

<div>Documentation</div> <div>=pod my \$dog = "hatchi"; my \$cat = "meow"; =cut</div>	<div>Regular expression (cont)</div> <div>End \$ /bFred\b/ matches whole word Next LINE if \$line=/^#/;</div>	<div>Evaluation</div> <div>print(\$foo, exit) # Obviously not what you want print \$foo, exit #nor this These do the print before evaluating exit. (print \$foo), exit or print (\$foo), exit</div>	<div>Tricks</div> <div>Sub setenv{ my (\$key, \$value) =@_ \$ENV{\$ key }=\$ value unless \$ENV{\$key} }</div>																																
<div>Logical Operators</div> <div>Logical or, and, xor, not, , &&, ! Strings eq, gt, lt, le, ge, cmp Numbers ==, <,>,<=,>=,<=></div>	<div>Quantifiers</div> <div>min, max \d{min, max} 7 to 11 digit \d{7,11} Only matches 7 digit \d{7}</div>	<div>File test operator</div> <div><table><thead><tr><th>Operator</th><th>Meaning</th></tr></thead><tbody><tr><td>-r</td><td>File is readable by effective UID/GID.</td></tr><tr><td>-w</td><td>File is writable by effective UID/GID.</td></tr><tr><td>-x</td><td>File is executable by effective UID/GID.</td></tr><tr><td>-o</td><td>File is owned by effective UID.</td></tr><tr><td>-R</td><td>File is readable by real UID/GID.</td></tr><tr><td>-W</td><td>File is writable by real UID/GID.</td></tr><tr><td>-X</td><td>File is executable by real UID/GID.</td></tr><tr><td>-O</td><td>File is owned by real UID.</td></tr><tr><td>-e</td><td>File exists.</td></tr><tr><td>-z</td><td>File has zero size.</td></tr><tr><td>-s</td><td>File has nonzero size (returns size).</td></tr><tr><td>-f</td><td>File is a plain file.</td></tr><tr><td>-d</td><td>File is a directory.</td></tr><tr><td>-l</td><td>File is a symbolic link.</td></tr><tr><td>-p</td><td>File is a named pipe (FIFO).</td></tr></tbody></table></div>	Operator	Meaning	-r	File is readable by effective UID/GID.	-w	File is writable by effective UID/GID.	-x	File is executable by effective UID/GID.	-o	File is owned by effective UID.	-R	File is readable by real UID/GID.	-W	File is writable by real UID/GID.	-X	File is executable by real UID/GID.	-O	File is owned by real UID.	-e	File exists.	-z	File has zero size.	-s	File has nonzero size (returns size).	-f	File is a plain file.	-d	File is a directory.	-l	File is a symbolic link.	-p	File is a named pipe (FIFO).	<div>Initialization</div> <div>BEGIN { my @scale = ("A" .. " - G") ; my \$note = -1; sub next_pitch { return \$scale[(\$note += 1) %=@scale] }; }</div>
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<div>File Test Operators</div> <div>-e exists -r readable -w writable -d directory -f file -T Text file</div>	<div>LIST processing</div> <div>print reverse sort map{lc} keys %hash To parse a string 12:59:59 am -my (\$hour, \$min, \$sec, \$ampm)=/(\d+): (\d+) : (\d+) * (\w+)/</div>		<div>Symbol table reference</div> <div>for \$file(@names){ my \$fh; open(\$fh, \$file) next; \$fileh and le{ \$fi le} - =\$fh; }</div>																																
<div>Conditions</div> <div>Unless if { } elsif{ } else{ } given() { when { } }</div>	<div>Terms and List Operator</div> <div> has lower precedence than chdir chdir \$foo die #(chdir \$foo) die chdir(\$foo) die #(chdir \$foo) die chdir +(\$foo) die #(chdir \$foo) die</div>	<div>Total seconds /day = 86400 5 Minutes = 300 12 hour = 300 12 12 = 43200 Total hour= 12 hr/86400 = 0.5 -M \$filename > 0.5 #greated than 12 hours -M \$filename > 0.5 #recently modified file &callfunction If int(-A \$filename) == 90</div>	<div>Symbol table reference</div> <div>\$scalarref= *foo{SCALAR} # \ \$foo \$array ref =*A RGV - {ARRAY} # \@ARGV \$hashref = *ENV{H ASH}; # \%ENV \$coder ef= *ha ndl er{ - CODE} # \& handler</div>																																



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Symbol table reference (cont)

```
> $gobref=*foo{GLOB}
$ioref=*STDIN{IO};
$format=*foo{FORMAT};
```

protection

```
use strict "refs"

block counterman the decree
with
no strict "refs"
```

Symbolic reference example:

```
our $value = "global"; {
my $value = " pri vat -
e";
print " Inside, mine is
${value}, "; say "but
ours is ${"v alu -
e"}." ;
}
say " Out side, ${value}
is again ${"v alu -
e"}." ;
```

which prints:
Inside, mine is private, but ours
is global. Outside, global is again
global.

