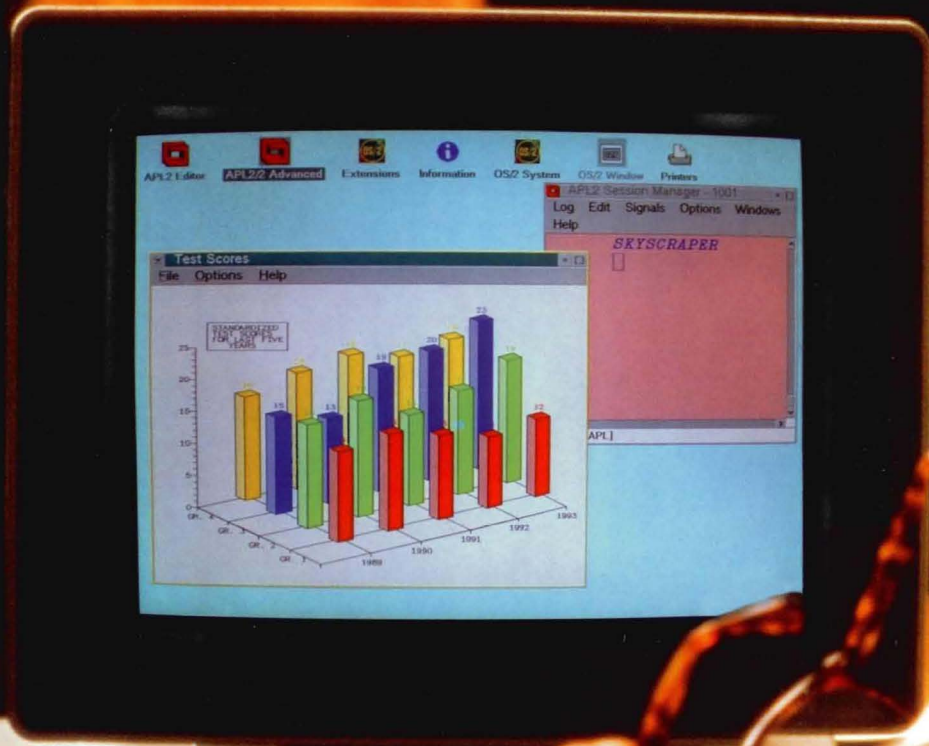


Today's APL2™



New! **APL2** now also available for
Windows®95 and Windows®NT

Ask for APL2 for Windows®, Product number: 5639-D46 Price \$1500 US

IBM®

Introduction

“APL2 is the only language used at Karsten Manufacturing Corporation to develop mission-critical business systems. APL2's concise notation has allowed us to replace lengthy, explicit procedures with powerful, symbolic algorithms, speeding development of new complex applications and simplifying maintenance. The same accuracy and precision that is paramount when manufacturing PING™ golf equipment is expressed in our successful use of APL2, the backbone of our applications workbench.”

—K. L. (Louis) Solheim,
Vice President,
Karsten Manufacturing
Corporation (makers of
PING™ golf clubs)

Are you someone who:

- Needs to quickly analyze frequently-changing data,
- Needs to visualize data from several different angles,
- Has problems which overwhelm spreadsheet macro facilities,
- Wants database query tools to let you work with query results rather than just display them,
- Is tired of having to use different tools on different machines,
- Finds network protocols too complicated to be convenient.

If your tools are making you lose sight of your problems, *you need APL2!*

What is APL2?

APL2 is a problem-solving tool, a visualization tool, and a database access tool—all in one!

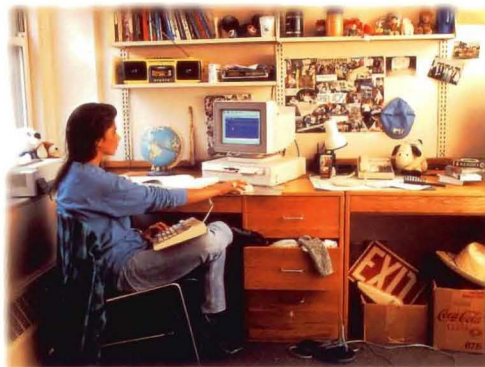
APL2 is interactive—like a spreadsheet—but it's also a high-level language that has the power and flexibility to solve even the toughest of problems quickly and easily.

