



C. A. Conroy, Ed.

International Business Machines Corporation

Thomas J. Watson Research Center  
P.O. Box 218  
Yorktown Heights, New York 10598  
914/945-3000

APL\360 NEWSLETTER NO. 1

JULY, 1967

INTRODUCTION

This is the first in a series of newsletters intended to keep you informed of developments in APL\360.

The contents of the newsletters will generally include:

- \* A detailed description of a system library workspace.
- \* A section on hints for more efficient programming.
- \* An APL puzzle.
- \* New and interesting uses of APL.

We look forward to contributions in all of these categories from the users of the system.

APL SYSTEM LIBRARY

A system library will be set up, in common library 1, for workspaces of general interest. It will be the responsibility of the system librarian to see to it that workspaces proposed for this library meet reasonable standards of usefulness, freedom from error, and adequate documentation.

It is desirable that library 1 be reserved exclusively for workspaces that have met the foregoing standards, and to this end it is requested that people who now have workspaces in this library move them to common library 10.

The procedure for qualifying a workspace for the system library will be as follows:

A. Notify:

Miss Colleen Conroy  
APL System Librarian  
IBM Corporation  
T. J. Watson Research Ctr.  
P. O. Box 218  
Yorktown Heights, New York 10598

and include,

1. The library number and name of the workspace (in general, such workspaces should be retained in your private library).
  2. The names of three persons qualified to review the workspace.
  3. A summary of the workspace giving:
    - a. Its general purpose.
    - b. A list of functions with their syntax and intended usage.
    - c. A list of significant global variables giving the functions in which they are used.
    - d. If there is an interdependency among some functions this should be diagrammed or otherwise indicated.
- B. The librarian will save the workspace in a special review library and request selected reviewers to evaluate it, checking for bugs and adequacy of documentation. The reviewers' findings will be submitted to the author, as required, to improve the workspace and the documentation.
- C. When the workspace qualifies, it will be placed in library 1, and a copy of the documentation will be distributed with the next following issue of the newsletter.

It is hoped that many users will submit workspaces for inclusion in the system library, and in particular that workspaces currently in libraries 1 and 10 will be brought up to the foregoing standards.

This issue of the newsletter includes documentation for the following workspaces (all in library 1):

CLEANSPACE  
NEWS  
UTILITY

### PROGRAMMING HINTS

There are times when you wish to print a literal vector and simultaneously leave the function. This can be accomplished in one line as follows:

```
→0,ρ⊞+'LITERAL STRING MESSAGE'
```

The following two functions - called GUESS AND FOODFORTHOUGHT - are examples of the uses of the representation symbol -  $\tau$  - and the  $\mathbf{i}$ -beam functions and how they can be used within functions.

Unless you already know, perhaps you would like to analyze these two functions and determine precisely what they do. We'll give you the exact solution next time.

They are:

```

∇R←FOODFORTHOUGHT
[1] R←1+(6ρ10)τI25
[2] R←'/0123456789'[1+1 1 0 1 1 0 1 1\R]
∇

∇R←X GUESS Y
[1] R←(4αY)/(X,60 60 60)τI20
∇
```

The index origin in both cases is 1.

### APL PUZZLE

Prove that, for positive integers,

$$(M \times \lceil N \div M \rceil) = N + M \mid -N$$

### REMINDER:

Please send all register dumps to L. M. Breed and R. H. Lathwell, who are located at the address on the letterhead. They would be interested in the following:

1. When you receive a register dump, which looks like this,

```
0002D0D4 6001DE42 0002E794 00000028 00001794
00001044 000017B8 00001808 0002D000 4001DCA4
FF550001 60000002
SYSTEM ERROR
```

only the first block of the register dump is needed along with the entire sequence of events from the last LOAD prior to the dump up to and including the first portion of the dump.

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If you have any other questions or comments, please feel free to call or write to Colleen Conroy at the address on the letterhead.

## 1 CLEANSPACE

The workspace - CLEANSPACE - in Library 1 is a clean space containing no functions or variables. It is used particularly in the following situations:

1. If you are hung up in the execution of a function because of a quad input ( $\square$ ), type )LOAD 1 CLEANSPACE; the only way to get out of a quad prime ( $\square$ ) input, is by hanging up.
2. To clear a workspace of superfluous functions, type )LOAD 1 CLEANSPACE. Then COPY any particular variables, functions or entire workspaces desired and SAVE.

Copying of an entire workspace into a clean workspace will sometimes increase the amount of usable workspace available since the COPY suppresses obsolete entries in the symbol table.

3. To leave execution of functions, which may have been nested to a considerable depth, execute any of the following: )SAVE the workspace, )LOAD 1 CLEANSPACE, or )COPY the workspace.

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1 NEWS

The main functions of this library workspace are:

APLNOW  
APLOPS  
DESCRIBE  
SCHEDULE

The following functions within this workspace are either used as subfunctions or in conjunction with the main functions. Because the main purpose of this workspace is to relay news, they will not be described in detail:

CHSKD  
DATF  
PRINT  
TDATE  
TOD

\* \* \* \* \*

SYNTAXDESCRIPTION

*APLNOW B*

*SUBFUNCTIONS:*  
*TDATE*  
*PRINT*

The right argument *B* should consist of the following: *MM,DD,YY* where *MM* is the month, *DD* is the day, and *YY* is the year. For example, *APLNOW 12,1,66*. This function prints out all temporary notes and restrictions on or after the date specified by the argument *B*.

*APLOPS*

Gives the latest current implementation status. *APLOPS* does not require any arguments for execution.

*DESCRIBE*

Gives a brief summary of the various functions within this workspace.

*SCHEDULE*

*SUBFUNCTIONS:*  
*CHSKD*  
*DATE*

As the name implies, this function gives the APL system schedule information. This function does not require any arguments for execution.

The following functions have been moved to Library 1 APLHIST:

ALLSTATS  
HISTOGRAMS  
PLOTNUM

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1 UTILITY

<u>SYNTAX</u>	<u>DESCRIPTION</u>
<i>R←ARCOS B</i>	Inverse cosine of B in radians.
<i>SUBFUNCTION:</i> <i>ARCSIN</i>	
<i>R←ARCSIN B</i>	Inverse sine of B in radians.
<i>R←ARCTAN B</i>	Inverse tangent of B in radians.
<i>R←COS B</i>	Cosine of B in radians.
<i>SUBFUNCTION:</i> <i>SIN</i>	
<i>R←COSH B</i>	Hyperbolic cosine of B in radians.
<i>R←DEG B</i>	Conversion of B from radians to degrees.
<i>DESCRIBE</i>	A brief description of the contents of this workspace.
<i>R←A LOG B</i>	Base A logarithm of B.
<i>R←RAD B</i>	Conversion of B from degrees to radians.
<i>R←SIN B</i>	Sine of B in radians.
<i>R←SINH B</i>	Hyperbolic sine of B in radians. Large relative error possible for B close to 1.
<i>R←TAN B</i>	Tangent of B in radians.
<i>SUBFUNCTIONS:</i> <i>SIN, COS</i>	
<i>R←TANH B</i>	Hyperbolic tangent of B in radians. Large relative error possible for B close to 1.

Except where noted, results have at least 14 correct decimal digits.

In all of these functions, the arguments may be a scalar or arrays of any rank. The two arguments of the LOG function must be conformable. That is, it is necessary that  $(\rho A) = \rho B$  or if their dimensions are different, one of them must be a scalar or an array containing only one element.

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