



I.P. Sharp

# newsletter

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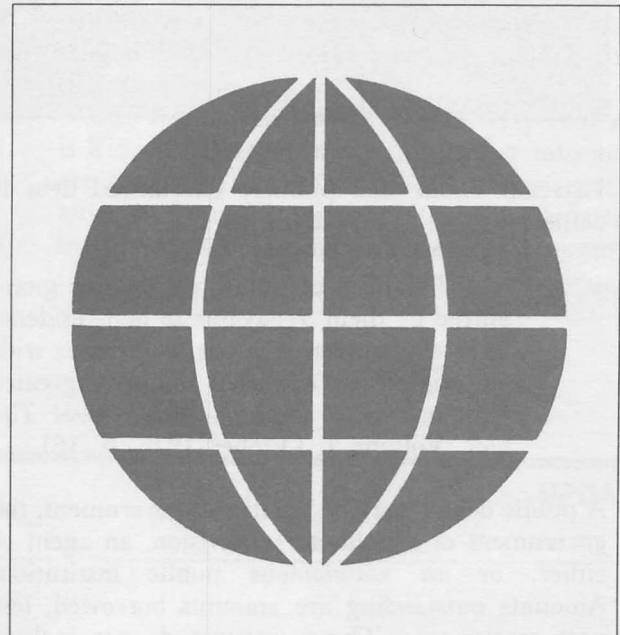
## WORLD BANK DEBT TABLES DATA BASE

Cathy Calvert

Toronto

The World Bank Debt Tables data base (wDEBT) contains information on the external public debt of 99 developing countries. The data is annual and available from 1970. I.P. Sharp maintains and updates the data base as new information is published by the International Bank for Reconstruction and Development (the World Bank) in the bank's publication *World Debt Tables*.

You can use the wDEBT data to assess the investment climate in a developing country or the country's credit-worthiness. Particularly revealing are year-over-year trends and the ratio of private to public credit. You can also combine this data with facts from other data bases such as the International Financial Statistics data base.



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WDEBT contains 1050 time series on the external public and publicly guaranteed debt of 99 developing countries and six country groupings. The data base comprises these 10 accounts for each country and group:

Code For All Lenders	Account	Code For Private Creditors
<i>DETT</i>	Debt outstanding—disbursed only	<i>DBTP</i>
<i>DIUT</i>	Debt outstanding—including undisbursed	<i>DIUP</i>
<i>DIST</i>	Disbursements	<i>DISP</i>
<i>PAYT</i>	Repayments of principal	<i>PAYP</i>
<i>INTT</i>	Interest payments	<i>INTP</i>

External public and publicly guaranteed debt is defined by the World Bank as:

...all liabilities of public entities, or guaranteed by them, repayable to non-residents in foreign currency, goods, or services with an original or extended maturity greater than one year. (Source: *World Debt Tables*, Volume 1, October 1978, p. 16)

A public debtor may be a national government, the government of a political subdivision, an agent of either, or an autonomous public institution. Amounts outstanding are amounts borrowed, less past repayments. These amounts do not include interest unless interest is reported as part of the principal. Disbursements are drawings on loan commitments and are recorded in the year in which the drawing takes place.

The reporting currency for all data in the data base is U.S. dollars. The figures are published in units of millions of dollars, but may be retrieved from the data base with any scale factor you want.

The data is annual and is updated after *World Debt Tables* is published, 8 to 12 months after yearend. The data is available to all I.P. Sharp customers without surcharge.

**Accessing the data**

Access to the data is provided via the workspace 39 *MAGIC*, using the access function *WDEBT*. To access data, you must supply one or more three-character **country codes** (e.g. *MLY* for Malaysia), followed by a **slash**, followed by one or more of the **account codes** listed in the table above.

For example:

```
WDEBT 'MEX,PAN/INTT,INTP'
```

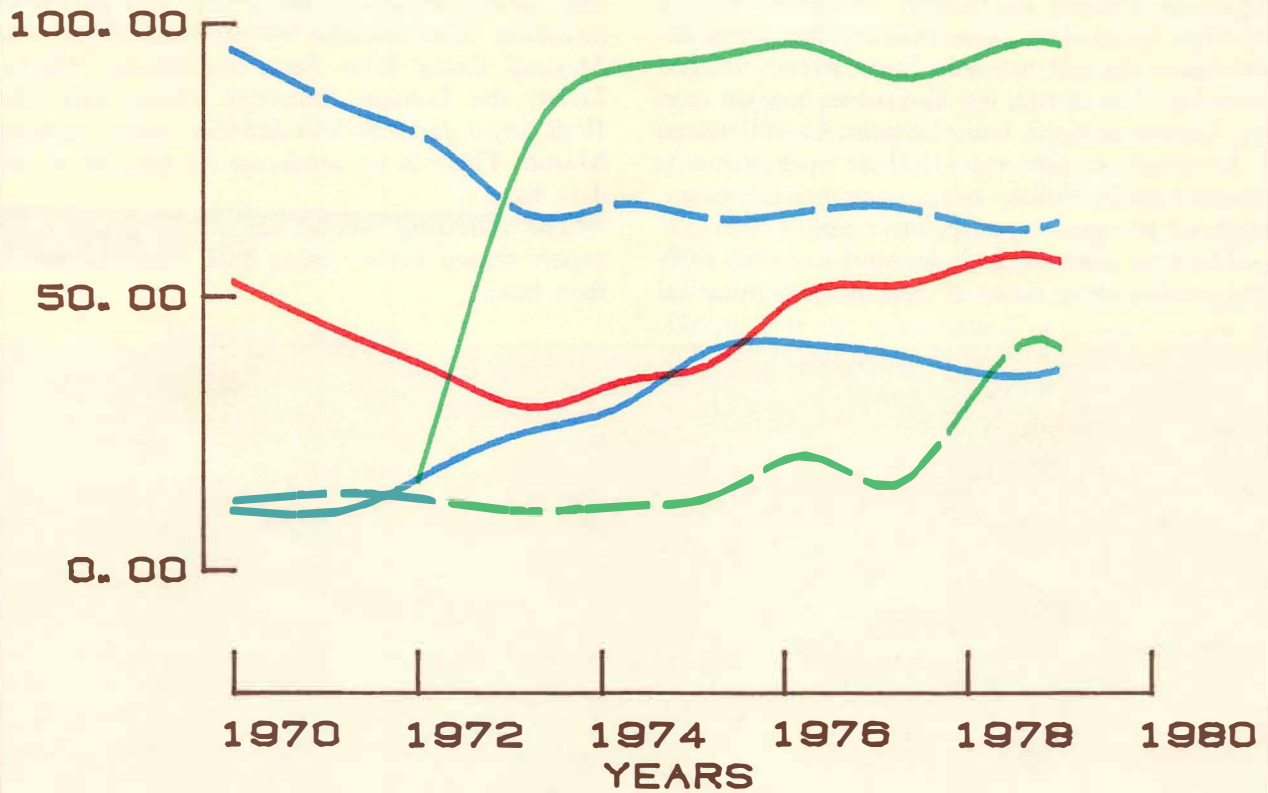
specifies for Mexico and Panama: repayment of interest—all lenders; and repayment of interest—private creditors.