Package variables are global
variable

Variables

```
$days : simple scalar value
$days[28] : 29 elements
$days{"feb"} value from hash
days
${day}. Equivalent to $day
$Dog::day; from Dog package
```

Variables (cont)

```
$#days last index of array #days
$days->[28] 29 the element
pointed to by reference
$days[0][2] multi dim array
$days{2000}{"feb"} mult dim
hash
$days{200,"feb"} multi dimens-
ional hash emulation
@days : array containing
($day[0], $day[1]....$day[N])
@days[3,4,5] :array containing
($day[3], $day[4], 4day[5])
@days[3..5] : array containing
($day[3], $day[4],$day[5])
@days{"Jan", "Feb"}: hash
containing ($days{"Jan"},
$days{"feb"})
$days{"feb"} equivalent to
$days{feb}
```

Name space

```
Lexical scope: block
Symbol table : global
Tips:
$foo, @foo can be declared
In same block,
$foo[0] is different from $foo
```

CommandLine

```
Perl -E 'say 10/3';
Perl-Mbigrat. -E 'sat 4/3. * 5/12'
```

Truth

```
String True except for " " and "0"
Number true except for 0
Any reference is true
Any undefined value is false.
```

Tips

```
" " is equal to space " "
$temp=join("$", @array);
Or
$temp=join(" ", @array);
```

Quote Construct

```
q// ' '
qq// " "
qx/ / Command exec
qw// WordList
m// Pattern match
s// Substitute
y/// Translation
Qr// Regular Expression
```

Auto Increment and Decrement

```
++$b{/(w+)/}[0]}
# increment the element hash
indexed by word in the default
search variable ($_)and return
after increment.

my $foo;
$foo="99"; print ++ $foo ;
#prints 100
$foo="Az"; print ++ $foo ; #prints
Ba
```

Binding operator

```
$string ! ~ /$pattern/
! ($string =~ /$pattern/)
not ($string =~ /$pattern/)

~ is after =
```

Equality Operator

Numeric	String	Meaning
==	eq	Equal to
!=	ne	Not equal to
<=>	cmp	Comparison, with signed
~~	~~	Smartmatch

```
cmp : return -1 if left operand is
less than right, 0 If it is equal, 1
if left operand is greater than
right.
```



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smartwatch operator

Left	Right	Description	Like (But Evaluated in Boolean Context)
Any	undef	Check whether Any is undefined	!defined Any
Any	Object	Invoke -- overloading on Object, or die	
HASH	CODE	Sub returns true on all HASH keys	grep { !CODE->(\$_) } keys %HASH
ARRAY	CODE	Sub returns true on all ARRAY elements	grep { !CODE->(\$_) } @ARRAY
Any	CODE	Sub passed Any returns true	CODE->(Any)
HASH1	HASH2	All same keys in both HASHes	keys HASH1 == grep { exists HASH2->{\$_} } keys HASH1
ARRAY	HASH	Any ARRAY elements exist as HASH keys	grep { exists HASH->{\$_} } @ARRAY
Regexp	HASH	Any HASH keys pattern match Regexp	grep { /Regexp/ } keys %HASH
undef	HASH	Always false (undef can't be a key)	0 == 1
Any	HASH	HASH key existence	exists %HASH->(Any)
HASH	ARRAY	Any ARRAY elements exist as HASH keys	grep { exists HASH->{\$_} } @ARRAY
ARRAY1	ARRAY2	Recurse on paired elements of ARRAY1 and ARRAY2	&& (ARRAY1[0] == ARRAY2[0]) && (ARRAY1[1] == ARRAY2[1]) && ...
Regexp	ARRAY	Any ARRAY elements pattern match Regexp	grep { /Regexp/ } @ARRAY
undef	ARRAY	undef in ARRAY	grep { !defined } @ARRAY
Any	ARRAY	Smartmatch each ARRAY element	grep { Any == \$_ } @ARRAY

```
my %hash = (red => 1, blue => 2, green => 3, orange => 4, yellow => 5, purple => 6, black => 7, grey => 8, white => 9);
my @array = qw(red blue green);
print "some element in hash" if @array ~~ %hash;
```

Reference

```
@tailings=popmany(\@a, \@a2, \@a3);
Sub popmany{
my @retlist=();
for my $ref (@_) {
push @retlist @$ref;
}
return @retlist;
}
```

