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**NAME**

perlmodlib - constructing new Perl modules and finding existing ones

**THE PERL MODULE LIBRARY**

Many modules are included in the Perl distribution. These are described below, and all end in *.pm*. You may discover compiled library files (usually ending in *.so*) or small pieces of modules to be autoloaded (ending in *.al*); these were automatically generated by the installation process. You may also discover files in the library directory that end in either *.pl* or *.ph*. These are old libraries supplied so that old programs that use them still run. The *.pl* files will all eventually be converted into standard modules, and the *.ph* files made by **h2ph** will probably end up as extension modules made by **h2xs**. (Some *.ph* values may already be available through the `POSIX`, `Errno`, or `Fcntl` modules.) The **pl2pm** file in the distribution may help in your conversion, but it's just a mechanical process and therefore far from bulletproof.

**Pragmatic Modules**

They work somewhat like compiler directives (pragmata) in that they tend to affect the compilation of your program, and thus will usually work well only when used within a `use`, or `no`. Most of these are lexically scoped, so an inner BLOCK may countermand them by saying:

```
no integer;
no strict 'refs';
no warnings;
```

which lasts until the end of that BLOCK.

Some pragmas are lexically scoped--typically those that affect the `%^H` hints variable. Others affect the current package instead, like `use vars` and `use subs`, which allow you to predeclare a variables or subroutines within a particular *file* rather than just a block. Such declarations are effective for the entire file for which they were declared. You cannot rescind them with `no vars` or `no subs`.

The following pragmas are defined (and have their own documentation).

attributes

Get/set subroutine or variable attributes

attrs

Set/get attributes of a subroutine (deprecated)

autouse

Postpone load of modules until a function is used

base

Establish an ISA relationship with base classes at compile time

bigint

Transparent BigInteger support for Perl

bignum

Transparent BigNumber support for Perl

bigrat

Transparent BigNumber/BigRational support for Perl

blib

Use MakeMaker's uninstalled version of a package

bytes

|             |  |
|-------------|--|
|             | Force byte semantics rather than character semantics                     |
| chardnames  | Define character names for <code>\N{named}</code> string literal escapes |
| constant    | Declare constants  |
| diagnostics | Produce verbose warning diagnostics                                      |
| encoding    | Allows you to write your script in non-ascii or non-utf8                 |
| fields      | Compile-time class fields  |
| filetest    | Control the filetest permission operators                                |
| if          | use a Perl module if a condition holds                                   |
| integer     | Use integer arithmetic instead of floating point                         |
| less        | Request less of something from the compiler                              |
| lib         | Manipulate <code>@INC</code> at compile time                             |
| locale      | Use and avoid POSIX locales for built-in operations                      |
| open        | Set default PerlIO layers for input and output                           |
| ops         | Restrict unsafe operations when compiling                                |
| overload    | Package for overloading Perl operations                                  |
| re          | Alter regular expression behaviour                                       |
| sigtrap     | Enable simple signal handling  |
| sort        | Control <code>sort()</code> behaviour                                    |
| strict      | Restrict unsafe constructs   |

|                    |  |
|--------------------|--|
| subs               | Predeclare sub names                                       |
| threads            | Perl interpreter-based threads                             |
| threads::shared    | Perl extension for sharing data structures between threads |
| utf8               | Enable/disable UTF-8 (or UTF-EBCDIC) in source code        |
| vars               | Predeclare global variable names (obsolete)                |
| vmsish             | Control VMS-specific language features                     |
| warnings           | Control optional warnings                                  |
| warnings::register | Warnings import function                                   |

## Standard Modules

Standard, bundled modules are all expected to behave in a well-defined manner with respect to namespace pollution because they use the Exporter module. See their own documentation for details.

It's possible that not all modules listed below are installed on your system. For example, the GDBM\_File module will not be installed if you don't have the gdbm library.

|                     |  |
|---------------------|--|
| AnyDBM_File         | Provide framework for multiple DBMs                          |
| Attribute::Handlers | Simpler definition of attribute handlers                     |
| AutoLoader          | Load subroutines only on demand                              |
| AutoSplit           | Split a package for autoloading                              |
| B                   | The Perl Compiler  |
| B::Asmdata          | Autogenerated data about Perl ops, used to generate bytecode |
| B::Assembler        | Assemble Perl bytecode                                       |
| B::Block            | Walk basic blocks  |
| B::Bytecode         |  |

|                 |  |
|-----------------|--|
|                 | Perl compiler's bytecode backend                           |
| B::C            | Perl compiler's C backend                                  |
| B::CC           | Perl compiler's optimized C translation backend            |
| B::Concise      | Walk Perl syntax tree, printing concise info about ops     |
| B::Debug        | Walk Perl syntax tree, printing debug info about ops       |
| B::Deparse      | Perl compiler backend to produce perl code                 |
| B::Disassembler | Disassemble Perl bytecode                                  |
| B::Lint         | Perl lint  |
| B::Lint::Debug  | Adds debugging stringification to B::                      |
| B::Showlex      | Show lexical variables used in functions or files          |
| B::Stackobj     | Helper module for CC backend                               |
| B::Stash        | Show what stashes are loaded                               |
| B::Terse        | Walk Perl syntax tree, printing terse info about ops       |
| B::Xref         | Generates cross reference reports for Perl programs        |
| Benchmark       | Benchmark running times of Perl code                       |
| ByteLoader      | Load byte compiled perl code                               |
| CGI             | Simple Common Gateway Interface Class                      |
| CGI::Apache     | Backward compatibility module for CGI.pm                   |
| CGI::Carp       | CGI routines for writing to the HTTPD (or other) error log |

|                  |  |
|------------------|--|
| CGI::Cookie      | Interface to Netscape Cookies                          |
| CGI::Fast        | CGI Interface for Fast CGI                             |
| CGI::Pretty      | Module to produce nicely formatted HTML code           |
| CGI::Push        | Simple Interface to Server Push                        |
| CGI::Switch      | Backward compatibility module for defunct CGI::Switch  |
| CGI::Util        | Internal utilities used by CGI module                  |
| CORE             | Pseudo-namespace for Perl's core routines              |
| CPAN             | Query, download and build perl modules from CPAN sites |
| CPAN::API::HOWTO | A recipe book for programming with CPAN.pm             |
| CPAN::FirstTime  | Utility for CPAN::Config file Initialization           |
| CPAN::Kwalify    | Interface between CPAN.pm and Kwalify.pm               |
| CPAN::Nox        | Wrapper around CPAN.pm without using any XS module     |
| CPAN::Version    | Utility functions to compare CPAN versions             |
| Carp             | Warn of errors (from perspective of caller)            |
| Carp::Heavy      | Heavy machinery, no user serviceable parts inside      |
| Class::ISA       | Report the search path for a class's ISA tree          |
| Class::Struct    | Declare struct-like datatypes as Perl classes          |
| Config           | Access Perl configuration information                  |
| Cwd              | Get pathname of current working directory              |

|                      |   |
|----------------------|---|
| DB                   | Programmatic interface to the Perl debugging API (draft, subject to   |
| DBM_Filter           | Filter DBM keys/values  |
| DBM_Filter::compress | Filter for DBM_Filter   |
| DBM_Filter::encode   | Filter for DBM_Filter   |
| DBM_Filter::int32    | Filter for DBM_Filter   |
| DBM_Filter::null     | Filter for DBM_Filter   |
| DBM_Filter::utf8     | Filter for DBM_Filter   |
| DB_File              | Perl5 access to Berkeley DB version 1.x                               |
| Data::Dumper         | Stringified perl data structures, suitable for both printing and eval |
| Devel::DProf         | A Perl code profiler  |
| Devel::InnerPackage  | Find all the inner packages of a package                              |
| Devel::Peek          | A data debugging tool for the XS programmer                           |
| Devel::SelfStubber   | Generate stubs for a SelfLoading module                               |
| Digest               | Modules that calculate message digests                                |
| Digest::MD5          | Perl interface to the MD5 Algorithm                                   |
| Digest::base         | Digest base class   |
| Digest::file         | Calculate digests of files  |
| DirHandle            | Supply object methods for directory handles                           |
| Dumpvalue            | Provides screen dump of Perl data.                                    |