A directory listing of all the country codes and account codes is available on line and may be printed at your terminal or at an I.P. Sharp high-speed print facility. After loading 39 *MAGIC*, type:

```
WDEBT 'DIRECTORY'
```

For further details on *WDEBT*, refer to the *World Bank Debt Tables Data Base* manual.

WORLD DEBT TABLES  
PRIVATE VS. TOTAL DEBT OUTSTANDING  
(PERCENTAGE)



— HONG KONG  
— INDONESIA  
— PHILIPPINES  
- - PAPUA NEW GUINEA  
- - THAILAND

This SUPERPLOT shows the percentage of privately held debt to total debt for some Far Eastern countries.

MONEY MARKET RATES DATA BASE

Ann Rockley, Toronto

Since its creation in January 1980, the Money Market Rates data base (MRATE) has been expanded to include not only Eurocurrency interest rates for 11 countries, but also money market rates for Canada and the United States. Canadian and U.S. money market rates include such items as treasury bills, dollar swaps, commercial paper, bankers' acceptance and prime rates.

The data base now includes more than 200 daily and weekly time series of current and historical

data. There are several sources for this data base, including the *Toronto Globe and Mail*, the *McLeod Young Weir Bond and Money Market Letter*, the *London Financial Times*, and *The Wall Street Journal*. You can use MRATE through MAGIC. There is no surcharge for the use of this data base.

The following MAGIC commands produce the report shown below, using data from the MRATE data base.

```
CLEAR ◇ RESETOPTIONS
DECIMALS 2 2
COLWIDTH 11
1 2 3 4 5 DAILY DATED 1 8 81 TO 14 8 81
PUT MRATE 'CCENC,UDISC'
PUT (ITEM 1) MINUS (ITEM 2)
PUT MRATE 'CPRIH,UPRIH'
PUT (ITEM 4) MINUS (ITEM 5)
TITLE 'CANADIAN AND U.S. LENDING RATES'
LABEL 'CDN. CENTRAL BANK,U.S. DISCOUNT,SPREAD'
LABEL 'CDN. PRIME-HIGH,U.S. PRIME-HIGH,SPREAD'
'H' TABLE ABOVE
```

CANADIAN AND U.S. LENDING RATES

	CDN. CENTRAL BANK	U.S. DISCOUNT	SPREAD	CDN. PRIME-HIGH	U.S. PRIME-HIGH	SPREAD
3AUG81	20.54	14.00	6.54	22.00	20.50	1.50
4AUG81	20.54	14.00	6.54	22.00	20.50	1.50
5AUG81	20.54	14.00	6.54	22.00	20.50	1.50
6AUG81	21.24	14.00	7.24	22.75	20.50	2.25
7AUG81	21.24	14.00	7.24	22.75	20.50	2.25
10AUG81	21.24	14.00	7.24	22.75	20.50	2.25
11AUG81	21.24	14.00	7.24	22.75	20.50	2.25
12AUG81	21.24	14.00	7.24	22.75	20.50	2.25
13AUG81	21.07	14.00	7.07	22.75	20.50	2.25
14AUG81	21.07	14.00	7.07	22.75	20.50	2.25

MRATE data is of interest to bankers, corporate financial officers, economists and others. In an age of rapidly changing money market rates, it is useful to observe and compare the rates of return for various financial instruments. For further details on the MRATE data base, refer to the *Money Market Rates Data Base* manual which will be available soon.

## CORPORATE NEWS

### I.P. SHARP

#### PARTICIPATES IN "iNET" TRIAL

I.P. Sharp Associates will be involved in a trial of iNet. This intelligent network concept developed by The Computer Communications Group (CCG) of the Trans Canada Telephone System will be tested for a year, starting in July 1982. As a participant in the trial, I.P. Sharp will provide prototype users of iNet with access to the SHARP APL system.

I.P. Sharp is one of the world's largest central online suppliers of numeric data bases. It is expected that Statistics Canada's CANSIM\* data base will be one of the more popular data bases of the 60 public data bases available from I.P. Sharp.

The participating organizations represent more than 30 companies within such major industry segments as banking, energy, legal, real estate, travel, broadcasting, and bibliography.

\*CANSIM is a registered trademark of Statistics Canada.

## Workspace of the Month

### 4 EDIT

Clement Kent, Toronto

The text entry, editing, and formatting capabilities of the 4 *EDIT* workspace have been improved and the program code updated by Leslie Goldsmith and Rohan Jayasekera. Two new formatting commands have been added: `^B` and `^V`.

