

Beginner

# Perl Maven

by Gábor Szabó

## **Perl Maven**

### Gábor Szabó

This book is for sale at http://leanpub.com/perl-maven

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Collaborative Development using Git and GitHub
Single Page Application with Perl Dancer
Automated Configuration Management using Ansible
Creating a Markua Parser in Perl 5

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## **Preface**

In this eBook you will learn the basics of the Perl programming language. We will cover a large part of the language.

The goal is to provide a book that will be useful for both people who maintain legacy code and thos who start new projects.

Wee keep in mind that you might need to maintain some really old code running on some really old version of Perl.

We will also provide solutions for when you are free from those chains. When you can use a recently released version of Perl and install extensions from CPAN.

## **Error reporting**

Before reporting any issues with the eBook, please check that you are looking at the most recent edition. Check the Changes for the version number of this edition and compare that with the version number published on LeanPub<sup>1</sup>.

If you encounter issues with the content, or the formatting you can report them as an issue on the GitHub project of the perlmaven.com<sup>2</sup> or privately to the author: Gabor Szabo gabor@szabgab.com.

## Changes

Remove the newlines from the paragraph text to fit the expectation of Markua.

#### v0.06 2018-05-05

- New articles included:
  - Have exceeded the maximum number of attempts (1000) to open temp file/dir
  - Passing multiple parameters to a function
- Updated articles:
  - Slurp
  - Using a queue in Perl

<sup>&</sup>lt;sup>1</sup>https://leanpub.com/perl-maven/read sample

<sup>&</sup>lt;sup>2</sup>https://github.com/szabgab/perlmaven.com

Preface 2

#### v0.05 2018-04-04

- New articles included:
  - tell
  - exists
  - Current working directory in Perl (cwd, pwd)
  - eof, end of file
- Updated:
  - json

#### v0.04 2018-03-24

- New articles included:
  - min, max, sum in Perl using List::Util
  - Reading and writing binary files
  - File Test Operators
  - How to improve my Perl program?
- Create an index by collecting the =indexes from every file and listing them at the end of the book.
- · Include images as well.
- Extract some sample code into files.

#### v0.03 2018-03-16

- New articles included:
  - What is autovivification?
  - Installing a Perl Module from CPAN on Windows, Linux and Mac OSX
  - Running external programs from Perl with system
  - Scalar value ... better written as ...
  - substr outside of string at ...
  - Using a queue in Perl
- Add Chapters
- Fix lots of formatting issues.
- Updated articles:
  - Perl Tutorial
  - Perl Editor

Preface 3

#### v0.02 2018-03-13

- Convert the <b></b> tags to bold.
- Convert the <i></i> to italic.
- Convert to list item.
- Convert the external links such as <a href="http://dwimperl.szabgab.com/">DWIM Perl</a>.
- Include pro articles as well.
- Include the Perl-tutorial main page with the list of supporters.
- Include the "other" pages from the bottom of the perl-tutorial.
- Include the <include ..> files.
- Add ids to the pages, include internal links.
- Convert <iframe> to link and warn about it.

#### v0.01 2018-03-12

• Collected the pages and put them together into a eBook.

This content is not available in the sample book. The book can be purchased on Leanpub at http://leanpub.com/perl-maven.

#### Perl tutorial

#### **About this Tutorial and eBook**

The Perl Maven tutorial will teach you the basics of the Perl programming language. You'll be able to write simple scripts, analyze log files and read and write CSV files. Just to name a few common tasks.

You'll learn how to use CPAN and several specific CPAN modules.

It will be a good foundation for you to build on.

If you are interested in getting updated when new parts are published, please subscribe to the newsletter<sup>3</sup>.

There is also an e-book<sup>4</sup> version of the material available for purchase. In addition to the tutorial, the eBook also includes some material that is only available pro<sup>5</sup> subscribers.

