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CRITERIA FOR DESIGN OF AN ON-LINE ACQUISITIONS SYSTEM AT WASHINGTON STATE UNIVERSITY LIBRARY

In order to lay the framework for developing the criteria for our acquisitions system, I think it would first be helpful to describe briefly the environment of the University and the Library and the computing capabilities available. Washington State University is a land grant college and is therefore somewhat oriented toward the agricultural sciences as well as the engineering and physical sciences. The University's current enrollment is approximately 12,000 students with approximately 3,000 graduate and 9,000 undergraduate students with the graduate student population increasing faster than the undergraduate. The total student population is increasing on the average of about 500 students a year. The University is remotely located in a very small town so that the student population on the campus is a resident population.

The Library at Washington State contains approximately one million volumes and about 900,000 titles. Our current standing orders range in the neighborhood of 9,000 entries. The Library is organized into four independent divisional activities, three of these being user services activities for the sciences, the humanities, and the social sciences, the fourth being the technical services group which is providing services and support to the three user libraries. These three libraries are completely independent in the development of procedures for servicing their clientele and for the development of the collections in their respective areas. Under these three divisional libraries fall some twenty-seven departmental libraries whose collections are provided by the main divisional library but whose staffing is provided by the department involved. Operational policies for the departmental libraries are determined by the department involved.

Washington State has been a strong leader in the field of computer science since its emergence on campus in 1956. We have a department of computer sciences offering both the master's and Ph.D. degrees. The computing center, which supports this activity and administrative data processing, uses a 360 model 67 and a 360 model 20.

The University Library became deeply involved in automation in 1967. Prior to that time they had dabbled in some machine processing of acquisitions data. The Library's decision to move more heavily into automation resulted initially from growing faculty concern over the continued splintering of both the collection and the location of materials on the campus. Although there is one consolidated catalog for the campus, the serial records information is fragmented between the three divisional libraries. The second reason for moving towards automation was because existing services within the Library were breaking down due to the increased volume of materials being received by the Library. The Library's budget had been steadily expanding, and there had been a corresponding increase in the collection of materials. The systems operated by the Library were thus becoming saturated and increasingly less effective. These systems included both manual systems and semi-automated machine processing systems. It was at this point in 1967 that the position of systems analyst was created on the Library staff, and I assumed that position. We were installing the 360 model 67 in that year and looking forward to time-sharing systems for the total campus environment in the near future.

Because of the great computer capability which we were able to anticipate, we decided to design a system which would include terminal operations. We also recognized that there were many areas within the Library which could be automated. We felt that before development of any one specific area could be undertaken, however, a total system design or at least a set of total system criteria should be developed, and this we set out to do.

We felt that, first of all, the various subsystems within the total system would have to be compatible with each other and that it would therefore be necessary before the development of any particular subsystem to develop a set of interface criteria to provide for compatibility with other subsystems.

Secondly, upon analysis of total Library operations, there appeared to be many similar and repetitive tasks being performed in many areas of the Library. Therefore we decided that the computer program system should be designed on a modular basis and that most of these similar activities within the Library should be written as sub-routines within and called from the various applications programs by the various subsystems as they were developed, thus reducing the total development time for the Library. This concept of modularity can pay off not only in terms of total development time, but also in terms of revision and maintenance of existing operations.

Thirdly, we realized that the Library maintained many redundant files or portions of files in various locations. Therefore we decided to reduce the number of files to a minimum and to build a total data base with a capability for servicing all activities within the Library without redundant files. This required that the Library build its total system so that it could present to its

users immediate information about all of its holdings—which in turn meant the development of rather sophisticated information retrieval programs to be operated from terminals. A further requirement was management information. Too often libraries are operated by intuition and past experience which are all that most library administrators have to guide them in managing the library. Therefore, we felt that any system devised should be able to provide management with good solid data and statistics concerning its operations and use.

The next criterion for development of the total library system was that economic use of all the Library's resources should be made in the development of any subsystem. This meant that processes which could be automated but which do not have to be automated should not be. Also, the equipment procured for use in automated systems by the Library should be as

