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Subject: IDL FAQ: V1.0

Posted by [pat](#) on Fri, 19 Mar 1993 21:00:41 GMT

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Here, after many changes, is the official first version of the Interactive Data Language Frequently Asked Questions List. I will post an updated list every month or so in comp.lang.idl-pvwave and in news.answers. Please send any updates, corrections, additions, etc. to [idl-faq@jaameri.gsfc.nasa.gov](mailto:idl-faq@jaameri.gsfc.nasa.gov).

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A Note from the editor about PV~WAVE:

I do not have any direct experience with PV~WAVE. As such, I will try to minimize comments which appear to favor one package or the other. I will, however, welcome concise descriptions of technical and functional differences between the two packages.

If you are viewing this text in a GNU Emacs Buffer, you can type "M-2 C-x \$" to get an overview of just the questions. Then, when you want to look at the text of the answers, just type "C-x \$".

The following questions are answered:

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orientation on a PostScript or HP-GL printer?  
T15. I get the error message "Code Area Full". What do I do?

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GENERAL:

G01. What is IDL?

IDL is the Interactive Data Language. It is a product of  
Research Systems, Inc. (RSI).

The following is quoted from the README file at [rsinc.com/pub/idl/README](http://rsinc.com/pub/idl/README).  
As such, it describes IDL's capabilities in an understandably subjective  
manner. ;-)

{begin quote}

IDL, Interactive Data analysis Language, is a  
complete package for the interactive reduction, analysis,  
and visualization of scientific data and images. Optimized  
for the workstation environment, IDL integrates a responsive  
array oriented language with numerous data analysis methods  
and an extensive variety of two and three dimensional  
displays into a powerful tool for researchers.

IDL supports an extensive data import capability,  
publication quality hard copy output, and user-defined Motif  
graphical user interfaces.

Users can create complex visualizations in hours  
instead of weeks with the aid of IDL's high level capabilities  
and interactive environment.

IDL is useful in physics, astronomy, image and  
signal processing, mapping, medical imaging, statistics,  
and other technical disciplines requiring visualization of  
large amounts of data.

{end quote}

Here is a short history of RSI:  
[attributed to ali@rsinc.com (Ali Bahrami)]

{begin quote}

IDL is a product of Research Systems, Inc., founded in 1977 by David Stern. The origins of IDL were developed at the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado. David was one of the people involved in efforts to make computers easier to use for the physicists at the Lab. The first program in the evolutionary chain to IDL was named Rufus (named after Dave's dog). Rufus was a very simple vector oriented calculator that ran on the PDP-12. It accepted 2 letter codes that specified (1) An arithmetic operation (2) The input registers to serve as operands, and (3) the destination register. The next version was the Mars Mariner Spectrum Editor (MMED) which was a version of Rufus that ran on the PDP-8.

The next program in this line was named SOL, and it also ran on the PDP-8. Unlike its predecessors, SOL was a real computer language with a real syntax (no more 2 letter codes). It was an APL influenced array oriented language with some primitive graphics capabilities. The resemblance to IDL was there, but very faintly.

In 1977, Dave left LASP to start Research Systems Inc. (RSI) with the intention of building on the ideas contained in SOL. The initial result of this endeavor was PDP-11 IDL, which was much more capable than SOL. Graphics was usually done on Tektronix terminals and outboard raster graphics displays. I used this version at LASP in 1981 on a PDP11/34 under RSX-11M in 1981 (I worked as a student at LASP from 1981 to 1987). I didn't use it for very long though, because 1981 was the year that Dave released the VAX/VMS version of IDL. This version, which was written in VAX-11 MACRO and FORTRAN, took advantage of the VAX virtual memory and 32-bit address space, and was a huge step beyond the PDP-11 version. It used essentially the same sort of graphics hardware as the PDP-11.

In 1987, Dave decided that Unix workstations were the direction in which IDL should progress, but porting the current VAX IDL to Unix didn't make much sense because of its MACRO and FORTRAN implementation. I had just finished my Masters degree and was looking for work. Dave hired me and together we wrote the current version of IDL for Unix on the Sun 3 taking advantage of the re-write to extend and improve the language. Since then, we've ported it to many Unix machines as well as moving it back to VMS. We have more employees now, but we're still developing and extending IDL as our sole product.

{end quote}

G02. Where can I contact them?