Backspacing can be explicitly controlled by the `^B` command. SHARP APL users needing diacritical marks for foreign text (umlaut, accent grave, etc.) can use the sequence `z^Bn` to produce overstrikes. The character represented by `n` will display above the character represented by `z`. For example: `"GRO^B/N"` prints as `"GRØN"`. The `^B` command can also be used to provide an alternative to the `^U` command for underlining: `"X 3^B^B^B——"` displays as `"X 3"`.

Vertical spacing is controlled by the `^V` command. The default is single-spacing. `^V2` causes double-spacing; `^V1` causes a return to single-spacing.

Online documentation for these and other changes is available in the workspace 4 *EDIT*.

## APPLICATIONS LIBRARY UPDATE

- |    |                   |   |  |
|----|-------------------|---|--|
| 4  | <i>EDIT</i>       | → | New features added                               |
| 3  | <i>SUPERPLOT</i>  | → | New features added                               |
| 3  | <i>SAGA</i>       | → | New release<br>(formerly 503 <i>SAGA</i> )       |
| 39 | <i>BAREMAGIC</i>  | → | New location (formerly<br>702 <i>BAREMAGIC</i> ) |
| 14 | <i>APLSTARTER</i> | → | Moved to 499                                     |
| 31 | <i>CROSSTABS</i>  | → | Moved to 499                                     |
| 76 | <i>SKILLS</i>     | → | Moved to 499                                     |
| 65 | <i>MARTHA</i>     | → | Moved to 565                                     |

**AUSTRALIAN DATA BASES**

Silva Bassett, Sydney

I.P. Sharp Associates has several new Australian financial and economic data bases which should be of interest worldwide. Here is a summary of some of these data bases.

**Australian Commodities (AUSTCOM)**

This data base contains the daily high, low, close, buy, and sell prices along with the volume and open position for all commodity contracts traded on the Sydney Futures Exchange since November 1979. The commodities currently traded are: boneless beef, fat lambs, greasy wool, live cattle, gold, 90-day bank bills, U.S. dollar, British pound, and the Japanese yen. The data is updated at 09:00 (Sydney time) the day after trading, by the International Commodities Clearing House in Sydney.

Commodity data is of interest to financial institutions and companies participating in the commodity market, and, in particular, to market traders. AUSTCOM data can be used for many forms of analysis, such as: forecasting models, moving-average calculations, momentum studies, standard deviation, and other technical computations—depending on the user's requirements.

**Technical Trading Systems for Commodities Traders (COMVIEW)**

Commodity traders can now retrieve a previous day's trading data, together with pre-calculated trading indicators. The information contained in this new service includes: moving averages and Welles Wilder parabolic, relative strength, directional movement, swing, and volatility indices. Markets covered are London, New York, Chicago, and Sydney.

**The Sydney Stock Exchange Share Prices (SYDSTOCK)**

This data base contains trading statistics for more than 440 major companies traded on the Sydney Stock Exchange. The data comprises high, low, and close prices, and volumes. The data is daily from 1980, and monthly from 1962.

The information is updated daily and is available to users on the first business day following trading.

**Sydney Stock Exchange STATEX Service (STATEX)**

The STATEX data base contains a wide range of financial information on major companies which are listed on the Sydney Stock Exchange, excluding the banking and insurance industries. The information, from published annual reports, is composed of all profit and loss statements and balance sheet items, together with other significant financial details from the notes to the accounts.

The information in the data base generally covers a 10-year period for the major companies. The basic criteria for including a company are its size and public interest.

The data base represents about 70 percent of total capitalization of the Australian market. As the selection criteria are biased toward larger surviving companies, and exclude defunct or delisted companies, the data base represents the current state of the Australian industry.

SYDSTOCK, STATEX, and the Australian Stock Exchange Indices data bases can be manipulated together, using MAGIC and SUPERPLOT.

For more details on all of the Australian data bases, load the workspace 760 *DESCRIBE* and type *DESCRIBE*.



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## technical supplement 37

### IMPROVED DISPLAY FOR ENCLOSED ARRAYS

#### AND A NEW SYSTEM VARIABLE $\square PS$

Peter Wooster, Toronto

Monadic thorn ( $\nabla$ ) and the system default display ( $\square\leftarrow$ ) now format enclosed arrays. The definition is based on a proposal by Jenkins and Michel [3]. It has been extended to include an option to draw boxes around enclosed subarrays, as used by Ghandour and Mezei [2].

$\nabla$  converts each subarray to a character representation. The character arrays created at each level are catenated to form a rectangular array of rank 2 or greater, preserving all but the last two elements of the shape vector of the subarray, i.e.,  $(\bar{2}+\rho\nabla\omega) \equiv \bar{2}+\rho\omega$ .

The system variable  $\square PS$  controls the positioning and spacing of enclosed arrays for both default display and monadic  $\nabla$ .

#### $\square PS$ (Positioning and Spacing)

$\square PS$  is a four-element vector: the first two elements control positioning (justification) of the subarrays, the last two control spacing.

#### 1. Positioning

Each subarray will be placed in one of nine positions within its "print box", i.e.,

top,left	top,centre	top,right
centre,left	centre,centre	centre,right
bottom,left	bottom,centre	bottom,right

#### 2. Spacing

You may insert any number of spaces between the subarrays of the result. Boxes showing the structure may be drawn around subarrays. If they are drawn, the boxes enclose non-simple scalars, and the lines are drawn in the space between subarrays. By convention, when  $\square PS[2\ 3]$  is negative, the magnitude specifies the amount of spacing. The negative sign causes non-simple scalars to be boxed, but only when  $\square PS[2\ 3] \leq -2$ , since two spaces are needed for the box.  $-1$  does not do boxes.