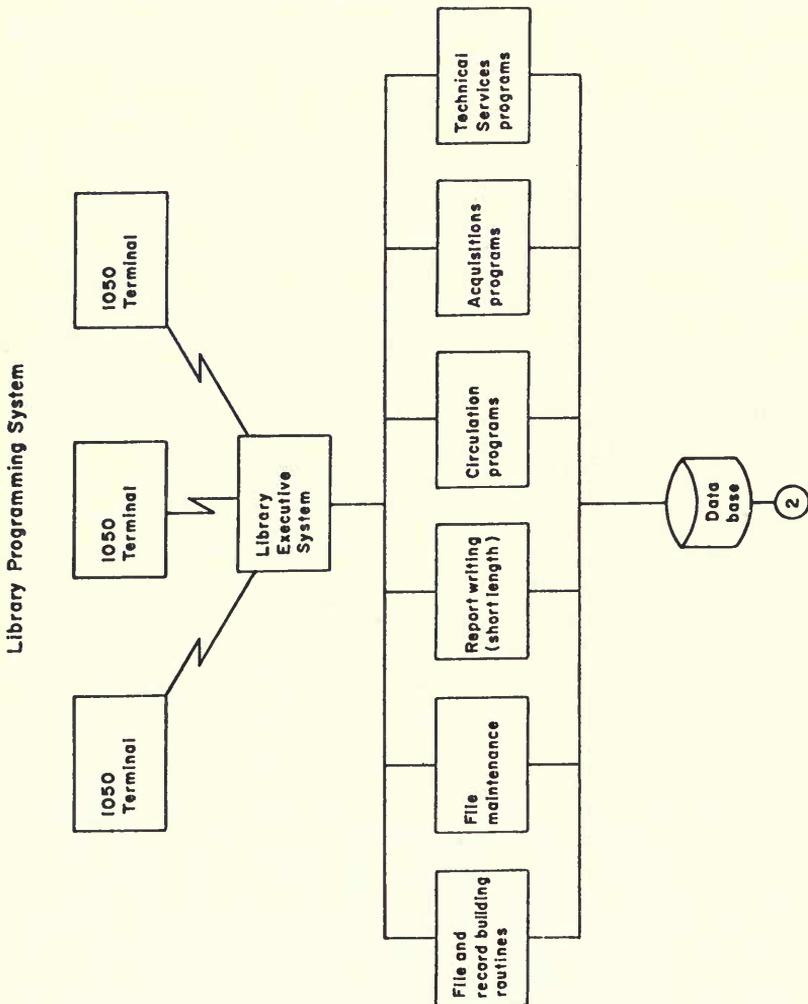


Figure 1

multi-purposed as possible so that it could be used in other subsystems. It meant further that activities which could be batch processed should be and should not be placed on-line. Finally, throughout the entire development, cost justification and cost effectiveness were to be emphasized. This last criterion required of course that the Library spend more time and more money upon the development in order to achieve efficient, effective operations.

Given this set of criteria and a very generalized plan of the system design, the Library then began to build its individual subsystems (see Figure 1). The approach was to develop these subsystems incrementally and not try to build a total system at one time. Although the analysis and development of the acquisitions system was started prior to the development of the circulation system, the circulation system was the first subsystem to become operational. The circulation system is an off-line, standard one card IBM 357 circulation system. It is built around a disk file of circulation data. Its input processing is in batch mode to the file. It is of the transaction type in that each transaction card off the circulation system is identified by its transaction code prior to the information being processed into the file. The reason for this was that we felt that we wanted to have the capability of using the 357 equipment for purposes other than circulation. Development of this off-line circulation system immediately violated one of our original criteria, however, in that it does not make available immediately information on Library holdings. This is one of its major disadvantages and we hope to correct this as soon as desirable on-line equipment becomes available.

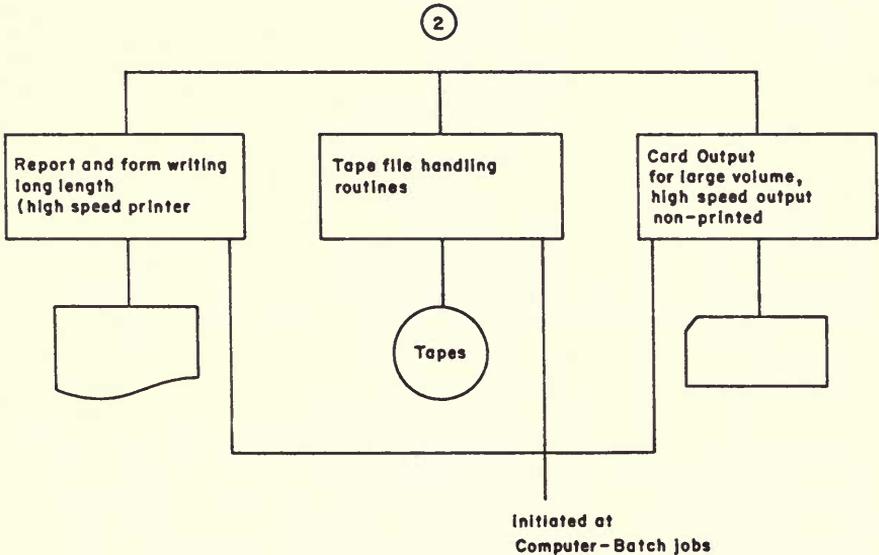
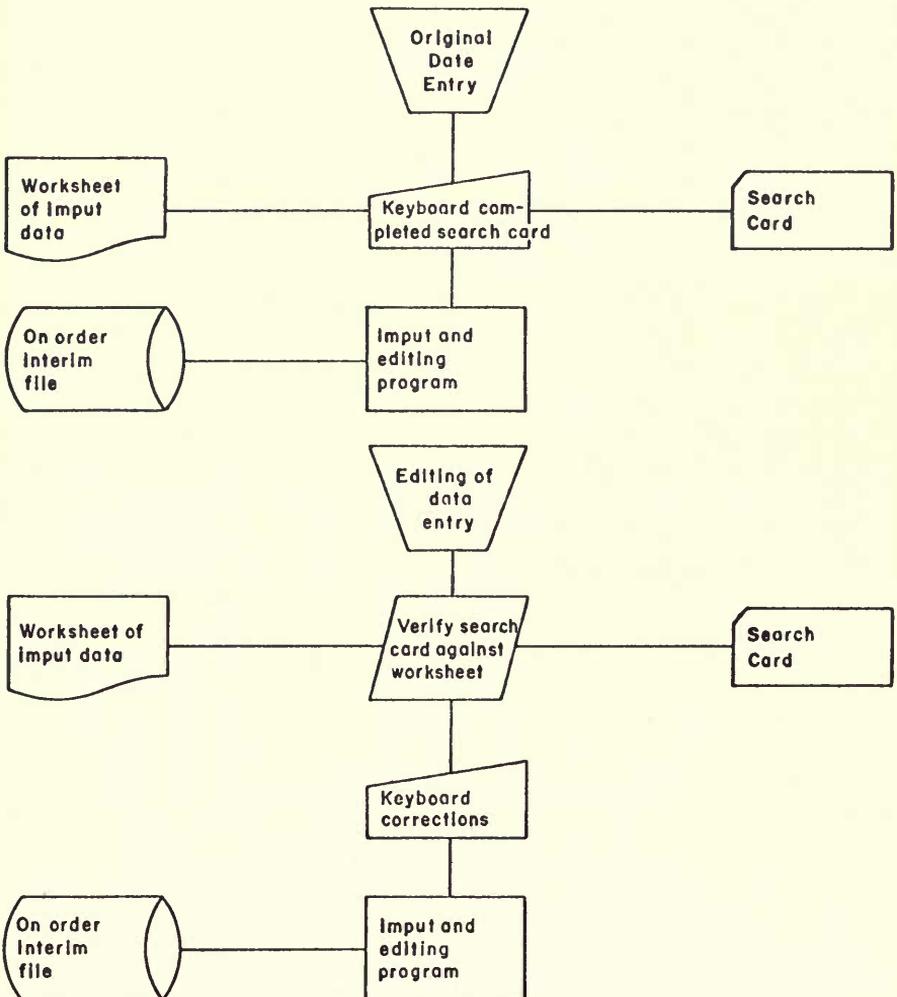


