An APL Catalog System

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ABSTRACT

UCLA has developed an on-line Catalog System which provides the needed documentation of the APL public library. The system provides a controllable method to generate concise, complete, internally consistent, and easy to use documentation. The APL documentation is stored in the APL*PLUS (a registered trademark of Scientific Time Sharing Corp.) File System, and is accessible from a central location, as opposed to present systems which store program documentation within the workspace structure itself.

I. Introduction

UCLA has developed an on-line catalog system to provide the needed documentation of the APL public library.[1] The system provides a controllable method to generate concise, complete, internally consistent, and easy to use documentation, as contrasted with the most prevalent method of documentation in which documentation is stored within the individual workspaces in the form of functions or variables. In the latter type of system, it is very difficult to maintain control over the quality, completeness, and consistency of the documentation.

A feature of the new system is its ability to produce on the high speed printer a complete copy of all public library documentation. This printout can then be evaluated based on the above criteria and changed where necessary.

This evaluation, under the other method, could only be accomplished by periodically loading each workspace and adding, modifying, and deleting documentation where necessary. The new catalog system substantially reduces this time requirement.

The catalog system allows a user to search through the entire library of documents in one process from a single central location. This is a far superior method to loading a series of workspaces, and retrieving available documentation in each until converging upon the desired program. This was the mode in the prior system at UCLA as well as many other installations.

The catalog system was developed on the APL*PLUS system at UCLA. The implementation depends crucially upon this system, which offers both a highly powerful file system (all documentation is stored on two APL*PLUS[2] files, an index file and a document file), and major speed-ups in the execution. (These speed-ups facilitate searching of the entire library of documents on the IBM 360/91 at UCLA in approximately 1/8 of a second.)

The purpose of this paper is to present the design considerations of the UCLA Catalog system to the APL Community, as an alternative to present methods of documentation. This paper will describe (1) the UCLA APL Public Library structure, (2) the design objectives of the catalog system, (3) the system implemented, and (4) proposed improvements.

II. CCN PUBLIC LIBRARY

The UCLA APL public library is divided into two sets: that maintained by the Campus Computing Network (libraries 1-500), and that maintained by private users (libraries 501-999). The catalog system to be described documents the CCN maintained libraries, 1 to 500. These libraries are under the complete supervision of CCN since only privileged users can modify the contents of these libraries. Since it was impossible to control the contents of libraries 501-999, their documentation was left to the originators, who are encouraged to document using the outline developed at the APL working group of SHARE X.

As programs are developed and finalized, they are moved from libraries 501-999 to their appropriate place in the CCN

maintained libraries. This procedure is necessary to maintain a constantly growing, internally consistent body of publicly accessible APL programs.

III Design Objectives of the Catalog System

Ease of Use

A public library retrieval system must be designed to require a minimal amount of prior knowledge of APL and the particular system being used. The only prior knowledge required should be:

1. The sign-on procedure.
2. The APL hierarchy of libraries, workspaces, and functions, and)LOAD and)COPY commands.
3. Operation of the terminal.

Consistency in documentation

The following information should be available for every APL public library function:

1. Where is it?
2. What is its syntax?
3. What other functions and variables are needed for execution?
4. Who wrote it?
5. What other references are available?

Certain information should also be present in all workspace and library documentation. By requiring this information to be entered into the system as a prerequisite for installing the document, consistency in format and content can to a certain extent be enforced.

Completeness

It is vital that every element of the public library be documented. A major disincentive to the use of the public library is the inability to retrieve documentation for a function contained in the library. Completeness should thus be ensured by both the facilities of the computer based system and the human intervention of the APL librarian.

Conciseness

Most documents should be less than a page. Documents that are longer should be summarized with appropriate references.

Modes of Use

The UCLA Catalog System allows for the following modes of use:

1. Location of a specific item
2. Searching
3. Browsing
4. Off-line copies of the documentation
5. Accessing from Active Workspaces

Quick Location of a specific item

A user who knows the name of the function and its use, but cannot remember the workspace in which it is stored, may search the catalog and without actually retrieving the document, quickly obtain its library number and workspace name.

Searching

A basic use of the UCLA Catalog System is to retrieve individual documents. Since it is a name oriented system, the user must know the name of the function or make an educated guess. For example, a user needing a function to perform correlations could search for all catalog entries beginning with the letters 'CORR'. This implies that the APL librarian exercise some control over the names given to public library entries.

Browsing

A user who has only a general idea of his requirements needs to be able to systematically move through the APL library hierarchy to find a program that meets his needs. To facilitate this, each library and workspace document includes a directory of contents, and a short description of each directory entry. For example, within a library document all the workspaces within the library will be listed and briefly described. Then by looking at the documentation of an interesting workspace, descriptions of the functions within the workspace can be found. This method allows a user to start with a description of available libraries and converge systematically upon the program he needs.

Off-line copies of documentation

An important feature of the Catalog System is the availability of current, high-speed-printed copies of the documents.[3] This is particularly useful for users who prefer browsing through hard copy, for minimizing terminal connect time, and for providing handouts to classes needing certain documents.

Accessing from Active Workspaces

An APL user, while he is executing a function, may require documentation without leaving his active workspace. This can be accomplished by copying into the active workspace of the user an abbreviated form of the documentation retrieval program and specifying the document to retrieve.

IV   The Catalog System

Within the Catalog System the five types of documents stored are: libraries, workspaces, functions, important variables, and special documents. All documents are stored in the order they are entered and are not distinguished by type for searching purposes.