|                      |   |
|----------------------|---|
| DynaLoader           | Dynamically load C libraries into Perl code |
| Encode               | Character encodings                         |
| Encode::Alias        | Alias definitions to encodings              |
| Encode::Byte         | Single Byte Encodings                       |
| Encode::CJKConstants | Internally used by Encode::??::ISO_2022_*   |
| Encode::CN           | China-based Chinese Encodings               |
| Encode::CN::HZ       | Internally used by Encode::CN               |
| Encode::Config       | Internally used by Encode                   |
| Encode::EBCDIC       | EBCDIC Encodings                            |
| Encode::Encoder      | Object Oriented Encoder                     |
| Encode::Encoding     | Encode Implementation Base Class            |
| Encode::GSM0338      | ESTI GSM 03.38 Encoding                     |
| Encode::Guess        | Guesses encoding from data                  |
| Encode::JP           | Japanese Encodings                          |
| Encode::JP::H2Z      | Internally used by Encode::JP::2022_JP*     |
| Encode::JP::JIS7     | Internally used by Encode::JP               |
| Encode::KR           | Korean Encodings                            |
| Encode::KR::2022_KR  | Internally used by Encode::KR               |
| Encode::MIME::Header | MIME 'B' and 'Q' header encoding            |

|                           |   |
|---------------------------|---|
| Encode::MIME::Name        | Internally used by Encode   |
| Encode::PerlIO            | A detailed document on Encode and PerlIO                            |
| Encode::Supported         | Encodings supported by Encode                                       |
| Encode::Symbol            | Symbol Encodings  |
| Encode::TW                | Taiwan-based Chinese Encodings                                      |
| Encode::Unicode           | Various Unicode Transformation Formats                              |
| Encode::Unicode::UTF7     | UTF-7 encoding  |
| English                   | Use nice English (or awk) names for ugly punctuation variables      |
| Env                       | Perl module that imports environment variables as scalars or arrays |
| Errno                     | System errno constants  |
| Exporter                  | Implements default import method for modules                        |
| Exporter::Heavy           | Exporter guts   |
| ExtUtils::Command         | Utilities to replace common UNIX commands in Makefiles etc.         |
| ExtUtils::Command::MM     | Commands for the MM's to use in Makefiles                           |
| ExtUtils::Constant        | Generate XS code to import C header constants                       |
| ExtUtils::Constant::Base  | Base class for ExtUtils::Constant objects                           |
| ExtUtils::Constant::Utils | Helper functions for ExtUtils::Constant                             |
| ExtUtils::Constant::XS    | Base class for ExtUtils::Constant objects                           |
| ExtUtils::Embed           | Utilities for embedding Perl in C/C++ applications                  |



|                     |   |
|---------------------|---|
| ExtUtils::Install   | Install files from here to there                          |
| ExtUtils::Installed | Inventory management of installed modules                 |
| ExtUtils::Liblist   | Determine libraries to use and how to use them            |
| ExtUtils::MM        | OS adjusted ExtUtils::MakeMaker subclass                  |
| ExtUtils::MM_AIX    | AIX specific subclass of ExtUtils::MM_Unix                |
| ExtUtils::MM_Any    | Platform-agnostic MM methods                              |
| ExtUtils::MM_BeOS   | Methods to override UN*X behaviour in ExtUtils::MakeMaker |
| ExtUtils::MM_Cygwin | Methods to override UN*X behaviour in ExtUtils::MakeMaker |
| ExtUtils::MM_DOS    | DOS specific subclass of ExtUtils::MM_Unix                |
| ExtUtils::MM_Darwin | Special behaviors for OS X                                |
| ExtUtils::MM_MacOS  | Once produced Makefiles for MacOS Classic                 |
| ExtUtils::MM_NW5    | Methods to override UN*X behaviour in ExtUtils::MakeMaker |
| ExtUtils::MM_OS2    | Methods to override UN*X behaviour in ExtUtils::MakeMaker |
| ExtUtils::MM_QNX    | QNX specific subclass of ExtUtils::MM_Unix                |
| ExtUtils::MM_UWIN   | U/WIN specific subclass of ExtUtils::MM_Unix              |
| ExtUtils::MM_Unix   | Methods used by ExtUtils::MakeMaker                       |
| ExtUtils::MM_VMS    | Methods to override UN*X behaviour in ExtUtils::MakeMaker |
| ExtUtils::MM_VOS    | VOS specific subclass of ExtUtils::MM_Unix                |
| ExtUtils::MM_Win32  | Methods to override UN*X behaviour in ExtUtils::MakeMaker |

|                               |   |
|-------------------------------|---|
| ExtUtils::MM_Win95            | Method to customize MakeMaker for Win9X                 |
| ExtUtils::MY                  | ExtUtils::MakeMaker subclass for customization          |
| ExtUtils::MakeMaker           | Create a module Makefile                                |
| ExtUtils::MakeMaker::Config   | Wrapper around Config.pm                                |
| ExtUtils::MakeMaker::FAQ      | Frequently Asked Questions About MakeMaker              |
| ExtUtils::MakeMaker::Tutorial | Writing a module with MakeMaker                         |
| ExtUtils::MakeMaker::bytes    | Version-agnostic bytes.pm                               |
| ExtUtils::MakeMaker::vmsish   | Platform-agnostic vmsish.pm                             |
| ExtUtils::Manifest            | Utilities to write and check a MANIFEST file            |
| ExtUtils::Mkbootstrap         | Make a bootstrap file for use by DynaLoader             |
| ExtUtils::Mksymlists          | Write linker options files for dynamic extension        |
| ExtUtils::Packlist            | Manage .packlist files                                  |
| ExtUtils::ParseXS             | Converts Perl XS code into C code                       |
| ExtUtils::testlib             | Add blib/* directories to @INC                          |
| Fatal                         | Replace functions with equivalents which succeed or die |
| Fcntl                         | Load the C Fcntl.h defines                              |
| File::Basename                | Parse file paths into directory, filename and suffix.   |
| File::CheckTree               | Run many filetest checks on a tree                      |
| File::Compare                 | Compare files or filehandles                            |

|                       |  |
|-----------------------|--|
| File::Copy            | Copy files or filehandles                              |
| File::DosGlob         | DOS like globbing and then some                        |
| File::Find            | Traverse a directory tree.                             |
| File::Glob            | Perl extension for BSD glob routine                    |
| File::Path            | Create or remove directory trees                       |
| File::Spec            | Portably perform operations on file names              |
| File::Spec::Cygwin    | Methods for Cygwin file specs                          |
| File::Spec::Epoc      | Methods for Epoc file specs                            |
| File::Spec::Functions | Portably perform operations on file names              |
| File::Spec::Mac       | File::Spec for Mac OS (Classic)                        |
| File::Spec::OS2       | Methods for OS/2 file specs                            |
| File::Spec::Unix      | File::Spec for Unix, base for other File::Spec modules |
| File::Spec::VMS       | Methods for VMS file specs                             |
| File::Spec::Win32     | Methods for Win32 file specs                           |
| File::Temp            | Return name and handle of a temporary file safely      |
| File::stat            | By-name interface to Perl's built-in stat() functions  |
| FileCache             | Keep more files open than the system permits           |
| FileHandle            | Supply object methods for filehandles                  |
| Filter::Simple        | Simplified source filtering                            |

|                        |   |
|------------------------|---|
| Filter::Util::Call     | Perl Source Filter Utility Module                         |
| FindBin                | Locate directory of original perl script                  |
| GDBM_File              | Perl5 access to the gdbm library.                         |
| Getopt::Long           | Extended processing of command line options               |
| Getopt::Std            | Process single-character switches with switch clustering  |
| Hash::Util             | A selection of general-utility hash subroutines           |
| I18N::Collate          | Compare 8-bit scalar data according to the current locale |
| I18N::LangTags         | Functions for dealing with RFC3066-style language tags    |
| I18N::LangTags::Detect | Detect the user's language preferences                    |
| I18N::LangTags::List   | Tags and names for human languages                        |
| I18N::Langinfo         | Query locale information                                  |
| IO                     | Load various IO modules                                   |
| IO::Dir                | Supply object methods for directory handles               |
| IO::File               | Supply object methods for filehandles                     |
| IO::Handle             | Supply object methods for I/O handles                     |
| IO::Pipe               | Supply object methods for pipes                           |
| IO::Poll               | Object interface to system poll call                      |
| IO::Seekable           | Supply seek based methods for I/O objects                 |
| IO::Select             | OO interface to the select system call                    |

|                         |   |
|-------------------------|---|
| IO::Socket              | Object interface to socket communications                     |
| IO::Socket::INET        | Object interface for AF_INET domain sockets                   |
| IO::Socket::UNIX        | Object interface for AF_UNIX domain sockets                   |
| IPC::Open2              | Open a process for both reading and writing                   |
| IPC::Open3              | Open a process for reading, writing, and error handling       |
| IPC::SysV               | SysV IPC constants  |
| IPC::SysV::Msg          | SysV Msg IPC object class                                     |
| IPC::SysV::Semaphore    | SysV Semaphore IPC object class                               |
| List::Util              | A selection of general-utility list subroutines               |
| Locale::Constants       | Constants for Locale codes                                    |
| Locale::Country         | ISO codes for country identification (ISO 3166)               |
| Locale::Currency        | ISO three letter codes for currency identification (ISO 4217) |
| Locale::Language        | ISO two letter codes for language identification (ISO 639)    |
| Locale::Maketext        | Framework for localization                                    |
| Locale::Maketext::TPJ13 | Article about software localization                           |
| Locale::Script          | ISO codes for script identification (ISO 15924)               |
| MIME::Base64            | Encoding and decoding of base64 strings                       |
| MIME::QuotedPrint       | Encoding and decoding of quoted-printable strings             |
| Math::BigFloat          | Arbitrary size floating point math package                    |