APL2 is array based; you can work with enormous amounts of data and still stay focused on your problem.

APL2 manages your data—you manage your solution.

APL2 is portable; you can move both data and solutions between machines and across networks, quickly and easily.

APL2 is easy to get started with, but powerful enough to grow with.



Who uses APL2?

APL2 is used by:

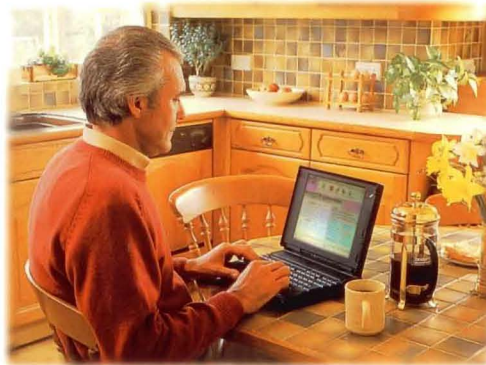
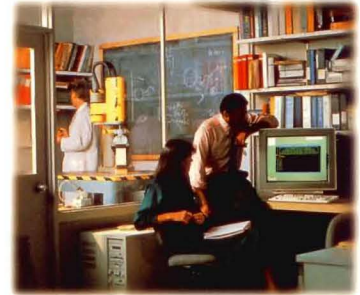
- People who need to develop solutions quickly and accurately.
- People who need to find solutions to problems that are too complicated for ordinary tools.
- Business people, insurance and financial analysts, scientists, engineers, teachers and students.
- Power-users with significant problems to solve.
- People who want to develop their own solutions, without having to wait for someone to help them.

APL2 is for you!

You will build solutions in a natural interactive fashion, so you can easily modify them as your problems evolve.

You will spend more time focusing on your problem and less time constructing programs and macros.

Your work will be portable, so you can reuse it as you move to new machines and operating systems.



If you're someone who needs to be more productive, you need APL2!

Working with APL2

Working with APL2 is like having a conversation with an ultra-powerful calculator. But unlike a calculator, you can perform a calculation with a million pieces of information as easily as with one. You focus on the problem—APL2 manages the calculation.

Many of the common tools you need are built right in. For example, many mathematical, logical, sorting, and searching routines are available. You spend time solving your problem rather than building tools.

APL2's session manager keeps a log of your conversation. You can experiment, modifying expressions until you have found an approach to your problem that works just the way you want. If you make a mistake, APL2 immediately warns you; you can fix your error and continue without interruption. When you're satisfied with your solution, you can give a name to it and perform the calculation by just using the name. This is problem solving in APL2.

You focus on what you want to do—APL2 focuses on *how* to do it.

“APL is concise and consistent. I like it for its intellectual beauty—problems become simpler when I start using APL to solve them.”

—Donald B. McIntyre,
Ph.D., D.Sc., F.R.S.E.,
Emeritus Professor,
Pomona College



Your Solution's Look and Feel

APL2 includes the tools you need to give your solutions a consistent easy-to-use look and feel. And just as you develop your calculations interactively, you can develop your solution's presentation of text and graphics interactively, too.

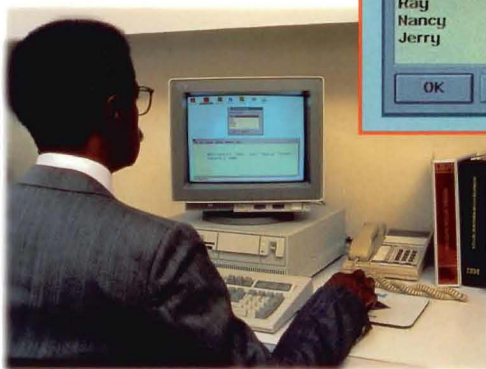
You can use APL2's portable tools to build solutions that will have the same look and feel even on different types of machines and operating systems.

