Subject: E Format code whinge
Posted by William Clodius on Tue, 15 Feb 2005 22:16:44 GMT
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I have just had to clean up a UNIX to Windows porting problem that occurred because IDL's implementation of formats (in printf) use only a subset of the capabilities provided Fortran's more detailed specification, and the Windows and UNIX specifications for this implementation differ.

In Fortrran the E format code can have either of the formats
Ew.d
or
Ew.dEe
where w is the width (in characters) of the output, d is the number of positions after the decimal point, and e is the number of characters required by the exponent. The first simplification in IDL's format implementation is to ignore the Ee specification and have e be a fixed size. Unfortunately this size differs between UNIX and WIndows (e is 2 on UNIX and 3 on Windows). Thiss by itself is a portability problem, but it is worsened by IDL's failure to implement Fortran's flexibility in dealing with format specification that do not match the characteristics of the input data. In Fortran, some of the default characters in the outpur (the 'E' the sign in the exponent, or the digit in front of the decimal poin) can be dropped to allow appropriate output.

As a result of this lack of flexibility an E10.3 Format code for the IDL printf procedure has the following output formats

Sf.dddEsee on UNIX

and

f.dddEseee on Windows

where S is the sign ' ' or '-', f is the first significant digit, ddd is the digits after the decimal point, s is the exponent sign '+', or '-', and eee is the exponent.

Note what happens to S in Windows. As a result IDL on Windows cannot output a negative number in E10.3 format. Fortran by default wold eliminate the f and change ddd and eee appropriately.

I was surprised at the choice of e=3 for Windows. On most Fortran systems e=2 is sufficient as the s can be dropped for large positive exponents, and the E can be dropped for large negative exponents.