|                           |   |
|---------------------------|---|
| Math::BigInt              | Arbitrary size integer/float math package                         |
| Math::BigInt::Calc        | Pure Perl module to support Math::BigInt                          |
| Math::BigInt::CalcEmu     | Emulate low-level math with BigInt code                           |
| Math::BigRat              | Arbitrary big rational numbers                                    |
| Math::Complex             | Complex numbers and associated mathematical functions             |
| Math::Trig                | Trigonometric functions   |
| Memoize                   | Make functions faster by trading space for time                   |
| Memoize::AnyDBM_File      | Glue to provide EXISTS for AnyDBM_File for Storable use           |
| Memoize::Expire           | Plug-in module for automatic expiration of memoized values        |
| Memoize::ExpireFile       | Test for Memoize expiration semantics                             |
| Memoize::ExpireTest       | Test for Memoize expiration semantics                             |
| Memoize::NDBM_File        | Glue to provide EXISTS for NDBM_File for Storable use             |
| Memoize::SDBM_File        | Glue to provide EXISTS for SDBM_File for Storable use             |
| Memoize::Storable         | Store Memoized data in Storable database                          |
| Module::CoreList          | What modules shipped with versions of perl                        |
| Module::Pluggable         | Automatically give your module the ability to have plugins        |
| Module::Pluggable::Object | Automatically give your module the ability to have plugins        |
| NDBM_File                 | Tied access to ndbm files   |
| NEXT                      | Provide a pseudo-class NEXT (et al) that allows method redispatch |

|                |   |
|----------------|---|
| Net::Cmd       | Network Command class (as used by FTP, SMTP etc)                |
| Net::Config    | Local configuration data for libnet                             |
| Net::Domain    | Attempt to evaluate the current host's internet name and domain |
| Net::FTP       | FTP Client class  |
| Net::NNTP      | NNTP Client class   |
| Net::Netrc     | OO interface to users netrc file                                |
| Net::POP3      | Post Office Protocol 3 Client class (RFC1939)                   |
| Net::Ping      | Check a remote host for reachability                            |
| Net::SMTP      | Simple Mail Transfer Protocol Client                            |
| Net::Time      | Time and daytime network client interface                       |
| Net::hostent   | By-name interface to Perl's built-in gethost*() functions       |
| Net::libnetFAQ | Libnet Frequently Asked Questions                               |
| Net::netent    | By-name interface to Perl's built-in getnet*() functions        |
| Net::protoent  | By-name interface to Perl's built-in getproto*() functions      |
| Net::servent   | By-name interface to Perl's built-in getserv*() functions       |
| O              | Generic interface to Perl Compiler backends                     |
| ODBM_File      | Tied access to odbm files                                       |
| Opcode         | Disable named opcodes when compiling perl code                  |
| POSIX          | Perl interface to IEEE Std 1003.1                               |

|                          |   |
|--------------------------|---|
| PerlIO                   | On demand loader for PerlIO layers and root of PerlIO::* name space |
| PerlIO::encoding         | Encoding layer  |
| PerlIO::scalar           | In-memory IO, scalar IO   |
| PerlIO::via              | Helper class for PerlIO layers implemented in perl                  |
| PerlIO::via::QuotedPrint | PerlIO layer for quoted-printable strings                           |
| Pod::Checker             | Check pod documents for syntax errors                               |
| Pod::Find                | Find POD documents in directory trees                               |
| Pod::Functions           | Group Perl's functions a la perlfunc.pod                            |
| Pod::Html                | Module to convert pod files to HTML                                 |
| Pod::InputObjects        | Objects representing POD input paragraphs, commands, etc.           |
| Pod::LaTeX               | Convert Pod data to formatted Latex                                 |
| Pod::Man                 | Convert POD data to formatted *roff input                           |
| Pod::ParseLink           | Parse an L<> formatting code in POD text                            |
| Pod::ParseUtils          | Helpers for POD parsing and conversion                              |
| Pod::Parser              | Base class for creating POD filters and translators                 |
| Pod::Perldoc::ToChecker  | Let Perldoc check Pod for errors                                    |
| Pod::Perldoc::ToMan      | Let Perldoc render Pod as man pages                                 |
| Pod::Perldoc::ToNroff    | Let Perldoc convert Pod to nroff                                    |
| Pod::Perldoc::ToPod      | Let Perldoc render Pod as ... Pod!                                  |



|                       |   |
|-----------------------|---|
| Pod::Perldoc::ToRtf   | Let Perldoc render Pod as RTF                         |
| Pod::Perldoc::ToText  | Let Perldoc render Pod as plaintext                   |
| Pod::Perldoc::ToTk    | Let Perldoc use Tk::Pod to render Pod                 |
| Pod::Perldoc::ToXml   | Let Perldoc render Pod as XML                         |
| Pod::PlainText        | Convert POD data to formatted ASCII text              |
| Pod::Plainer          | Perl extension for converting Pod to old style Pod.   |
| Pod::Select           | Extract selected sections of POD from input           |
| Pod::Text             | Convert POD data to formatted ASCII text              |
| Pod::Text::Color      | Convert POD data to formatted color ASCII text        |
| Pod::Text::Overstrike | Convert POD data to formatted overstrike text         |
| Pod::Text::Termcap    | Convert POD data to ASCII text with format escapes    |
| Pod::Usage            | Print a usage message from embedded pod documentation |
| SDBM_File             | Tied access to sdbm files                             |
| Safe                  | Compile and execute code in restricted compartments   |
| Scalar::Util          | A selection of general-utility scalar subroutines     |
| Search::Dict          | Search for key in dictionary file                     |
| SelectSaver           | Save and restore selected file handle                 |
| SelfLoader            | Load functions only on demand                         |
| Shell                 | Run shell commands transparently within perl          |

|                              |   |
|------------------------------|---|
| Socket                       | Load the C socket.h defines and structure manipulators    |
| Storable                     | Persistence for Perl data structures                      |
| Switch                       | A switch statement for Perl                               |
| Symbol                       | Manipulate Perl symbols and their names                   |
| Sys::Hostname                | Try every conceivable way to get hostname                 |
| Sys::Syslog                  | Perl interface to the UNIX syslog(3) calls                |
| Sys::Syslog::win32::Win32    | Win32 support for Sys::Syslog                             |
| Term::ANSIColor              | Color screen output using ANSI escape sequences           |
| Term::Cap                    | Perl termcap interface                                    |
| Term::Complete               | Perl word completion module                               |
| Term::ReadLine               | Perl interface to various <code>readline</code> packages. |
| Test                         | Provides a simple framework for writing test scripts      |
| Test::Builder                | Backend for building test libraries                       |
| Test::Builder::Module        | Base class for test modules                               |
| Test::Builder::Tester        | Test testsuites that have been built with                 |
| Test::Builder::Tester::Color | Turn on colour in Test::Builder::Tester                   |
| Test::Harness                | Run Perl standard test scripts with statistics            |
| Test::Harness::Assert        | Simple assert   |
| Test::Harness::Iterator      | Internal Test::Harness Iterator                           |

|                        |   |
|------------------------|---|
| Test::Harness::Point   | Object for tracking a single test point                           |
| Test::Harness::Results | Object for tracking results from a single test file               |
| Test::Harness::Straps  | Detailed analysis of test results                                 |
| Test::Harness::TAP     | Documentation for the TAP format                                  |
| Test::Harness::Util    | Utility functions for Test::Harness::*                            |
| Test::More             | Yet another framework for writing test scripts                    |
| Test::Simple           | Basic utilities for writing tests.                                |
| Test::Tutorial         | A tutorial about writing really basic tests                       |
| Text::Abbrev           | Create an abbreviation table from a list                          |
| Text::Balanced         | Extract delimited text sequences from strings.                    |
| Text::ParseWords       | Parse text into an array of tokens or array of arrays             |
| Text::Soundex          | Implementation of the soundex algorithm.                          |
| Text::Tabs             | Expand and unexpand tabs per the unix expand(1) and unexpand(1)   |
| Text::Wrap             | Line wrapping to form simple paragraphs                           |
| Thread                 | Manipulate threads in Perl (for old code only)                    |
| Thread::Queue          | Thread-safe queues  |
| Thread::Semaphore      | Thread-safe semaphores  |
| Thread::Signal         | Start a thread which runs signal handlers reliably (for old code) |
| Thread::Specific       | Thread-specific keys  |