#### Positioning

$\square PS[0]$	$\square PS[1]$
TOP $\bar{1}$	LEFT $\bar{1}$
CENTRE 0	CENTRE 0
BOTTOM 1	RIGHT 1

#### Spacing

$\square PS[2]$	$\square PS[3]$
NO. OF BLK	NO. OF BLK
<u>ROWS</u>	<u>COLUMNS</u>
BETWEEN	BETWEEN
SUBARRAYS	SUBARRAYS

-----  
IF  $\leq -2$ , BOXES ARE DRAWN

# IMPROVED DISPLAY FOR ARRAYS

For example:

$A \leftarrow 2 \text{ } 2p(<5 \text{ } 5p(' \square '), 3p('<' * '<')$

$\square PS \leftarrow \bar{1} \bar{1} 0 1$      *A* DEFAULT  $\square PS$

*A*

```

□□□□ *
□□□□
□□□□
□□□□
□□□□
□□□□
*   *
  
```

*A* NOTE:     TOP LEFT POSITION  
 NO BLANK ROWS INSERTED  
 ONE BLANK COLUMN INSERTED

$\square PS \leftarrow 0$

*A*

```

□□□□
□□□□
□□□□*
□□□□
□□□□
*   *
  
```

*A* NOTE:     CENTERED ROWS AND COLUMNS  
 NO BLANK ROWS OR COLUMNS

$\square PS \leftarrow 1 \bar{1} \bar{2} \bar{2}$

*A*

```

┌───┐
│   │
│ □□□□ │
│ □□□□ │
│ □□□□ │
│ □□□□ │ ┌─┐
│ □□□□ │ │ * │
└───┘ ┌─┐
        │ * │ * │
        └─┘ └─┘
  
```

*A* NOTE:     LOWER RIGHT POSITION  
 NO BLANK ROWS OR COLUMNS  
 BOXES ARE DRAWN IN THE TWO SPACES  
 BETWEEN ARRAYS

### Model of enclosed array thorn

The following model of  $\nabla$  uses the variable  $QPS$  for  $\square PS$ .

```

Z←THORN D;R;C;A;□IO;W;F;E;I;J;K;G;B;T;NPS;R;B1;BXS
□IO←1
NPS← $\bar{1}$  $\bar{1}$  0 1
→(0=□NC 'QPS')ρP0
NPS←4ρQPS
P0:BXS← $\bar{2}$ ≥ $\bar{2}$ ↑NPS
NPS[3 4]←|NPS[3 4]+2×BXS
→(A≡>A←1↑,D)/LS
I←'|ρρF←'|
A←ρD←((-2⌈ρρD)↑ 1 1 ,ρD)ρD
A←(x/W← $\bar{2}$ ↑A), $\bar{2}$ ↑A
D←,D
L3:→((I←I+1)>ρD)ρL3Z
B←((-2⌈ρρB)↑ 1 1 ,ρB)ρB←THORN>D[I]
E←(( $\bar{1}$ ↑T)∈T←+|1+ $\bar{1}$ ↑0,+f0=T°. |ιJ)∧((J← $\bar{1}$ ↑T←x|1↑T),1↑T←φρB)ρB
E←(B1ρ' $\bar{1}$ '),[1] E,[1](B1←BXS[1], $\bar{1}$ ↑ρE)ρ'_'
E←(B1ρ'|'),E,(B1←(1↑ρE),BXS[2])ρ'|'
F←F,<E
→L3
L3Z:Z←(J←0)ρD←((B←x/2↑A), $\bar{1}$ ↑A)ρF
C←NPS[4]+0⌈⌈f⌈fAρ(F←ρ $\bar{0}$ >F)[;2]
R←NPS[3]+0⌈⌈f⌈fAρF[;1]
L1:→(B←J←J+1)ρL2Z
G←((K←R[1+A[2]]| $\bar{1}$ ↑J),I←0)ρ'_'
L0:→(A[3]<I←I+1)ρL0Z
E←>D[J;I]
G←G,(K,C[I])↑(-ρE)+⌊((0≤NPS[1 2])×(K,C[I])−NPS[3 4]+ρE)÷2*0=NPS[1 2])↑E
→L0
L0Z:Z←Z,,G
→L1
L2Z:Z←(W,(+/R),+/C)ρZ
Z←((-ρρZ)↑ $\bar{2}$ ↑NPS)↑Z
→0
LS:Z←∇D

```

### Folding function

Output often exceeds  $\square PW$  in width. L.M. Breed has proposed a matrix oriented folding scheme suitable for “cut and paste” assembly. The following function provides this folded display:

```

E←FOLD B;T;J
B←((-2⌈ρρB)↑ 1 1 ,ρB)ρB
E←(( $\bar{1}$ ↑T)∈T←+|1+ $\bar{1}$ ↑0,+f0=T°. |ιJ)∧((J← $\bar{1}$ ↑T←x|1↑T),1↑T←φρB)ρB
E←(□IO+ 1 0 2)Ⓞ((1↑ρE),T,□PW)ρ((1↑ρE),□PW×T←⌈( $\bar{1}$ ↑ρE)÷□PW)↑E

```

## References

- [1] Breed, L.M. IBM Corporation, Palo Alto, Ca., personal communication.
- [2] Ghandour, Z. and J. Mezei. "General Arrays, Operators, and Functions", *IBM Journal of Research and Development*, IBM Corporation, July 1973, pp. 335-352.
- [3] Jenkins, M.A. Queen's University, Kingston, Ontario, and J. Michel, Universite Paris XI (Orsay). *Operators in APL with Nested Arrays: A System 1 View*.

