
















Perl 5

See also: Perl <ul style="list-style-type: none"> Perl @ Wikipedia perl.org 	<div>Perl Guidelines</div> <div>Tools:</div>	Perl Style Guide, 10 Essential Development Practices. <ul style="list-style-type: none"> Books: Perl Best Practices , Modern Perl Best Practices (course)  perlcritic script uses Perl::Critic to scan Perl code. The perltidy application reformats Perl code. Older perltidy home page. PerlTidy @ Wikipedia. PBP recommended .perltidyrc
	Learning Perl  : links to O'Reilly Books .	<ul style="list-style-type: none"> Perl Intro - a quick introduction to Perl Learning Perl , Intermediate Perl , Mastering Perl  Effective Perl Programming  Online Perl books : Beginning Perl , Modern Perl (html) , Perl tutorial.org Perl Maven Tutorial <div> perl , Perl command line options , perlrun , perlivp , perldoc , perlbug / perlthanks perlsec </div> <ul style="list-style-type: none"> Online Perl Interpreter Online PerlTidy  option info.
perldoc browser <ul style="list-style-type: none"> C-c C-h F 	Topic groups: <ul style="list-style-type: none"> perldoc : about perldoc itself perltoc : table of content: names of all pages perlsyn : Perl syntax perlfunc : Perl built-in functions 	 Use perldoc to find if a Perl module is installed, as in: <code>perldoc local::lib</code> <ul style="list-style-type: none"> <code>perldoc local::lib</code> prints the documentation of local::lib if it is installed. <code>perl -Mlocal::lib</code> is useful to get modules installed in your home directory 
CPAN	<ul style="list-style-type: none"> CPAN @ Wikipedia The Zen of Comprehensive Archive Networks CPAN Search CPAN — meta::cpan PAUSE - Perl Authors Upload Server 	Command line tools interacting with CPAN to install Perl modules  : <ul style="list-style-type: none"> cpan: (requires config): install on some Linux with: <code>sudo dnf install perl-CPAN</code> cpanplus cpanminus : cpanm (no config required) install on some Linux with: <code>sudo dnf install perl-App-cpanminus</code>

Perl scripts

Writing Perl scripts	Impose strictures in Perl files to prevent errors by adding one of the following use lines. Also see the strictures package .		
Use the following at the beginning of Perl script files. <div>perldiag @ perldoc</div>	<pre><code>#!/usr/bin/perl use strict; use warnings; use diagnostics;</code></pre>	<pre><code>#!/usr/bin/perl -w use v5.12; # loads strict</code></pre>	<ul style="list-style-type: none"> The first line of an executable script should be a valid shebang line identifying the appropriate location of the Perl interpreter. Most Perl code should also activate the strict Perl rules and warnings to detect warnings. <ul style="list-style-type: none"> See: Barewords in Perl <code>use diagnostics;</code> line to produce more diagnostics for detected warning or errors.
use version/features	<code>use v5.36;</code>	This can be used to enable both the strict and warning pramas as well as several named features . <ul style="list-style-type: none"> See the table listing the feature bundles per Perl versions. 	