Their address is:

Research Systems, Inc.  
777 29th Street, Suite 300  
Boulder, CO 80303  
(303) 786-9900 (Voice)

Email:

info@rsinc.com or support@rsinc.com # Internet  
ORION::IDL # SPAN  
IDL@COLOLASP # Bitnet

G03. How do I get IDL?

RSI's distribution scheme is unique in that all of the binaries and IDL one needs are available via anonymous ftp. IDL binaries and code are available at these sites:

gateway.rsinc.com (192.5.156.17)  
pub/idl  
boulder.colorado.edu (128.138.240.1)  
pub/idl  
lumpi.informatik.uni-dortmund.de (129.217.36.140)  
pub/idl

The README file describes which files are needed, how to unpack them, and how to install them.

If you install IDL without a valid license, you will get IDL's 7 minute demo mode. This mode is designed for users who are considering buying the package.

To actually get IDL running for good, you must pay for a license from IDL and follow their instructions. You will be asked to fill out a form with information unique to your machine. IDL will create a license key which the license manager program (lmgrd) reads to validate your license. For more details, contact RSI.

G04. What is the current version of IDL?

Version 3.0.0 is the current version. The next release is expected around May, 1993.

G05. On what systems does IDL run?

The information below is from the file RELEASE\_LEVEL  
located at rsinc.com:/pub/idl/RELEASE\_LEVEL:

{begin quote}

This release supports the following systems:

- Convex C2 and C3: ConvexOS 10.0.5.
  - Data General Aviiion: DG/UX 5.4.1 and later
  - HP 9000: HP-UX 8.0 on Series 300, 400 and 700.
  - IBM 6000: AIX 3.2.
  - MIPS: Risc/OS 4.52B.
  - Risc Ultrix: Ultrix 4.2.
  - SGI: IRIX 4.0
  - Sun 3: SunOS 4.1.0. Widgets are built using OpenWindows 2.0.
  - Sun 4 (sparc): SunOS 4.1.0. Widgets are built using OpenWindows 3.0.
  - VAX/VMS: The standard release which does not include widgets requires VMS 5.1 or later. The version including widgets requires VMS 5.4.
  - DOS based personal computers running Microsoft Windows 3.1
- {end quote}

There is also a version of IDL which runs on DEC Alphas under OpenVMS 1.0. A version that will run under OSF/1 is due out soon.

G06. What is PV~WAVE and how is it related to IDL?

Around the time that the Unix version of IDL first became available (1988), Precision Visuals Inc. (PVI) entered into an agreement with RSI under which they enhanced and resold IDL under the name PV~WAVE. In September of 1990, they exercised an option in that agreement that resulted in the following:

- They received a copy of the IDL source code as it existed in September 1990 in return for a one-time payment to RSI.
- The connection between RSI and PVI was severed.

IDL and PV~WAVE are now on separate development tracks. Each company enhances, supports, and maintains its own product.

PVI has since merged with IMSL and is now Visual Numerics, Inc. (VNI).

G07. Are there anonymous FTP sites for IDL?

The sites below contain public domain IDL code.

JHU/APL IDL library

fermi.jhuapl.edu [128.244.147.14]

/pub/idl-pvwave/jhuapl

NASA IDL Astronomy User's Library

idlastro.gsfc.nasa.gov [128.183.57.82]

/

IUE RDAF library

iuesn1.gsfc.nasa.gov [128.183.57.16]

cetus.colorado.edu [128.138.238.151]

/pub

ICUR Spectral Analysis Software

ftp.astro.psu.edu [128.118.147.28]

/pub/neffftp/icur

IDL ROSAT software

rosserv.gsfc.nasa.gov [128.183.8.43]

/pub/IDL

IDLmeteo library

ftp.sma.ch (141.249.3.33)

/pub/idlmeteo

G08. How can I get help?

RSI has excellent telephone support. You can contact them at:

(303) 786-9900 (Voice)

(303) 786-9909 (Fax)

Email:

info@rsinc.com or support@rsinc.com # Internet

ORION::IDL # SPAN

IDL@COLOLASP # Bitnet

Keep in mind, however, that their phone support is primarily for their paying customers.

G09. Why are there two newsgroups for IDL?

Unfortunately, there are two very different packages

with the abbreviation "IDL". The newsgroup comp.lang.idl

is for the Interface Description Language. The newsgroup for discussing issues related to RSI's IDL and PV~WAVE is [comp.lang.idl-pvwave](mailto:comp.lang.idl-pvwave).

