

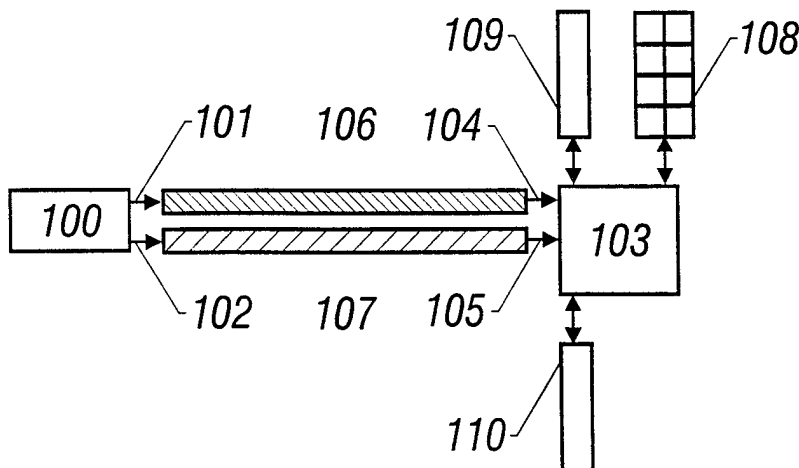


INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/US98/08559 (22) International Filing Date: 28 April 1998 (28.04.98) (30) Priority Data: 08/847,909 28 April 1997 (28.04.97) US (71) Applicant: AB INITIO SOFTWARE CORPORATION [US/US]; 477 Virginia Road, Concord, MA 01742 (US). (72) Inventors: STANFILL, Craig, W.; 62 Florence Road, Waltham, MA 02154 (US). LASSER, Clifford, A.; Apartment 1, 15 Lee Street, Cambridge, MA 02139 (US). (74) Agent: LAND, John; Fish &amp; Richardson P.C., Suite 1400, 4225 Executive Square, La Jolla, CA 92037 (US).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>  (88) Date of publication of the international search report: 11 March 1999 (11.03.99)</p>
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(54) Title: METHOD FOR PREVENTING BUFFER DEADLOCK IN DATAFLOW COMPUTATIONS



(57) Abstract

A buffer deadlock prevention technique for dataflow computations. The invention implements the following algorithm: (1) providing a supplemental buffer (108) for each input of a downstream program (103); (2) partitioning the inputs (104, 105) of each downstream program into disjoint input sets, such that two inputs are in the same input set if and only if such inputs come, either directly or indirectly, from a common upstream program (100); (3) attempting to read data into a downstream program from an upstream program via an input I in an input set; (4) if no data is currently available from input I, and if any other input J in the same input set has data available, then reading into the downstream program available data from each such input J and storing such that data in the supplemental buffer corresponding to such input J until such time as available data is exhausted on all such inputs J or data becomes available on input I.

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INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/08559

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) :G06F 15/16  
US CL : 395/677, 345/302

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 395/677, 200.61, 877, 876, 873, 345/302

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS, IEEE ONDISC, search terms: stream, buffer, deadlock, block, dataflow, queue, fill, empty, alternation, pool, read, write

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,568,614 A (MENDELSON et al) 22 October 1996, col. 2, line 31-49, col. 2, line 62 - col. 3, line 4; col. 10 - col. 11, section 5; col. 14, lines 33-39; figures 5, 8, 10.	1-10
Y	US 4,298,954 A (BIGELOW et al) 03 November 1981, abstract; col. 1, lines 30-51.	1-10
Y	LAU, F. C. M. et al. Propagating Buffer: A New Approach to Deadlock Freedom in Store-and-Forward Networks, IEEE ONDISC, 1991, pages 804-807, especially page 804, right column, second paragraph.	1-10
Y	US 5,487,167 A (DINALLO et al) 23 January 1996, col. 7, lines 3-8; col. 9, line 40 - col. 10, line 8; figures 3, 4, 7, 8.	4-5, 9-10

Further documents are listed in the continuation of Box C.  See patent family annex.

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