Perl 5 Operators


Perl 5 Operators		Perl has a large number of operators, listed below with their precedence and associativity .				
Note:		<ul style="list-style-type: none">C Operators missing from Perl : unary &, unary * and (type)Quote and Quote-like operators : in Perl quotes are operators and they provide various kind of interpolating and pattern matching capabilities.				
Associativity: one of: <ul style="list-style-type: none">rightleftNA : not associative: cannot use more than one of these operators in sequence.CH: chained To get this information, use: perldoc perlop	left	<u>terms and list operators (leftward)</u>	()			
	left	<u>Arrow Operator:</u>	->			
	NA	<u>Auto-increment and Auto-decrement:</u>	++ --			
	right	<u>Exponentiation:</u>	**			
	right	<u>Symbolic Unary Operators:</u>	! ~ -. \	and unary + and -	Note: The operator \ creates a reference . See example .	
	left	<u>Binding operators:</u>	-- !-			
	left	<u>Multiplicative Operators:</u>	* / % x			
	left	<u>Additive Operators:</u>	+ - .			
	left	<u>Shift Operators:</u>	<< >>			
	NA	<u>named unary operators</u>				
	NA	<u>Class instance Operator:</u>	isa			
	CH	<u>Relational Operators:</u>	as numbers: < > <= >=	as strings: lt gt le ge		
	CH/NA	<u>Equality Operators:</u>	as numbers: == != <=>	as strings: eq ne cmp ~~		
	left.	<u>Bitwise And:</u>	& &.			
	left	<u>Bitwise Or and Exclusive Or:</u>	. ^ ^.			
	left	<u>C-style Logical And:</u>	&&			
	left	<u>Logical Defined-Or:</u>	^^ //			
	NA	<u>Range Operators:</u>			
	right	<u>Conditional Operator:</u>	?:			
	right	<u>Assignment Operators:</u>	=			
			**= += *= &= &.= <<= &&=			
			-= /= = .= >>= =			
			.= %= ^= ^.= //.=			
			x=			
			goto last next redo dump			
	left	<u>Comma, fat-comma Operators:</u>	, =>			
	NA	<u>list operators (rightward)</u>				
	right	<u>Logical Not:</u>	not			
	left	<u>Logical And:</u>	and			
	left	<u>Logical or and Exclusive or:</u>	or xor			
<u>trick operators</u> These are not real Perl operators, but look like operators: they are concatenation of other operators that achieve a specific effect. See the link for others. Understanding these operators helps understand Perl. They should not be used in production code.	<u>--+</u>	Converts a string that starts with digits into a number.	<pre>print --+ '22les poulets!';</pre> # prints 22	--+ is essentially - + - or - - but a + to allow placing them together. The 0+ does the same as --+, but the second has higher precedence.		
	<u>=()</u>	Called the ' goatse ' operator. It causes the right side expression to be evaluated in array context. Used to assign the array/list size to a scalar.	<pre>my \$str = "A 22 before 33 does not make 9, it is 44!";</pre> <pre>my \$digit_count =()= \$str =~ /\d/g;</pre> <pre>print "\$digit_count";</pre> # prints '7',the number of digits in \$str			
	<u>@{[]}</u>	Useful to interpolate an array inside a string. Note that: " @{[something]} " is the same as join \$", something	<pre>print "these people @{[get_names()] } get promoted"</pre>			
	<u>--</u>	Force scalar context.	In scalar context localtime() returns human readable time, but in list context it returns a 9-tuple with various date elements.	<pre>\$ perl -le 'print ~~localtime'</pre> Mon Nov 30 09:06:13 2009		
<u>Truth and falsehood</u>  Remember that the strings '0' and '' mean false. The output of glob() may return a file named '0' !  a bareword false has a truth value of true!!!!	<ul style="list-style-type: none">False in a boolean context:<ul style="list-style-type: none">the number 0,the strings '0' and '' ,the empty list () ,"undef"All other values are true.	<ul style="list-style-type: none">Negation of a true value by "!" or "not" returns a special false value.When evaluated as a string it is treated as '', but as a number, it is treated as 0.	So the following scalar values are considered false : <ul style="list-style-type: none">undef - the undefined value0 the number 0, even if you write it as 000 or 0.0'' the empty string.'0', a single 0 in the string.	All other scalar values, including the following are true : <ul style="list-style-type: none">1 any non-0 number'' the string with a space in it'00' two or more 0 characters in a string"0\n" a 0 followed by a newline'true''false' . Even the string 'false' evaluates to true.		
	 One way to define valid true and false <i>constant symbols</i> that can be used in assignments (but see ):			<pre>use constant { true => 1, false => 0 };</pre>		
<u>File test operators</u>	It is possible to combine the file test operator with the AND operator as in the following example:					
	<pre>if (-e \$fname && -f _ && -r _) { print("\$fname exists, is readable\n"); }</pre>					
The most important operators are shown here. They check if the file...	-r	is readable	-e	exists.	-b	is a block special file.
	-w	is writable	-z	is empty.	-c	is a character special file.
	-x	is executable	-s	has nonzero size (returns size in bytes).	-t	handle is opened to a tty.
	-o	is owned by effective uid.	-f	is a plain file.	-u	has setuid bit set.
	-R	is readable	-d	is a directory.	-g	has setgid bit set.
	-W	is writable	-l	is a symbolic link.	-k	has sticky bit set.
	-X	is executable	-p	is a named pipe (FIFO) or Filehandle is a pipe.	-T	is an ASCII text file (heuristic guess).
	-O	file is owned by real uid.	-S	is a socket.	-B	is a "binary" file (opposite of -T).