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## TECHNICAL QUESTIONS:

Note for Sun users:

There is a mini FAQ for Sun IDL in \$IDL\_DIR/notes, and the following questions are answered in the file openwin3.doc:

- (1) IDL complains about missing fonts when creating widgets.
- (2) IDL complains about missing bitmap files when creating widgets.
- (3) How to make IDL work with OpenWindows version 3.0.
- (4) 3-D appearance for OpenLook IDLwidgets.
- (5) Why does one of the widgets appear red?
- (6) Why does pressing the left button while pointing at a pulldown menu button cause the menu to pop up with the pushpin in? Older versions of IDL didn't to that.
- (7) The font used by the list widget is much larger than it used to be, and I don't like the result on my program.
- (8) Why do I get "Cannot allocate colormap entry" errors, and why do they kill IDL?
- (9) I've changed my .Xdefaults file, but nothing different happened. Why?

T01. Why doesn't polycontour fill open contours?

This problem is described in the POLYCONTOUR manual page.

{begin quote}

### RESTRICTIONS:

This routine will NOT draw open contours. To eliminate open contours in your dataset, surround the original array with a 1-element border on all sides. The border should be set to a value less than or equal to the minimum data array value.

For example, if A is an (N,M) array enter:

```
B = REPLICATE(MIN(A), N+2, M+2) ;Make background
B(1,1) = A ;Insert original data
CONTOUR, B, PATH=Filename ... ;Create the contour file.
{end quote}
```

Sources at RSI tell me that efforts to fix this problem have been given a high priority. In the next release, expect a new parameter to CONTOUR which will automatically draw filled

contours, closed and open.

T02. How do I increase the number of commands stored in the history buffer?

The system variable !EDIT\_INPUT controls command recall. By default, it is set to 1, causing the last 20 commands to be saved. If it is 0, no commands are saved. To save more than 20 commands, just put !EDIT\_INPUT=50 (or other large number) in your startup file.

T03. How do I get IDL to call routines in language X, running under system Y?

Jeff Valenti has written a sizable document about calling external FORTRAN routines from IDL. You can find it at [jaameri.gsfc.nasa.gov:/pub/idl/idl-fortran](http://jaameri.gsfc.nasa.gov:/pub/idl/idl-fortran).

T04. Why does XPALETTE edit my color table incorrectly?

[this question still under construction]

T05. Is there on-line help for IDL?

Try ?.

T06. I run IDL under X in SunOS 4.x, and after I logout, the screen becomes completely blank. Typing in login names and passwords 'blindly' logs you in again with the 'correct' colors. How to prevent this?

Add the following to your .Xdefaults:

```
Idl*colors: -5
```

which reserves some colors for the colormap so that IDL does not exhaust all the available colors. (For a nice summary of Sun IDL interactions with OpenWindows, see \$IDL\_DIR/notes/openwin3.doc)

Another solution is to put a call to `clear_colormap` in your .login file to be executed after OpenWindows start up.

T07. Sometimes my variables seem to disappear. Why is this?

Quoting the IDL User's Guide, page 10-8:



{begin quote}

IDL users may find that all their variables have seemingly disappeared after an error occurs inside a procedure or function. The misunderstood subtlety is that after the error occurs, IDL's context is inside the called procedure, not in the main level. Typing RETALL or RETURN will make the lost variables reappear.

RETALL is best suited for use when an error is detected in a procedure and it is desired to return immediately to the main program level despite nested procedure calls. RETALL issues RETURN commands until the main program level is reached.

The HELP command can be used to see the current call stack (i.e., which program unit IDL is in and which program unit called it).

{end quote}

T08. Is there a major mode for editing IDL code in Emacs?

No and yes.

PV-Wave has developed a PV-Wave major mode, which they have made available under the FSF copyleft. Given the (remaining) strong similarity between Wave and IDL, it has many of the features that one would like in such a mode.

It is available by anonymous ftp from ftp.pvi.com (128.138.213.22) in the ./PVI/emacs directory

[ wave-mode.el seems to work pretty well. Be warned, however, that it is a memory hog and it will do a lot of garbage-collection. -pat ]

T09. How do I get 3-D widgets under OpenLook 3.0?

This subject is discussed on page 53 of the OpenWindows Version 3 User's Guide Release Manual.