Figure 1 (Continued)

The decision to go ahead with circulation in the absence of desirable on-line circulation equipment was made because of the other known benefits that could be gained from having an automated circulation system. These were improved accuracy of information on outstanding items, reduced clerical functions in preparation of overdue notices and fine notices, and the ability to provide management with information and valid statistics on the use of the active collection. These advantages were felt to far outweigh the disadvantage of not having immediate access to accurately updated circulation files.

Figure 2
On-line Operations

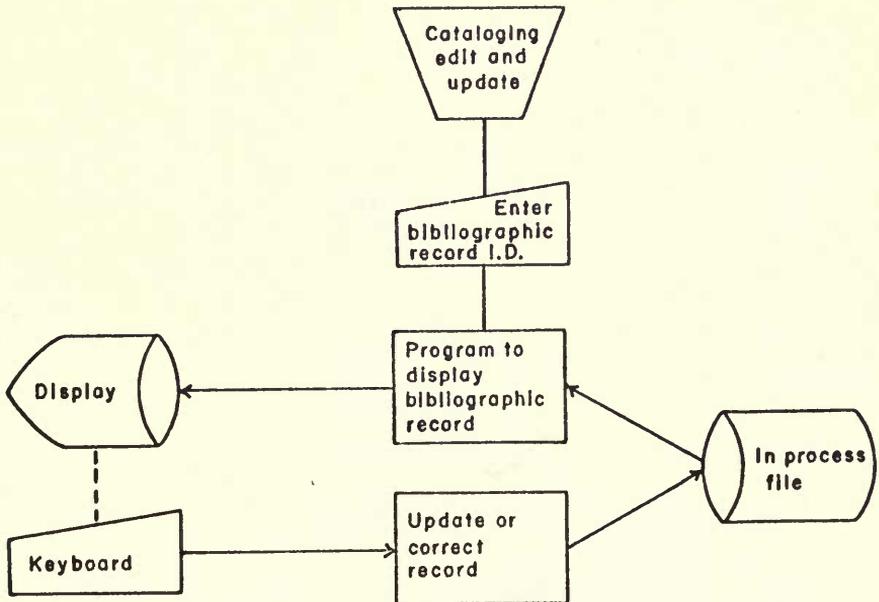


One of the reasons for discussing the circulation system before going into the criteria for the acquisitions system is to illustrate the use of two of the total system design requirements. First is the sharing of files. The circulation system shares a file of student names and addresses with the registrar's office. It is this file which we use for automatically addressing fines and overdue notices to the students. The second requirement concerns the ability to use the circulation equipment for control of processes in both the acquisitions and technical services areas as well as for building an automated time clock system for the management of student labor and the proper calculation and reporting to the administration of student hours worked. This refers to the criterion of effective utilization of all Library resources.

The first criterion in the design of the acquisitions system was to collect the necessary data for each order at the beginning of the acquisitions process. As currently defined in our Library, the acquisitions process begins with the release of the order request from the searching section after verification of bibliographic information. At this point the data are immediately entered into our in-process file which is stored on magnetic disk. A second criterion for the development of the acquisitions system was that we provide for effective file management and for immediate and continuous updating of data within the files.

Figure 2 (Continued)

