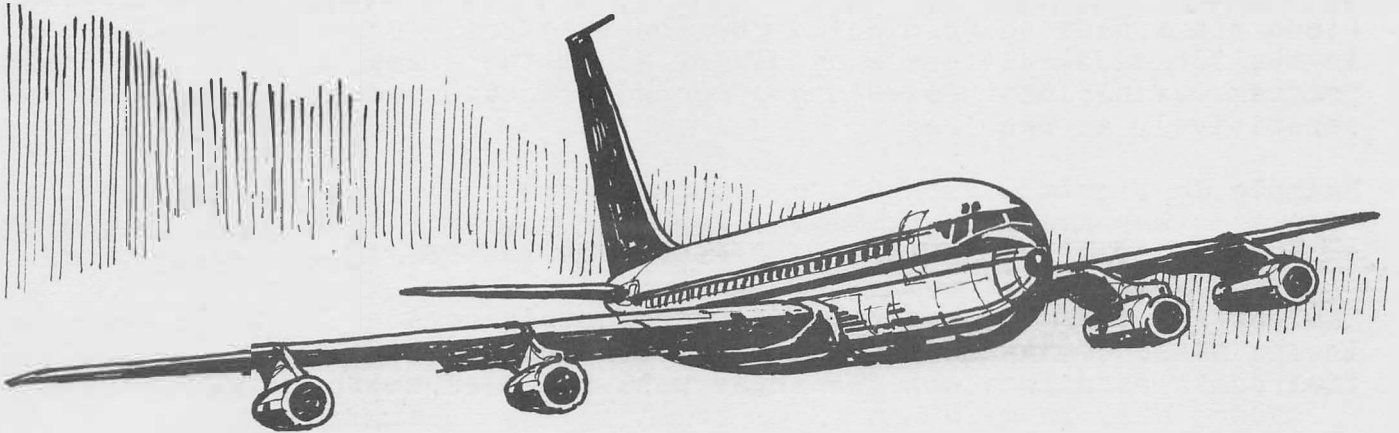


the I.P. Sharp *newsletter*

FEBRUARY/MARCH 1975



MAGIC with the *Civil Aeronautics Board* *data base*

by DAVE KEITH

The Civil Aeronautics Board (CAB) data base is an on-line data base available to all users of the *SHARP APL* system. It is constructed from CAB Form 41 reports submitted to the Civil Aeronautics Board in Washington D.C. by all American air carriers on a monthly and a quarterly basis. The data is comprised of the balance sheet, expense, revenue and traffic statistics by aircraft type, type of service and by airport, of over 60 carriers in considerable detail. In all, there are about 300,000 time-series associated with the data base, and it occupies about 25 million bytes of disc storage. In the first few months of usage, it has been extremely well-received by several companies in the aircraft industry.

SHARP APL represents an ideal vehicle for a data base of this nature. The maintenance and updating of the data base via interactive *APL* functions allows for more flexible updates, the screening of errors before they enter the data base and, most importantly, the facility for making human decisions during the process of an update (as opposed to the more conventional batch update technique). In addition, an interactive change function can change any number in the data base immediately upon an error being perceived or reported to us. Of course, the built-in security mechanisms of the *SHARP APL* file system are a natural in this situation, since only the data base Steward is allowed to make changes.

From the user's point of view, *SHARP APL* again serves him well. Using the *APL* written macro language *MAGIC*, an analyst with no computer experience can quite easily perform detailed studies which previously required hours to complete. In fact, the *MAGIC* system provides an

effective link between any user and any time-series oriented data base. For example, we have linked *MAGIC* to the National Bureau of Economic Research (*NBER*) data base, which exists on the system as a separate entity.

MAGIC assumes no previous computer experience and no knowledge of *APL*, except perhaps an hour or two spent reading the manual. Using English commands such as *SUM*, *SCALE*, *YEARLY CHANGE*, *PLOT*, etc. it allows one to retrieve, manipulate and format data in a fashion similar to the operations one would use when doing the work by hand. Use of *MAGIC* can be in the "desk calculator" mode of *APL* as in the examples below, or in the program definition mode so that "canned" functions can be set up and used repetitively as required.