## SEARCHING

## SEARCHING, Part 1

Robert Metzger, Rochester

Data processing involves the collection, analysis, and reporting of information. In all three phases, there may be cause to search the sets of information collected to find a piece of data or a group of data items. The purpose of this series of articles is to explore a variety of searching techniques which you may need to employ while using APL. We will look into efficient algorithms in the following areas:

- 1) Searching vectors
- 2) Searching tables
- 3) Searching texts
- 4) Searching files
- 5) Searching by sound, spelling, and synonym

## 1) Searching vectors

There are two primitive functions provided in APL for searching vectors. **Dyadic iota** (index locator) and **dyadic epsilon** (membership) provide this basic facility.

The index locator tells you where the first location of each element of the right argument is found in the left argument. The shape of the result is always the same as the shape of the right argument, since there is always an answer for each

element. If an element is not found, the value returned for that element is one more than the index position of the last element. The left argument must be a vector.

The membership function tells you whether or not each element of the left argument is found in the right argument. The shape of the result is always the same as the shape of the left argument, since each element is either found (1) or not found (0). Even though there are no restrictions on the shape of the right argument, it is treated as a vector for purposes of searching.

You may not always want to search the way these functions do. If you are working in origin 1, you might like a zero in the positions where elements are not found.

```
ZEROINDEX◇ (⊂IO+ρα)|α1ω
```

```
(Φ110) ZEROINDEX 2 3 5 7 11 13
9 8 6 4 0 0
```

If you would like to search from the end of the vector instead of from the beginning, you could use the following function:

```
LASTINDEX◇ Z-(Z←⊂IO+ρα)|(Φα)1ω
```

```
LIST←(13),(14),(15)
LIST LASTINDEX 2 4 6
9 11 13
```

Sometimes you might want to find all occurrences of one element, rather than just one occurrence of many elements. The APL idiom for this is the following:

```
ALLINDEX◇ (ω∈α)/1ρω
```

```
'I' ALLINDEX 'MISSISSIPPI'
2 5 8 11
```

You probably learned this early in your APL career. You may not have learned, however, that SHARP APL has provided an "invisible enhancement", which makes this idiom run faster than on other APL systems. Rather than do the index generation first, and then compress out the integers, the /1 is treated as a single function. So, if you want to convert a Boolean vector into an integer vector, which indicates where the 1's were, make sure you keep the /1 operation together to gain this advantage.

Another variation on the index locator function is a function which finds indices progressively. Such a function treats multiple occurrences of an element to be searched for differently than dyadic iota. Instead of giving the same index for elements which have the same value, it gives the next index following the last one reported for that same value.

```
PROGINDEX◇
((⊖α1α,ω)11ρα)1(⊖α1ω,α)11ρ,ω

'ABA' PROGINDEX 'ACAABA'
1 4 3 4 2 4
```

A different type of progressive search treats all elements the way *PROGINDEX* treats elements with the same value. This means that the starting point in the search for an element is the position where you found the last element you looked for. Thus the answer will always be in ascending order. An example of such a search is given below. Can you write an efficient, non-looping solution which does such a search?

```
'CABACUS' PROGINDEX 'ACAB'
2 5 8 8
```

A variation on the searching done by the membership function is to count the number of occurrences of a given element, rather than just tell whether the element was found.

```
COUNT◇ +/αο. =ω

'MNPQRS' COUNT 'MISSISSIPPI'
1 0 0 2 0 0 4
```

Obviously, there are a lot of interesting ways to search vectors. Even when you are searching vectors with just iota or epsilon, there are a variety of algorithms the system uses to compute the result. The algorithm SHARP APL chooses depends upon several factors:  $\square CT$ , the data type of the object being searched in and searched for, and  $\square WA$ .

$\square CT$  affects index location and membership, because it must compare elements for equality. If the data is stored in floating point (8 byte) format, and  $\square CT$  is not zero, it must do tolerant comparison. This requires extra work. If  $\square CT$  is zero, it just checks for an exact match. You can benefit from this speedup if you are storing integers in floating point form. This would happen if the magnitude of one or more of your integers was greater than  $2*31$ . Even though the integers will be stored with full precision up to magnitude  $2*56$ , when  $\square CT$  is not zero, they will be compared tolerantly, which is unnecessary. If you set  $\square CT \leftarrow 0$ , they will be compared exactly, at less cost.

Now you can see how  $\square CT$  and data type affect the choice of algorithm for searching. What about  $\square WA$ ? Basically, the more space you give to these primitives, the faster they run.

Listed below is the naive algorithm for index location. We can measure the CPU usage of searching algorithms by the number of loop iterations they do.

This one will do  $.5 \times (\rho LEFT) \times (\rho RIGHT)$  iterations on the average. This algorithm really uses no more space than that required for the arguments and result, but it is slow.

```
▽ I←L INDEXLOCATE1 R;RCTR;RLMT
;LCTR;LLMT
[1] I←10
[2] RCTR←⊖IO-1
[3] RLMT←(ρR)~⊖IO
[4] RLOOP:→(RLMT<RCTR+RCTR+1)ρRLOOPΔEND
[5] LCTR←⊖IO-1
[6] LLMT←(ρL)~⊖IO
[7] LLOOP:→(LLMT<LCTR+LCTR+1)ρLLOOPΔEND
[8] →(L[LCTR]≠R[RCTR])ρLLOOP
[9] LLOOPΔEND:I←I,LCTR
[10] →RLOOP
[11] RLOOPΔEND:▽
```