|                    |   |
|--------------------|---|
| Tie::Array         | Base class for tied arrays                                  |
| Tie::File          | Access the lines of a disk file via a Perl array            |
| Tie::Handle        | Base class definitions for tied handles                     |
| Tie::Hash          | Base class definitions for tied hashes                      |
| Tie::Memoize       | Add data to hash when needed                                |
| Tie::RefHash       | Use references as hash keys                                 |
| Tie::Scalar        | Base class definitions for tied scalars                     |
| Tie::SubstrHash    | Fixed-table-size, fixed-key-length hashing                  |
| Time::HiRes        | High resolution alarm, sleep, gettimeofday, interval timers |
| Time::Local        | Efficiently compute time from local and GMT time            |
| Time::gmtime       | By-name interface to Perl's built-in gmtime() function      |
| Time::localtime    | By-name interface to Perl's built-in localtime() function   |
| Time::tm           | Internal object used by Time::gmtime and Time::localtime    |
| UNIVERSAL          | Base class for ALL classes (blessed references)             |
| Unicode::Collate   | Unicode Collation Algorithm                                 |
| Unicode::Normalize | Unicode Normalization Forms                                 |
| Unicode::UCD       | Unicode character database                                  |
| User::grent        | By-name interface to Perl's built-in getgr*() functions     |
| User::pwent        | By-name interface to Perl's built-in getpw*() functions     |

## Win32

Interfaces to some Win32 API Functions

## Win32API::File

Low-level access to Win32 system API calls for files/dirs.

## Win32CORE

Win32 CORE function stubs

## XS::APITest

Test the perl C API

## XS::Typemap

Module to test the XS typemaps distributed with perl

## XSLoader

Dynamically load C libraries into Perl code

To find out *all* modules installed on your system, including those without documentation or outside the standard release, just use the following command (under the default win32 shell, double quotes should be used instead of single quotes).

```
% perl -MFile::Find=find -MFile::Spec::Functions -Tlwe \  
  'find { wanted => sub { print canonpath $_ if /\.pm\z/ }, \  
  no_chdir => 1 }, @INC'
```

(The -T is here to prevent '.' from being listed in @INC.) They should all have their own documentation installed and accessible via your system `man(1)` command. If you do not have a **find** program, you can use the Perl **find2perl** program instead, which generates Perl code as output you can run through perl. If you have a **man** program but it doesn't find your modules, you'll have to fix your manpath. See *perl* for details. If you have no system **man** command, you might try the **perldoc** program.

Note also that the command `perldoc perllocal` gives you a (possibly incomplete) list of the modules that have been further installed on your system. (The `perllocal.pod` file is updated by the standard MakeMaker install process.)

## Extension Modules

Extension modules are written in C (or a mix of Perl and C). They are usually dynamically loaded into Perl if and when you need them, but may also be linked in statically. Supported extension modules include Socket, Fcntl, and POSIX.

Many popular C extension modules do not come bundled (at least, not completely) due to their sizes, volatility, or simply lack of time for adequate testing and configuration across the multitude of platforms on which Perl was beta-tested. You are encouraged to look for them on CPAN (described below), or using web search engines like Alta Vista or Google.

## CPAN

CPAN stands for Comprehensive Perl Archive Network; it's a globally replicated trove of Perl materials, including documentation, style guides, tricks and traps, alternate ports to non-Unix systems and occasional binary distributions for these. Search engines for CPAN can be found at <http://www.cpan.org/>

Most importantly, CPAN includes around a thousand unbundled modules, some of which require a C compiler to build. Major categories of modules are:

- Language Extensions and Documentation Tools

- Development Support
- Operating System Interfaces
- Networking, Device Control (modems) and InterProcess Communication
- Data Types and Data Type Utilities
- Database Interfaces
- User Interfaces
- Interfaces to / Emulations of Other Programming Languages
- File Names, File Systems and File Locking (see also File Handles)
- String Processing, Language Text Processing, Parsing, and Searching
- Option, Argument, Parameter, and Configuration File Processing
- Internationalization and Locale
- Authentication, Security, and Encryption
- World Wide Web, HTML, HTTP, CGI, MIME
- Server and Daemon Utilities
- Archiving and Compression
- Images, Pixmap and Bitmap Manipulation, Drawing, and Graphing
- Mail and Usenet News
- Control Flow Utilities (callbacks and exceptions etc)
- File Handle and Input/Output Stream Utilities
- Miscellaneous Modules

The list of the registered CPAN sites as of this writing follows. Please note that the sorting order is alphabetical on fields:

Continent | |-->Country | |-->[state/province] | |-->ftp | |-->[http]

and thus the North American servers happen to be listed between the European and the South American sites.

You should try to choose one close to you.

## Africa

### South Africa

```
http://ftp.rucus.ru.ac.za/pub/perl/CPAN/  
ftp://ftp.rucus.ru.ac.za/pub/perl/CPAN/  
ftp://ftp.is.co.za/programming/perl/CPAN/  
ftp://ftp.saix.net/pub/CPAN/  
ftp://ftp.sun.ac.za/CPAN/CPAN/
```

## Asia

### China

```
http://cpan.linuxforum.net/  
http://cpan.shellhung.org/
```

<ftp://ftp.shellhung.org/pub/CPAN>  
<ftp://mirrors.hknet.com/CPAN>

#### Indonesia

<http://mirrors.tf.itb.ac.id/cpan/>  
<http://cpan.cbn.net.id/>  
<ftp://ftp.cbn.net.id/mirror/CPAN>

#### Israel

<ftp://ftp.iglu.org.il/pub/CPAN/>  
<http://cpan.lerner.co.il/>  
  
<http://bioinfo.weizmann.ac.il/pub/software/perl/CPAN/>  
  
<ftp://bioinfo.weizmann.ac.il/pub/software/perl/CPAN/>

#### Japan

<ftp://ftp.u-aizu.ac.jp/pub/CPAN>  
<ftp://ftp.kddlabs.co.jp/CPAN/>  
<ftp://ftp.ayamura.org/pub/CPAN/>  
<ftp://ftp.jaist.ac.jp/pub/lang/perl/CPAN/>  
<http://ftp.cpan.jp/>  
<ftp://ftp.cpan.jp/CPAN/>  
<ftp://ftp.dti.ad.jp/pub/lang/CPAN/>  
<ftp://ftp.ring.gr.jp/pub/lang/perl/CPAN/>

#### Malaysia

<http://cpan.MyBSD.org.my>  
<http://mirror.leafbug.org/pub/CPAN>  
<http://ossig.mncc.com.my/mirror/pub/CPAN>

#### Russian Federation

<http://cpan.tomsk.ru>  
<ftp://cpan.tomsk.ru/>

#### Saudi Arabia

<ftp://ftp.isu.net.sa/pub/CPAN/>

#### Singapore

<http://CPAN.en.com.sg/>  
<ftp://cpan.en.com.sg/>  
<http://mirror.averse.net/pub/CPAN>  
<ftp://mirror.averse.net/pub/CPAN>  
<http://cpan.oss.eznetsols.org>  
<ftp://ftp.oss.eznetsols.org/cpan>

#### South Korea

<http://CPAN.bora.net/>  
<ftp://ftp.bora.net/pub/CPAN/>  
<http://mirror.kr.FreeBSD.org/CPAN>  
<ftp://ftp.kr.FreeBSD.org/pub/CPAN>

## Taiwan

```
ftp://ftp.nctu.edu.tw/UNIX/perl/CPAN
http://cpan.cdpa.nsysu.edu.tw/
ftp://cpan.cdpa.nsysu.edu.tw/pub/CPAN
http://ftp.isu.edu.tw/pub/CPAN
ftp://ftp.isu.edu.tw/pub/CPAN
ftp://ftpl.sinica.edu.tw/pub1/perl/CPAN/
http://ftp.tku.edu.tw/pub/CPAN/
ftp://ftp.tku.edu.tw/pub/CPAN/
```

## Thailand

```
ftp://ftp.loxinfo.co.th/pub/cpan/
ftp://ftp.cs.riubon.ac.th/pub/mirrors/CPAN/
```

**Central America**

## Costa Rica

```
http://ftp.ucr.ac.cr/Unix/CPAN/
ftp://ftp.ucr.ac.cr/pub/Unix/CPAN/
```

**Europe**

## Austria

```
http://cpan.inode.at/
ftp://cpan.inode.at
ftp://ftp.tuwien.ac.at/pub/CPAN/
```

## Belgium

```
http://ftp.easynet.be/pub/CPAN/
ftp://ftp.easynet.be/pub/CPAN/
http://cpan.skynet.be
ftp://ftp.cpan.skynet.be/pub/CPAN
```

```
ftp://ftp.kulnet.kuleuven.ac.be/pub/mirror/CPAN/
```