## **Supporters**

The updating of Perl Tutorial was supported by a number of people and corporations via a crowdfunding campaign. Some people wanted to stay anonymous, but most of them are listed here. Thanks to all of you for making this ongoing work possible!

- cPanel, Inc.<sup>6</sup> picked up almost 50% of the tab. Thanks to benny Vasquez<sup>7</sup> \* The Perl Shop<sup>8</sup> also provided substantial support.
- Liz<sup>9</sup> & Wendy<sup>10</sup> Mattijsen & Van Dijk \* Desmond Hokin<sup>11</sup> \* Kevin Phair<sup>12</sup>

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#### **Extended eBook**

An extended version of the Perl Tutorial is available as an  $eBook^{61}$ . It contains all the materials from the free tutorial and a number of additional articles that are only available to the  $Pro^{62}$  subscribers.

#### **Brand new or Legacy?**

In every tutorial and in every book there is a tension between teaching the most modern techniques or teach how the legacy code works.

The most recent techniques will only be available to people who can use the most recent version of Perl. They are probably only relevant to new projects. People who need to use older versions of Perl or who cannot install modern CPAN modules will just get frustrated seeing all the nice stuff, but not able to use it.

The old techniques on the other hand will allow you to maintain existing applications and will allow you to write new applications on both old and new versions of Perl. The drawback here is that in many cases you might need to write more code, sometimes a lot more code, than you would if you used a recent version of Perl and recent CPAN modules.

This tutorial, and this eBook tries to provide a solution to this dilemma by providing both. Telling you about the alternative options and giving advice which one to use in which situation.

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61 https://leanpub.com/perl-maven/
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62 https://perlmaven.com/pro

#### Video series

There is a free video course<sup>63</sup> that includes over 210 screencasts, a total of more than 5 hours of video. In addition to presenting the material it also provides explanations to the solutions of all the exercise.

#### Free on-line Beginner Perl Maven tutorial

In this tutorial you are going to learn how to use the Perl 5 programming language to **get your job done**.

You will learn both general language features, and extensions or libraries or as the Perl programmers call them **modules**. We will see both standard modules, that come with perl and 3rd-party modules, that we install from CPAN.

When it is possible I'll try to teach things in a very task oriented way. I'll draw up tasks and then we'll learn the necessary tools to solve them. Where possible I'll also direct you to some exercises you can do to practice what you have learned.

#### Introduction

• Install Perl, print Hello World, Safety net (use strict, use warnings) \* #!/usr/bin/perl - the hash-bang line \* Editors, IDEs, development environment for Perl \* Getting Help \* Perl on the command line \* Core Perl documentation, CPAN module documentation \* POD - Plain Old Documentation \* Debugging Perl scripts

#### **Scalars**

• Common warnings and error messages \* Prompt, read from STDIN, read from the keyboard \* Automatic string to number conversion \* Conditional statements: if \* Boolean (true and false) values in Perl \* Numerical operators \* String operators \* undef, the initial value and the defined function \* Strings in Perl: quoted, interpolated and escaped \* Here documents \* Scalar variables \* Comparing scalars \* String functions: length, lc, uc, index, substr \* Number Guessing game (rand, int) \* Perl while loop \* Scope of variables in Perl \* Boolean Short circuit

#### **Files**

exit \* Standard Output, Standard Error and command line redirection \* warn \* die \* Writing to files \* Appending to files \* Open and read from files using Perl \* Don't open files in the old way \* Binary mode - reading and writing binary files \* eof, end of file in Perl \* tell \* seek \* truncate \* Slurp mode

<sup>63</sup> https://perlmaven.com/beginner-perl-maven-video-course

#### **Lists and Arrays**

• Perl foreach loop \* The for loop in Perl \* Lists in Perl \* Using Modules \* Arrays in Perl \* Process command line parameters @ARGV \* Process command line parameters using Getopt::Long \* Advanced usage of Getopt::Long for accepting command line arguments \* split \* How to read and process a CSV file? (split, Text::CSV\_XS) \* join \* The year of 19100 (time, localtime, gmtime) and introducing context \* Context sensitivity in Perl \* Reading from a file in scalar and list context \* STDIN in scalar and list context \* Sorting arrays in Perl \* Sorting mixed strings \* Unique values in an array in Perl \* Manipulating Perl arrays: shift, unshift, push, pop \* Stack \* Queue \* reverse \* The ternary operator \* Loop controls: next and last \* min, max, sum using List::Util \* qw - quote word