Example 1.

FUEL COST PER REVENUE MILE FLOWN FOR THE 'BIG FOUR' CARRIERS

The cost of fuel has been a topic of much discussion recently. The following *MAGIC* commands show the use of the *CAB* data base to evaluate the fuel cost per mile flown for three well-known aircraft types.

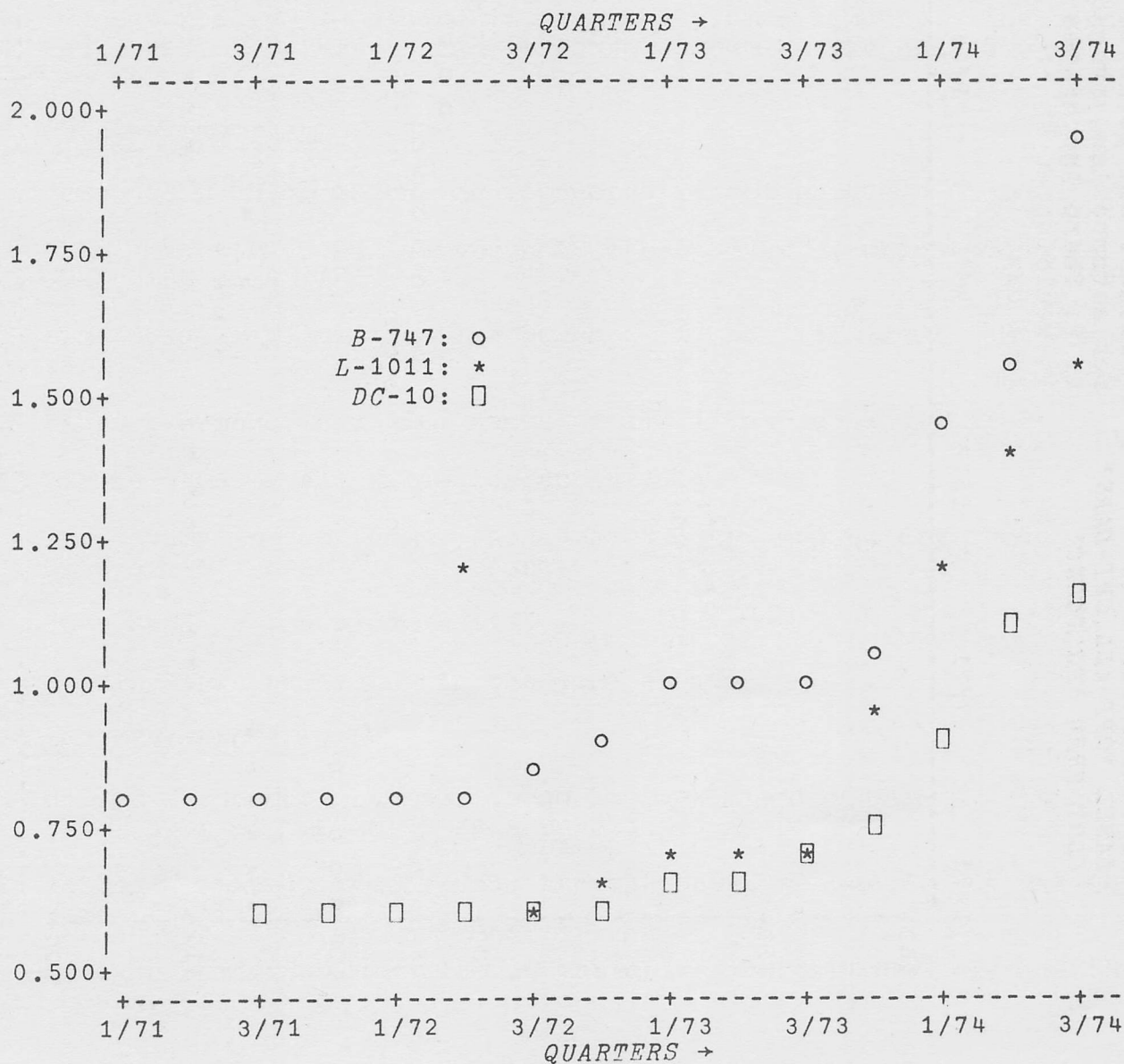
It should be pointed out that in evaluating an aircraft, fuel consumption is only one of many factors to be considered. This example was chosen merely to show what can be done with *MAGIC*. The three aircraft types were evaluated over the "big four" carriers, namely American Airlines Inc., Eastern Airlines, Trans World Airlines Inc. and United Airlines. Twenty-four time-series were used. The cost of producing the report is about \$5.00. The time required to do the same study by hand could quite literally involve one to two man days of effort, the greater proportion of that time being spent merely retrieving the appropriate data.

```
)LOAD 702 MAGIC
SAVED 12.08.08 03/12/75
```

```
CLEAR
BIG4←AA,UA,EA,TW * FUEL←5145.1 * MILES←K410
B747←8161 * L1011←7601 * DC10←7301
Q←BLIND * Q←ZERO
QUARTERLY,DATED 1 71 TO 3 74
PUT SUM P5,BIG4,FUEL,T B747
PUT SUM P5,BIG4,FUEL,T L1011
PUT SUM P5,BIG4,FUEL,T DC10
PUT SUM T2,BIG4,MILES,T B747
PUT SUM T2,BIG4,MILES,T L1011
PUT SUM T2,BIG4,MILES,T DC10
PUT (ITEM 1 2 3) DIVIDED BY (ITEM 4 5 6)
TITLE ' FUEL COST PER REVENUE MILE FLOWN FOR BIG 4 CARRIERS'
LABEL 'B-747,L-1011,DC-10'
DISPLAY ITEM 7 8 9 * PLOT ITEM 7 8 9
```

