Perl 入门和提高　Lesson 8

周晓方
courses@xfzhou.homeftp.org

Namespaces & Packages 命名空间

- A namespace stores names (of all its var, sub, fileHd, etc. Each namespace has its own symbol table.
- In perl, namespace held in a *package*.

```
$a = 4; my $b = 'X'; #Don't say my $a…
print "In main: $a, $::a, $main::a\n";
package A;
$a = 6;       print "A, $a, $b\n";
package A::B;
$a = 7;       print "A::B, $a, $b\n";
package B;
$a = 8;       print "B, $a, $b\n";
$C::a=9;
print "$::a, $A::a, $A::B::a, $B::a\n";
print join(", ", keys %main::), "\n";
print join(", ", keys %A::), "\n";
print join(", ", keys %A::B::), "\n";
print join(", ", keys %B::), "\n";
print join(", ", keys %C::), "\n";
```

Screen Dump

```
In main: 4, 4, 4
A, 6, X
A::B, 7, X
B, 8, X
4, 6, 7, 8
utf8::, STDOUT, @,
ARGV, …, A::, C::,
_,…, B::, STDERR,
main::
a, B::
a
a
a
```

- Full qualified name: $@%*pack_name*::*var_name*
- All names of a package in hash *%pack_name::*
- "*my*" vars are *lexical*, not belongs to any namespaces.

Perl modules

- Rule 1: Put each package (i.e. module, namespace) in its own file (*.pm), except the **main** package (the main .pl file)
- Rule 2: special variables are always global. *Localize* (esp. $_, i.e. say "*local $_;*" in your code) if necessory.
- Rule 3: Package with nested name. :: ⇔ sub folder
  - Store package FDU in ./FDU.pm
  - Store package FDU::ME in ./FDU/ME.pm
  - Store package FDU::ME::SENIOR in ./FDU/ME/SENIOR.pm
- Perl search modules in paths given in *@INC*,例如草莓`perl`是 `C:/Strawberry/perl/site/lib,C:/Strawberry/perl/vendor/lib,C:/Strawberry/perl/lib;`
  Activeperl缺省是`(C:/Perl/site/lib,C:/Perl/lib)`
- Add my modules to perl search path:
  use lib Mod_Base
  use lib "path" 例如
  `use lib './lib', './blib/lib', './blib/arch';`

Perl modules, *@INC*, *%INC*

- To include a module, say *use/require module*;
  - '*use module*' includes a module at compile time.
  - '*require module*' includes one at run time. (obsolete)

- *@INC* is just like the UNIX *$path*, where perl search for modules. Run this and get:

```
perl -e "print join ', ', @INC;";
C:/Perl/lib, C:/Perl/site/lib, .
```

  Perl will search "mylib" in c:/perl/lib/mylib.pm, c:/perl/site/lib/mylib.pm, ./mylib.pm, one by one.

- *%INC* (module_name=>file_location) contains all modules included via *do*, *require*, *use*.

Don't reinvent the wheel

- Check existence

  检查库路径 perl -e *"print join ' ', @INC"*

  检查特定模块 perl -e *"use Tk;"*

  查看文档 perldoc *perlmodref*

  查看CPAN http://search.CPAN.org/

- cpan命令安装（AP可以用ppm命令安装）
  - 如果cpan安装失败，可以尝试手工安装
- Install new modules

  Find and download from CPAN, unpack it

  perl Makefile.PL #产生Makefile

  gmake #或make,运行Makefile

  gmake test #测试

  gmake install #安装

- 草莓Perl、ActivePerl都已预装了大量模块

Standard module——Benchmark

- Manual page: `perldoc -m Benchmark`
- Usage:

```
#!/usr/bin/perl -w
use strict;
use Benchmark;
timethis(10000000, 'sqrt(12.34)');
1;
=>timethis 10000000:  1 wallclock secs
  ( 0.45 usr +  0.00 sys =  0.45 CPU)
```

- 参考*"Instant Perl Modules" "即时应用Perl模块"* 人民邮电出版社2001年

Arbitrary Precision--Math::BigInt

- 大数整数运算，重载算术运算符

```
use Math::BigInt; #注意下面面相对象的写法
$i = Math::BigInt->new('1234567890');
$j = new Math::BigInt '9876543210';
print $i*$j, "\n"; # don't say "$i*$j"
$two = new Math::BigInt '2';
print 2**500, "\n";
print $two**500, "\n";
```