On-line Operations



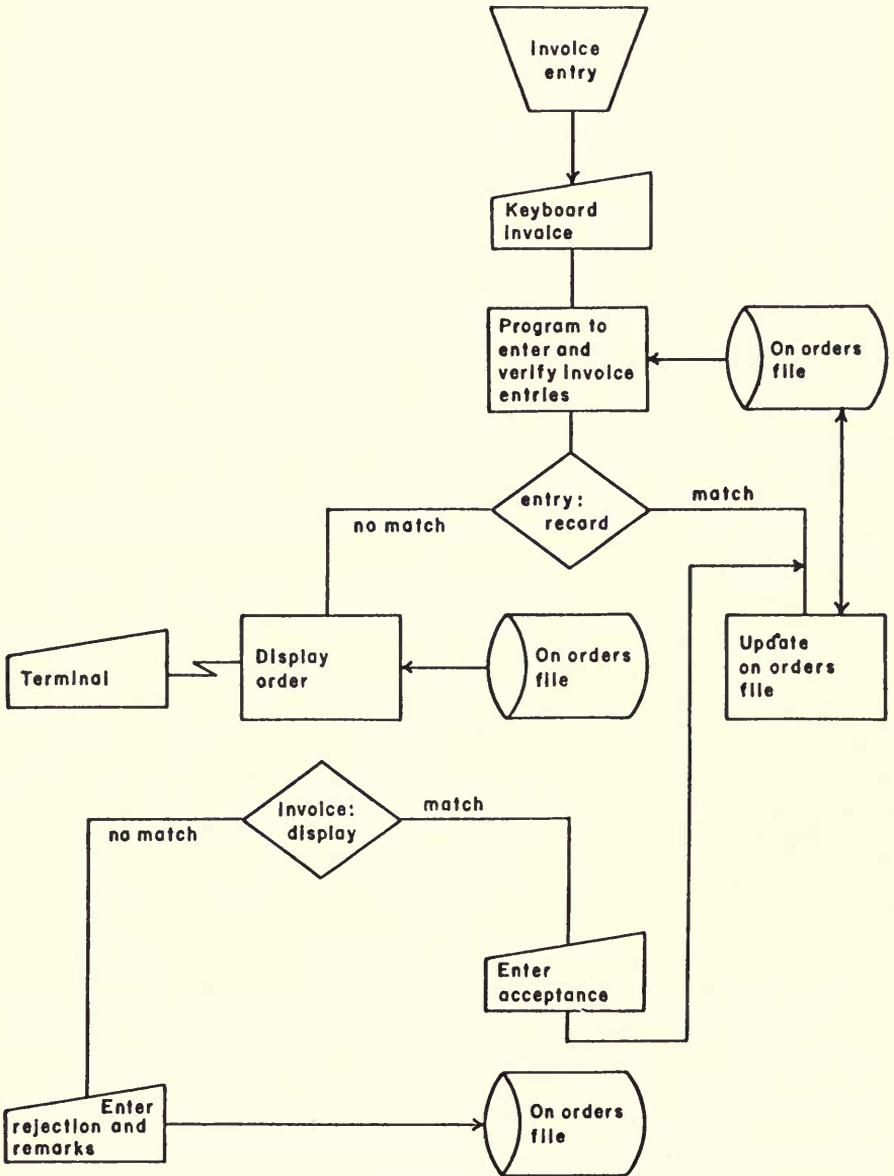


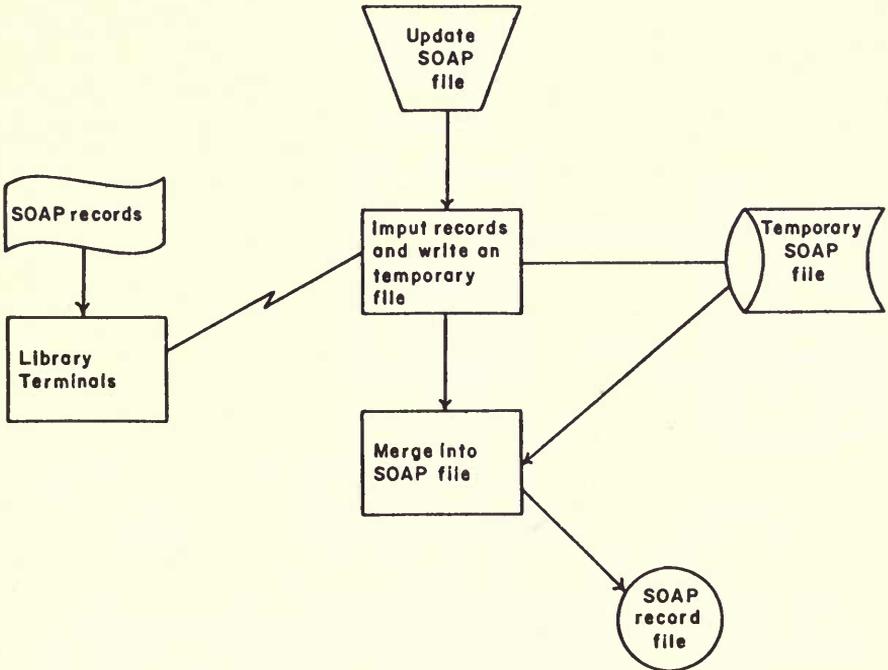
Figure 2 (Continued)

The third criterion was the provision for both terminal operations and batch processing, batch processing being used where it was most effective. The fourth criterion was the ability to have immediate inquiry into the file from many different kinds of access points such as vendor, title, author, publisher, etc.

The fifth criterion was to provide for as much automatic machine processing file editing as possible. This included editing for reasonableness of input information as well as for periodic editing of the entire file to determine if duplicate records existed. The sixth criterion for the acquisitions system called for the automatic performance of as many processes as could be defined which should not be on an on-demand basis. Thus, processing of records for determining which orders are outstanding beyond a certain allowable period of time should be done on an automatic basis. Automatic removal of records from the file when the material is no longer in the technical services area must also be provided.

The seventh criterion involves the development of management information on the acquisitions process. We judged it necessary that we be able to develop vendor performance information, to identify the length of time materials are on order and to supply other data in order to provide both top administrative management as well as middle management with information which allows them to more effectively perform their functions. The eighth

Figure 2 (Continued)