OpenWindows 3.0 added 3-D appearance for widgets. In order for the 3-D look to work, it must be enabled and the background color must be a medium tone color such as "grey" or "wheat".

Add the following resources to your ~/.Xdefaults file:

For plain IDL:

```
Idl*threeD: TRUE
Idl*background: PeachPuff2
```

For IMSL/IDL:

```
Imslidl*threeD: TRUE
```

Imslidl\*background: PeachPuff2

T10. Why does one of the widgets appear red under OpenWindows?

This subject is discussed on page 53 of the OpenWindows Version 3 User's Guide Release Manual.

The OLIT widget toolkit, which is used by IDL, added the concept of "mouseless focus" under version 3.0. The red widget indicates where the current mouseless focus is. Use the arrow keys to traverse the widgets, and the spacebar to make a selection.

T11. Where are all the IDL routines and userlib procedures?

The basic routines are not accessible, for obvious reasons. The userlib, statlib and widget procedures are in \$IDL\_DIR/lib/. The procedure XDL also displays the full pathname. The system variable !path also contains the directory names for all accessible IDL procedures.

T12. Does anybody know how to put multiple image plots on one page in PostScript?

Because PostScript has scalable pixels, you must specify the xsize and ysize parameters, as well as the position parameter, in TV or TVSCL. I don't know about PV-Wave, but the following works in IDL:

```
; Display four images in a 2x2 grid
; Assume data(x,y,4) = array containing the 4 images

set_plot, 'ps'          ;request PostScript output
device, ...             ;modify page size, orientation, etc. as desired
ximsize = 0.5*!d.x_size ;define output image size
yimsize = 0.5*!d.y_size ;note: 0.5 assumes 2x2 grid
for i=0,3 do begin      ;display the 4 images, using i as position index
    tv, data(*,*,i), i, xsize=ximsize, ysize=yimsize
endfor
```

T13. Does case matter in IDL?

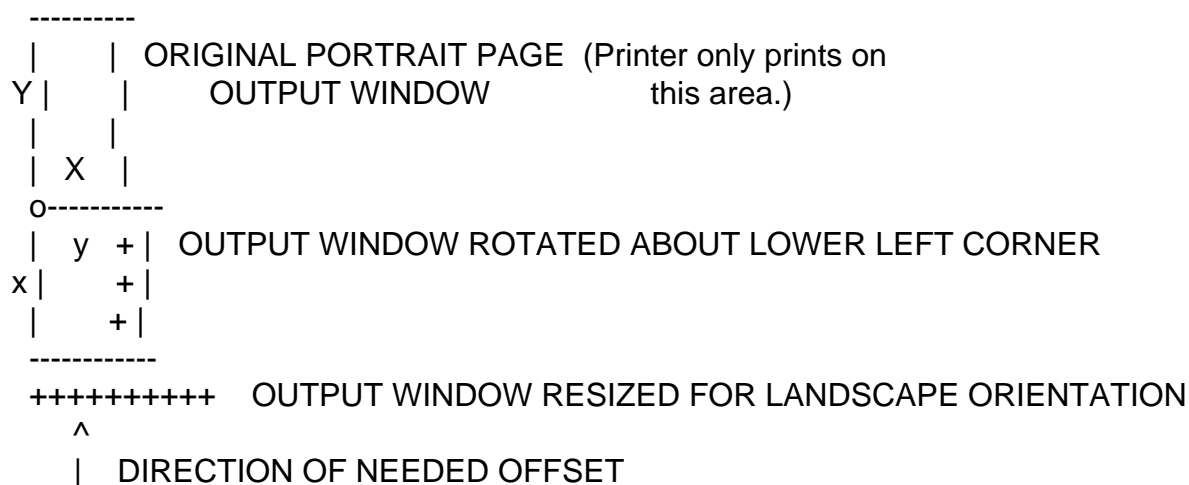
No.

Compiled routines are case insensitive. The only catch is that, on Unix systems, when executing a script via the .RUN command, the file name argument must exactly match the file name as it appears on the disk. Once the routines in the script are compiled, their names can be written in any case. This is not a problem in operating systems such as VMS that do not distinguish case for file names.

T14. How do I set up IDL to get precise control over plot window and text positioning with either portrait or landscape page orientation on a PostScript or HP-GL printer?

(This answer only applies to PostScript and HP-GL printers -- other printers may differ in having the X and Y offsets measured from the upper left corner of the portrait page instead of the lower left corner.)