If you want to pass more than one array and hashes to the function you might have to use pass by reference, it saves the time and space

Hash of Hash

```
%table= (
    'john' => {age =>47,
                eyes=> 'brown',
                weight =>186},
    'Mary' =>{ age =>23,
              eyes=> 'hazel',
              weight =>128}
);
print %table {john} -> {age}
```

Ref operator: ref

Ref operator to determine what a reference is pointing. SCALAR, ARRAY, HASH, CODE, GLOB, REF, VSTRING, IO, LVALUE, FORMAT, REGEXP

Symbolic reference

```
$name="bam";
$name=1; #sets $bam
$name->[0]=4;
#set the first element of @bam
$name->{X}="Y" #sets the X element of Y
$name=() #resets the @bam
&$name #calls the function bam
```

Status

\$\$ current process id
\$? Exits status

Context

Scalar:
\$x = funkshun()
\$x[1] = funkshun()
\${"ray"} = funkshun()
List:
@x = funkshun();
@x[1] = funkshun();
@x{"ray"} = funkshun()
%x = funkshun()
(\$x, \$y, \$z) = funkshun()
(\$x) = funkshun()
my \$x = funkshun() #scalar context
my (\$x) = funkshun(). # list context
Boolean:
@x; gives number of elements
While(@x){
\$file=Shift(@x);
unlink(\$file) || warn. "couldn't delete file";
}

List values and arrays

@stuff=("one", "two", "three") Assign entire list to array
\$stuff=("one", "two", "three") "three" is assigned to stuff
\$stuff=@stuff; \$stuff is assigned to length of the array i.e 3
@releases=("alpha", "beta", "gamma",) Comma is allowed in the last.
\$modificationtime=(stat(\$file))[9]; Modification time
\$hexdigit=("a", "b", "c", "d",) [\$digit-10] hexdigit
(\$day, \$month, \$year)=(localtime)[3, 4, 5]; day/month/year
@days + 0; implicit forces array into scalar
scalar(@days) explicit r @days into scalar
@whatever=() \$whatever=-1



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List values and arrays (cont)

```
undef(@whatever)    recover its
                    memory

scalar(@whatever)   $# whatever +
                    1;
```

Multiplicative operator

```
print "-" x 80      prints row of
                    dashes.

my @ones =          list of 80 1's;
(1) x 80;

@ones = (5) x      #set all
@ones              elements to 5
```

Array, Hash initialization:

```
my %hash = @hash(@keys) = (" ")
%hash x @keys;

my @keys=qw( perl doc
@keys yyy);
```

Result:

```
$hash{perl}="";
$hash{doc}="";
$hash{yyy}=""
```

Short circuit operator

```
$a && $b or $a and $b
$a || $b or $a or $b
$a // $b #define OR
```

```
$pid=fork() // die "can't fork $!"
$value = $hash{value} //
"DEFAULT"
```

Conditional operator

```
my $a = $ok ? $a: $b
my @a=$ok? @a:@b;
( $a_or_b ? $a:$b)=$c
```

miscellaneous

State : state variable is never initialized and restricted to scalar variables.

```
use v5.18;
sub next_count{
state $counter=0;
return ++$counter;
}
print (next_count());
print (next_count());
print (next_count());
Output: 1,2,3
```

Our: access the global variable

```
sub check_warehouse {
our @Current_Inventory;
my $widget;
foreach $widget (@Current_Inventory) {
say "I have a $widget in stock
today.";
}
}
```

our keyword changes the global variable

local: it changes the variable value locally even if it uses the global name and it will not change the global variable value.

Subroutines

miscellaneous (cont)

To declare named subroutine without defining

```
Sub Name Sub Name Proto Sub
Name Proto attr
```

Tricks2

```
@reflist = ( \ $s, \@a,
\ %h)

Is

equal to

@reflist = \ ( $s, \@a, %h)

@reflist = \ (@x);

Is equal to

@reflist = map { \ $_ } @x;

Is equal to

@reflist = map { \ $_ }
fx();

@reflist = \ (fx(), fy(),
fz());

Is equal to

@reflist = map { \ $_ }
fx(), fy(), fz();

@reflist = \ local -
time(); #ref to each of
nine time elements

$lastref = \ local time()
#ref to whether it's
daylight saving time
```

variable as a a variable name

\$\$ref is scalar value of \$ref refers to

@\$ref is array values of \$ref refers to

%\$ref is hash values of \$ref refers to

```
$foo = "three humps";
$scalarref = \ $foo;
$camel_model= $$scal -
arref;

push(@ $arrayref,
$filename);
$$arrayref[0] = "Jan -
uary" ; set the first
element of @$arrayref;
@$arrayref[4..6] = qw
/may June July/;
%$hashref =
(KEY=> "RING",
BIRD=> "Sing")
$$hashref {KEY} = "VA -
LUE";
@$hashref {"KEY1",
"KEY2"} = ( "VAL1",
"VAL2");
$refref = \ \ " -
body";
print ($$$refrefref);

Sigil => $ (dollar means sigil)
```