You focus on your solution's needs—not the machine's needs.

If your solutions need to fully exploit your operating system's features, APL2 provides tools for that, too. Whether you use Presentation Manager, X Windows, Motif, GDDM, or ISPF, your solution can look and feel like the rest of your environment.

APL2 lets you work on solutions interactively *even* when you're using facilities that wouldn't otherwise support an interactive approach. For example, APL2 is an excellent tool for learning how to use OS/2's Presentation Manager. Because APL2 is interactive, you can learn how to use PM a bit at a time, as you need to, rather than trying to learn all of its features at once.

APL2 manages the system's requirements—you manage only your problem's needs.



Data Analysis

APL2 gives you the tools to look at your data in new ways. More powerful ways.

With APL2's array processing, you can work with entire collections of data, all at once. And not just a few numbers or even a few thousand numbers. Using APL2 you can work with millions of numbers as easily as a few. Forget the limitations you're used to. And forget the errors that go with trying to work around them. APL2 puts you in control of your data. Quickly and effortlessly.

Because APL2 is array-oriented, you can easily explore new ways to view your data. Often, in just a few moments with APL2, you can find a perspective which reveals trends and solutions that would have escaped you using less-powerful tools.

APL2 is *interactive*, so that you can work *with* it to find solutions. With each new entry, APL2 can give you fresh insight into your problems. Together, you and APL2 can look at your problems in a new light.

"APL2 is the basis of my business. Once my customers see how productive it can be, it is the tool that they want."

—Kiyosuke Saigusa,
President,
APL Consultants
of Japan, Ltd.
Kanagawa, Japan



Of course, not all data is perfect. Occasionally your data contains some incorrect values. And sometimes you're missing some data.

With ordinary tools, you can spend a lot of effort on handling data errors—effort that would be better spent on your real problem. In APL2, you can frequently pin-point, fix, or work around data errors in just a few minutes.

APL2 is extendible. As you explore your problems, you can add new functions and operations to APL2, to tailor it to your own needs—your own problems. And your additions can easily provide all the same array-processing flexibility of the built-in functions.

Conventional tools require that you know what you're looking for, and that you know how to find it. To find solutions where none existed before, you need a tool that will let you explore.

You need APL2.

APL2's notation:

APL2 uses symbols to represent its built-in operations. For example, common arithmetic functions (+ - × ÷) are represented by the same familiar symbols you learned as a child. Using just a few simple functions, you can get a lot done. And APL2 provides many other built-in functions, each with its own symbol.

Of course, you don't have to learn all the symbols the first day. You can be productive right away using the functions you know today, and you can learn the others as you need them for more complex problems.

APL2 symbols become well known in a very short time. Many of them are pictographs of what they do for you. Once you find that "Δ" gives you a way to sort your data into ascending order (smallest on top), you will automatically know what "▽" does.

In APL2, you can represent a list of numbers with a single name, like "COST". Then, since APL2 is array-oriented, "COST+2" will add two to every number in the list, or "COST÷100" will divide them all by 100.

Because of its symbols, APL2 is concise. And precise. Furthermore, since APL2 doesn't use words for its built-in functions, you can use any names you like for your data and expressions—nothing is reserved.

Because APL2 uses symbols rather than words, it is also independent of any particular nation's language. People who don't read English can still read your solutions. Of course, you can use words to name your data and solutions, and APL2 can produce messages in a variety of