Process Control

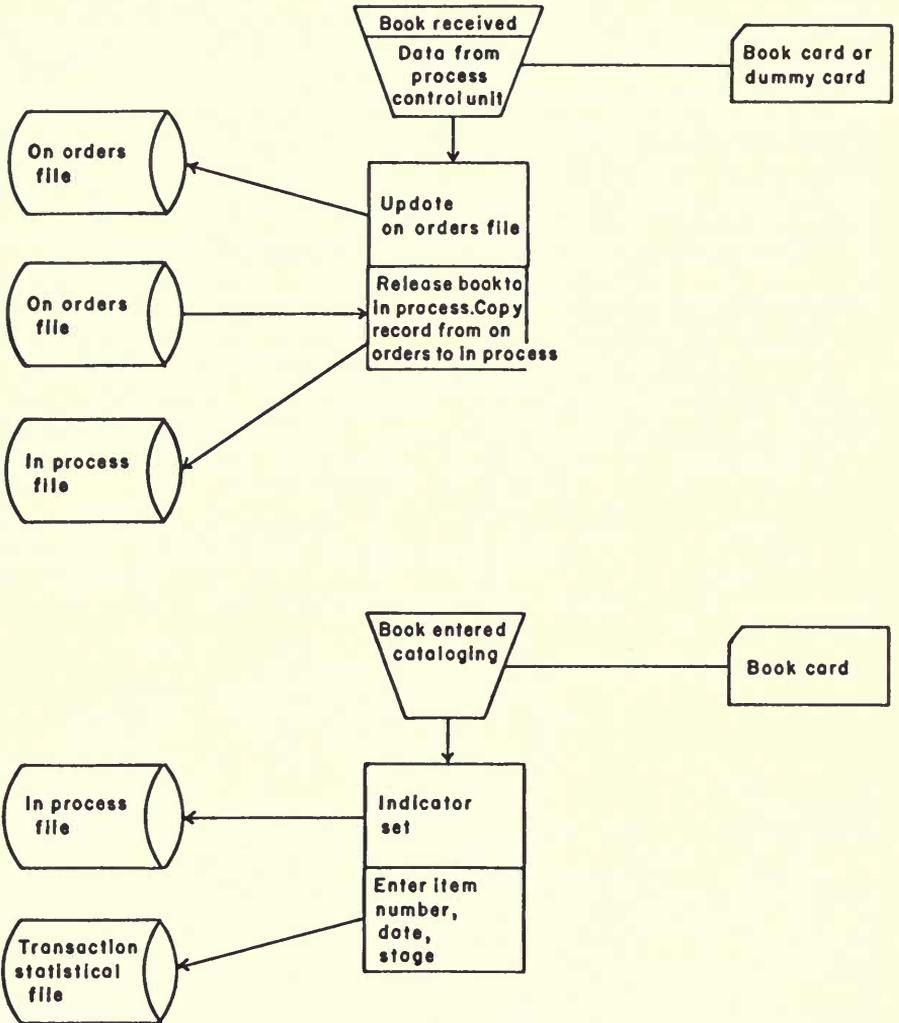


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Process Control

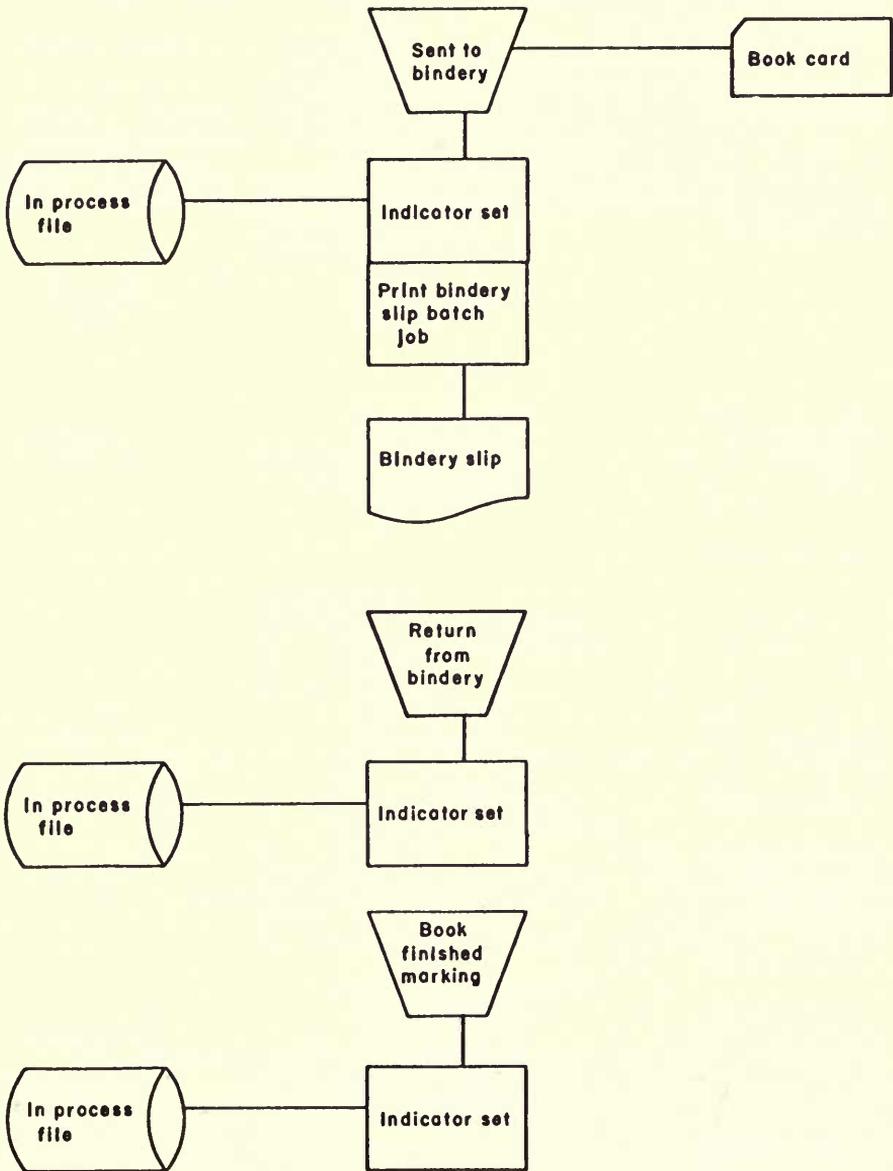


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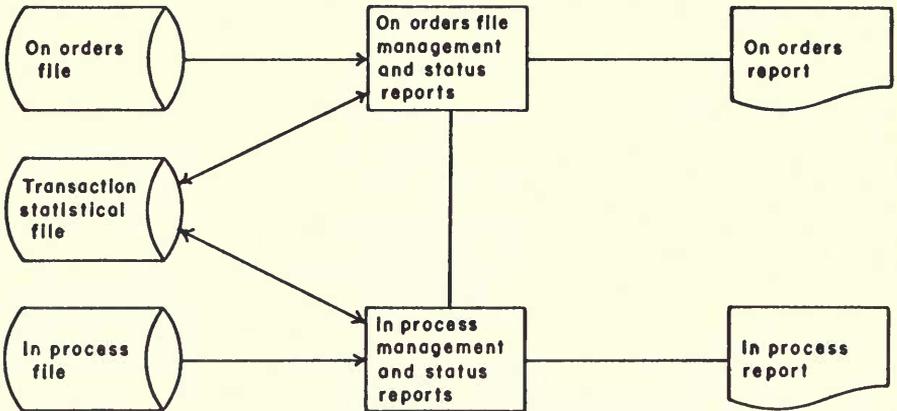
criterion was for the development of flexibility of procedures. The system should have the capability of being modified easily in order to keep up with constantly changing administrative procedures and to continue to grow as the acquisitions activity grows.

The ninth criterion was that the system should be as simple to operate as possible; terminal functions by the clerical staff should be kept simplified. The tenth criterion was that the system should have the potential of growing so that the maximum volume of materials that can be handled by the system effectively would be much larger than the current volume. Having developed the criteria for the acquisitions subsystem we then began to design the system (see Figure 2).