Perl 5 Constants and Variables






<div>Perl Constants</div> <ul style="list-style-type: none">Perl pragma to declare constants. ⚠️ But be aware that these are still not read-only, that they inject sub-routines and have several limitations. Read the doc!!CPAN modules for defining constants by Neil Bowers . Of particular interest: Const::Fast and Attribute::Constant for efficient read-only constants.					
Perl Variables Names		Scalar Naming Conventions		Array Naming Conventions	All: underscore or letter of the first character.
Case is significant in all names. ASCII by default, UTF-8 if the utf8 pragma is used.	<ul style="list-style-type: none">Local variables: \$lowercaseGlobal variables: \$Title_CaseConstants: \$UPPER_CASEAll variables: words separated by underscores.		Similar conventions, except that array names should be plural . <ul style="list-style-type: none">@locals@Global_Arrays@CONSTANT_ARRAYS		<ul style="list-style-type: none">Module names are MixedCaseNoUnderscoresConstants are UPPERCASE_WITH_UNDERSCORESPackage wide vars are Mixed_Case_With_UnderscoresFunctions/methods are lowercase_with_underscoresAvoid ALLUPPERCASE: used by Perl special variables.
Perl types	Sigil	Examples	Meaning		Extra Info
Scalar	\$	\$foo \$days[28] \$days{'Feb'} \${days} \$Dog::days \$Dog' days \$#days \$days->[28] \$days[0][2] \$d{99}{'Feb'} \$d{99, 'Feb'}	Simple scalar value 29 th element of array @days Value associated with the <i>Feb</i> key of hash %days Same as \$days, but unambiguous before alphanumerics. Useful inside strings <u>for interpolation of variables followed by other letters</u> . The \$days variable inside the Dog package. Same as above. However this is an archaic use of the single quote. Last index of array @days . 29 th element of array pointed to by reference \$days. Multi-dimensional array Multi-dimensional hash Multi-dimensional hash emulation		
list and Array <ul style="list-style-type: none">0-based indexed (first index is 0).Last index of array @name is \$#name	@	@days @days[3,4,5] @days[3..5]	Array containing (\$days[0] , \$days[1] , ... #days[\$#days]) . Array slice containing (\$days[3] , \$days[4] , \$days[5]) . Array slice containing (\$days[3] , \$days[4] , \$days[5]) .		<ul style="list-style-type: none">A <i>list</i> is an ordered collection of scalars (of any type).An <i>array</i> is a variable that contains a list.Reading beyond the end of array returns undef
		<ul style="list-style-type: none"><i>Negative</i> indices used in read access from the end: -1 is last item.Use these negative indices to access from the end. Do not compute index with \$#name -3, if the list size is 2, this will give invalid results.			
<ul style="list-style-type: none">slices	<ul style="list-style-type: none">Use a slice to select multiple elements from a list, array, or hash.Don't use a slice when you know you need exactly one element.		<ul style="list-style-type: none">An lvalue slice imposes list context on the righthand side.		
<ul style="list-style-type: none">Anonymous arrays	<ul style="list-style-type: none"><u>What are the advantages of anonymous array? @ StackOverflow</u><u>Perldref @ Perldoc</u>, <u>Perl reference tutorial @ Perldoc</u>		<ul style="list-style-type: none">Anonymous array := a type of array reference.Array reference allows Perl to treat the array as a single item.<ul style="list-style-type: none">This can be used to build, nested data structures.		
Hash/associative array	%	%days	Associative array (hash): keys-value pairs. Can be initialized as: <ul style="list-style-type: none">%days = (Jan => 31, Feb => \$leap? 29 : 28, ...)%days = ("Jan, 31, 'Feb', \$leap? 29 : 28, ...)		Initialize a hash slice with array context: @char_to_num{'A' .. 'Z'} = 1 .. 26;
		@days{'J','F'}	Hash slice containing (\$days{'J'} , \$days{'F'}) .		
Subroutine	&	&foo	& is needed to create reference to subroutine.		
Typeglob	*	*foo	See: <u>Advanced Perl Programming, 1st Edition Section 3.2</u>		
7 kinds of package variables or variable-like elements in Perl:	1. scalar variables 2. array variables 3. hash variables		4. subroutine name 5. format names <ul style="list-style-type: none"><u>how to format output in Perl?</u>, <u>Perl-Formats</u>See write and select		6. file handles 7. directory handles
Scalar values			Numeric literals examples. Note: leading 0 work only for literals, not for string-to-number conversions.		Useful related builtin functions