	<code>SALES←10 15 27 15 45 29</code>	<i>Give a name to six months of sales (This list could be arbitrarily large)</i>
141	<code>+/SALES</code>	<i>Total of sales</i>
6	<code>ρSALES</code>	<i>Number of months recorded</i>
23.5	<code>(+/SALES)÷ρSALES</code>	<i>Average monthly sales</i>
5 12	<code>⍒2-/SALES ⍒12 30 ⍒16</code>	<i>First differential: velocity of sales (month-to-month changes)</i>
67 102 116	<code>4+/SALES</code>	<i>Moving-window totals, looking at four months at a time</i>
1 2 4 3 6 5	<code>ΔSALES</code>	<i>Positions for sorting the list</i>
10 15 15 27 29 45	<code>SALES[ΔSALES]</code>	<i>Sort the list</i>
1 1 0 1 0 0	<code>SALES≤21</code>	<i>Which values are ≤ 21?</i>
3	<code>+/SALES≤21</code>	<i>How many?</i>



Power to Perform

Your machines have gotten more powerful. *Much* more powerful. But have your tools kept pace?

You can couple the *impressive processing power* of today's modern workstations with the *expressive problem-solving power* of APL2. Together, they form a unique tool for rapidly building solutions, and for working with constantly-changing or poorly-defined problems.

Today's power users are finding that they can easily harness APL2's power to dramatically increase their own productivity.

As you start down the road to increased productivity, you will discover that you don't have to learn *all* of APL2 just to get started. You can learn just a bit now, and get started right away. Then, when you need more, you can learn as you go. The APL2 products include "APL2 at a Glance," a textbook that can guide you from beginner's level to real expert-level proficiency. And if you'd like some hands-on help in bringing your team up to speed, we can offer classes and consultation to fit all levels of expertise.

However you approach it, APL2 lets *you* grow.





Room to Grow

You've seen the problem before—you start with what seems like a simple solution to your problem, and everything seems to work out great. Until your problem outgrows your tools. Then a simple solution starts to get complicated. And messy.

You can avoid all that with APL2, because it offers open-ended growth. You just can't outgrow it.

Your solutions can grow—gracefully. The same solution that you developed and tested with ten items of data should work just fine with 100,000 items.

Your existing solutions can also grow to new platforms—even with mixed machine types and different operating systems. Even if you outgrow your machine, you won't outgrow APL2, because it runs on a wide range of processors—from personal computers to multi-user servers. It's comforting to know that algorithms that run on one platform will run on the other ones—without any recompilation.

And all with the same language: APL2.
...Now, we think *that will grow on you!*

Graphics

Business Graphics

APL2 gives you plenty of tools for displaying your data graphically: pie charts, histograms, skyscraper charts—even surface plots. These tools and many others come standard with all of the APL2 systems.

APL2 graphics solutions are easily portable across platforms, even between different kinds of machines. Just like all of your APL2 work.

Your graphics work is a natural extension of APL2's *array-oriented* notation. "PLOT X" can give you a picture of your data, no matter how complex "X" might be.

APL2 lets you use *dozens* of dimensions, unlike your spreadsheet that squeezes you into just two or three dimensions. You can easily manipulate and visualize Revenue versus Divisions versus Quarters versus Sites versus... well, you get the idea.

As always, APL2 can grow: If you need a special graphics tool that's not built in, APL2 gives you the means to "roll-your-own," using built-in graphics primitives.



Statistical Graphics

If you work with statistics and want to go beyond the standard graphics tools, an even more powerful statistical analysis package is optionally available.

AGSS: A Graphical Statistical System is fully integrated with APL2, and extends the basic built-in facilities. Best of all, your data is still in APL2, so you don't lose any of the easy data manipulation.

You can start with simple color plots using default options. When you're ready for more complex plots, AGSS gives you 2-D and 3-D scientific-engineering graphics and applied statistics. It gives you on-line help and plenty of hard-copy documentation, just to make life easy.

The system's menus give you a simple way to control all of the plot characteristics. AGSS does the hard part, to make *you* look good.

And for all of its power, only minimal familiarity with APL2 is needed to use AGSS. ...So you become productive *immediately!*

AGSS gives you the tools you need:

AGSS lets you produce surface plots, contour plots, trajectory plots, scatter plots, and parametric Y,Z plots. Or use very powerful menus to apply both linear and non-linear least squares to the fitting of curves and surfaces to data.