Daily Batch



Batch at computer



Batch at computer

Figure 2 (Continued)

Daily Batch

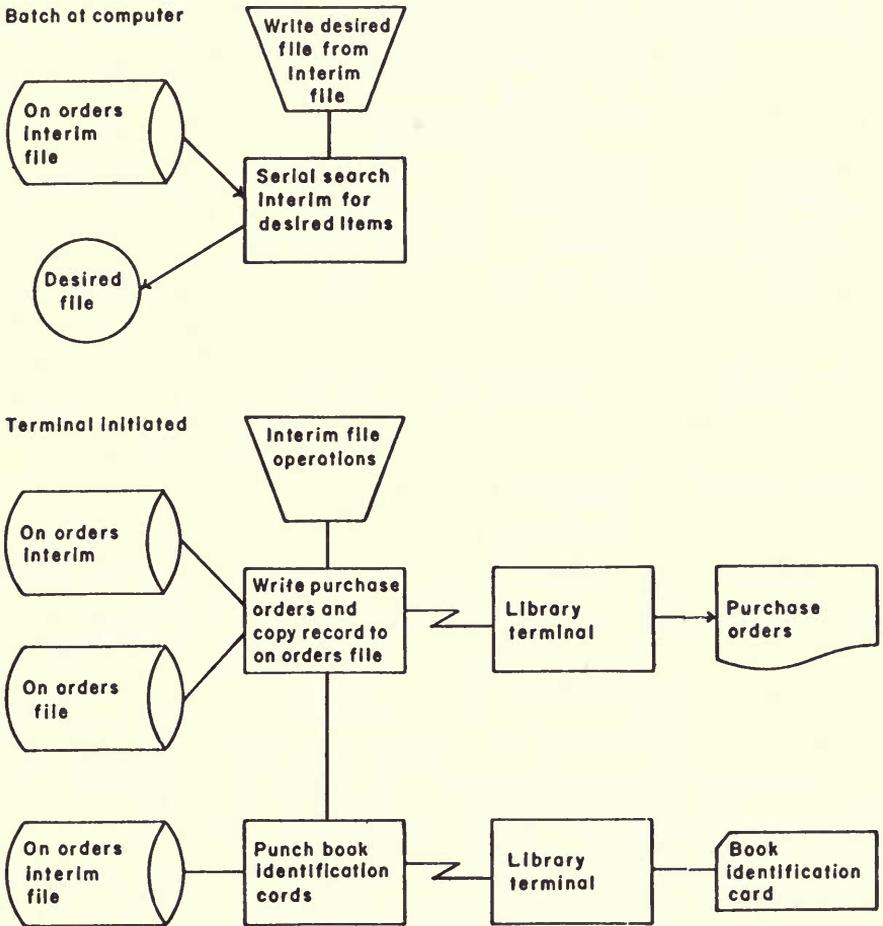
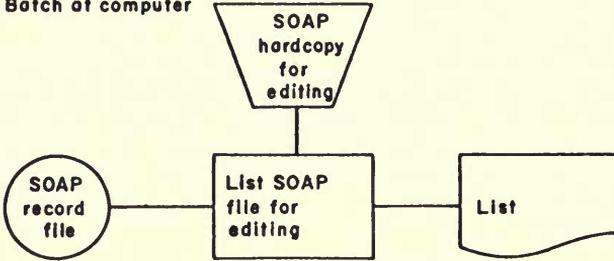


Figure 2 (Continued)

The file was structured around tagged fields. The terminal system was designed to recognize tagged fields and to process the information accordingly. Therefore we designed a series of sub-routine programs which could be called on the basis of the data tag. The system currently contains approximately 150 different data tags and sub-programs which operate on these tags. After developing the system to this point, we then placed it in pilot operation working on a file of approximately 1,000 records. After operating in the pilot fashion for approximately six months, we then put the system into full operational status. It was at this time that we began to build procedures