<ul style="list-style-type: none">numeric:	<ul style="list-style-type: none">integer : using the system's native format.<ul style="list-style-type: none">bigint - transparent big integer support.bignum - transparent big number support.floating-point : using the system's native format.<ul style="list-style-type: none">bigrat - transparent big rational number support.		my \$x = 12345; # integer my \$x = 12345.67; # floating point my \$x = 6.02e23; # scientific notation my \$x = 0x1f.0p3; # power ² exponent: <i>Perl >= v5.22</i> my \$x = 4_294_967_296; # underline for legibility my \$x = 0x1234_5678; # underline in hex is also OK my \$x = 0377; # octal my \$x = 0o377; # octal also <i>Perl >= v5.34</i> my \$x = 0xffff; # hexadecimal my \$x = 0b1100_0010; # binary		<ul style="list-style-type: none">oct - supports binary, octal, hexhexPOSIX::ceilPOSIX::floorabs
<ul style="list-style-type: none">string	<ul style="list-style-type: none">double-quoted strings: perform backslash and variable interpolation of expression that begin with \$ (a scalar) or @ (an array). Hashes cannot be interpolated.single-quote strings: only perform \' and \\ substitution (to ' and \ respectively), nothing else.Single quote and double quote strings can spread multiple lines: it embeds the newline character on each new line.But \n is only expanded in double quoted strings! In single quote string it is treated as two characters; no substitution is done (as explained above).				
<ul style="list-style-type: none">Unicode support	To use Unicode literally in a program, add the utf8 pragma : use utf8; See: <u>Perl Unicode Tutorial</u> , <u>Perl Unicode Introduction</u> , <u>Perl Unicode Support @ perldoc</u>				
<ul style="list-style-type: none">Quote constructs	Customary	Generic	Meaning	Interpolates?	Notes
<div>See:</div> <ul style="list-style-type: none"><u>Strings in Perl: quoted, interpolated and escaped</u>	''	q//	Literal string	No	<ul style="list-style-type: none">Not all characters can be used as the / separator. { }, () and < > can also be used.You can use whitespace between the quote specifier and its initial bracketing character:<pre>my \$chuck_of_code = q { if (\$condition) { print "Salut!"; } };</pre>
	""	qq//	Literal string	Yes	
	~	qx//	Command execution	Yes	
	()	qw//	World list	No	
	//	m//	Pattern match	Yes	
	s///	s///	Pattern substitution	Yes	
	tr///	y///	Character translation	No	
	""	qr//	Regular expression	Yes	
<ul style="list-style-type: none">Character escapes (only inside double quoted strings)					Any Unicode code point, by name: \N{LATIN SMALL LETTER E WITH ACUTE} é \N{ U+E9 } é
	\a	Alert (bell)	\e	ESC character	
<ul style="list-style-type: none">translation escapes (inside double quoted strings)	\b	Backspace	\033	ESC in octal	\E Ends \U, \L, \F or \Q
	\e	ESC character	\o{33}	ESC in octal	
	\f	Form feed	\x7f	DEL in hexadecimal	
	\n	Newline (usually LF)	\x{263a}	Character number 0x263A	
	\r	Carriage return (Usually CR)	\cC	Control-C	
	\t	Horizontal tab			
<ul style="list-style-type: none">translation escapes (inside double quoted strings)	\u	Force next character to titlecase	\U	Force all following characters to uppercase. Ends at \E	
	\l	Force next character to lowercase	\L	Force all following characters to lowercase. Ends at \E	
			\F	Force all following characters to Unicode fold case. Ends at \E	
			\Q	Backslash all following non alphanumeric characters. Ends at \E	
<ul style="list-style-type: none">bareword	In Perl, a <i>bareword</i> refers to a sequence of characters suitable for an identifier. It's not quoted. By default Perl allows barewords to behave like strings. <ul style="list-style-type: none">This is not allowed when any of use strict; or use strict "subs"; or use v5.12; is specified.				
<ul style="list-style-type: none">Here documentsHere docs @ Perl mavenPerl here doc @Wikipedia	Perl here-documents are a form of line oriented quoting. There are several forms of here documents, where the identifier (like EOF used below, but can be any word) must be placed at the beginning of the terminating line: <ul style="list-style-type: none">Default : <<EOF; Supports variable interpolation.Double quotes: <<"EOF"; Supports variable interpolation. Can also be written with whitespace as in << "EOF";Single quotes: <<'EOF'; Does not support interpolation. Can also be written with whitespace as in << 'EOF';backticks: <<`EOF; Execute commands in a shell and return text printed on stdout. Can also be written with whitespace as in << `EOF;indented: <<~EOF; Allows indenting the here-doc string. Can also use the ~ with the other forms: <<~\EOF, <<~"EOF", <<~"EOF", <<~`EOF`They can also be stacked and text can be transformed. See the documentation.				
<ul style="list-style-type: none">Perl Regexp info, cheatsheets & regexp testers	<ul style="list-style-type: none">Regexp TutorialLearn PCRE in X minutes		<ul style="list-style-type: none">PCRE cheatsheet		<ul style="list-style-type: none">Debuggex regexp testerregex101RegEx Pal