- BigInt的缺省后端是Math::BigInt::Calc (慢)
- 其他后端：安装Math::BigInt::GMP/LTM/Pari
- Gnu Multiple Percision/LibTomMath
- 例如use Math::BigInt lib => 'GMP'; (快)

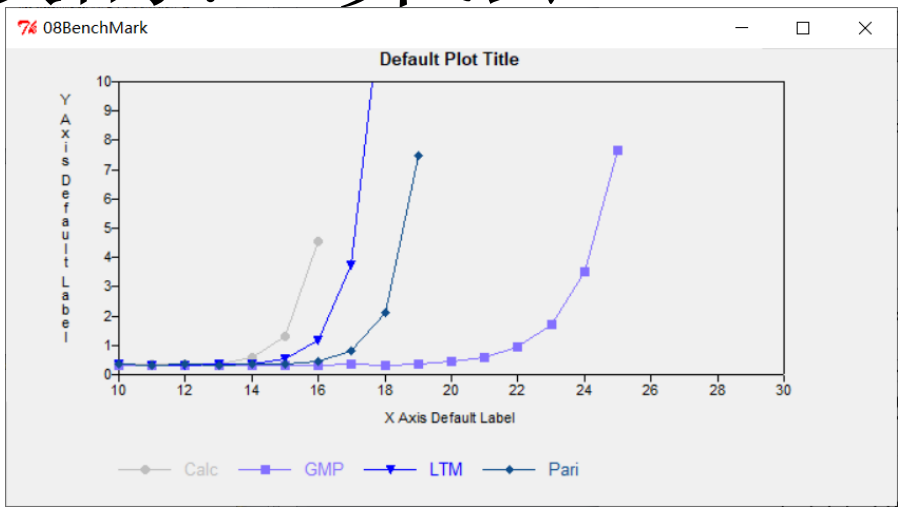
Time::HiRes, Tk::LineGraphDataset, Tk::PlotDataset

- 高精度时间大数整数运算，重载算术运算符

```
use Time::HiRes qw ( time sleep );
sleep (2.2);        # 重载perl的time和sleep
$in_real = time; # 返回浮点数秒
```

- LineGraphDataset对象用于在Tk里面作曲线图
  - 每个对象（数据集）有一个名字-name，可以只带一组-yData，也可以-xData / -yData都加入
  - 该模块会报一堆warning，请直接忽略
- Tk::PlotDataset将多个LineGraphDataset对象画在一张图中，可以用鼠标放大、缩小，可以点击高亮单条曲线。
  - 方法有PlotDataset、plot，用pack( )放到Tk窗口之中

平方收敛的√2 算法



- 初值$p_0=q_0=1$, 迭代：
  $p \leftarrow 2*p*q;$
  $q_{k+1} \leftarrow q*q+2*p*p_k$
- 开始迭代后：
  - q*q–2*p*p始终是1
  - q/p迅速接近根号2，例如迭代到第10次约有400位精度，第20次约400,000位精度，22次1,600,000位…
- 作业：学号-09.pl、学号-09sqrt2.pl (两个脚本)
  - 学号-09sqrt2.pl *迭代次数 后端名称*
  - 学号-09.pl用Time::HiRes统计"学号-09sqrt2.pl"在不同迭代次数和后端下的耗时并作图
  - 每种后端迭代10到25次，耗时>4秒则跳过
  - 如果BigInt个别后端装不上，就略过，少条曲线

ref: 汤涛《从圆周率计算浅谈计算数学》高等教育出版社2018年6月

*use*的其他用法

- use Config;
  print join ", ", @Config{'osname', 'cc', 'ccflags'};
  `MSWin32, cl, -nologo -O1 -MD -Zi...`
- use Env; print $PATH; #as $ENV{'PATH'}
- use vars qw($a $b ...); #Perl5.6可以用our变量
- use Exporter; #把package内的名字别名到外面来
- use English; 用英文名字代替难读难记的perl变量