Descriptive statistics and exploratory data analysis:

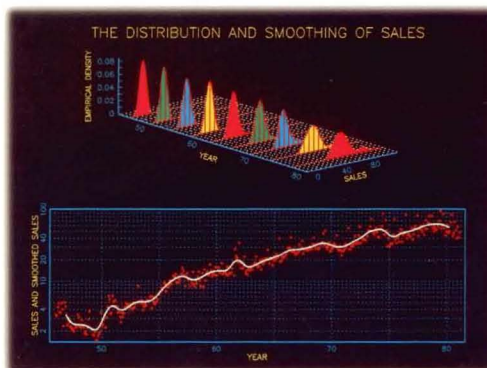
AGSS provides capabilities for bar charts, pie charts, skyscraper plots, coded 2-D and 3-D scatter plots with point identification, box plots, bivariate histograms, empirical CDF's, empirical densities, symmetry plots, and quantile-quantile plots.

Statistical modules:

AGSS contains modules for regression analysis, quality control, reliability analysis and distribution fitting, accelerated life tests, design of experiments, and time-series analysis, providing a powerful integrated combination of graphical output and formal statistical tests.

Work management utilities:

A set of catalog screens lets you review, run, edit, and document your menu responses, graphics output, programs and data, and a diary facility keeps a record of menu executions.



Databases

APL2 is a great tool for manipulating lots of different kinds of files. You can easily move data between APL2 and files that many of your other tools use.

If you need the power of a relational database, APL2 makes it easy to access DB2™ or SQL/DS™, using Structured Query Language.

APL2 lets you issue SQL requests and explore your database interactively, without any precompilation or other special preparation steps. You can access remote databases using IBM's distributed database support.

Unlike ordinary query tools, you can do a lot more than just display data. When you use APL2 to issue a database query, the results are placed in an array. You can display the array or you can perform calculations with it using simple APL2 expressions. You can then update database tables using SQL.

When you issue a database request from APL2, it's processed asynchronously—so you can continue your work in APL2 while the relational database is retrieving query results or updating tables.

If you want to make complex databases simple, *you need APL2.*



```
QUERY 'SELECT * FROM CELLAR WHERE COST < 11.00'
```

BIN	YEAR	TYPE	COST	COLOR
B10	1978	CHAMBERTIN	10.95	R
B11	1971	BORDEAUX	8.95	R
B12	1979	BORDEAUX	10.95	R
C11	1976	RIOJA	4.95	R
C12	1976	RIOJA	3.95	R
F16	1988	ROSE		
G12	1979	MERLOT	8.95	R
I10	1984	BARDOLINO	2.25	R
I11	1984	VALPOLICELLA	2.25	R
K10	1986	CHABLIS	3.95	W
K11	1986	RIESLING	6.25	W

This database query returns a five-column array.



Networks

Using APL2, you can communicate around the world.

Unlike other tools that require you to use complicated network protocols, APL2 makes communication as easy as assigning and referencing names that you've shared with other sessions. To send data to another session, simply assign it to a shared name; to receive data, just *use* the name.

To communicate with another session on the network, simply share another name. You can share as many names with as many sessions as you like. APL2 manages all the network protocols—you stay focused on your problem.

With APL2, one method is all you need for both local and network communication. It even works between different types of machines and operating systems.

APL2's communication methods are simple—but simple doesn't mean simplistic. These methods are flexible enough for today's and tomorrow's cooperative processing solutions. From communication between users to distributing your solution across an entire network, APL2 gives you the flexibility you need to enable your solution for networks.



Although all of your communication needs can be handled using one method, the *style* of your solution will depend upon the requirements of your problem. APL2 supports all of the

common styles of solutions. The following table identifies some common styles which may be appropriate for your problems:

<i>Requirement</i>	<i>Style</i>	<i>Examples</i>
Control and serialize access for multiple users	Client-Server	<ul style="list-style-type: none"> • File servers • Database servers • Bank teller machines
Using several machines to solve a single problem	Peer-to-Peer	<ul style="list-style-type: none"> • Distributed computing • Parallel processing • User-to-user communication
Access another machine's facilities or power	Master-Slave	<ul style="list-style-type: none"> • Using a mainframe as a large coprocessor • Remote file access

The network connection:

APL2's network communication facilities are based on TCP/IP. You can communicate with APL2 users and programs using cross-system shared variables.