FUEL COST PER REVENUE MILE FLOWN FOR BIG 4 CARRIERS

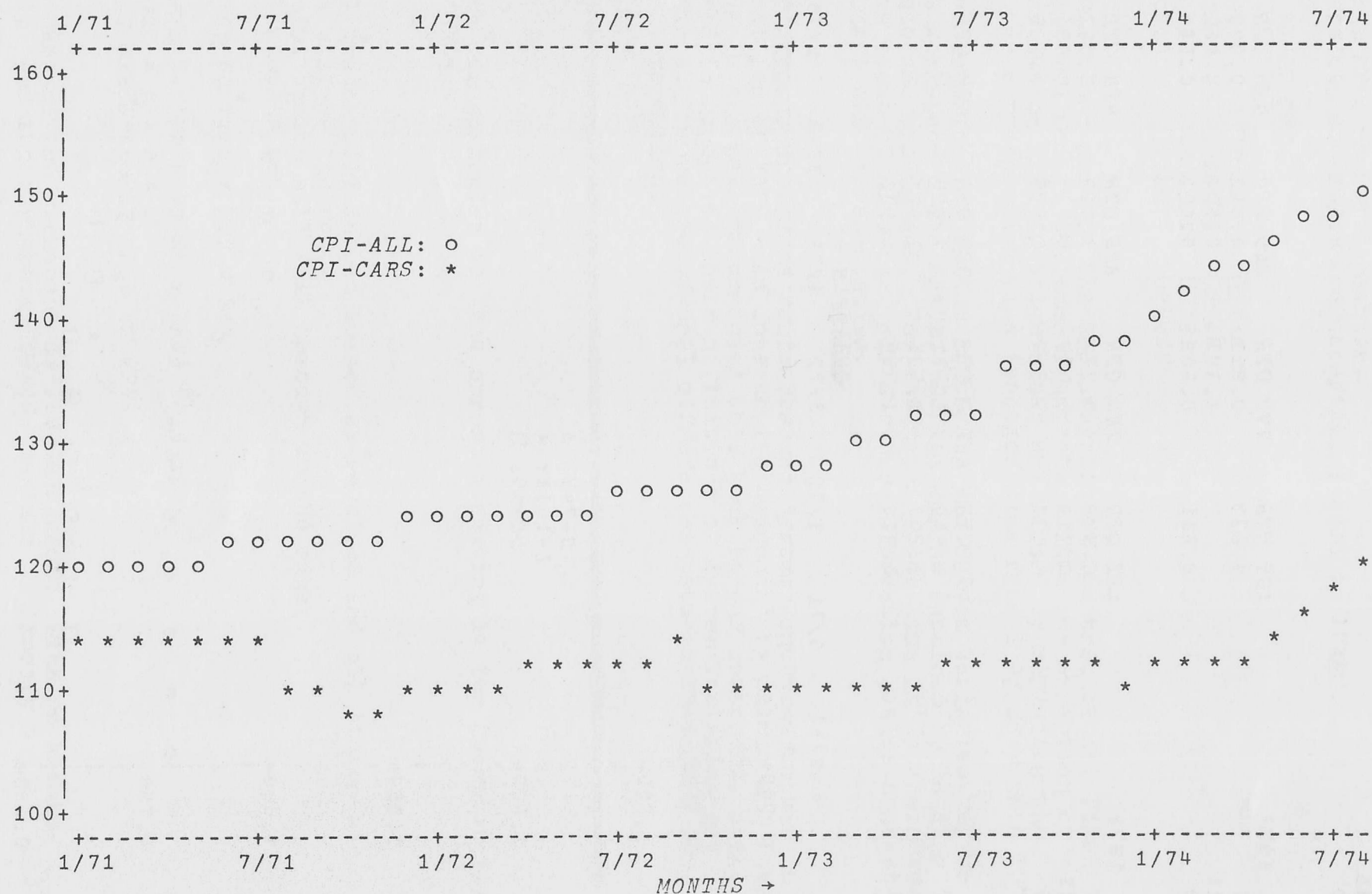
	1971	1ST QTR	2ND QTR	3RD QTR	4TH QTR	TOTAL
B-747		0.817	0.788	0.805	0.786	0.799
L-1011						
DC-10				0.601	0.583	0.587
	1972	1ST QTR	2ND QTR	3RD QTR	4TH QTR	TOTAL
B-747		0.823	0.813	0.842	0.922	0.848
L-1011			1.181	0.603	0.666	0.659
DC-10		0.611	0.588	0.602	0.589	0.595
	1973	1ST QTR	2ND QTR	3RD QTR	4TH QTR	TOTAL
B-747		0.979	0.978	1.015	1.042	1.003
L-1011		0.714	0.699	0.711	0.933	0.762
DC-10		0.637	0.639	0.679	0.736	0.671
	1974	1ST QTR	2ND QTR	3RD QTR	4TH QTR	TOTAL
B-747		1.446	1.571	1.926		1.654
L-1011		1.207	1.405	1.531		1.395
DC-10		0.912	1.098	1.133		1.064



CLEAR
 SCALE 1
 WAS 1000
 MONTHLY, DATED 1 71
 LABEL 'CPI-ALL, CPI-CARS'
 PLOT NBER 'PC, PCDNC'

Example 2.

This example compares the Consumer Price Index (CPI) for all goods to the Consumer Price Index for automobiles, over time, as retrieved from I. P. Sharp Associates Limited's *NBER* data base. It would appear that cars are still a pretty good buy!



AIDS:

(APL FOR INTEGRATED DECISION SYSTEMS)

AIDS is a computer-based system of concepts, commands, procedures and instructions which provides planners and decision-makers with a facility for designing and evaluating alternative strategies and tactics and for monitoring performance with respect to plans.

The system is the product of an extensive applied research programme in the field of planning and control technology. As a result, it is applicable to a wide variety of decision areas, a few of which are:

- Long-range planning
- Project feasibility studies
- Venture investment analysis
- Merger/Acquisition/Divestiture evaluations
- Development of annual plans and budgets and the monitoring of their performance
- Consolidation of financial statements

Since generally released in January 1974, AIDS has enjoyed widespread usage within governments and industry in Canada, the United States and Great Britain. The system was described in detail in the March, 1974 issue of "EDP In-Depth Reports" and is regarded as one of the most sophisticated Corporate Planning systems currently available.

The product incorporates a powerful executive monitor which allows the user to make use of "English" commands for the various file, data, simulation and report operations, thereby allowing planners to devote full attention to problem-solving activities.