#### **Subroutines**

• Subroutines and Functions in Perl \* Passing multiple parameters to a function \* Variable number of parameters \* Returning a list, returning an array \* Recursive subroutines

#### Hashes

Perl Hashes (dictionary, associative array, look-up table) \* Creating hash from an array \* Perl
hash in scalar and list context \* exists hash element \* delete hash elements \* Sorting a hash \*
Count word frequency in a text file

#### **Regular Expressions**

• Introduction to Regular Expressions in Perl \* Regex: character classes \* Regex: special character classes \* Regex: quantifiers \* Regex: Greedy and non-greedy match \* Regex: Grouping and capturing \* Regex: Anchors \* Regex options and modifiers \* Substitutions (search and replace) \* trim - remove leading and trailing spaces \* Perl 5 Regex Cheat sheet

#### Shell related functionality

• Perl -X operators \* Perl pipes \* Unix commands: chmod, chown, cd, mkdir, rmdir, ln, ls \* Unix commands: pwd - current working directory \* Running external programs using system \* Unix commands: rm, mv, cp: How to remove, copy or rename a file with Perl \* Windows/DOS commands: del, ren, dir \* File globbing (Wildcards) \* Directory handles \* Traversing directory tree manually with recursion \* Traversing directory tree manually using a queue and using find.

#### **CPAN**

• Download and install Perl (Strawberry Perl or manual compilation) \* Download and install Perl using Perlbrew \* Locating and evaluating CPAN modules \* Downloading and installing Perl Modules from CPAN \* How to change @INC to find Perl modules in non-standard locations? \* How to change @INC to a relative directory \* local::lib

#### **Examples for using Perl**

How to replace a string in a file with Perl? (slurp) \* Reading Excel files using Perl \* Creating Excel files using Perl \* Sending e-mail using Perl \* CGI scripts with Perl \* Parsing XML files \* Reading and writing JSON files \* Database access using Perl (DBI, DBD::SQLite, MySQL, PostgreSQL, ODBC) \* Accessing LDAP using Perl

#### Common warnings and error messages

• Global symbol requires explicit package name ... \* .. also explained in Variable declaration in Perl \* Use of uninitialized value \* Bareword not allowed while "strict subs" in use \* Name "main::x" used only once: possible typo at ... \* Unknown warnings category \* Can't use string (...) as a HASH ref while "strict refs" in use at ... ... \* ... explained in Symbolic references in Perl \* Can't locate ... in @INC \* Scalar found where operator expected \* "my" variable masks earlier declaration in same scope \* Can't call method ... on unblessed reference \* Argument ... isn't numeric in numeric ... \* Can't locate object method "..." via package "1" (perhaps you forgot to load "1"?) \* Odd number of elements in hash assignment \* Possible attempt to separate words with commas \* Undefined subroutine ... called \* Useless use of hash element in void context \* Useless use of private variable in void context \* readline() on closed filehandle \* Possible precedence issue with control flow operator \* Scalar value better written as ... \* substr outside of string at ... \* Have exceeded the maximum number of attempts (1000) to open temp file/dir

#### Extra articles

• Multi dimensional arrays \* Multi dimensional hashes \* Minimal requirement to build a sane CPAN package \* Statement modifiers: reversed if statements \* autovivification

#### From other books

Splice to slice and dice arrays in Perl \* How to improve your Perl code

#### Object Oriented Perl with Moose or Moo

There is a whole series of articles on writing Object Oriented code, using the light-weight Moo<sup>64</sup> OOP framework or the full-blown Moose<sup>65</sup> OOP framework.