Current value of warning switch	<ul style="list-style-type: none">• \$WARNING• \$^W	Current set of warning checks enabled by the use warnings pragma	\$^{^WARNING_BITS}		
<ul style="list-style-type: none">• Variables related to the interpreter state	These variables provide information about the current interpreter state.				
Flag associated with the -c switch	<ul style="list-style-type: none">• \$COMPILING• \$^C	The current value of the debugging flags	<ul style="list-style-type: none">• \$DEBUGGING• \$^D		
Current phase of the perl interpreter	\$_{^GLOBAL_PHASE}	Debugging support. Internal variable.	<ul style="list-style-type: none">• \$PERLDB• \$^P		
Compile-time hints for the perl interpreter. Internal use only	\$^H	Values of compiled statements	%^H		
Taint mode	\$_{^TAINT}	Safe locale operations availability	\$_{^SAFE_LOCALES}		
Input/Output Layers. Internal use by PerlIO only.	\$_{^OPEN}	Unicode Settings of Perl	\$_{^UNICODE}		
Internal UTF-8 offset caching code state	\$_{^UTF8CACHE}	State of UTF-8 locale detected by perl at startup.	\$_{^UTF8LOCALE}		
<ul style="list-style-type: none">• File handle Variables	See also: Perl File Handles The following variables are used in the Input/Output handling as well as program arguments.				
Name of current file read from <>	\$ARGV	Command line arguments of the script ← See diamond operator <> . →	@ARGV	Number of arguments minus one	\$#ARGV
Special file handle that iterates over command-line filenames in @ARGV	ARGV	Special file handle that points to currently open output file when doing edit-in-place processing	ARGVOUT		
Output field separator for the print operator	<ul style="list-style-type: none">• IO::Handle->output_field_separator(EXPR)• \$OUTPUT_FIELD_SEPARATOR• \$OFS• \$,	Current line number for the last file handled accessed	<ul style="list-style-type: none">• HANDLE->input_line_number(EXPR)• \$INPUT_LINE_NUMBER• \$NR• \$.		
Input record separator (newline by default)	<ul style="list-style-type: none">• IO::Handle->input_record_separator(EXPR)• \$INPUT_RECORD_SEPARATOR• \$RS• \$/	Output record separator	<ul style="list-style-type: none">• IO::Handle->output_record_separator(EXPR)• \$OUTPUT_RECORD_SEPARATOR• \$ORS• \$\		
Auto-flush control <ul style="list-style-type: none">• order of output @ Perl Maven• Suffering from Buffering?	<ul style="list-style-type: none">• HANDLE->autoflush(EXPR)• \$OUTPUT_AUTOFLUSH• \$!	Perl activates file buffering by default. Assign 1 to \$! to activate auto-flush.	Last read file handle	\$_{^LAST_FH}	

