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## Advanced Perl Programming Course Outline

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### Overview

Perl has evolved from its beginnings as an eclectic scripting tool for UNIX administrators into one of the most popular, influential, and widely used computer languages in history. In this course, you will learn how to fully utilize the Perl programming language.

### Audience

Application programmers, system administrators, web-site authors, webmasters, and UNIX/NT power users.

### Prerequisites

Perl Programming and Perl application development experience. Full comprehension of the extending and embedding material will require some C or C++ programming experience.

### Course Outline

#### 1. Debugging

- Warnings
- Diagnostic Messages
- Carping, Confessing, and Croaking
- Strict Checks
- Compiler Pragmas
- Debugging Flags
- Your Perl Configuration
- The Devel::Peek Module
- The Data::Dumper Module

#### 2. Expert List Manipulation

- The grep Operator
- Lists, Arrays, and List Operators
- Context and Subroutines
- Initializing Arrays and Hashes
- Reference Syntax

Auto-vivification  
Defined Values  
Other List Operators  
Usage of map, grep, and foreach

### 3. Blocks and Code References

Blocks  
Subroutines  
Subroutine Prototypes  
Code Refs and Anonymous Subroutines  
Typeglobbing for the Non-Squeamish  
Local (Dynamic) Variables  
Lexical Variables  
Persistent Private Subroutine Variables  
Closures  
The eval Operator  
The Block Form of eval  
The String Form of eval  
Block Form of eval for Exception Handling

### 4. Packages

Review of Packages  
BEGIN and END Blocks  
Symbol Tables  
Package Variables  
Calling Package Subroutines  
Importing Package Symbols  
Exporting Package Symbols  
Using the Exporter Package  
The use Function  
AUTOLOAD and @ISA  
AutoLoader and SelfLoader

### 5. Objects and Classes

Object-Oriented Stuff  
Making Perl Object-Oriented  
References  
The bless Function  
So, What's a Blessed Thing Good For?  
Calling Class and Object Methods

Object Methods  
Writing Classes  
Constructors  
Inheritance  
What Perl Doesn't Do

## 6. Tied Variables

Why Use tie?  
Tying a Scalar  
Inside Tied Variables  
untie  
Tying an Array  
Tying Hashes  
Tie::Hash and Tie::Array  
Tying Filehandles  
What Are DBM, NDBM, GDBM, SDBM, etc?  
Using the DBM Modules

## 7. Installing and Using Perl Modules

Laziness, Impatience, and Hubris  
CPAN  
Using Modules  
Installing a Perl Module  
Unpacking the Module Source  
The Configuration Step  
The Build Step  
The Test Step  
The Install Step  
Using CPAN.pm  
Using Module Documentation

## 8. Introduction to DBI/DBD

The Old Way - DBPerls  
A Better Way - DBI/DBD  
Database Programming  
Handles  
Connecting to the Database  
Creating a SQL Query  
Getting the Results  
Updating Database Data

Transaction Management  
Finishing Up

## 9. DBI/DBD SQL Programming

Error Checking in DBI  
Getting Connected  
Drivers  
Using Parameterized Statements  
Statement Handle Attributes  
Other Handle Attributes  
Column Binding  
The do Method  
BLOBs and LONGs and Such  
Installing DBI Drivers

## 10. Introduction to Perl/Tk

Tcl, Tk, Tcl/Tk, Tkperl, Perl/Tk, etc.  
Perl/Tk  
Creating a Perl/Tk Application  
GUI Programming Overview  
Adding Widgets  
Scrolled Widgets  
Configuring Widgets  
Menus  
More Fun with Menus  
Using FileSelect

## 11. Perl/Tk Programming

Tk::Error and Tk::ErrorDialog  
Configuring Widgets  
Geometry Management  
Geometry Management with grid()  
The Frame Widget  
Defining Widget Callbacks  
Bindings  
Nonblocking I/O with fileevent()  
Tags  
Other Widgets  
Other Tk Commands  
Getting Tk

## 12. Extending Perl with C/C++

Extending the Perl Interpreter  
Overview of Perl5 XSUBs  
Get Started with h2xs  
Set up the Perl Wrapper Class  
Write the XS Code  
The XS File  
Write Some Test Code  
What Do You Want?  
Returning Values on the Stack  
A Walk through an XSUB  
Arguments to XSUBs  
Other h2xs Options

## 13. Embedding the Perl Interpreter

Why Embed Perl?  
Embedding Perl in a C Program  
Compiling the Program  
perlmain.c  
Perl Data Types  
Macros and Functions  
Manipulating Scalars  
Memory Management  
Script Space  
Evaluating Perl Expressions  
Dynamic Loading  
Multiple Perl Interpreters

## 14. Module Development and Distribution

Distributing Modules  
Get Started with h2xs  
Files Created by h2xs  
The Build Library (blib) Directory  
Unit Testing and test.pl  
Versions  
Using blib  
POD  
POD Translators  
Cutting a Distribution

Other Niceties

Makefile.PL

## 15. Design and Implementation

Think First

Object-Oriented Design

Object-Oriented Development

Library Modules

Utility Programs

Filters

Performance

Timing with Benchmark

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