AIDS integrates the art and science of planning to provide users with the type of flexible environment that is needed to simulate complex business situations.

For additional information regarding this program product please contact your local SHARP APL representative.

PISA! APL75

A reminder: The International APL Congress will be held at the University of Pisa on June 11, 12 and 13. We will be there (as APL Europa S.A.) Come and see us.

INTERSYSTEMS NEWS

Users in Amsterdam, The Netherlands, now have local access to the SHARP APL System.

THE SKILLS INVENTORY SYSTEM: Square away those square pegs!

The computer-based *SKILLS INVENTORY SYSTEM* was designed for use by search organizations for the placement of candidates, or within personnel departments of large organizations, for the location and assignment of employees or candidates.

The basic system allows the user to define a series of skill categories and attributes and to proceed with the definition of individual candidate information. For instance, the user specifies an area of interest (accounting, sales, engineering, etc.) and then defines the various desired skills and attributes such as age, experience and education. These user-defined attribute tables can create inter-attribute relationships (i.e. in a *LANGUAGE* category, if we ask for a "good" knowledge of Spanish we may also have the system provide names of candidates with both "excellent" and "fair" ratings, but not those with "translator" or "poor" ratings). The system will respond with a list of candidates that match the required profile. Matches are made with respect to an "adjusted" attribute profile, that is consideration has been given to the implied relationships between attributes.

In summary, search activities are undertaken by the specification of individual search attribute profiles. The system will produce listings of candidates that match the specified profiles and in those instances where no match can be found, the system will carry out a statistical analysis in the interests of assisting the user in the definition of an adjusted attribute profile for a subsequent search activity.

The file creation and data management procedures are completely automatic and the system neither requires nor supposes a knowledge of computers or computer systems.

For further information please contact your *SHARP APL* representative.

THE QUADS

New system variables as well as new system functions have been added to *SHARP APL*. System variables and system functions are all characterized by names beginning with quad (□).

SYSTEM VARIABLES

System variables control such properties as index origin, significant digits and print width. They resemble ordinary variables in that they may be assigned values, used in computations, localized and grouped. All of them have appropriate default values which may be changed by assignment, or by system commands such as *)ORIGIN*, *)WIDTH*, etc.

- CT Comparison Tolerance determines the maximum relative difference between numbers considered equal (fuzz).
- IO Index Origin may be set to either 0 or 1. Origin independence is accomplished easily in all origin-dependent functions by making □IO a local variable and setting it to the desired value within those functions.

SYSTEM VARIABLES (continued)

- PP* Print Precision is the number of significant digits printed when numbers are displayed.
- RL* Random Link is used as a seed in the generation of random numbers for the query operator. Each time a ? is used the "most local" □*RL* is changed to preserve randomness.
- PW* Page Width can be dynamically changed within functions and localized to any level.

The main use of System Variables is in the dynamic control or interrogation of the workspace environment.

SYSTEM FUNCTIONS

System Functions perform services such as file manipulation and report formatting, or return information about the system or the user. They cannot be assigned values. Unlike keyword functions such as *ΔFMT* and *FE* they do not need to be copied in from the public library. They are recognized directly by *APL* and are treated somewhat like ordinary *APL* operators.

NILADIC SYSTEM FUNCTIONS

- AI* Accounting Information, as discussed in the previous issue.
- AV* Atomic Vector of 256 unique characters, many of which print as a "squish quad" (□).
- LC* Line Counter gives the line numbers in the *)SI STACK*, the same as *i27*.
- NAMES* Library numbers and file names of all files currently tied.
- NUMS* Tie numbers of all files currently tied.
- TS* Time Stamp in the form: the current year, month, day, hour, minute, second and millisecond.
- UL* User Load is the same as *i23*.
- WA* Working Area remaining is the same as *i22*.

MONADIC SYSTEM FUNCTIONS

- DL N* delays *N* seconds. *N* must be an integer greater than 9. It returns the length of the delay as a result.
- FI V* builds a numeric vector from the character vector *V*. It has the same effect as *ΔFI*.
- VI V* gives a numeric validation of the character vector *V*. It has the same effect as *ΔVI*.

