

Setting up your environment

The machines you have been using for the practical sessions had all the software you need pre-installed on them. Below you will find instructions to install the various bits and pieces of software we have used. The instructions are intended for Mac OSX machines, but with little modification they should work for any UNIX like operating system. However, it is probably worth first checking if each particular piece of software can be installed using any native package management system (e.g. apt or yum under Debian or Suse), or if you can persuade a local system administrator to do the work for you.

G95

We used the free G95 compiler for the course. This compiler sticks fairly strictly to the Fortran standards. Installation of a pre-compiled binary is easy on almost any flavour of operating system.

1. Download the compressed binary from www.g95.org. Follow the link to “Download binaries, source and manual” at the top left of the page and scroll down to the section marked “G95 Binaries (Current Snapshot)”. Click on the link marked “HTTP” next to “x86 OSX” and select “Save to Disk” and click “OK” when prompted. A icon labeled “g95-x86-osx.tgz” should appear on your desktop after a couple of seconds.
2. In a terminal window, type the following commands to unpack the executable and place it into your path:

```
mkdir -p bin
cd bin
mv ~/Desktop/g95-x86-osx.tgz .
tar -xzvf g95-x86-osx.tgz
ln -s g95-install/bin/i386-apple-darwin6.8-g95 g95
export PATH=~/.bin:$PATH
cd
```

Now, assuming you are using the bash shell add the PATH export to your `.profile` by typing: `echo "PATH=$HOME/bin:$PATH" >> .profile`

3. Check that g95 is installed by typing “g95 -v” at the prompt, you should see some information about the setting used to build the compiler.

Installing an XPath library for Python

By default most computers do not come with a pre-installed XPath library for python. However, it’s very easy to download and set up such a library for your own use:

1. First download <http://codespeak.net/lxml/lxml-1.3.6.tgz> and extract the files from the archive. For example, using curl you would type the following at the command line:

```
cd ~
curl http://codespeak.net/lxml/lxml-1.3.6.tgz > lxml-1.3.6.tgz
tar xzf lxml-1.3.6.tgz
```

2. Now build the package (this involves compiling some C code that is made available to python. Just type (the second step may take a couple of minutes):

```
cd lxml-1.3.6
python setup.py build
```

3. That's it - you have now created libXML bindings to your python installation! If you wanted to install the library for all users of the system (and you had root access) you would now type "setup.py install", but you don't so instead we will just set up things so that you have access to the library. Type:

```
mv build/lib.macosx-10.4-i386-2.5/lxml $HOME
export PYTHONPATH=$HOME
```

You should now be ready to start using XPath. Note: if you change terminal windows you will have to type the final "export" line again. Add the export command to your .profile, like you did for g95.

Installing an XPath library for Perl

The installation route for Perl is very similar (unless you have the CPAN module set up, when you just have to run a single command as root: perl -MCPAN -e 'install XML::LibXML').

1. First download the file XML-LibXML-1.65.tar.gz using the download link from <http://search.cpan.org/~pajas/XML-LibXML-1.65/> and extract the files from the archive. For example, if you have downloaded to your home directory you would type the following at the command line:

```
cd ~
tar xzf XML-LibXML-1.65.tar.gz
```

2. Now build the module and install it in a new directory (this involves compiling some C code that is made available to perl). Just type (the fourth step may take a couple of minutes):

```
mkdir my-perl-LibXML
cd XML-LibXML-1.65
perl ./Makefile.PL LIB=~ /my-perl-LibXML PREFIX=~ /my-perl-LibXML
make
make test
make install
```

3. That's it - you have now created libXML bindings to your perl installation. If you wanted to install the library for all users of the system (and you had root access) you would have left off the LIB and PREFIX arguments to Makefile.PL (or, more likely have used the CPAN module as root), but you don't so instead we will just set up things so that you have access to the library. Type:

```
export PERL5LIB=$HOME/my-perl-LibXML
```

You should now be ready to start using XPath. Add the export command to your .profile, like you did for g95.

Sources of further information

In putting together this workshop we have made use of many books and other resources that you may find useful as you continue to explore the XML ecosystem. We list these sources and other resources below, grouped by theme.

Fortran

- The best up to date text book on Fortran95 is probably *Fortran 95/2003 explained* by Michael Metcalf, John Reid and Malcolm Cohen (2004, Oxford University Press, ISBN 0-19-852693-8). This is the latest in a long series of *Fortran explained* books that have followed the development of the language.
- Other useful Fortran resources include Starlink's Theory and Modelling Resources Cookbook at: <http://www.starlink.rl.ac.uk/star/docs/sc13.htx/index.html> and the various Numerical Recipes books (see: <http://www.nr.com/>).

General information about XML

- XML development is co-ordinated the World Wide Web Consortium (W3C). Links to the various XML standards ("recommendations") can be found at <http://www.w3.org/> and a brief outline of current activities can be found at <http://www.w3.org/XML/>.
- Also www.w3schools.com has a good series references and tutorials on XML and related technologies.

The Fortran XML library (FoX)

- The FoX home page is at <http://www.uszla.me.uk/FoX/>, the up to date documentation is at <http://www.uszla.me.uk/FoX/DoX/> and the source (for various versions) is at <http://www.uszla.me.uk/software/source/FoX/>.
- There is also a low traffic mailing list. Subscription is via a web based form located at <http://www.uszla.me.uk/cgi-bin/mailman/listinfo/FoX/>.

Information about specific XML languages

- **XHTML**: Much useful information about XHTML and related technologies can be found from the World Wide Web Consortium (W3C) home page at <http://www.w3.org/>. Useful tools and documents include a validator, the specification(s) and information about related technologies.
- **MathML**: The most useful resource for MathML is probably the W3C page on the language located at <http://www.w3.org/Math/>. Of particular interest is the specification for version 2 located at <http://www.w3.org/TR/2003/REC-MathML2-20031021/>, content MathML is described in section 4.
- **KML**: Documentation, tutorials and the specification are available from Google, linked from <http://earth.google.com/kml/>. Google Earth is available from <http://earth.google.com/>.
- **quakeML**: Documentation can be found at <http://www.quakeml.ethz.ch>.
- **Dublin Core**: Documentation at <http://dublincore.org>.
- **The Open Geospatial Consortium**: Looks after Geography Markup Language (GML). <http://www.opengeospatial.org>.

- **Other XML languages:** A fairly comprehensive list of other XML languages can be found at <http://xml.coverpages.org/xmlApplications>.

XPath

- A useful (if perhaps dated) book on XPath is *XPath and XPointer* (2002) by John E. Simpson (O'Reilly, ISBN: 0-596-00291-2).
- The ultimate reference work is the specification, which is a W3C Recommendation located at <http://www.w3.org/TR/xpath>.
- The Python XPath library and documentation can be downloaded at <http://codespeak.net/lxml>.
- The Perl XPath library is called XML::LibXML. CPAN (the Comprehensive Perl Archive Network, <http://www.cpan.org/>) and the library can be installed using the CPAN module. Documentation is at: <http://search.cpan.org/~pajas/XML-LibXML-1.65/>.
- A standard C XML library (libxml2) can be found at <http://xmlsoft.org>, this has bindings for many other scripting languages.