## Bosnia and Herzegovina

```
http://cpan.blic.net/
```

## Bulgaria

```
http://cpan.online.bg
ftp://cpan.online.bg/cpan
http://cpan.zadnik.org
ftp://ftp.zadnik.org/mirrors/CPAN/
http://cpan.lirex.net/
ftp://ftp.lirex.net/pub/mirrors/CPAN
```

## Croatia

```
http://ftp.linux.hr/pub/CPAN/
ftp://ftp.linux.hr/pub/CPAN/
```

## Czech Republic

```
ftp://ftp.fi.muni.cz/pub/CPAN/
```



`ftp://sunsite.mff.cuni.cz/MIRRORS/ftp.funet.fi/pub/languages/perl/CPAN/`

#### Denmark

`http://mirrors.sunsite.dk/cpan/`  
`ftp://sunsite.dk/mirrors/cpan/`  
`http://cpan.cybercity.dk`  
`http://www.cpan.dk/CPAN/`  
`ftp://www.cpan.dk/ftp.cpan.org/CPAN/`

#### Estonia

`ftp://ftp.ut.ee/pub/languages/perl/CPAN/`

#### Finland

`ftp://ftp.funet.fi/pub/languages/perl/CPAN/`  
`http://mirror.eunet.fi/CPAN`

#### France

`http://www.enstimac.fr/Perl/CPAN`  
`http://ftp.u-paris10.fr/perl/CPAN`  
`ftp://ftp.u-paris10.fr/perl/CPAN`  
`http://cpan.mirrors.easynet.fr/`  
`ftp://cpan.mirrors.easynet.fr/pub/ftp.cpan.org/`  
`ftp://ftp.club-internet.fr/pub/perl/CPAN/`  
`http://fr.cpan.org/`  
`ftp://ftp.lip6.fr/pub/perl/CPAN/`  
`ftp://ftp.oleane.net/pub/mirrors/CPAN/`  
`ftp://ftp.pasteur.fr/pub/computing/CPAN/`  
`http://mir2.ovh.net/ftp.cpan.org`  
`ftp://mir1.ovh.net/ftp.cpan.org`  
`http://ftp.crihan.fr/mirrors/ftp.cpan.org/`  
`ftp://ftp.crihan.fr/mirrors/ftp.cpan.org/`  
`http://ftp.u-strasbg.fr/CPAN`  
`ftp://ftp.u-strasbg.fr/CPAN`  
`ftp://cpan.cict.fr/pub/CPAN/`  
`ftp://ftp.uvsq.fr/pub/perl/CPAN/`

#### Germany

`ftp://ftp.rub.de/pub/CPAN/`  
`ftp://ftp.freenet.de/pub/ftp.cpan.org/pub/CPAN/`  
`ftp://ftp.uni-erlangen.de/pub/source/CPAN/`  
  
`ftp://ftp-stud.fht-esslingen.de/pub/Mirrors/CPAN`  
`http://pandemonium.tiscali.de/pub/CPAN/`  
`ftp://pandemonium.tiscali.de/pub/CPAN/`  
`http://ftp.gwdg.de/pub/languages/perl/CPAN/`  
`ftp://ftp.gwdg.de/pub/languages/perl/CPAN/`  
  
`ftp://ftp.uni-hamburg.de/pub/soft/lang/perl/CPAN/`  
`ftp://ftp.leo.org/pub/CPAN/`  
`http://cpan.noris.de/`  
`ftp://cpan.noris.de/pub/CPAN/`

<ftp://ftp.mpi-sb.mpg.de/pub/perl/CPAN/>  
<ftp://ftp.gmd.de/mirrors/CPAN/>

#### Greece

<ftp://ftp.acn.gr/pub/lang/perl>  
<ftp://ftp.forthnet.gr/pub/languages/perl/CPAN>  
<ftp://ftp.ntua.gr/pub/lang/perl/>

#### Hungary

<http://ftp.kfki.hu/packages/perl/CPAN/>  
<ftp://ftp.kfki.hu/pub/packages/perl/CPAN/>

#### Iceland

<http://ftp.rhnet.is/pub/CPAN/>  
<ftp://ftp.rhnet.is/pub/CPAN/>

#### Ireland

<http://cpan.indigo.ie/>  
<ftp://cpan.indigo.ie/pub/CPAN/>

<http://ftp.heanet.ie/mirrors/ftp.perl.org/pub/CPAN>

<ftp://ftp.heanet.ie/mirrors/ftp.perl.org/pub/CPAN>  
<http://sunsite.compapp.dcu.ie/pub/perl/>  
<ftp://sunsite.compapp.dcu.ie/pub/perl/>

#### Italy

<http://cpan.nettuno.it/>  
<http://gusp.dyndns.org/CPAN/>  
<ftp://gusp.dyndns.org/pub/CPAN>  
<http://softcity.iol.it/cpan>  
<ftp://softcity.iol.it/pub/cpan>  
<ftp://ftp.unina.it/pub/Other/CPAN/CPAN/>  
<ftp://ftp.unipi.it/pub/mirror/perl/CPAN/>  
<ftp://cis.uniroma2.it/CPAN/>  
[ftp://ftp.edisontel.it/pub/CPAN\\_Mirror/](ftp://ftp.edisontel.it/pub/CPAN_Mirror/)  
<http://cpan.flashnet.it/>  
<ftp://ftp.flashnet.it/pub/CPAN/>

#### Latvia

<http://kvin.lv/pub/CPAN/>

#### Lithuania

<ftp://ftp.unix.lt/pub/CPAN/>

#### Netherlands

<ftp://download.xs4all.nl/pub/mirror/CPAN/>  
<ftp://ftp.nl.uu.net/pub/CPAN/>  
<ftp://ftp.nluug.nl/pub/languages/perl/CPAN/>  
<http://cpan.cybercomm.nl/>  
<ftp://mirror.cybercomm.nl/pub/CPAN>

```
ftp://mirror.vuurwerk.nl/pub/CPAN/  
ftp://ftp.cpan.nl/pub/CPAN/  
http://ftp.easynet.nl/mirror/CPAN  
ftp://ftp.easynet.nl/mirror/CPAN  
http://archive.cs.uu.nl/mirror/CPAN/  
ftp://ftp.cs.uu.nl/mirror/CPAN/
```

#### Norway

```
ftp://ftp.uninett.no/pub/languages/perl/CPAN  
ftp://ftp.uit.no/pub/languages/perl/cpan/
```

#### Poland

```
ftp://ftp.mega.net.pl/CPAN  
ftp://ftp.man.torun.pl/pub/doc/CPAN/  
ftp://sunsite.icm.edu.pl/pub/CPAN/
```

#### Portugal

```
ftp://ftp.ua.pt/pub/CPAN/  
ftp://perl.di.uminho.pt/pub/CPAN/  
http://cpan.dei.uc.pt/  
ftp://ftp.dei.uc.pt/pub/CPAN  
ftp://ftp.nfsi.pt/pub/CPAN  
http://ftp.linux.pt/pub/mirrors/CPAN  
ftp://ftp.linux.pt/pub/mirrors/CPAN  
http://cpan.ip.pt/  
ftp://cpan.ip.pt/pub/cpan/  
http://cpan.telepac.pt/  
ftp://ftp.telepac.pt/pub/cpan/
```

#### Romania

```
ftp://ftp.bio-net.ro/pub/CPAN  
  
ftp://ftp.kappa.ro/pub/mirrors/ftp.perl.org/pub/CPAN/  
ftp://ftp.lug.ro/CPAN  
ftp://ftp.roedu.net/pub/CPAN/  
ftp://ftp.dntis.ro/pub/cpan/  
  
ftp://ftp.iasi.roedu.net/pub/mirrors/ftp.cpan.org/  
http://cpan.ambra.ro/  
ftp://ftp.ambra.ro/pub/CPAN  
ftp://ftp.dnttm.ro/pub/CPAN/  
ftp://ftp.lasting.ro/pub/CPAN  
ftp://ftp.timisoara.roedu.net/mirrors/CPAN/
```

#### Russia

```
ftp://ftp.chg.ru/pub/lang/perl/CPAN/  
http://cpan.rinet.ru/  
ftp://cpan.rinet.ru/pub/mirror/CPAN/  
ftp://ftp.aha.ru/pub/CPAN/  
ftp://ftp.corbina.ru/pub/CPAN/  
http://cpan.sai.msu.ru/  
ftp://ftp.sai.msu.su/pub/lang/perl/CPAN/
```