082use.pl

```
#!/usr/bin/perl -w
use strict;
use Config;
use Env;
use Simple;
print join ", ",
@Config{'osname', 'cc'};
print "\nPATH is $PATH\n";
Simple::True();
True();
1;
```

Simple.pm

```
#!/usr/bin/perl -w
use strict;
package Simple;  use Exporter;
use vars qw(@ISA @EXPORT);
@ISA=qw(Exporter);
@EXPORT=qw(True);
sub True {
  print "I'm Simple::True.\n";
}
1;
```

运行结果

```
MSWin32, cl, -……
PATH is C:\PERL\
I'm Simple::True.
I'm Simple::True.
```

use 的其他用法, ***Progma***

- 要求Perl版本号 use 5.005_03; use v5.6.1;等
- use constant PI => 4 * atan2 1, 1; print PI*2;
- use integer; print 10/3; 强制整型运算，显示3
- use lib *LIST*; no lib *LIST*; 给*@INC*添加/删除路径；用 *@INC = @lib::ORIG_INC;*恢复
- use strict; (和 #!/usr/bin/perl -w 一起用)
  use strict "vars";no strict "vars";以及"subs"
  use strict "refs"; 禁止符号引用
- use subs *LIST*;预定义子程序名, 可不带()调用
- use vars *LIST*;预定义全局变量名,相当于perl5.6+的our
- 更多内容，参考在线帮助文件的*Progma*部分

易读的日期 HTTP::Date

```
Use HTTP::Date;
$string = time2str($time);
      # Format as GMT ASCII time
$time = str2time($string);
      # convert ASCII date to machine time
```

- time2str参数是机器时间(秒计数)，返回字符串

```
print time2str(); #缺省表示当前时间
```

➔ `Thu, 24 Apr 2008 01:28:32 GMT`

- str2time($str, *$zone*)将字符串转换回机器时间；若$zone不是GMT，需要安装Time::Zone
- Time::Zone没有预安装的话，上CPAN网下载

CPAN模块下载安装实例1

- CPAN搜索主页

The CPAN Search Site - search.cpan.org - Windows Internet Explorer

http://search.cpan.org/

CPAN

Home · Authors · Recent · News · Mirrors · FAQ · Feedback

Time::Zone ← 输入模块名或关键字

in All CPAN Search

Archiving Compression Conversion
Bundles (and SDKs)
Commercial Software Interfaces
Control Flow Utilities
Data and Data Types
Database Interfaces
Development Support
Documentation
File Handle Input/Output
File Name Systems Locking
Graphics
Internationalization Locale
Language Extensions
Language Interfaces
Mail and Usenet News
Miscellaneous
Networking Devices IPC
Operating System Interfaces
Option Parameter Config Processing
Perl6
Pragmas
Security
Server Daemon Utilities
String Language Text Processing
User Interfaces
World Wide Web

← CPAN模块分类浏览

44072 Uploads, 15105 Distributions 56281 Modules, 6597 Uploaders

Hosted by craftsmen
digital craftsmen

Internet 100%

CPAN

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Time::Zone

in All

CPAN S

Results 1 - 10 of 13 Found

1 · 2 · Next >>

Time::Zone ← 这是模块的使用手册

miscellaneous timezone manipulations routines

TimeDate-1.16 ★★★★☆ (3 Reviews) - 03 Jun 2003 - Graham Barr

← 点击这里

DateTime::Format::DateParse

Parses Date::Parse compatible formats

DateTime-Forma

Synopsi

文件下载

您想打开或保存此文件吗？

名称： TimeDate-1.16.tar.gz ← 都是.tar.gz文件

类型： WinRAR 压缩文件, 21.8KB

从： cpan.modperl.cn

打开(O) 保存(S) 取消

☑ 打开此类文件前总是询问(W)

来自 Internet 的文件可能对您有所帮助，但某些文件可能危害您的计算机。如果您不信任其来源，请不要打开或保存该文件。有何风险?