You can communicate with programs written in other languages using APL2's TCP/IP socket interface.

You can use the APL2 session manager on your workstation to control a remote APL2 interpreter.



Ordering APL2

To order any of the APL2 products:

United States	IBM Direct	1-800-IBM-CALL (1-800-426-2255)
Austria	IBM Orderline	(0222)-21145-2500
Belgium	IBM Blue Line	02/225.33.33
Canada	IBM Software Direct	1-800-565-7948
France	IBM APL	01-49-05-51-48
Germany	IBM Direkt	0130-853355
Italy	IBM Direct	167-017001
United Kingdom	IBM Software Enquiry Desk	0329 242728

In other countries (or for other inquiries), please contact your nearest IBM representative.

Volume discounts, educational discounts, and dealer prices are available on many of the products.

All prices quoted are U.S. prices, as of September 1, 1994.

Money-Back Guarantee

We're so sure that you'll like these productive tools that we're offering them with a two-month trial period. If you aren't *delighted* with them, just return them for a full refund.

APL2 for OS/2

APL2/2 is available in two editions:

Product	Price	Part Number
APL2 for OS/2, Entry Edition	\$185	89G1556
APL2 for OS/2, Advanced Edition	\$650	89G1697

Further discounts may be available by ordering through 1-800-3-IBM-OS2 (1-800-342-6672).

In Europe, specify Product Number 5621-430.

(If you run Windows and want to use APL2, order OS/2 2.1 for Windows.)

APL2 for the RISC System/6000™

Product number 5765-012. Prices are based upon processor size, starting at \$1050.

APL2 for Sun™ Solaris™

Product number 5648-065. Price: \$1500.

APL2 for the 370™/390™ Mainframe

APL2 for the IBM S/370 and S/390 is available for VM/CMS™ and MVS/TSO™ systems. For each of these systems, two types of APL2 products are available:

- APL2 Version 2, Program Product 5688-228
- APL2 Application Environment V2 [run-time], Program Product 5688-229

Prices are based upon processor size.

APL2 for PC DOS

APL2/PC is an IBM AISPO (As Is Software Products & Offerings) product. Part Number 6242936 (PRPQ RJ0411). Price: \$630. In Europe, specify Part Number 38F1753 or Product Number 5604-260.

AGSS: A Graphical Statistical System

AGSS is an IBM AISPO (As Is Software Products & Offerings) product.

- AGSS for Workstations: Order Number 5764-092 (\$500)
for OS/2 Prereq: APL2/2, either Entry or Advanced Edition
for RS/6000 Prereq: APL2/6000
for Sun Prereq: APL2 for Sun Solaris
- AGSS for PC DOS: Order Number 5764-009 (\$250)
Prereq: APL2/PC DOS
- AGSS for VM: Order Number 5764-011 (\$2500)
Prereq: APL2 for VM/CMS

Want more details?

For more detailed product information—or to talk to the developers—please contact us:

- Internet: apl2@vnet.ibm.com
- CompuServe: go IBMAPL2
- Tel: 408-463-APL2 (1-408-463-2752)
- Fax: 408-463-4488

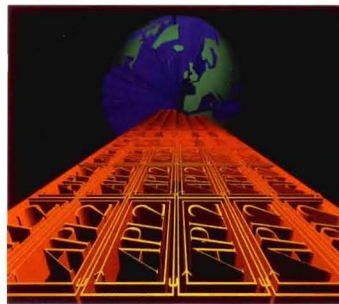
Mail:

APL Products and Services
IBM Santa Teresa Lab – M46/D12
555 Bailey Avenue
San Jose, CA 95141 USA

We can also arrange for APL2 classes and other support services that you might need.



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