## Slovakia

<ftp://ftp.cvt.stuba.sk/pub/CPAN/>

## Slovenia

<ftp://ftp.arnes.si/software/perl/CPAN/>

## Spain

<http://cpan.imasd.elmundo.es/>  
<ftp://ftp.rediris.es/mirror/CPAN/>  
[ftp://ftp.ri.telefonica-data.net/CPAN](ftp://ftp.ri.telefonica-data.net/CPAN/)  
<ftp://ftp.etse.urv.es/pub/perl/>

## Sweden

<http://ftp.du.se/CPAN/>  
<ftp://ftp.du.se/pub/CPAN/>  
[http://mirror.dataphone.se/CPAN](http://mirror.dataphone.se/CPAN/)  
[ftp://mirror.dataphone.se/pub/CPAN](ftp://mirror.dataphone.se/pub/CPAN/)  
<ftp://ftp.sunet.se/pub/lang/perl/CPAN/>

## Switzerland

<http://cpan.mirror.solnet.ch/>  
<ftp://ftp.solnet.ch/mirror/CPAN/>  
<ftp://ftp.danyk.ch/CPAN/>  
<ftp://sunsite.cnlab-switch.ch/mirror/CPAN/>

## Turkey

<http://ftp.ulak.net.tr/perl/CPAN/>  
[ftp://ftp.ulak.net.tr/perl/CPAN](ftp://ftp.ulak.net.tr/perl/CPAN/)

<ftp://sunsite.bilkent.edu.tr/pub/languages/CPAN/>

## Ukraine

<http://cpan.org.ua/>  
<ftp://cpan.org.ua/>  
<ftp://ftp.perl.org.ua/pub/CPAN/>  
<http://no-more.kiev.ua/CPAN/>  
<ftp://no-more.kiev.ua/pub/CPAN/>

## United Kingdom

<http://www.mirror.ac.uk/sites/ftp.funet.fi/pub/languages/perl/CPAN>

<ftp://ftp.mirror.ac.uk/sites/ftp.funet.fi/pub/languages/perl/CPAN/>  
<http://cpan.teleglobe.net/>  
<ftp://cpan.teleglobe.net/pub/CPAN>  
<http://cpan.mirror.anlx.net/>  
<ftp://ftp.mirror.anlx.net/CPAN/>  
<http://cpan.etla.org/>  
<ftp://cpan.etla.org/pub/CPAN>  
<ftp://ftp.demon.co.uk/pub/CPAN/>  
<http://cpan.m.flirble.org/>

```
ftp://ftp.flirble.org/pub/languages/perl/CPAN/  
ftp://ftp.plig.org/pub/CPAN/  
http://cpan.hambule.co.uk/  
http://cpan.mirrors.clockerz.net/  
ftp://ftp.clockerz.net/pub/CPAN/  
ftp://usit.shef.ac.uk/pub/packages/CPAN/
```

## North America

### Canada

#### Alberta

```
http://cpan.sunsite.ualberta.ca/
```

```
ftp://cpan.sunsite.ualberta.ca/pub/CPAN/
```

#### Manitoba

```
http://theoryx5.uwinnipeg.ca/pub/CPAN/
```

```
ftp://theoryx5.uwinnipeg.ca/pub/CPAN/
```

#### Nova Scotia

```
ftp://cpan.chebucto.ns.ca/pub/CPAN/
```

#### Ontario

```
ftp://ftp.nrc.ca/pub/CPAN/
```

### Mexico

```
http://cpan.azc.uam.mx  
ftp://cpan.azc.uam.mx/mirrors/CPAN  
http://www.cpan.unam.mx/  
ftp://ftp.unam.mx/pub/CPAN  
http://www.msg.com.mx/CPAN/  
ftp://ftp.msg.com.mx/pub/CPAN/
```

### United States

#### Alabama

```
http://mirror.hiwaay.net/CPAN/  
ftp://mirror.hiwaay.net/CPAN/
```

#### California

```
http://cpan.develooper.com/  
http://www.cpan.org/  
ftp://cpan.valueclick.com/pub/CPAN/
```

```
http://www.mednor.net/ftp/pub/mirrors/CPAN/
```

```
ftp://ftp.mednor.net/pub/mirrors/CPAN/
```

```
http://mirrors.gossamer-threads.com/CPAN
```

<ftp://cpan.nas.nasa.gov/pub/perl/CPAN/>  
<http://mirrors.kernel.org/cpan/>  
<ftp://mirrors.kernel.org/pub/CPAN>  
<http://cpan-sj.viaverio.com/>  
<ftp://cpan-sj.viaverio.com/pub/CPAN/>  
<http://cpan.digisle.net/>  
<ftp://cpan.digisle.net/pub/CPAN>  
<http://www.perl.com/CPAN/>  
<http://www.uberlan.net/CPAN>

#### Colorado

<ftp://ftp.cs.colorado.edu/pub/perl/CPAN/>  
<http://cpan.four10.com>

#### Delaware

<http://ftp.lug.udel.edu/pub/CPAN>  
<ftp://ftp.lug.udel.edu/pub/CPAN>

#### District of Columbia

<ftp://ftp.dc.aleron.net/pub/CPAN/>

#### Florida

<ftp://ftp.cise.ufl.edu/pub/mirrors/CPAN/>  
<http://mirror.csit.fsu.edu/pub/CPAN/>  
<ftp://mirror.csit.fsu.edu/pub/CPAN/>  
<http://cpan.mirrors.nks.net/>

#### Indiana

<ftp://ftp.uwsg.iu.edu/pub/perl/CPAN/>  
<http://cpan.netnitco.net/>  
<ftp://cpan.netnitco.net/pub/mirrors/CPAN/>  
<http://archive.progeny.com/CPAN/>  
<ftp://archive.progeny.com/CPAN/>  
<http://fx.saintjoe.edu/pub/CPAN>  
<ftp://ftp.saintjoe.edu/pub/CPAN>  
  
<http://csociety-ftp.ecn.purdue.edu/pub/CPAN>  
  
<ftp://csociety-ftp.ecn.purdue.edu/pub/CPAN>

#### Kentucky

<http://cpan.uky.edu/>  
<ftp://cpan.uky.edu/pub/CPAN/>  
<http://slugsite.louisville.edu/cpan>  
<ftp://slugsite.louisville.edu/CPAN>

#### Massachusetts

<http://mirrors.towardex.com/CPAN>

<ftp://mirrors.towardex.com/pub/CPAN>

<ftp://ftp.ccs.neu.edu/net/mirrors/ftp.funet.fi/pub/languages/perl/CPAN/>

#### Michigan

<ftp://cpan.cse.msu.edu/>  
<http://cpan.calvin.edu/pub/CPAN>  
<ftp://cpan.calvin.edu/pub/CPAN>

#### Nevada

<http://www.oss.redundant.com/pub/CPAN>  
<ftp://www.oss.redundant.com/pub/CPAN>

#### New Jersey

<http://ftp.cpanel.net/pub/CPAN/>  
<ftp://ftp.cpanel.net/pub/CPAN/>  
<http://cpan.teleglobe.net/>  
<ftp://cpan.teleglobe.net/pub/CPAN>

#### New York

<http://cpan.belfry.net/>  
<http://cpan.erlbaum.net/>  
<ftp://cpan.erlbaum.net/>  
<http://cpan.thepirtgroup.com/>  
<ftp://cpan.thepirtgroup.com/>  
<ftp://ftp.stealth.net/pub/CPAN/>

<http://www.rge.com/pub/languages/perl/>

<ftp://ftp.rge.com/pub/languages/perl/>

#### North Carolina

<http://www.ibiblio.org/pub/languages/perl/CPAN>  
<ftp://ftp.ibiblio.org/pub/languages/perl/CPAN>  
<ftp://ftp.duke.edu/pub/perl/>  
<ftp://ftp.ncsu.edu/pub/mirror/CPAN/>

#### Oklahoma

<ftp://ftp.ou.edu/mirrors/CPAN/>

#### Oregon

<ftp://ftp.orst.edu/pub/CPAN>

#### Pennsylvania

<http://ftp.epix.net/CPAN/>

<ftp://ftp.epix.net/pub/languages/perl/>

<http://mirrors.phenominet.com/pub/CPAN/>

<ftp://mirrors.phenominet.com/pub/CPAN/>  
<http://cpan.pair.com/>  
<ftp://cpan.pair.com/pub/CPAN/>  
<ftp://carroll.cac.psu.edu/pub/CPAN/>