There is a corresponding video courses<sup>66</sup> and the whole tutorial is available as eBook<sup>67</sup>.

<sup>64</sup> https://perlmaven.com/moo

<sup>65</sup> https://perlmaven.com/moose

 $<sup>^{66}</sup> https://perlmaven.com/beginner-perl-maven-video-course\\$ 

<sup>&</sup>lt;sup>67</sup>https://leanpub.com/perl-maven/

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## Installing and getting started with Perl

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#### Windows

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#### **Video**

#### First program

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#### Hello world

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#### Perl on the command line for non-Padre users

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## say() instead of print()

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#### Safety net

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#### **User Input**

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## **Getting rid of newlines**

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#### Conclusion

#### **Exercises**

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#### **Exercise 2**

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## Type conversion in Perl

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#### **Nested if statements**

#### elsif

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#### else if in Perl

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#### When interpolation is not the answer

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## x the repetition operator

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#### ++ on a string

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## **Escaping double quotes**

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## qq, the double-q operator

## q, the single-q operator

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#### Here documents and code indentation

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## Two sets of comparison operators

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## String functions: length, lc, uc, index, substr

## Ic, uc, length

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#### index

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#### substr

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## Replacing part of a string

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## **Number Guessing game**

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### Integer part of a fractional number

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#### **Random numbers**

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## **Exercise: Number Guessing game**

## while loop

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## Variable scope: visible everywhere

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## Variable hidden by other declaration

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## Same name in multiple blocks

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## in-file package declaration

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## open or die

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#### sort

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## **Examining exit code in Perl**

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## Standard output, standard error and command line redirection

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#### How to print error messages?

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## **Redirecting Standard Error**

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#### **Redirecting both**

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#### null on MS Windows

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# Warning when something goes wrong

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# **Catching warnings**

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# warning

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### What does die do?

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# **Collecting die calls**

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# Writing to files with Perl

# Simple example

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# **Error handling**

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# Open or die

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# **Better error reporting**

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### **Greater-than?**

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### Non-latin character?

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# **Appending to files**

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# Prepending to the beginning of a file

# Open and read from text files

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# **Exception**

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# Warn or keep silent

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# **Explanation**

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# Reading more than one line

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# An edge-case

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# open without die

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# Don't Open Files in the old way

#### So what shall I do?

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# The danger

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# The old and not recommended way

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# Filehandle glob

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# 2 parameter open

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### Need to close that filehandle

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# How to avoid these problems?

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# **Good and Bad for reading**

# **Good and Bad for writing**

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# So what is it about 3-argument open that protects you from overwriting /etc/passwd?

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# Reading and writing binary files in Perl

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# Opening a binary file for reading

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# Opening a binary file for writing

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# Reading from a binary file

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# Meaning of the binary data

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# **EOF** - End of file in Perl

# Reading text file in while loop

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# Reading file in list context

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# **Reading binary file**

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### tell how far have we read a file

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#### tell

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# slurp mode - reading a file in one step

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# **Explanation**

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# localize the change

# **Creating a slurp function**

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# File::Slurp

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# Path::Tiny

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# Installing the modules

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# Perl for loop explained with examples

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# Perl for loop

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### foreach

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# The parts of the perl for loop

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# **Infinite loop**

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# peridoc

# **Perl Arrays**

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# **Debugging of an array**

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# foreach loop and perl arrays

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# Accessing an element of an array

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# **Indexing array**

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# Length or size of an array

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# Loop on the indexes of an array

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# **Push on Perl array**

# **Pop from Perl array**

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# shift the Perl array

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# Processing command line arguments - @ARGV in Perl

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#### **Command line**

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# The name of the script is in \$0

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# **C** programmer

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# **Unix/Linux Shell programming**

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# How to extract the command line arguments from @ARGV

# Checking the arguments

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# shift a single parameter

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# Minor bug

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# **Complex cases**

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# How to process command line arguments in Perl using Getopt::Long