in All

Graham Barr > TimeDate-1.16

TimeDate-1.16

This Release	TimeDate-1.16 [Download] [Browse] 03 Jun 2003 ← 点击这里下载
Other Releases	TimeDate-1.15 -- 02 Jun 2003 Goto
Links	[Discussion Forum] [View/Report Bugs (11)] [Dependencies] [Other Tools]
CPAN Testers	PASS (675) [View Reports] [Perl/Platform Version Matrix]
Rating	★★★★☆ (3 Reviews) [Rate this distribution]
License	Unknown
Special Files	ChangeLog MANIFEST Makefile.PL README ← 点击这里

Modules

Date::Format	Date formating subroutines	2.22
Date::Language		1.10
Date::Language::Afar		0.99
Date::Language::Amharic		1.00
Date::Language::Austrian		1.01

← 原来这个文件安装后包含很多个模块

务必先读一下README

This is the perl5 TimeDate distribution. It requires perl ***version 5.003*** or later

This distribution replaces my earlier GetDate distribution, which was only a date parser. The date parser contained in this distribution is far superior to the yacc based parser, and a *lot* fatser.

The parser contained here will only parse absolute dates, if you want a date parser that can parse relative dates then take a look at the Time modules by David Muir on CPAN.

You install the library by running these commands:

perl Makefile.PL
make
make test
make install

按照这个顺序安装。注意Win32下没有make.exe，要用Visual C自带的nmake.exe，也就是：

```
perl Makefile.PL
nmake test
nmake install
```

Please report any bugs/suggestions to gbarr@pobox.com

Copyright 1996-2000 Graham Barr. All rights reserved.

This library is ***free software***; you can redistribute it and/or modify it under the same terms as Perl itself.

Share and Enjoy!

Graham <gbarr@pobox.com>

CPAN模块下载安装实例2

- 一起来找一个产生超文本格式日历的模块

打开浏览器

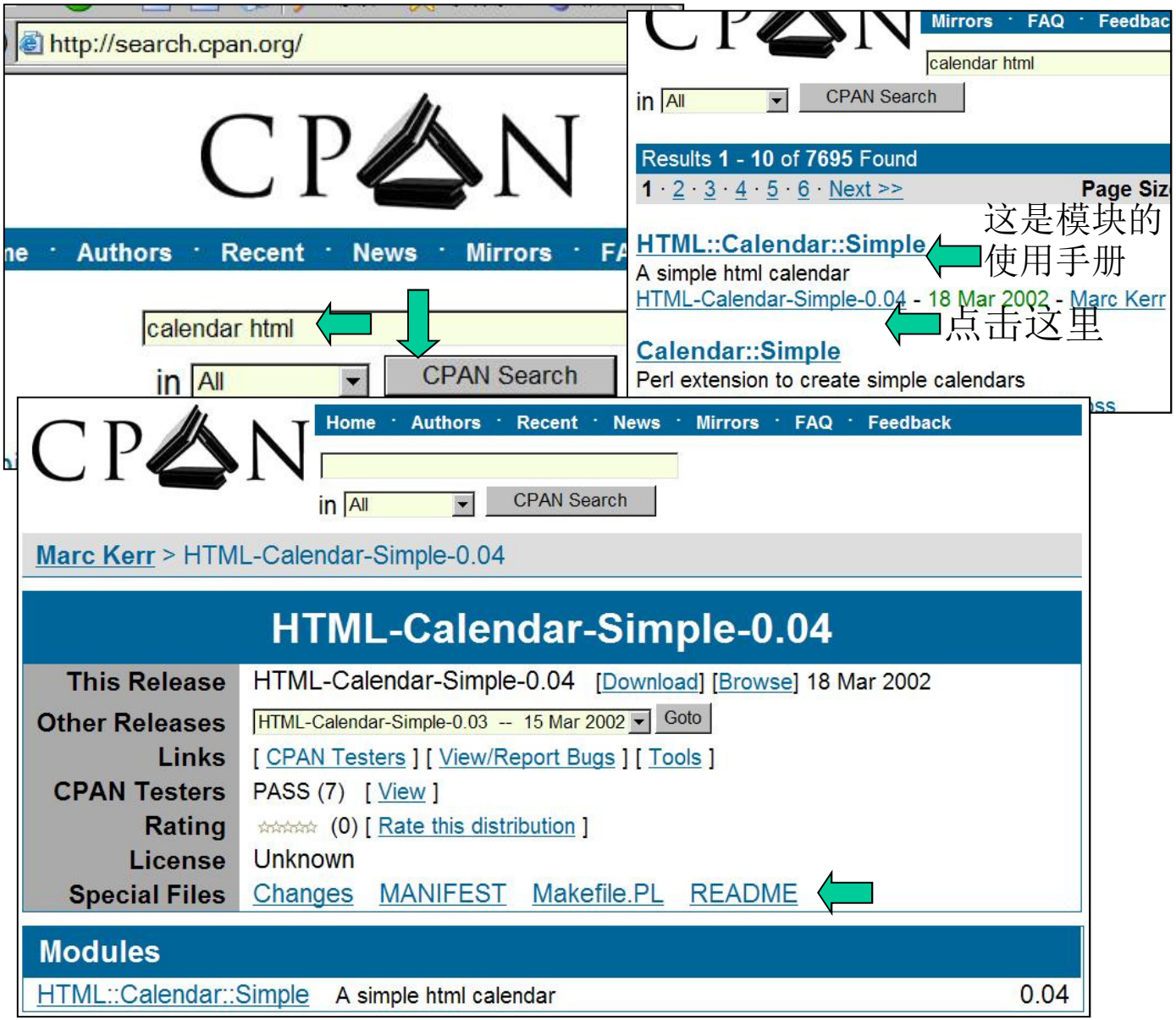
连接"search.cpan.org"