#### Tennessee

<ftp://ftp.sunsite.utk.edu/pub/CPAN/>

#### Texas

<http://ftp.sedl.org/pub/mirrors/CPAN/>  
<http://www.binarycode.org/cpan>  
<ftp://mirror.telentente.com/pub/CPAN/>

<http://mirrors.theonlinerecordstore.com/CPAN>

#### Utah

<ftp://mirror.xmission.com/CPAN/>

#### Virginia

<http://cpan-du.viaverio.com/>  
<ftp://cpan-du.viaverio.com/pub/CPAN/>

<http://mirrors.rcn.net/pub/lang/CPAN/>  
<ftp://mirrors.rcn.net/pub/lang/CPAN/>  
<http://perl.secsup.org/>  
<ftp://perl.secsup.org/pub/perl/>  
<http://noc.cvaix.com/mirrors/CPAN/>

#### Washington

<http://cpan.llarian.net/>  
<ftp://cpan.llarian.net/pub/CPAN/>  
<http://cpan.mirrorcentral.com/>

<ftp://ftp.mirrorcentral.com/pub/CPAN/>

<ftp://ftp-mirror.internap.com/pub/CPAN/>

#### Wisconsin

<http://mirror.sit.wisc.edu/pub/CPAN/>  
<ftp://mirror.sit.wisc.edu/pub/CPAN/>  
<http://mirror.aphix.com/CPAN>  
<ftp://mirror.aphix.com/pub/CPAN>

### Oceania

#### Australia

<http://ftp.planetmirror.com/pub/CPAN/>  
<ftp://ftp.planetmirror.com/pub/CPAN/>



`ftp://mirror.aarnet.edu.au/pub/perl/CPAN/`  
`ftp://cpan.topend.com.au/pub/CPAN/`  
`http://cpan.mirrors.ilisys.com.au`

#### New Zealand

`ftp://ftp.auckland.ac.nz/pub/perl/CPAN/`

#### United States

`http://aniani.ifa.hawaii.edu/CPAN/`  
`ftp://aniani.ifa.hawaii.edu/CPAN/`

### South America

#### Argentina

`ftp://mirrors.bannerlandia.com.ar/mirrors/CPAN/`  
`http://www.linux.org.ar/mirrors/cpan`  
`ftp://ftp.linux.org.ar/mirrors/cpan`

#### Brazil

`ftp://cpan.pop-mg.com.br/pub/CPAN/`  
`ftp://ftp.matrix.com.br/pub/perl/CPAN/`  
`http://cpan.hostsul.com.br/`  
`ftp://cpan.hostsul.com.br/`

#### Chile

`http://cpan.netglobalis.net/`  
`ftp://cpan.netglobalis.net/pub/CPAN/`

### RSYNC Mirrors

`www.linux.org.ar::cpan`  
`theoryx5.uwinnipeg.ca::CPAN`  
`ftp.shellhung.org::CPAN`  
`rsync.nic.funet.fi::CPAN`  
`ftp.u-paris10.fr::CPAN`  
`mir1.ovh.net::CPAN`  
`rsync://ftp.crihan.fr::CPAN`  
`ftp.gwdg.de::FTP/languages/perl/CPAN/`  
`ftp.leo.org::CPAN`  
`ftp.cbn.net.id::CPAN`  
`rsync://ftp.heanet.ie/mirrors/ftp.perl.org/pub/CPAN`  
`ftp.iglu.org.il::CPAN`  
`gusp.dyndns.org::cpan`  
`ftp.kddlabs.co.jp::cpan`  
`ftp.ayamura.org::pub/CPAN/`  
`mirror.leafbug.org::CPAN`  
`rsync.en.com.sg::CPAN`  
`mirror.averse.net::cpan`  
`rsync.oss.eznetsols.org`  
`ftp.kr.FreeBSD.org::CPAN`  
`ftp.solnet.ch::CPAN`  
`cpan.cdpa.nsysu.edu.tw::CPAN`  
`cpan.teleglobe.net::CPAN`  
`rsync://rsync.mirror.anlx.net::CPAN`

```
ftp.sedl.org::cpan
ibiblio.org::CPAN
cpan-du.viaverio.com::CPAN
aniani.ifa.hawaii.edu::CPAN
archive.progeny.com::CPAN
rsync://slugsite.louisville.edu::CPAN
mirror.aphix.com::CPAN
cpan.teleglobe.net::CPAN
ftp.lug.udel.edu::cpan
mirrors.kernel.org::mirrors/CPAN
mirrors.phenominet.com::CPAN
cpan.pair.com::CPAN
cpan-sj.viaverio.com::CPAN
mirror.csit.fsu.edu::CPAN
csociety-ftp.ecn.purdue.edu::CPAN
```

For an up-to-date listing of CPAN sites, see <http://www.cpan.org/SITES> or <ftp://www.cpan.org/SITES>.

## Modules: Creation, Use, and Abuse

(The following section is borrowed directly from Tim Bunce's modules file, available at your nearest CPAN site.)

Perl implements a class using a package, but the presence of a package doesn't imply the presence of a class. A package is just a namespace. A class is a package that provides subroutines that can be used as methods. A method is just a subroutine that expects, as its first argument, either the name of a package (for "static" methods), or a reference to something (for "virtual" methods).

A module is a file that (by convention) provides a class of the same name (sans the .pm), plus an import method in that class that can be called to fetch exported symbols. This module may implement some of its methods by loading dynamic C or C++ objects, but that should be totally transparent to the user of the module. Likewise, the module might set up an AUTOLOAD function to slurp in subroutine definitions on demand, but this is also transparent. Only the .pm file is required to exist. See *perlsub*, *perltoot*, and *AutoLoader* for details about the AUTOLOAD mechanism.

## Guidelines for Module Creation

- Do similar modules already exist in some form?

If so, please try to reuse the existing modules either in whole or by inheriting useful features into a new class. If this is not practical try to get together with the module authors to work on extending or enhancing the functionality of the existing modules. A perfect example is the plethora of packages in perl4 for dealing with command line options.

If you are writing a module to expand an already existing set of modules, please coordinate with the author of the package. It helps if you follow the same naming scheme and module interaction scheme as the original author.

- Try to design the new module to be easy to extend and reuse.

Try to use `warnings;` (or use `warnings qw(...);`). Remember that you can add `no warnings qw(...);` to individual blocks of code that need less warnings.

Use blessed references. Use the two argument form of `bless` to bless into the class name given as the first parameter of the constructor, e.g.,:

```
sub new {
    my $class = shift;
    return bless {}, $class;
}
```

or even this if you'd like it to be used as either a static or a virtual method.

```
sub new {
    my $self = shift;
    my $class = ref($self) || $self;
    return bless {}, $class;
}
```

Pass arrays as references so more parameters can be added later (it's also faster). Convert functions into methods where appropriate. Split large methods into smaller more flexible ones. Inherit methods from other modules if appropriate.

Avoid class name tests like: `die "Invalid" unless ref $ref eq 'FOO'`. Generally you can delete the `eq 'FOO'` part with no harm at all. Let the objects look after themselves! Generally, avoid hard-wired class names as far as possible.

Avoid `$r->Class::func()` where using `@ISA=qw(... Class ...)` and `$r->func()` would work (see *perlbot* for more details).

Use autosplit so little used or newly added functions won't be a burden to programs that don't use them. Add test functions to the module after `__END__` either using `AutoSplit` or by saying:

```
eval join(' ', <main::DATA>) || die $@ unless caller();
```

Does your module pass the 'empty subclass' test? If you say `@SUBCLASS::ISA = qw(YOURCLASS);` your applications should be able to use `SUBCLASS` in exactly the same way as `YOURCLASS`. For example, does your application still work if you change: `$obj = YOURCLASS->new();` into: `$obj = SUBCLASS->new();` ?

Avoid keeping any state information in your packages. It makes it difficult for multiple other packages to use yours. Keep state information in objects.

Always use **-w**.

Try to use `strict;` (or use `strict qw(...);`). Remember that you can add `no strict qw(...);` to individual blocks of code that need less strictness.

Always use **-w**.

Follow the guidelines in the `perlstyle(1)` manual.

Always use **-w**.

- Some simple style guidelines

The `perlstyle` manual supplied with Perl has many helpful points.

Coding style is a matter of personal taste. Many people evolve their style over several years as they learn what helps them write and maintain good code. Here's one set of assorted suggestions that seem to be widely used by experienced developers:

Use underscores to separate words. It is generally easier to read `$var_names_like_this` than `$VarNamesLikeThis`, especially for non-native speakers of English. It's also a simple rule that works consistently with `VAR_NAMES_LIKE_THIS`.