Perl 5 Input/Output

References	<ul style="list-style-type: none">• open @ perldoc browser• Writing to files with Perl @ Perl Maven• open file in-memory @ stackOverflow• Stupid open() tricks @Perl.com:<ul style="list-style-type: none">• No explicit filename• create an anonymous temporary file• print to a string• read lines from a string					
print, printf, sprintf	print , printf , sprintf (which describes the format) . Note: print is more efficient than printf . print and printf output to stdout by default, but accept a file handle as the first argument if it is NOT followed by a separating comma! (a <code>,</code> puts it in the list to print!)					
diamond operator <>	Both <> and <<>> operators read the content of files listed on the command line via @ARGV. Nothing or - on the command line identifies stdin. The <> operator supports shell redirection and pipe operations which <<>> does not allow (for security reasons).					
The double diamond, a more secure <> (Perl >= v5.22)	print <>;	← Simple implementation of /bin/cat	print <<>>;	← safer one	Redirection cannot be forced via file names embedding them with. the <<>> operator.	
	print sort <>;	← Simple implementation of /bin/sort	print sort <<>>;	← safer one		
 In-place-editing <> The <> operator tries to duplicate the original file's permission and ownership.	Set \$^I to a backup file extension (such as Emacs "~" or ".bak") to change the behaviour of the <> and <<>> operators and print. In a while (<>) {...} loop, when \$^I is not undef (its default), Perl: <ul style="list-style-type: none">• renames currently processed file with the specified extension added,• opens a new file with the original name• prints into the new file.• Any modification goes into the new file: in-place-editing it!		use strict; \$^I = "~"; # rename old file: add '~' to it's name (Emacs-style backup) while (<>) { s/something/Something else/; # perform any substitution print; }			
perl -i cmdline option	It's also possible to do this on the command line!		For example:	perl -p -i~ -w -e 's/something/Something else/g' data*.dat		
Special filehandle names	ARGV	The special filehandle that iterates over command-line filenames in @ARGV. Usually written as the null filehandle in the angle operator <> (or <<>>)				
Also See: <ul style="list-style-type: none">• File handle Variables section above.	ARGVOUT	The special filehandle that points to the currently open output file when doing edit-in-place processing with _i. <ul style="list-style-type: none">• Useful when you have to do a lot of inserting and don't want to keep modifying \$_				
	STDIN	<STDIN> : line input operator for the STDIN filehandle (for the standard input). <ul style="list-style-type: none">• Each time <STDIN> is used in scalar context, Perl reads 1 complete line of the standard input and uses it as the value of <STDIN>.<ul style="list-style-type: none">• The string includes a line termination character. Use the chomp() built-in function to strip it off the variable.• If <STDIN> is read in list context, it returns all lines inside a list! For example, foreach (<STDIN>) { ... } reads the entire stdin in 1 step: \$_ holds it all!				
		while (<STDIN>) { # print all print; # lines of # stdin }	while (defined(\$_ = <STDIN>)) { print \$_; }	The code in the left-most cell is the shortest form. It is equivalent to the code beside it; each line of stdin is stored in the default variable \$_ and the loop stops on end at which time <STDIN> returns undef.		
	STDOUT	standard output				
	STDERR	standard error Note: generally STDERR is not buffered, while STDOUT is buffered by default. Text sent on STDERR may show up before STDOUT. <ul style="list-style-type: none">• Print a new line on STDOUT to help flushing it or assign 1 to \$ to activate auto-flush.				
	DATA					
say	<ul style="list-style-type: none">• say use feature qw(say); or use v5.10; (or higher). Like print, but implicitly appends a newline at the end of the list.					

Perl 5 Statements

Loop control	See perlsyn for more information on Perl syntax which includes declarations, blocks, loops, labels, subroutines, etc...		
 Use the last and redo inside a naked block of code to control looping.		The last , next , and redo loop control keywords work in the following constructs:	Notes: <ul style="list-style-type: none">The while and foreach loops may have a continue block: executed before evaluating condition again, which corresponds to the 3rd part of a for loop statement. See this @ stackOverflow.Blocks can be labelled  as targets to last, next, and redo
	loop control keywords: <ul style="list-style-type: none">last : exits the loop.next : starts the next iteration of the loop.redo : restarts the loop block without evaluating the condition again.	<ul style="list-style-type: none">while (condition) { ... }until (condition) { ... }for (init; condition; continue) { ... }foreach array { ... }naked block: { ... }	

Statement modifiers	<ul style="list-style-type: none"> if EXPR unless EXPR while EXPR until EXPR for LIST foreach LIST when EXPR 	The for and foreach statements impose a list context ; the complete list is processed. Therefore a loop like the following trying to stop on a line that has " __END__ " on it will not work since it reads all of STDIN: <pre>foreach (<STDIN>) { last if ?__END__;/ ...; }</pre>	The while statement imposes a scalar context ; it takes one line at a time from <STDIN> and the following code works properly: <pre>while (<STDIN>) { last if /__END__/; ...; }</pre>
	<ul style="list-style-type: none"> do block 		
Conditional statements			

