NASA TECH BRIEF

Simultaneous Random and Sequential Computer Processing Using an Expanded Sequential Index

This improved data processing method should be of interest to EDP personnel using third generation equipment. The method involves an indexing system in which the update status for a given record is contained in the record key. The technique is novel in that the keys may be searched sequentially while retaining the random nature of the file.

Essentially, a second-generation, tape-oriented computer system is redesigned to take appropriate actions in updating a data record; increase the capability to perform daily update runs; and produce a sequential report for every update run. This report is required to contain, for each data record, the exact nature of any discrepancies existing between it and the corresponding specifications record.

File updates, when they affect only a small number of records, are most efficiently accomplished by random processing; that is, the only records read from or written into the file are those which actually have some activity being processed against them. Sequential reports, in contrast, usually require that the entire file be read in some particular sequence. If large data record files are updated sequentially, the time involved in updating is greatly increased. Such daily update runs are prohibitively costly. Moreover, to maintain file availability when a change to a specification record occurs, it is necessary to locate in the data record file all records of the category which uses that set of specifications. Unless a method of random access to those records is available, this procedure involves reading the entire data record file, sorting it into category sequence, applying the specification

changes against the affected records, and then resorting the updated file into its original sequence.

To develop the expanded sequential index for random files, the data records are organized first into a random-processing file. A sequential index is utilized as the method of randomly addressing the file. Status flags are added to the basic sequential index. The different values these flags can assume reflect all the discrepancies possible between the data record and its specification record. In addition, the identification field of the corresponding specification record is stored in the data record index entry.

In any update run, specification changes are processed first. When an update takes place, the data records index is searched for all data records to which the updated specification record pertains, and appropriate action is taken to reflect the change. (This action usually involves adjusting the status flags, with reading and writing of the data record itself being unnecessary.)

Writing the sequential report and updating the data record file are accomplished simultaneously. The added status flags reflect discrepancies between the data record and its specification record. The identification field of the corresponding specification record is stored in the data record index entry. Appropriate action is taken to reflect the update changes. This action involves adjusting the status flags. Writing of every data record back to the file is unnecessary. The only data records read and written are those being updated, but the report may be printed for every record in the file.

(continued overleaf)

Note:

No further documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer
Code A&TS-TU
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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

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