IDL uses portrait page orientation as a default. (The x axis is along the shorter dimension of the paper.) In portrait orientation the lower left corner of the page is the origin for the XOFFSET and YOFFSET page offsetting keywords of the DEVICE command that determine the origin (lower left corner) of the output window. (Normally one uses XOFFSET=0 and YOFFSET=0 for portrait orientation.) Size of the output window is determined by the XSIZE and YSIZE keywords of the DEVICE command. The origin for graph positioning variables !P.POSITION and !P.REGION is the output window origin. X and Y coordinates for portrait page orientation are shown on the sketch below as upper case X and Y.



If device,/landscape is specified, then the output window is rotated 90 deg. clockwise about the lower left corner of the page. In this condition nothing will be plotted on the page, since the rotation has carried the output window entirely off the paper as shown in the sketch above. To correct this mismatch, the rotated output window must be offset. XOFFSET AND YOFFSET are still measured in the X and Y coordinates of the portrait page, but now represent the position of the lower left corner of the rotated (and resized) output window (marked by an o above) with respect to the lower left corner of the portrait (actual) page. Hence, one generally uses XOFFSET=0 and YOFFSET=long\_dimension\_of\_page for landscape orientation.

In landscape orientation, the coordinates for graph positioning variables !P.POSITION and !P.REGION are the lower case x and y coordinates shown in the sketch above and having origin marked by the letter o. Position of output window origin o on the page is, of course, affected by the setting of XOFFSET and YOFFSET, as explained before. The XSIZE and YSIZE (output window size) keywords of the DEVICE command are also measured in the x and y directions when in landscape orientation. The resizing of the landscape page generally means interchanging the values of XSIZE and YSIZE appropriate for the portrait page.

Example of settings for a portrait page:

```
XPAGE=8.5 & YPAGE=11. & XOFFS=0. & YOFFS=0. ;Inches
DEVICE,/INCHES,XSIZE=XPAGE,YSIZE=YPAGE,XOFFSET=XOFFS,YOFFSET=YOFFS
```

Example of settings for a landscape page:

```
XPAGE=11. & YPAGE=8.5 & XOFFS=0. & YOFFS=XPAGE ;Inches
DEVICE,/LANDSCAPE,/INCHES,XSIZE=XPAGE,YSIZE=YPAGE,XOFFSET=XOFFS, $
YOFFSET=YOFFS
```

Example of setting position and size of a plot window:

```
X0=1.374 & Y0=1.283 & XLEN=3.622 & YLEN=6.157 ;Inches
!P.POSITION=[X0/XPAGE,Y0/YPAGE,(X0+XLEN)/XPAGE,(Y0+YLEN)/YPAGE]
```

Example of setting position and orientation of a text string:

```
x0=.35 & y0=.37 ;Inches
xyouts,x0/xpage,y0/ypage,!stime,orient=90,/normal ;Date, time
```

T15. I get the error message "Code Area Full". What do I do?

IDL sets aside a certain amount of memory area for compiling programs. The current code and area sizes can be seen with the HELP command, e.g.

```
IDL> help
% At $MAIN$ .
Code area used: 0% (0/16384), Symbol area used: 0% (2/4096)
```

These sizes can be increased with the .SIZE command. Quoting the IDL User's Manual, page 2-11:

{begin quote}

These sizes represent a compromise between an unlimited program space and

conservation of memory. User procedures and functions are compiled in this large program area. After successful compilation, a new memory area of the required size is allocated to contain the newly compiled program unit.

Resizing the code and data areas erases the currently compiled main program and all main program variables. For example, to extend the code and data areas to 30000 and 5000 bytes respectively:

```
.SIZE 30000 5000  
{end quote}
```

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Disclaimer:

I do not work for RSI and I am in no way answerable to them. Questions and answers in this document are culled from the user community. No warranty, express or implied exists regarding this document. Permission to copy all or part of this work is granted, provided that the copies are not made or distributed for resale.

This file can always be found at [jaameri.gsfc.nasa.gov](http://jaameri.gsfc.nasa.gov) [128.183.88.75]  
in [pub/idl/idl-faq](http://pub/idl/idl-faq).

Additions and corrections should be sent to:

[idl-faq@jaameri.gsfc.nasa.gov](mailto:idl-faq@jaameri.gsfc.nasa.gov)

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