DYADIC SYSTEM FUNCTIONS

\square FD same as Δ FD, function to string, etc.
 \square FMT same as Δ FMT, report formatter.
 \square WS same as Δ WS, workspace characteristics such as)VARS.

SYSTEM FILE FUNCTIONS

\square APPEND	\square FF	\square READ	\square STAC
\square AVAIL	\square HOLD	\square RENAME	\square STIE
\square CREATE	\square LIB	\square RESIZE	\square TIE
\square DROP	\square RDAC	\square SIZE	\square UNTIE
\square ERASE	\square RDCl		

These functions produce the same results as the traditional file functions and accept the same arguments. With the exception of \square FF, the system file function names are formed by replacing the "F" in the corresponding file function name from 1 FILES with a " \square ".

Complete documentation for System Functions and System Variables may be found in the workspace 1 QUADNAMES. Copies may be obtained by loading this workspace and typing ALL. The estimated print time at 15 characters per second is about 30 minutes. For further information please contact your local SHARP APL representative.

CAUTION:

Definitions of System Variables and System Functions appear in the second edition of "APL - An Interactive Approach" by Gilman and Rose. While we have in the past recommended this book to our customers, caution should be used in accepting their definitions of System Variables and System Functions. There are several differences between these and the SHARP APL implementation.

CORRECTION!

Please accept our apologies for the errors appearing in the December 74/January 75 issue.

DIAMONDS:

A successful branch will indeed branch as required and all statements to the right will be ignored.

An unsuccessful branch will fall through to the right.

The correct examples are:

```
24 60 60 60 TI20 * SOB * 2+2
```

```
'IF THIS! * 'THEN THIS' * 'AND THIS TOO'
```

```
→X↓1+I26 * A * B * C
```

```
∘ A,B,C EXECUTE ONLY IF X IS TRUE
```

CANSIM:

The name of the workspace is 210 ORDERΔFORM, with no blanks interspersed; and the workspace CSUSAGE resides in library 81, not 210.

SHARP APL EDUCATIONAL PROGRAM

Our Ottawa office has introduced a new schedule of courses in the *APL* language and the *SHARP APL* time-sharing system. This educational program is more flexible so as to accomodate the various levels and objectives of those attending the courses.

Separate courses are now available for clerical and support activities using *SHARP APL*, as well as a relatively complete course on programming and system development. A novice will be able to take essentially the same course in one week as previously, but we suggest that the one-day introductory course be taken first, and the intermediate course a month or two later.

The intention is to conduct special-purpose advanced seminars on a variety of topics, as interest warrants. Your suggestions and interest in this area are most welcome.

Introduction to APL: A one-day course intended to introduce the novice to the concept of time-sharing and to teach the essentials of using *SHARP APL* as a desk calculator. Held on the first working Monday of each month.

Intermediate Course: A three-day course which follows up on the introductory course and leads into the writing of programs. Held on Tuesday, Wednesday and Thursday following the Introductory Course.

Libraries Course: A one-day course in the use of *SHARP APL* Public Library Routines and packages. The Introductory Course is a prerequisite. Held on or about the 20th of each month.

These courses fill rapidly so please register well in advance by contacting the Ottawa office of I. P. Sharp Associates Limited.

APL COURSES IN OTHER CENTRES

Five-day courses are being offered in Toronto and Rochester, N.Y., where the course content is generally tailored to the needs of the attendees.

Toronto office:	April 14 - 18	Rochester office:	April 21 - 25
	May 12 - 16		May 19 - 23

A three-day introductory course is planned in the United Kingdom for April 8 - 10 at the London office.

Anyone interested in attending a course should contact their *SHARP APL* representative.



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Update

- ☐ Please amend my mailing address as indicated.
- ☐ Add to your mailing list the following name(s).
- ☐ Send me SHARP APL manuals and product literature as listed.

☐ Note my comments: _____

The Newsletter is a regular publication of I.P. Sharp Associates Limited. Contributions and comments are welcomed and should be addressed to: The Editor, I.P. Sharp Newsletter, Suite 1400, York Centre, 145 King Street West, Toronto, Ontario, M5H 1J8.



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