An alternative is the algorithm below, which only works on character data. It is not the actual algorithm used when more space is available, but it is a realistic simplification. It will do  $(\rho LEFT) + (\rho RIGHT)$  iterations. Since the growth rate is additive, rather than multiplicative, it is much less expensive than the previous one. But notice the fact that it requires extra space for the array *FOUND*. In fact, if we were to make this algorithm work for numbers, the extra table would take up much more space than this one does.

```

∇ I←L INDEXLOCATE2 R;CTR;LMT
  ;FOUND;INDEX;ΔIO
[1] I←10
[2] ΔIO←⊖IO-1
[3] FOUND←(ρ⊖AV)ρΔIO
[4] CTR←ΔIO
[5] LMT←(ρL)-~⊖IO
[6] FLOOP:→(LMT<CTR+CTR+1)ρFLOOPΔEND
[7] INDEX←⊖AV∖L[CTR]
[8] →(FOUND[INDEX]>ΔIO)ρFLOOP
[9] FOUND[INDEX]←CTR
[10] →FLOOP
[11] FLOOPΔEND:
[12] CTR←ΔIO
[13] LMT←(ρR)-~⊖IO
[14] SLOOP:→(LMT<CTR+CTR+1)ρSLOOPΔEND
[15] I←I,FOUND[⊖AV∖R[CTR]]
[16] →SLOOP
[17] SLOOPΔEND: ∇

```

There is yet a third type of algorithm which involves sorting the data. It requires more storage than the first algorithm, and less than the second.

It takes less time than the first, but more than the second.

The point of these explanations is this: SHARP APL chooses the best searching algorithm it can, given the constraints you put on it. You can save CPU time by doing the following:

- Use the data representation which takes the least space. (Complex, floating point, fixed decimal point, character, and Boolean data representations take 16, 8, 4, 1, .125 bytes respectively.)
- Set  $\square CT \leftarrow 0$  when searching integers stored in 8 byte floating point format.
- Leave as much space as possible for APL to work in.

Future articles in this series will explore other aspects of searching. You can find the functions discussed in this series in workspace 777 *SEARCH*.

*Note:* Alert readers will notice that in direct definition statements, the name of the program is now separated from the first statement of the definition by a diamond rather than a colon. This usage, which Ken Iverson has adopted in his APL course, is preferable to the old version because if and when direct definition allows labeled statements, the colon will be used to designate labels, thus:

```
FOO◇.....◇L1: α+ω .....
```

## CANADIAN CHARTERED BANKS DATA BASE

Cathy Calvert, Toronto

The banking system in Canada is governed by an Act of Parliament called the Bank Act. By law, the Act may only be in force for 10 years. Parliament may extend the law year by year after the 10-year limit (as occurred from 1977 to 1980), but eventually the act is revised and rewritten.

The new Bank Act changes the number of banks operating in Canada and their reporting requirements. These changes seek to revise some outdated accounting techniques practised only by banks, and to increase in quantity and quality the figures the banks must make public.

The new Bank Act has made it necessary for I.P. Sharp to create new Chartered Banks data bases. The new reporting format is effective 1 November 1981, coinciding with the beginning of the banks' 1982 fiscal year. Although fact descriptions in many cases appear the same (e.g. Total Assets), the change to increased consolidation creates a gap between fiscal 1981 and 1982 figures. The reporting requirements set forth in the new Bank Act will be used for the 1982 fiscal year.

Data reported by the banks is made available in the form of **schedules**. There are two monthly, one quarterly, and five annual schedules. These are similar to the schedules used by the banks from 1967 to 1981, but they are more detailed. Schedule J, the Monthly Statement of Assets and Liabilities, has been made available as the first of the new chartered banks data bases.

The new JSCHEDULE data base contains data for 246 items for each bank. These may be thought of as three groups of 82 items each. The first group is the items in thousands of dollars; the second is the domestic dollar portion; and the third is the foreign dollar portion. The first 37 items in each group are assets, and the remaining 45 are liabilities.

Each chartered bank currently in operation in Canada is represented. There are 11 Schedule A banks and 12 Schedule B banks (as of November). The number of Schedule B banks will increase rapidly over the next year.

Data may be accessed using either MAGIC or RETRIEVE.

## FINANCIAL POST CANADIAN CORPORATE DATA BASE

Elie Kivity, Toronto

The Financial Post Corporate data base consists of current and historical Canadian corporate statistics. There are two sets of data: quarterly and annual. The quarterly data contains revenue, tax, dividend, and per-share information for over 110 companies. The annual data consists of balance sheets, income statements, shareholders' equity, and ratios for over 480 companies. The majority of companies that constitute the Toronto Stock Exchange 300 index system are included in this data base. They are supplemented by others selected for their growth and investor interest.

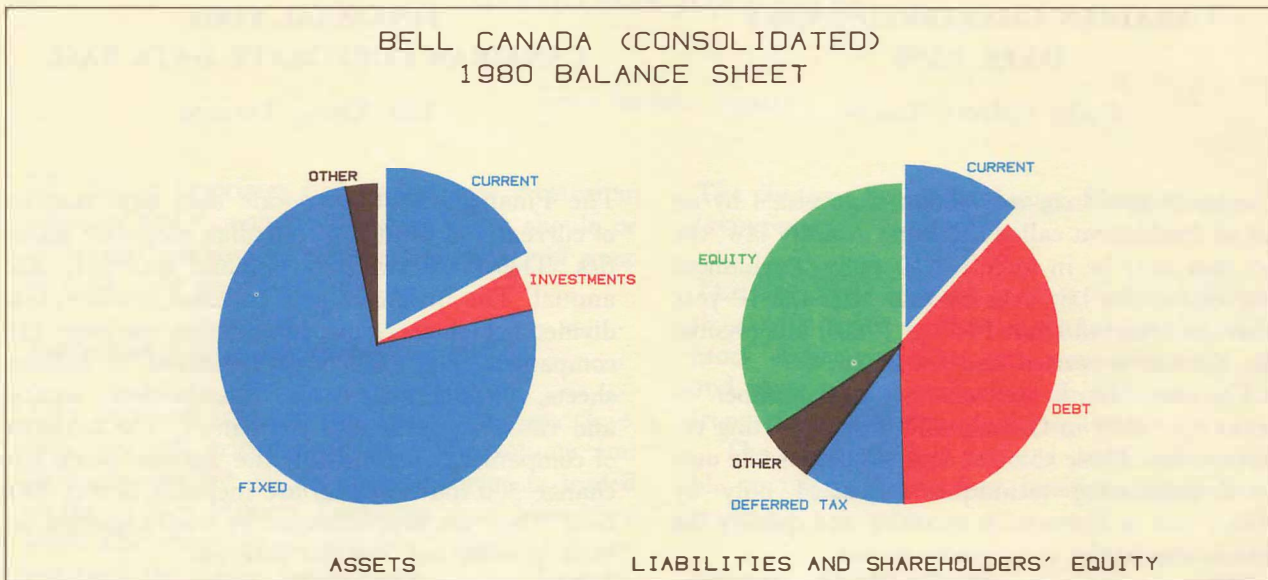
The FPCORP data base is of interest to financial institutions, investment houses, industrial corporations, and government agencies in the areas of merger studies, underwriting, corporate financial planning, debt and equity financing, and general research. This data base is suitable for many forms of analysis and studies, such as: ranking and screening, industry segment analysis, credit studies, fundamental analysis, forecasting, and trend analysis.