Perl 5 Subroutines ⚠️

Perl subroutines			
subroutine &	<ul style="list-style-type: none"> Why we teach the subroutine ampersand Why should I use the & to call a Perl subroutine? @ StackOverflow 		Another point of view: Subroutines and Ampersands
Subroutine Prototypes	An older Perl feature. Clashes with subroutine signatures as of Perl v5.20. In <i>Perl >= v5.20</i> put the :prototype attribute before subroutine prototype parenthesis.		
Subroutine signatures <ul style="list-style-type: none"> <i>Perl >=5.36</i>: Stable <i>Perl >= 5.20</i>: Experimental See: Use v5.20 subroutine signatures	Exactly zero arguments	()	Zero or 1 argument, no default, unnamed: (\$=)
	Zero or 1 argument, no default, named	(\$val=)	Zero or 1 argument, named, with default (\$val=1)
	exactly 1 named argument:	(\$val)	Exactly 2 arguments (\$v1, \$v2)
	2, 3 or 4 arguments no defaults:	(\$v1, \$v2, \$=, \$=)	2,3 or 4 arguments, 1 default: (\$v1, \$v2, \$v3='a', \$=)
	Two or more, any number of arguments.	(\$v1, \$v2, @)	Two or more arguments, remainders into a named array: (\$v1, \$v2, @rest)
	Two or more arguments: an even number	(\$v1, \$v2, %)	Two or more arguments, remainders into a named hash: (\$v1, \$v2, %rest)
	Class method	(\$class, ...)	Object method (\$self, ...)
Variables in subroutines	global by default		
	my	local, lexical scope, non persistent	
	state	Local, lexical scope, persistent	<i>Perl >= v5.10</i> Restriction: in <i>Perl < v5.28</i> : array and hashes state cannot be initialized in list context.
	our	creates a lexical scoped alias to a package variable	
	local		
Returned value	<ul style="list-style-type: none"> The result of the last evaluated expression is implicitly returned The return operator can be used but it's not required unless used to change execution flow (return immediately from the subroutine). The subroutine can return a scalar in scalar context or a list if called in list context. <ul style="list-style-type: none"> Inside the subroutine, use the wantarray function to determine the context of the subroutine call. 		

Perl 5 Built-in Functions ⚠️

Perl Functions Perl syntax	🗨️ To get information about a Perl function from the command line use the perldoc -f command. <ul style="list-style-type: none"> To get information about print use: perldoc -f print 		
⚠️ Cautionary notes			
<ul style="list-style-type: none"> each keyword is broken Use Var::Pairs instead. 	Do NOT use the built-in each . It is broken, as described by Damian Conway in his Modern Perl Best Practice O'Reilly course , section control structure. <ul style="list-style-type: none"> each is not re-entrant: <ul style="list-style-type: none"> nested loops of each over the same hash does not work as expected and will create infinite loop since the nested loop each juts iterates from where the first loop each left it. Exiting the loop leaves the state of the each internal pointer at the current location. <ul style="list-style-type: none"> If you use each on the same hash later it will resume from where it left, it will not start form the beginning. 		

Perl 5 Modules ⚠️

Perl Modules			
Perl core modules	<ul style="list-style-type: none"> How to detect where a module is installed : perldoc -l Module 		
Modules @perltutorial Modules	do	Looks for the module file by searching the @INC path. <ul style="list-style-type: none"> If Perl finds the file, it places the code inside the calling program and executes it. Otherwise, Perl will skip the do statement silently. 	
Using simple modules ⚠️	require	Loads the module file once. <ul style="list-style-type: none"> If the require for the same file appears twice, Perl ignores it. Perl will issue an error message if it cannot find the file. 	
	use	Similar to require except that Perl applies it before the program starts. <ul style="list-style-type: none"> Therefore the use statement cannot be invoked inside conditional statements such as if-else. Used often to include a module in a program. 	

PerlTidy formatting control ⚠️

perltidy option	Option	Impact
indentation style	<ul style="list-style-type: none"> -bl, --opening-brace-on-new-line --brace-left 	<ul style="list-style-type: none"> Without this option (the default) the code indentation style selected is K&R style. With this option, the indentation style is Allman/BSD style.