Package/Module names are an exception to this rule. Perl informally reserves lowercase module names for 'pragma' modules like `integer` and `strict`. Other modules normally begin with a capital letter and use mixed case with no underscores (need to be short and portable).

You may find it helpful to use letter case to indicate the scope or nature of a variable. For example:

|                               |  |
|-------------------------------|--|
| <code>\$ALL_CAPS_HERE</code>  | constants only (beware clashes with Perl vars)                     |
| <code>\$Some_Caps_Here</code> | package-wide global/static   |
| <code>\$no_caps_here</code>   | function scope <code>my()</code> or <code>local()</code> variables |

Function and method names seem to work best as all lowercase. e.g., `$obj->as_string()`.

You can use a leading underscore to indicate that a variable or function should not be used outside the package that defined it.

- Select what to export.
 

Do NOT export method names!

Do NOT export anything else by default without a good reason!

Exports pollute the namespace of the module user. If you must export try to use `@EXPORT_OK` in preference to `@EXPORT` and avoid short or common names to reduce the risk of name clashes.

Generally anything not exported is still accessible from outside the module using the `ModuleName::item_name` (or `$blessed_ref->method`) syntax. By convention you can use a leading underscore on names to indicate informally that they are 'internal' and not for public use.

(It is actually possible to get private functions by saying: `my $subref = sub { ... }; &$subref;` But there's no way to call that directly as a method, because a method must have a name in the symbol table.)

As a general rule, if the module is trying to be object oriented then export nothing. If it's just a collection of functions then `@EXPORT_OK` anything but use `@EXPORT` with caution.
- Select a name for the module.
 

This name should be as descriptive, accurate, and complete as possible. Avoid any risk of ambiguity. Always try to use two or more whole words. Generally the name should reflect what is special about what the module does rather than how it does it. Please use nested module names to group informally or categorize a module. There should be a very good reason for a module not to have a nested name. Module names should begin with a capital letter.

Having 57 modules all called `Sort` will not make life easy for anyone (though having 23 called `Sort::Quick` is only marginally better :-). Imagine someone trying to install your module alongside many others. If in any doubt ask for suggestions in `comp.lang.perl.misc`.

If you are developing a suite of related modules/classes it's good practice to use nested classes with a common prefix as this will avoid namespace clashes. For example: `Xyz::Control`, `Xyz::View`, `Xyz::Model` etc. Use the modules in this list as a naming guide.

If adding a new module to a set, follow the original author's standards for naming modules and the interface to methods in those modules.

If developing modules for private internal or project specific use, that will never be released to the public, then you should ensure that their names will not clash with any future public module. You can do this either by using the reserved `Local::*` category or by using a category name that includes an underscore like `Foo_Corp::*`.

To be portable each component of a module name should be limited to 11 characters. If it might be used on MS-DOS then try to ensure each is unique in the first 8 characters. Nested modules make this easier.
- Have you got it right?
 

How do you know that you've made the right decisions? Have you picked an interface design that will cause problems later? Have you picked the most appropriate name? Do you have any questions?

The best way to know for sure, and pick up many helpful suggestions, is to ask someone who knows. `Comp.lang.perl.misc` is read by just about all the people who develop modules and it's the best place to ask.

All you need to do is post a short summary of the module, its purpose and interfaces. A few lines on each of the main methods is probably enough. (If you post the whole module it might be ignored by busy people - generally the very people you want to read it!)

Don't worry about posting if you can't say when the module will be ready - just say so in the message. It might be worth inviting others to help you, they may be able to complete it for you!
- README and other Additional Files.

It's well known that software developers usually fully document the software they write. If, however, the world is in urgent need of your software and there is not enough time to write the full documentation please at least provide a README file containing:

- A description of the module/package/extension etc.
- A copyright notice - see below.
- Prerequisites - what else you may need to have.
- How to build it - possible changes to Makefile.PL etc.
- How to install it.
- Recent changes in this release, especially incompatibilities
- Changes / enhancements you plan to make in the future.

If the README file seems to be getting too large you may wish to split out some of the sections into separate files: INSTALL, Copying, ToDo etc.

- Adding a Copyright Notice.

How you choose to license your work is a personal decision. The general mechanism is to assert your Copyright and then make a declaration of how others may copy/use/modify your work.

Perl, for example, is supplied with two types of licence: The GNU GPL and The Artistic Licence (see the files README, Copying, and Artistic, or *perl/gpl* and *perl/artistic*). Larry has good reasons for NOT just using the GNU GPL.

My personal recommendation, out of respect for Larry, Perl, and the Perl community at large is to state something simply like:

```
Copyright (c) 1995 Your Name. All rights reserved.  
This program is free software; you can redistribute it and/or  
modify it under the same terms as Perl itself.
```

This statement should at least appear in the README file. You may also wish to include it in a Copying file and your source files. Remember to include the other words in addition to the Copyright.

- Give the module a version/issue/release number.

To be fully compatible with the Exporter and MakeMaker modules you should store your module's version number in a non-my package variable called \$VERSION. This should be a floating point number with at least two digits after the decimal (i.e., hundredths, e.g, \$VERSION = "0.01"). Don't use a "1.3.2" style version. See *Exporter* for details.

It may be handy to add a function or method to retrieve the number. Use the number in announcements and archive file names when releasing the module (ModuleName-1.02.tar.Z). See *perldoc ExtUtils::MakeMaker.pm* for details.

- How to release and distribute a module.

It's good idea to post an announcement of the availability of your module (or the module itself if small) to the comp.lang.perl.announce Usenet newsgroup. This will at least ensure very wide once-off distribution.

If possible, register the module with CPAN. You should include details of its location in your announcement.

Some notes about ftp archives: Please use a long descriptive file name that includes the version number. Most incoming directories will not be readable/listable, i.e., you won't be able to see your file after uploading it. Remember to send your email

notification message as soon as possible after uploading else your file may get deleted automatically. Allow time for the file to be processed and/or check the file has been processed before announcing its location.

FTP Archives for Perl Modules:

Follow the instructions and links on:

<http://www.cpan.org/modules/00modlist.long.html>  
<http://www.cpan.org/modules/04pause.html>

or upload to one of these sites:

<https://pause.kbx.de/pause/>  
<http://pause.perl.org/pause/>

and notify <modules@perl.org>.

By using the WWW interface you can ask the Upload Server to mirror your modules from your ftp or WWW site into your own directory on CPAN!

Please remember to send me an updated entry for the Module list!

- Take care when changing a released module.  
Always strive to remain compatible with previous released versions. Otherwise try to add a mechanism to revert to the old behavior if people rely on it. Document incompatible changes.

## Guidelines for Converting Perl 4 Library Scripts into Modules

- There is no requirement to convert anything.  
If it ain't broke, don't fix it! Perl 4 library scripts should continue to work with no problems. You may need to make some minor changes (like escaping non-array @'s in double quoted strings) but there is no need to convert a .pl file into a Module for just that.
- Consider the implications.  
All Perl applications that make use of the script will need to be changed (slightly) if the script is converted into a module. Is it worth it unless you plan to make other changes at the same time?
- Make the most of the opportunity.  
If you are going to convert the script to a module you can use the opportunity to redesign the interface. The guidelines for module creation above include many of the issues you should consider.
- The pl2pm utility will get you started.  
This utility will read \*.pl files (given as parameters) and write corresponding \*.pm files. The pl2pm utilities does the following:
  - Adds the standard Module prologue lines
  - Converts package specifiers from ' to ::
  - Converts die(...) to croak(...)
  - Several other minor changes

Being a mechanical process pl2pm is not bullet proof. The converted code will need careful checking, especially any package statements. Don't delete the original .pl file till the new .pm one works!

## Guidelines for Reusing Application Code

- Complete applications rarely belong in the Perl Module Library.
- Many applications contain some Perl code that could be reused.  
Help save the world! Share your code in a form that makes it easy to reuse.
- Break-out the reusable code into one or more separate module files.
- Take the opportunity to reconsider and redesign the interfaces.
- In some cases the 'application' can then be reduced to a small fragment of code built on top of the reusable modules. In these cases the application could invoked as:

```
% perl -e 'use Module::Name; method(@ARGV)' ...  
or  
% perl -mModule::Name ...      (in perl5.002 or higher)
```

## NOTE

Perl does not enforce private and public parts of its modules as you may have been used to in other languages like C++, Ada, or Modula-17. Perl doesn't have an infatuation with enforced privacy. It would prefer that you stayed out of its living room because you weren't invited, not because it has a shotgun.

The module and its user have a contract, part of which is common law, and part of which is "written". Part of the common law contract is that a module doesn't pollute any namespace it wasn't asked to. The written contract for the module (A.K.A. documentation) may make other provisions. But then you know when you use `RedefineTheWorld` that you're redefining the world and willing to take the consequences.