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# **Explain the command line**

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# Getopt::Long

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### **Failures**

#### **Unknown option**

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#### **Option requires an argument**

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#### **Default values**

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# Flags without value

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# **Multiple flags**

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#### **Short names**

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# **Single-character options**

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### Non-affiliated values

#### **Advanced**

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# Advanced usage of Getopt::Long for accepting command line arguments

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# Simple boolean (on/off) argument

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# Negatable boolean arguments

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# Incremental or counting arguments

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# Argument with a value

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# Argument that can get a value (but not required to)

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# Two arguments, one depending the other

#### Argument that can get a value (but not required to)

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# Perl split - to cut up a string into pieces

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# Syntax of split

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# Simple cases

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# Limit the number of parts

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# **Assign to scalars**

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# Slice on the fly

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# Split on more complex regex

# Split on multiple characters

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# Split on empty string

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# **Beware of regex special characters**

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# Other examples

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# How to read a CSV file using Perl?

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# The algorithm

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# **Using split**

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### Comma in the field

#### Text::CSV

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### **Multi-line fields**

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#### Hofeherke

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# join

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# The year of 19100

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#### localtime

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### The other localtime

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# Year 2000 bug

# gmtime

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# How does time really work?

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# **High precision time**

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### **DateTime**

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#### **Context awareness**

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# Scalar and List context in Perl, the size of an array

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# **Array in LIST context**

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# **Array in SCALAR context**

#### SCALAR and LIST context

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### The context of the if statement

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#### SCALAR and LIST context

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# **Creating SCALAR context**

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# **Creating LIST context**

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# When are the parentheses significant?

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# Forcing SCALAR context

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# Length or size of an array in Perl

# The tricky way

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# Reading from a file in scalar and list context

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# readline in SCALAR context

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#### readline in LIST context

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#### Which one is better?

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# Slurp mode

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# STDIN in scalar and list context

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#### STDIN in scalar context

#### STDIN in list context

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### **Usage?**

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# **Sorting arrays in Perl**

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#### Sort based on ASCII order

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# **Comparison function**

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# Sorting in alphabetical order

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# Sorting numbers in Perl

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# **Sorting mixed strings**

# **Extract numbers using substr**

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# Use regular expression to extract numbers

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# **Missing numbers**

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# **Speed**

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# Hiding the sort in a sub

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# Unique values in an array in Perl

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### A small clarification

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### List::MoreUtils

# Home made uniq

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# Home made uniq explained

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# Shortening the home made unique function

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# Filtering duplicate values using grep

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# Wrapping it in 'do' or in 'sub'

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# Home made uniq - round 2

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# Unique values in an array reference

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#### **Exercise**

#### **Exercise 2**

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# Manipulating Perl arrays: shift, unshift, push, pop

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#### pop

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### push

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#### shift

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### unshift

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# Reverse Polish Calculator in Perl using a stack

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# Using case / switch / given / when

#### **Problems**

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#### **Exercise**

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# Using a queue in Perl

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# What is a queue?

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# **Abstract implementation**

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# **Parallel or Asynchronous processing**

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# Reverse an array, a string or a number

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# **Reverse array**

# Reverse a scalar: string or number

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# The pitfalls

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# Semordnilap

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### Conclusion

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# The ternary operator in Perl

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# Unary, binary, ternary operators

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# The conditional operator

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# **Examples**

# **Setting a limit**

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# min, max, sum in Perl using List::Util

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#### min

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#### minstr

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#### max

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#### maxstr

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#### sum

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#### sum<sub>0</sub>

### product

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### Other functions of List::Util

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### first

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### any

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#### all

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#### reduce

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# qw - quote word

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# Why is it called quote word?

