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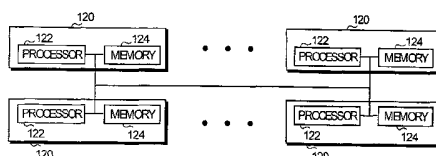
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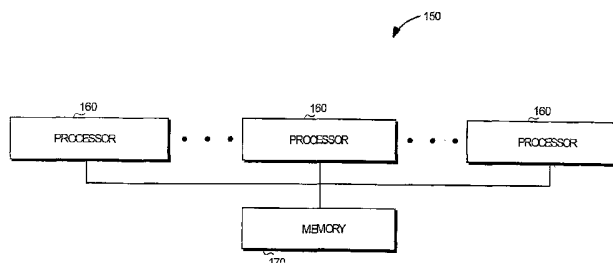
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[Continued on next page]

(54) Title: MULTI-ENTRY THREADING METHOD AND APPARATUS FOR AUTOMATIC AND DIRECTIVE-GUIDED PARALLELIZATION OF A SOURCE PROGRAM



A



B

(57) Abstract: A method and apparatus for compiling a source program are described. Multiple predetermined sequences within the source program are located. A start code is inserted in the source program prior to a first instruction of each predetermined sequence. An invocation code is inserted in the source program prior to the start code, the invocation code addressing the start code and transferring each sequence to a system for execution. Finally, a stop code is inserted in the source program after a last instruction of each sequence, the stop code signaling to the system to stop execution of the sequence.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 01/18614

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G06F9/45

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)  
IPC 7 G06F

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 practical, search terms used)  
EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CHOW, JYH-HERNG; LYON, L E; SARKAR, V: "Automatic Parallelization for Symmetric Shared-Memory Multiprocessors" PROCEEDINGS OF CASCON '96, 12 - 14 November 1996, pages 1-14, XP002205143 Toronto, Canada cited in the application the whole document	1-27
A	US 5 278 986 A (JOURDENAI KAREN C ET AL) 11 January 1994 (1994-01-11) column 2, line 38 -column 3, line 21	1-27
A	WO 94 22077 A (UNIV WESTMINSTER ;KALANTERY NASSAR (GB)) 29 September 1994 (1994-09-29) column 4, line 44 -column 5, line 15	1-27
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Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 244 928 A (BRITISH PETROLEUM CO PLC) 11 November 1987 (1987-11-11) page 10, line 1 - last line -----	1-27

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5278986	A	11-01-1994	US 5381550 A	10-01-1995
WO 9422077	A	29-09-1994	AU 6214394 A WO 9422077 A2 GB 2276742 A ,B US 5832272 A	11-10-1994 29-09-1994 05-10-1994 03-11-1998
EP 0244928	A	11-11-1987	EP 0244928 A1 WO 8706736 A1 JP 63503176 T	11-11-1987 05-11-1987 17-11-1988