Daily Batch

Batch at computer



Terminal Initiated

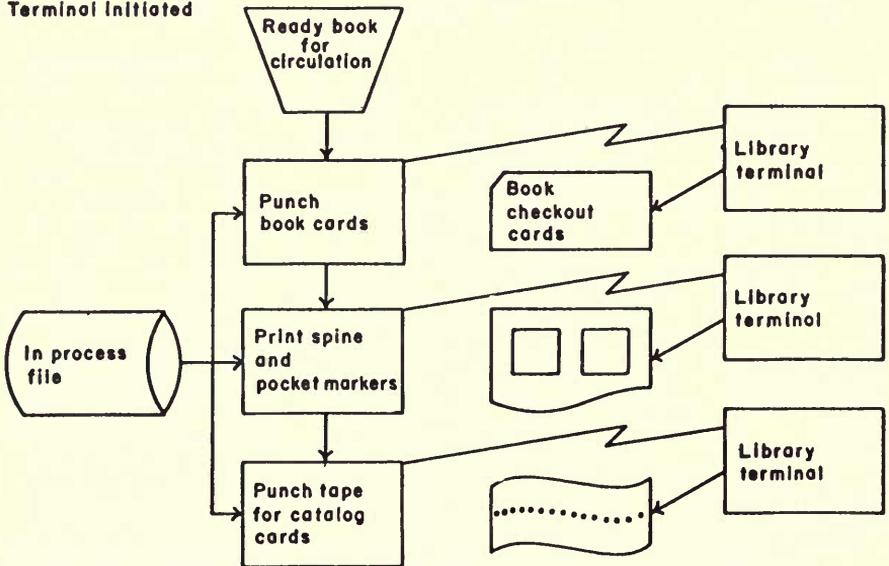
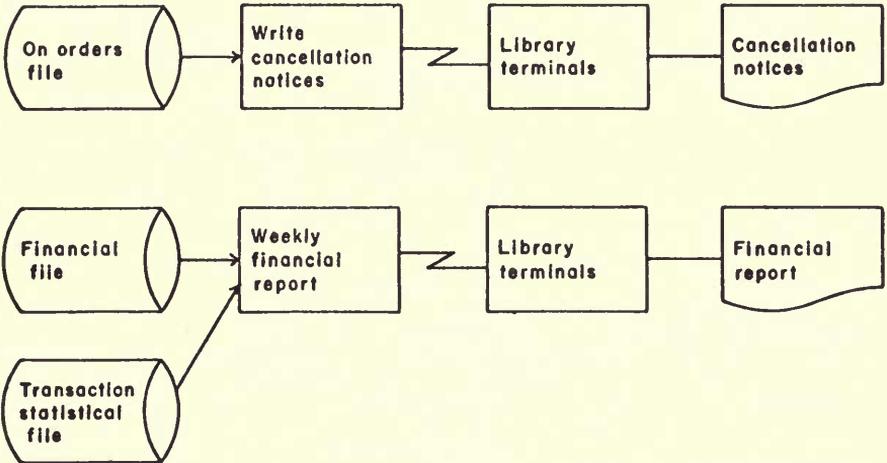


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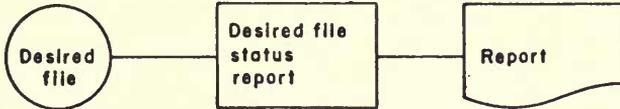
which would chain these data file tag programs together in order to reduce the total amount of operator keyboarding and operator intervention. Although it was possible to handle most all of the acquisition activities of the exception type in the original system, in many cases it was rather awkward. Therefore, we began to build procedures which allowed us to chain some of these operations together in order to make handling of exceptions within the system easier.

Weekly Batch

Terminal Initiated



Batch at computer



Batch at computer



Figure 2 (Continued)

We are still developing some of these procedures. At the same time we are beginning to develop a design for a re-structured system which will make the development of these procedures still easier. At this writing the system has been operating for approximately nine months, handling all of the University Library's acquisitions.

The acquisitions staff, having gone through some rather traumatic experiences during the initial shakedown of the system is now quite pleased with its operation and feels that it can handle additional increases in the book budget as they arise.

In conclusion, I might note that there has also been a change in the design of operating terminals which has caused a corresponding change in our original design (see Figure 3). However, our original goals are still being maintained.

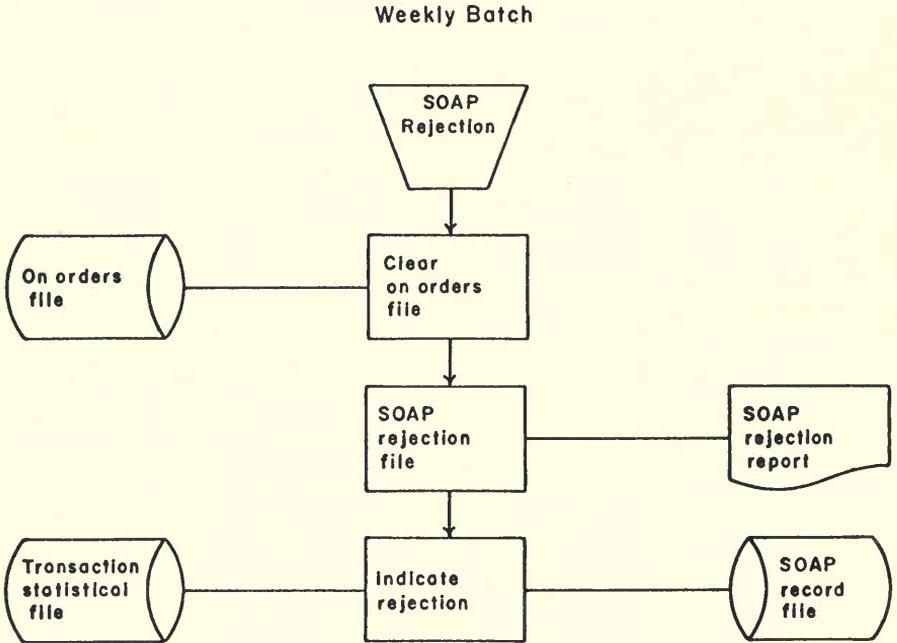


Figure 2 (Continued)