# qw is not a function

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# Possible attempt to separate words with commas

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# Importing functions selectively

# **Subroutines**

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# **Subroutines and functions in Perl**

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# Simple function

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# prompt

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# **Prototypes**

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# Parameters or signature

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### **Parentheses**

Subroutines 59

#### **Return values**

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# Passing multiple parameters to a function in Perl

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# Positional parameter in Perl function call

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# Named parameters for Perl functions - Expecting key-value pairs

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# Variable number of parameters in Perl subroutines

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# Variable-length parameter lists of functions in Perl

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# **Private array**

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# Passing more than one array

Subroutines

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# **Understanding recursive subroutines - traversing a directory tree**

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#### A better solution

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# Traversing a directory tree

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# Traversing a directory tree recursively

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# Top down approach

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### **Recursive function**

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# Other solution using a queue

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# **Hashes in Perl**

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# Create an empty hash

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# Insert a key-value pair into a hash

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### Fetch an element of a hash

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#### Initialize a hash with values

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# Assignment to a hash element

# **Iterating over hashes**

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#### The size of a hash

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# Using empty values in a hash

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#### **Thanks**

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# Creating a hash from an array in Perl

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# Odd number of elements in hash assignment

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#### **Discussion**

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# Perl hash in scalar and list context

#### Hash in scalar context

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# exists - check if a key exists in a hash

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# Syntax of exists

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# The 3 valid situations of a key-value pair

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# An example

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### **Conclusion**

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# How to sort a hash in Perl?

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### How to sort a hash?

# Sort the hash in alphabetical order of its keys

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#### Sort the values of the hash

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# Sort the keys of the hash according to the values

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# Count the frequency of words in text using Perl

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# **Impatient?**

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### The task

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# Sort the results according to the ASCII table

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# Sort the results according to frequency

# Store the number of occurrence of each string

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# Counting words in a string

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# No need for temporary array

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# More spaces

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# Strings in a file

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# **Extracting real words**

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# **Introduction to Regexes in Perl 5**

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#### Regex dialects and interactions

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### = $\sim$ the regex operator

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## !∼ negated regex

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## **Regular characters**

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#### **Special characters**

# **Regex character classes**

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#### Range in a character class

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#### **Negated character class**

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#### **Summary**

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# **Regex: special character classes**

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#### 1

```
\d - digit - [0-9]
```

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#### ]

```
\w - word character - [0-9a-zA-Z_]
```

#### ]

 $\s - \text{whitespace} - [\t\n\f\r]$ 

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#### D, W, S - negated character classes

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#### **POSIX character classes**

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#### Unicode character classes

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# **Perl 5 Regex Quantifiers**

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## color or colour? - optional characters

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#### \* Any number of characters

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#### + One or more characters

# **{} curly braces**

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#### **Quantifier table**

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#### Warning

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#### **Quantifiers on character classes**

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# trim - removing leading and trailing white spaces with Perl

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#### left trim

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#### right trim

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#### trim both ends

### **Hiding in function**

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#### String::Util

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#### Text::Trim

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# Perl 5 Regex Cheat sheet

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#### **Character Classes**

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### **Quantifiers**

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# "Quantifier-modifier" aka. Minimal Matching

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#### Other

# **Grouping and capturing**

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#### **Anchors**

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#### **Modifiers**

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## Other Regex related articles

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#### Official documentation

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# -X operators

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#### **Video**

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# **Current working directory in Perl (cwd, pwd)**

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#### cwd

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#### getcwd

#### cwd or getcwd?

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# Running external programs from Perl with system

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#### system

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#### system with multiple arguments

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# **Shell expansion**

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# The security risk

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# Conclusion and further reading

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# How to remove, copy or rename a file with Perl

#### remove

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#### rename

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#### copy

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# Reading the content of a directory

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#### readdir in SCALAR context

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#### readdir in LIST context

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#### closedir

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# What things?

#### readdir in SCALAR context

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#### readdir in LIST context

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# what does my \$dir = shift // '.' mean?

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# Traversing the filesystem - using a queue

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#### **Directory**

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## How can we know the queue will end?