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Hashes

```
my %map=("aa", 1, "bb", 2);
    or
my %map=( aa=>1,
bb=>2, );
    or
$map{a a}=1;
$map{b b}=2;
Reference:
    $map={ "aa". => 1,
"bb"=>2 }
```

Dereference:

```
%m=%$map;
print($m{aa});
Or
print($map->{aa});
```

Type glob and file handles

*foo contains values of \$foo,
@foo, %foo, \$foo,
Typeglob stores entire symbol
table entry
foo=bar;
It makes everything named foo.
synonymous to every corres-
ponding thing name bar
*foo=\$bar;
Makes an foo an alias of bar but
doesn't make it for @foo an alias
for @bar.

Backtic operator

```
$perl_info=qx(ps $); #thats perl
$K = `ls`; Interpreted in shell and
store the result in $K
$shell_info=qx'ps. $$'; #thats
shell
```

Line Input Operator

```
While($_=defined(<STDIN>)){
print } or
print $_ while defined($_=<STD-
IN>);
$one_line=<MYFILE>
@alllines=<MYFILE>
```

Filename Globbing operator

```
@files = <*.xml>
    To
Filehandle in a variable
<$f oo>
@files = gl ob( "*.x -
ml" );
while(glob *.c){
chmod 0644 $_
}
@files = go b( " $di r/*.
[c h]" );
```

Statement

```
Loop Control:
last, next, redo
LINE:while(<STDIN>){
last LINE if ~/^$/;
eval { }; print ($@) #captures
error
```

Statement (cont)

Scoped variables :

Named Unary operators

-X (file tests)	fileno	lock	setnetent
abs	getc	log	setprotoent
alarm	getgrgid	lstat	setservent
caller	getgrnam	my	shift
chdir	gethostbyname	oct	sin
chomp	getnetbyname	ord	sleep
chop	getpeername	our	sqr
chr	getpgrp	pop	srand
chroot	getprotobyname	pos	stat
close	getpwnam	prototype	state
closedir	getpwuid	quotemeta	study
cos	getsockname	rand	tell
dbmclose	glob	readdir	telldir
defined	gmtime	readline	tied
delete	hex	readlink	uc
do	int	readpipe	ucfirst
each	keys	ref	umask
eof	lc	reset	undef
eval	lcfirst	rewinddir	untie
exists	length	rmdir	values
exit	local	scalar	write
exp	localtime	sethostent	any (\$) sub
fc			

To declare and define named sub routine

Sub Name Block

Sub Name Proto Block

Sub Name Proto attr Block

Subroutines without names:
save return values at compile
time, but also returns value
\$subref = sub Block;

To import subroutines

use MODULE qw(Name1
Name2 Name3)

call subroutine

Name(LIST) & is optional with
parameter or
Name LIST

Name exposes current
@_ to that
subroutine

ct call

&\$subref(LIST)
&\$subref->(LIST),
&\$subref

ntics

```
Sub razzle{
print "Ok"
}
```

Default parameter @_;
Which is local array
\$_[0], \$_[1] are the first two
elements of array

Inline constant function

```
sub FLAG_FOO () { 1 << 8
}
sub FLAG_BAR () { 1 << 9
}
sub FLAG_MASK () {
FLAG_FOO | FLAG_BAR }
sub OPT_GL ARCH() {
{ (0x1B58 & FLAG_MASK)
== 0 } {
{ return 23 }
{ return 42 }
```



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Inline constant function (cont)

```
> }
```

To return hash memory

```
Sub hashem{ +{@_} }  
Sub hashem{ return {@_} }
```

Anonymous subroutine composer

```
$coderef = sub {print  
"Boink!\n"};
```

Semicolon is to terminate
\$coderef;
Sub { } > code inside is not
executed immediately, it just
generates reference to code.

References

References are like & in C
Anonymous hash with braces
\$hashref={
"adam" => "eve",
"clde"=>\$bonnie
}

Hash of array

```
%table= (  
'john' =>[47,  
'brown ',186],  
'mary '=>[23, 'hazel',  
128]  
);  
print @{$tab le{ joh n}}  
[0];
```

prints 47



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