–569.
4. H. T. Kung and M. S. Lam, Fault-Tolerance and Two Level pipelining in VLSI systolic arrays. *J. Para Dist Computing* **1** (1), pp. 32–63.
5. G. J. Li and B. W. Wah, The design of optimal systolic arrays. *IEEE Trans on Computers* **C-34** (1) (1985).
6. J. E. Savage, Area-Time trade-offs for matrix multiplication and related problems in VLSI models. *J. Computer & Systems Sciences* **22**, 230–242 (1981)

Announcements

27–30 AUGUST 1990
AMSTERDAM

EUROMICRO 90

Sixteenth Symposium on Microprocessing and Microprogramming

Hardware and Software in System Engineering

Euromicro 90 is the sixteenth annual Symposium organised by Euromicro. The purpose of the Symposium is to bring together people from business, industry, research, government and academia, who are interested in all problems related to the underlying technology and use of microprocessor systems.

The emphasis of the Euromicro 90 Symposium will be **the hardware/software interface and system reliability.**

The *theme* of Euromicro 90 is **Hardware and Software in System Engineering** with the sub-themes of **The Moving Hardware/Software Interface** and **System Reliability.**

Programme
The EUROMICRO Symposium is a major annual event around which a collection of related events congregate.

EUROMICRO 90 will include a mainstream programme based on Keynote Sessions, Scientific Paper Sessions, Short Note Sessions and a special Session devoted to Computer Music.

Tutorials on hot topics will be provided, ESPRIT groups will be invited to provide joint presentations and Social Events will be organised, offering additional opportunities for meetings with people from countries all over the world.

ESPRIT
EUROMICRO membership and Symposium attendance is wider than the European Community. However the EUROMICRO Symposium does provide a focal point for ESPRIT, BRITE and similar project partners to meet in order to disseminate their results to a wider audience.

For further information contact:
EUROMICRO, Attn. Mrs Chiquita Snippe-Marlisa, P.O. Box 545, 7500 AM Enschede, The Netherlands. Tel: +31 53 338799. Fax: +31 53 337415. Telex: 44200 thes

25–27 SEPTEMBER 1990

NOTTINGHAM UNIVERSITY

The NCUF Conference 1990

Open Systems in Business

The National Computer Users Forum is holding its 4th annual conference at Nottingham University from Tuesday, 25th September to Thursday, 27th September, 1990.

There are plenary sessions for all the delegates on each of the days of the conference. There will also be two parallel streams focusing on **interworking** and the **applications environment.**

The programme also has workshop and tutorial sessions during which case studies and topics of a specialised nature are presented. Numbers in these sessions are limited to 25 delegates so that they can discuss issues of specific interest in detail with expert workshop leaders.

It is anticipated that there will be in excess of 150 delegates.

The conference will consider topical issues arising from applications portability and communications networking in an Open Systems environment, a proprietary environment and in a mixed environment.

For further information contact:
The Conference Secretary, The NCUF Conference, PO Box 18, Beeston, Nottingham NG9 3LT. Fax: 0602-280823

26–28 SEPTEMBER 1990

QUEEN ELIZABETH II CONFERENCE CENTRE, LONDON

International Conference on System Development Environments and Factories

The International Conference on System Development Environments and Factories was jointly organised for the first time in 1989 by major European and American Research and Development Projects. The great success of the first conference gave rise to the establishment of the conference as a regular event that is aimed at providing a forum for the presentation of results achieved in those projects, for discussions between providers and potential users of environments and factories and for the demonstration of systems.
The second conference will focus on

Adopting Environment and Factory Concepts in Industry
by presenting information on
● Technical and Scientific Advances
● Current Status of Projects in Europe, the USA and Japan
● Financial, Human and Organisational Impact on Environments and Factories on Industry
● Case Studies Conducted in Industry
● Government Initiatives

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SDE & F OFFICE, Sema Group, 143/149 Farringdon Road, London EC1R 3AD. Tel: +44(0)1-831 6144. Fax: +44(0)1-278 0574