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#### The result

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#### **Download and install Perl**

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#### Perl 5 Porters and downstream distributors

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#### **Microsoft Windows**

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#### Linux

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#### **Mac OSX**

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#### UNIX

#### Download, compile and install Perl

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#### **Learn Perl directions**

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# Installing a Perl Module from CPAN on Windows, Linux and Mac OSX

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#### **Cases**

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# **Strawberry Perl or DWIM Perl on Windows**

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#### **ActivePerl**

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#### **GitPerl**

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## **Cygwin Perl**

#### **Debian/Ubuntu Linux**

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#### RedHat/Fedora/CentOS Linux

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#### **Mac OSX**

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# Using the cpan client

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#### **Using cpanm**

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#### TODO

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# How to change @INC to find Perl modules in non-standard locations

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## **Loading your private Perl module**

# **Upgrading a Perl module**

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#### The use statement

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#### PERLLIB and PERL5LIB

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#### use lib

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#### -I on the command line

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#### So which one to use?

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# How to add a relative directory to @INC

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# **Directory layout and use-case**

#### **Solution 1 - FindBin**

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#### Solution 2 - \$0

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#### Solution 3 - Cwd

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#### Solution 4 - Dir::Self

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#### **Solution 5 - Path::Tiny**

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#### **Solution 6 - Path::Tiny**

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#### Solution 7 - rlib

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#### Solution 8 - FindBin::libs

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#### Conclusion

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# How to replace a string in a file with Perl

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#### **Using Path::Tiny**

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#### File::Slurp

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## Replace content with pure Perl

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## How to read an Excel file in Perl

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#### **Create the Excel file**

#### Spreadsheet::Read

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#### Fetch a row

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#### Fetch all the rows

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## **Read Excel script**

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# How to create an Excel file with Perl?

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### **Adding formulas**

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# **Adding color using formats**

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# Address cells using coordinates

#### More

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# Sending HTML e-mail using Email::Stuffer

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## Sending simple text e-mail

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#### **Using SMTP**

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# **Sending HTML mail**

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# Sending to multiple addresses

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# Perl/CGI script with Apache2

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## **Background start Linux, install Apache2**

# **Creating the first CGI script in Perl**

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#### **Configure Apache to serve CGI files**

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# **Dynamic results**

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## **Trouble shooting**

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#### **500 Internal Server Error**

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#### 503 Service Unavailable

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#### **404 Not Found**

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#### 403 Forbidden

#### **Summary**

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# **JSON** in Perl

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# JSON implementations in Perl

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# **Usage example: Encoding Perl to JSON**

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#### **Encoding JSON in a human-readable way**

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### **Decoding JSON to Perl**

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#### More about JSON

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#### **Exercise**

#### **Other languages**

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# Simple Database access using Perl DBI and SQL

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#### **Architecture**

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# Simple example

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#### CREATE TABLE

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#### **INSERT**

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#### **UPDATE**

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#### **SELECT**

#### **Exercise**

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#### **Thanks**

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# Reading from LDAP in Perl using Net::LDAP

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#### Fetching Data from an LDAP server

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#### Admin limit exceeded

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#### **Bad filter**

# Common warnings and error messages

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# Global symbol requires explicit package name

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#### The simplest example

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#### The bad solution

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# **Example 2: scope**

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#### The other ways

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#### Variable declaration in Perl

#### The trouble

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#### use strict

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# The exceptions

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# The danger of the explicit package name

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#### use warnings

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# Always use strict

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# Use of uninitialized value

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# A quick explanation

#### A simple example

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#### Only a warning

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### **Confusing output order**

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## **Turning off buffering**

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## The unwanted scope

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# **Barewords in Perl**

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#### **Good uses of barewords**

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# Name "main::x" used only once: possible typo at ...

#### Assign to a variable

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#### **Fetch value only**

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#### What is the typo there?