The data is maintained and updated throughout the year by the Financial Post Investment Databank. As soon as the Financial Post receives this data, it is available on the I.P. Sharp system.

The data can be accessed through either MAGIC or RETRIEVE. Use of the data base involves a subscription fee and a user contract with Financial Post.

On the next page, you will find pie charts illustrating balance sheet information from the annual data of the FPCORP data base.

For further information on any of the data bases, please contact your I.P. Sharp representative.



The above pie charts were plotted using *MAGIC* in conjunction with *APL* and *SUPERPLOT*.

The sector "other" of the pie chart, *Assets*, includes intangibles. The sector "other" of the pie

chart, *Liabilities and Shareholders' Equity*, includes minority interest, while the sector "equity" consists of capital stock, contributed surplus, and retained earnings.

MEETINGS

APL 82 HEIDELBERG

A Status Report

The APL 82 Congress will be held in Heidelberg, Germany, from 26 July to 30 July 1982. It is sponsored by the APL Club of Germany and the German Cancer Research Centre, in cooperation with ACM, SIGAPL, the German Association for Informatics (GI), and the Organization for Mathematics, Economics and Operations Research (GMOEOR).

As of March, 397 people have registered from 14 countries. One hundred and eight-five technical papers have been submitted on all aspects of APL. From the many papers submitted, papers have been accepted in the following categories: 11 papers on applications, 5 on data bases, 7 on education, 4 on implementations, 2 on interfaces, 10 on the APL language, 9 on programming, and 4 on statistical and mathematical computing.

Further information may be obtained from:  
The Conference General Chairman:  
Ken Waller, APL 82  
Postfach 10 12 48  
D-6900 Heidelberg 1/Germany

or

The Program Committee Chairman:  
Prof. Dr. Wolfgang H. Janko, Program Chairman APL 82  
Universitaet Karlsruhe (T.H.)  
Institut fuer Angewandte Betriebswirtschaftslehre - Unternehmensfuehrung  
Postfach 63 80/ AM Zirkel 2, (Rechenzentrum 1.0G)  
D-7500 Karlsruhe 1/Germany

## HELSINKI

## NEW LOCAL DIAL ACCESS NUMBER

I.P. Sharp's agent in Helsinki, TMT-Team, now provides local dial-up access to the SHARP APL system. The new phone number is:

358 0 694 5144

## BULLETIN BOARD

## SYDNEY OFFICE

## READY FOR 1982

Everyone at I.P. Sharp in Sydney is now comfortably settled in their new "home". Situated in the commercial heart of the city, the office is conveniently located to serve customers quickly.

The Sydney staff has grown, in both the administrative and consulting areas, to meet the demands of increased business.

Chris Sanderson, managing director, and Laurie Gellatly, branch manager, hosted an informal opening in late November. Business managers from Sydney and from as far away as Canberra visited the open-plan office. The new facilities include a library, education area, and, of course, a separate terminal room. During the reception, I.P. Sharp consultants demonstrated SHARP APL; the four-colour plotter was an instant success.

The usual teething problems associated with any move are over and all is running smoothly. The staff of the Sydney office invites you to visit them in their new premises.

## ACM FORMS SIGAPL

## SPECIAL INTEREST GROUP ON APL

The SIGPLAN Technical Committee on APL, STAPL, has been reclassified as a Special Interest Group (SIG). This reclassification is especially significant in that it recognizes the continued growth and activity of the APL community.

STAPL, an international organization for people interested in APL, was formed in 1973. It operated as a committee of SIGPLAN (Special Interest Group on Programming Languages). The successful transformation from a Technical Committee to a full, permanent Special Interest Group was the culmination of a year's work by STAPL Chairman Eugene McDonnell of I.P. Sharp, aided by the STAPL Executive Board.

SIGAPL will continue all the activities of STAPL, including publication of *APL Quote Quad*, a quarterly journal for the APL community, and sponsorship of workshops and conferences, where APL users can meet and exchange ideas on the latest developments in APL. SIGAPL now has more than 1500 members worldwide.

The following people have been elected officers of SIGAPL for the term ending in June 1983.

Chairperson:

Raymond P. Polivka  
IBM Corporation; Poughkeepsie,  
New York

Vice Chairperson:

Marilyn J. Pritchard  
STSC, Inc.; Rockville, Maryland

Secretary-Treasurer:

Keith Iverson  
Morgan Stanley; New York, New York

Executive Board Members:

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Laurentian University; Sudbury, Ontario

Robert C. Metzger  
I.P. Sharp Associates; Rochester,  
New York

John W. Myrna  
STSC, Inc.; Rockville, Maryland

TORONTO

**Josh Levine** has joined the Applications Software Department in Corporate headquarters. With his extensive technical knowledge, Josh heads up a special project to design and implement a generalized report writer.