Weekly Batch

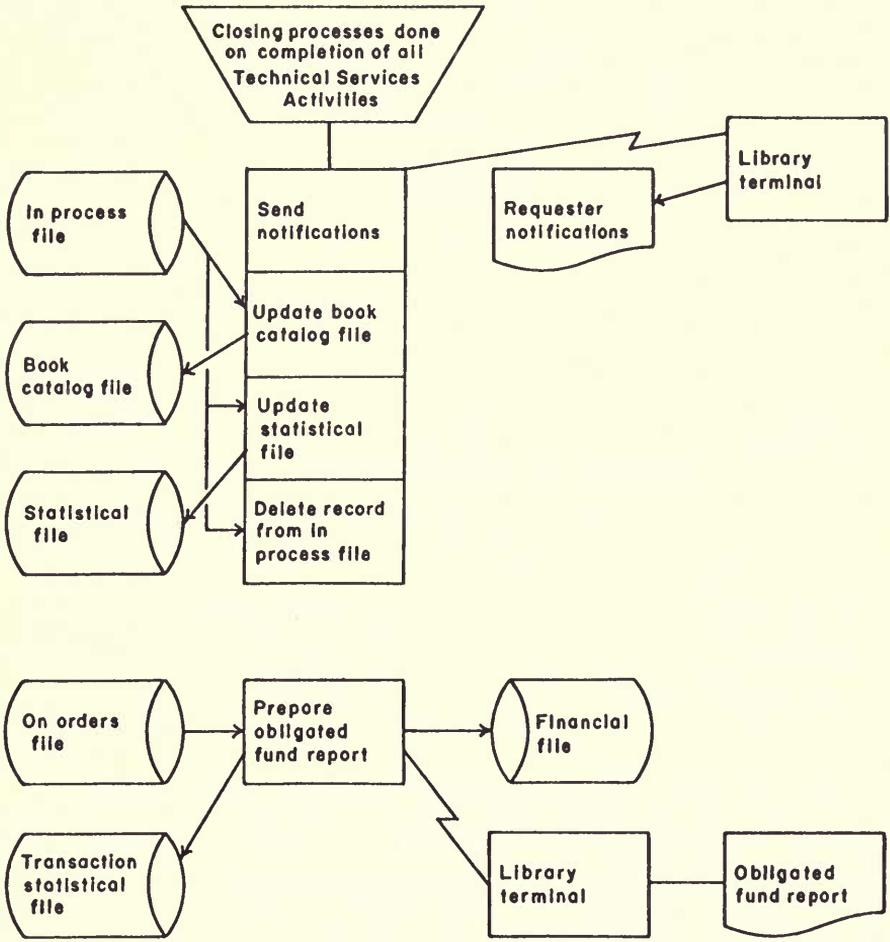
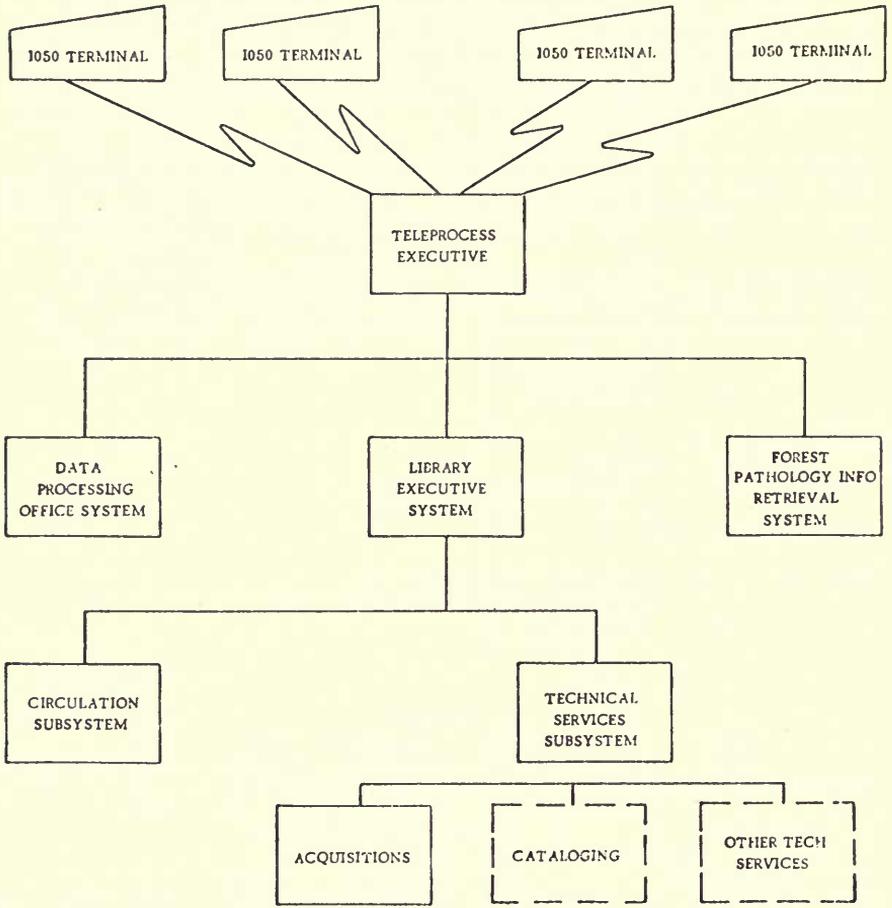


Figure 2 (Continued)



TELECOMMUNICATIONS SYSTEM CONFIGURATION

Figure 3