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#### use strict

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## Other cases while using strict

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# **Unknown warnings category**

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## **Unknown warnings category '1'**

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# **Unknown warnings category 'Foo'**

# **Missing semicolon**

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# Can't use string (...) as an HASH ref while "strict refs" in use at ...

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### Can't use string (...) as an HASH ref while "strict refs" in use at ...

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# **Symbolic references in Perl**

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# The danger

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#### The understanding

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## Symbolic references of scalar variables

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# Accessing a variable when its name is in another variable

#### Several numbered variables

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#### Conclusion

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# Can't locate ... in @INC

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#### Why Perl cannot find the module?

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# Can't locate warning.pm in @INC

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# Scalar found where operator expected

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## Missing comma

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# String found where operator expected

#### Number found where operator expected

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# Syntax error while comma is missing

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# Scalar found where operator expected at

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## Array found where operator expected

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# What other cases do you encounter often?

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# "my" variable masks earlier declaration in same scope

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# Plain script

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### **Block in conditional statement**

#### The scope of a function

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#### The scope of a for loop

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# What does "my" really mean?

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## How to empty an existing variable?

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# Can't call method ... on unblessed reference

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#### require

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# **B::Deparse**

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#### use

#### eval "use Storable";

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#### **Explanation**

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#### Solution

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# Argument ... isn't numeric in numeric ...

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#### Not numbers

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#### Solution

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# Can't locate object method "..." via package "1" (perhaps you forgot to load "1"?)

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## The explanation

# **AUTOLOAD - handling Undefined subroutines**

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#### **AUTOLOAD** in the script

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#### **AUTOLOAD** in object oriented code

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#### use strict or warnings?

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#### Useless use of hash element in void context

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#### **B::Deparse**

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# Useless use of private variable in void context

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#### This or That

#### Solution

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# readline() on closed filehandle in Perl

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# Not checking if 'open' was successful

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# Possible precedence issue with control flow operator

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#### How to locate these issues?

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# Scalar value ... better written as ...

#### Access element of an array

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#### Array element in dereference

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# Correct way to access elements of an array in Perl

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# substr outside of string at ...

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# Have exceeded the maximum number of attempts (1000) to open temp file/dir

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# Multi dimensional arrays in Perl

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#### **Creating a matrix in Perl**

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#### **Matrix**

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## Visualizing a multi-dimensional array

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# Two dimensional array or what?

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#### More than 2 dimensions?

#### Conclusion

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#### Multi dimensional hashes in Perl

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#### **Explanation**

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# Creating the third hash

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# Traversing the hashes manually

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#### Less than two dimensions

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#### More than two dimensions

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#### **Mixed dimensions**

# Checking if a key exists

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# Minimal requirement to build a sane CPAN package

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## Creating the distribution

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# **Adding tests**

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# **Prerequisites**

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# Use PREREQ\_PM instead of BUILD\_REQUIRES

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#### What's next?

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#### Statement modifiers: reversed if statements

#### if-statement in Perl

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#### unless-statement in Perl

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#### What is autovivification?

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# The simple cases for hashes

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# The simple cases for arrays

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#### **Complex data structures**

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# autovivification and accessing elements

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## autovification and deleting elements

### A bug

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#### no autovification

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# **Conclusion**

# From other books

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# Splice to slice and dice arrays in Perl

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#### How to remove an element from the middle of an array in Perl?

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# How to insert an element in the middle of an array in Perl?

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## How to insert a list of values in an array in Perl?

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# How to insert an array in the middle of another array in Perl?

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#### Replace part of an array with some other values

From other books 106

#### splice

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#### **Return values**

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## **Negative parameters**

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#### Conclusion

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# How to improve my Perl program?

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### **Layout - especially indentation**

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#### **Descriptive variable names**

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#### Don't use \$a and \$b

From other books 107

### **Eliminate \$\_**

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#### Always use strict and use warnings

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# Lexical filehandle and 3 argument open

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## **Direct object notation**

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#### **Use Perl::Critic**

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# **Object Oriented Programming**

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