Josh first became addicted to APL at Syracuse University. Since then, he has worked with APL in a variety of environments, particularly as applied to large data bases. As well, he has been involved with conversions to in-house SHARP APL. Prior to coming to Toronto, Josh has held a number of marketing and managerial positions within I.P. Sharp.

PARIS

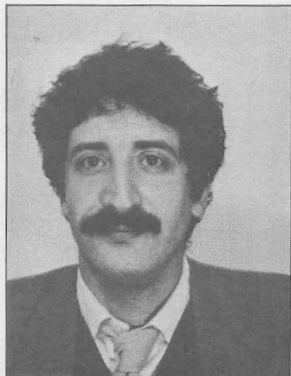
**Malcolm Hyde** is the new technical manager in Paris. He studied mathematics and philosophy at the University of New Brunswick in Canada and computer science and French at North Staffordshire Polytechnic in England.

Malcolm began his career with I.P. Sharp as a consultant in the London, England office and then worked in the Brussels office. He has considerable experience with management information systems and public data bases, particularly in the aviation and economics fields.

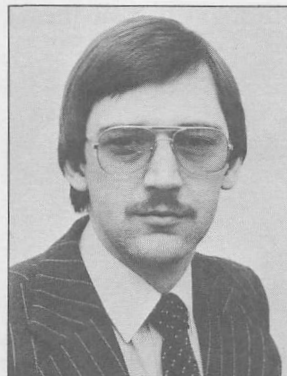
**Isaac Ohayon** joined I.P. Sharp as a consultant at the start of the year. For the past five years, he has taught mathematics. His experience with APL and several other programming languages makes him a valued asset to the Paris office. Isaac has a particular interest in operations research and artificial intelligence.



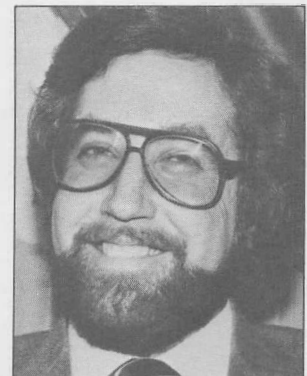
Malcolm Hyde



Isaac Ohayon



Norman Hardy



Gary Mills

LONDON

The new European Data Base Group is headed by **Norman Hardy**. After seven years of marketing and supporting timesharing systems, Norman joined I.P. Sharp as marketing manager for the United Kingdom.

Recognizing the demand for data base services, I.P. Sharp established the European Data Base Group to provide greater support for clients and to look at the future needs of our European customers.

The new group will provide full workshops for users on industry-related topics and on applications. These sessions will illustrate the use of analytical and display software to present data in an effective manner.

The European Data Base Group welcomes requests from users. The group can be contacted through the MAILBOX code *EDATA* or through the London office.

CHICAGO

**Gary Mills** has recently been appointed technical manager for Chicago. He graduated with a B.S. in computer science from the University of Illinois.

Before joining I.P. Sharp, Gary was with the Chicago Title and Trust Company. There he implemented a system to produce legal and financial documents required in real estate closings.

With I.P. Sharp, Gary provides customer support on the aviation and commodities data bases, MABRA, CONSOL, graphics, and APL.

## SPRING AVIATION CONFERENCE

Brian Oliver, Toronto

I.P. Sharp Associates will host its sixth annual Aviation Conference at the Halloran House, in New York, on May 20 and 21. This year's theme, "Perspectives on Planning", focuses on ways that all sectors of the aviation industry can adapt their planning strategies to the present climate of innovation and competition.

The program will feature invited speakers from the following organizations: Eastern Airlines, Southwest Airlines, Texas International Airlines, Air Transport Association of America, Massachusetts Institute of Technology, Oppenheimer & Company, L.F. Rothschild, Douglas Aircraft Company, and Simat, Helliesen & Eichner.

Judith Connor, Assistant Secretary for Policy and International Affairs for the U.S. Department

of Transportation, will be the keynote speaker at the conference luncheon. Her talk is titled: "So the Government Got Off Your Backs? Now What's Your Plan?"

In addition to the invited papers, I.P. Sharp will conduct technical seminars illustrating the use of SHARP APL software systems and data bases in aviation applications. Attendees will be introduced to MAGIC, SUPERPLOT, ROUTEMAPS, CONSOL, MABRA, SMS, the OAG data base, and other aviation data bases.

The registration fee for the two-day conference is \$75. Registration forms and further information are available from your local I.P. Sharp representative or from the Aviation Products Department in the international headquarters in Toronto.

## UPDATE

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The Newsletter is a regular publication of I.P. Sharp Associates. Contributions and comments are welcome and should be addressed to: I.P. Sharp Newsletter, Box 418, Exchange Tower, 2 First Canadian Place, Toronto, Canada M5X 1E3.

Irene Shimoda, *Editor*  
Mary Kopfensteiner, *Circulation*

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- Minneapolis • Oxford • Quebec City • Raleigh • Red Deer • Regina • Santa Ana • Stuttgart • Sunnysvale • Syracuse
- Towanda • Ukiah

Our private, packet-switched network connects with the Value Added Networks in:

- Alaska • Argentina • Bahrain • Bermuda • Chile • Dominican Republic • Hawaii • Israel • Japan • Luxembourg • New Zealand
- The Philippines • Portugal • Puerto Rico • Taiwan

In the continental United States, the SHARP APL Network is interconnected with the Value Added Networks to provide access in 170 more cities, 40 more in Canada, and 5 more in the U.K. In all, with the 92 cities served by the I.P. Sharp Network listed above, SHARP APL is accessible from close to 400 places via a local phone call. Please ask at your nearest I.P. Sharp office for a complete list of access points and access procedures. Our private network also connects with the worldwide Telex network via the Rochester, New York and Amsterdam codes.