The Catalog System has three levels of system access: user, documentor, and librarian. A user may only read from the document file and only while under program control. A documentor has the ability to add, modify or delete documentation. A librarian has, in addition to the access associated with the documentor, the ability to (1) repair file damage caused by system problems, (2) give special access to other users, (3) perform high speed prints of documents, and (4) performs general system maintenance.

The Catalog System is made up of three modules designed for:

1. Document Collection
2. Document Search and Retrieval
3. Quick Document Retrieval

Document Collection

When programs are added to the Public Library or existing programs modified, the documentation library must be modified. The documentor initiates this by loading the documentor workspace, and entering one of the three documentation modes, ADD, MODIFY, or DELETE.

To add a document to the library, the documentor is asked for the specific information associated with the type of document. Table 1 outlines the specific information needed for each type of document.

TABLE 1

Document Type	Specific Information	Required
Library	Name (Library No.)	Yes
	Short Description	Yes
Workspaces	Name (Library No., WS Name)	Yes
	Short Description	Yes
Functions	Name (Lib No., WS Name,Fn. Name)	Yes
	Short Description	Yes
	Syntax (e.g. X FUNCT Y)	Yes
	Required (any functions or vars.)	No
	Author	No
	References (additional doc.)	No
Variables	Name (Lib. No.,WS Name,Var. Name)	Yes
	Short Description	Yes

The general description collected, in addition to that described in Table 1, explains the input, output, and any other information necessary to understand the use of the item documented. Available to the documentor to aid in writing the general description is a high level text editor. The text editor allows him to input his original description; replace specific phrases; delete, add, and modify lines; and completely justify the final output to produce a polished document. Since there is a hierarchical structure built into the system, the library containing a workspace must have been previously entered. This same relationship must hold for workspaces and functions, facilitating the construction of directories for both libraries and workspaces of the items stored within them.

The modify mode allows the documentor to easily change a document. This is facilitated by passing the old document through the text editor. The delete mode is under a high amount of program control; no library or workspace document can be deleted until its submembers have been deleted.

Document Search and Retrieval

The following is an example of document retrieval.

```
)LOAD 1 CATALOG
SAVED  10.24.41   01/08/74
APL PUBLIC LIBRARY CATALOG - FOR INSTRUCTIONS TYPE 'HELP'
ENTER NAME OR LIB NUMBER TO FIND:  DSTAT          (NOTE 1)
FIND ALL NAMES OF THAT BEGINNING? NO             (NOTE 2)
DOC. NO.   TYPE   NAME          DESCRIPTION
    125    FCTN   2 STP1 DSTAT   BASIC STATISTICS ON A VECTOR
ENTER DOCUMENT NUMBER(S) TO PRINT: 125           (NOTE 3)

    --- 2 STP1 DSTAT ---

SYNTAX:  DSTAT X

     FOR A VECTOR X OF UNGROUPED OBSERVATIONS, DSTAT COMPUTES AND
LISTS WITH APPROPRIATE LABELS THE FOLLOWING STATISTICS: SAMPLE
SIZE, MAXIMUM OBSERVATION, MINIMUM OBSERVATION, RANGE, MEAN,
VARIANCE, STANDARD DEVIATION, MEAN DEVIATION, MEDIAN AND MODE. IF
THE MODE OCCURS FOR SEVERAL VALUES, EACH MODE IS LISTED, EXCEPT
IF ALL OBSERVATIONS ARE DIFFERENT IN WHICH CASE NO MODE IS
LISTED.

ENTER DOCUMENT NUMBER(S) TO PRINT:
```

NOTES:

1. Response should indicate the name of the document desired or the first few letters of the name.
2. 'YES' initiates a search for all entries beginning with the name entered; 'NO' restricts the search to that name only.
3. The information present in the index is (1) the document number, (2) the entry type, (3) the complete name and location of the entry, and (4) a short description of the entry. The valid entry types are displayed in table 2.

TABLE 2

ENTRY	DOCUMENT TYPE
LIB	Library
WS	Workspace
FCTN	Function
VAR	Variable
****	Special Documentation (all others)

Quick Documentation Retrieval

The functions DESCRIBE and HOW in workspace 1 OFIND, when copied into a workspace, automatically retrieve the workspace documentation and selected function documentation, respectively.

V. Future Enhancements -- Keyword Sturucture

UCLA is considering the implemention of a keyword structure. The main barrier to this implementation is the present lack of an adequate, standardized set of APL retrieval keywords. Hopefully an APL organization such as the SHARE APL working group will develop a set of keywords in the near future. Until such time, UCLA cannot undertake a large scale implementation of such a system that could become nonstandard vis-a-vis other installations.

VI. Conclusion

Implementation of the Catalog System at UCLA has accomplished three main things:

1. More effective control is exercised over the form and content of public library documentation.
2. The novice, non-APL-oriented user can more easily access and use public library programs.
3. Any user can readily ascertain whether his needs are met by some program within the system.

The structure that has been imposed on the UCLA Public Library has already aided in more orderly growth. Future

information on the availability of this system can be obtained from the authors.

FOOTNOTES

1. The UCLA Catalog System was developed by the UCLA APL Users Group with the support and encouragement of the Campus Computing Network.

2. APL*PLUS is a registered trademark of the Scientific Time Sharing Corporation.

3. The batch-interface to the high-speed-printer was provided by the Scientific Time Sharing Corporation. Special thanks are owed Bruce Frostick, STSC, for his special print translate table that simulates APL characters.

REFERENCES

1. SHARE X APL working groups proposed documentation standards

2. APL*PLUS File Subsystem Manual, Scientific Time Sharing Corp.