查找"calendar html"

浏览结果, 进入HTML-Calendar-Simple-0.04

首先查看README

然后点击Download下载.tar.gz文件, 参考README进行安装



仔细查看README

HTML/Calendar/Simple version 0.04

==========

DOCUMENTATION

Once installed, do a perldoc HTML::Calendar::Simple

INSTALLATION

To install this module type the following:

```
perl Makefile.PL
make
make test
make install
```

一般Perl模块的安装都是这几个命令, 在Win32下面要拷贝一个nmake.exe到路径中, 用nmake而不是make, 如果模块带有C代码,还要安装合适的C编译器,具体版本参考perl -V, 比如VC++6.0等.

DEPENDENCIES

依存关系很重要, 这个模块要预安装另外三个模块

This module requires these other modules and libraries:

这两个要手工下载安装

Date::Simple - this is A Good Module

Test::More - you do write tests, right?

(And do them before you write the code too.)

CGI已经有了

CGI - As long as I have the latest version of CGI, I know that my HTML will be the latest standard! I lurve CGI.pm

COPYRIGHT AND LICENCE

版权信息, 请使用正版和免费的模块

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This module is free software; you can redistribute it or modify it under the same terms as Perl itself.

逐一下载安装

- 查找Test::More下载最新的Test-Simple-0.53
- 查找Date::Simple下载最新的Date-Simple-2.05
- 如果找不到想要的模块，就到*www.cpan.org*→ Browsing *Perl modules*→ *all modules* (a long list)里面去找(现有七千五百多个)
- 现在共下载了三个模块,分别建立临时目录,解包安装
  - 6,479Byte HTML-Calendar-Simple-0.04.tar.gz
  - 19,109Byte Date-Simple-2.05.tar.gz
  - 57,969Byte Test-Simple-0.53.tar.gz

根据依赖关系,
要先安装这两个

- 如果安装中*nmake test*步骤通不过, 要仔细查找原因
- *nmake install*会将上述代码复制到c:/perl/site/lib 或者c:/perl/lib下面。安装好后可以删除临时安装目录。

安装时的问题和解决

- 安装Date-Simple-2.05
  - 模块中有XS接口的C代码，要安装C语言编译器，版本应该和编译Perl的C编译器一致。
  - VC++5, if ActivePerl 5.003 ()
  - VC++6, if ActivePerl 5.6 (包含了更多的模块)
  - VC.net, if ActivePerl 5.8 (unicode支持)
  - 对应版本的gcc, if Perl on UNIX/Linux, etc
- 安装Test-Simple-0.53
  - test没有完全通过，和win32平台有关
  - 忽略这些failure，继续安装
- 安装HTML-Calendar-Simple-0.04
  - test有语法警告，是HTML-Calendar-Simple的问题，继续。

马上学习、实践
HTML::Calendar::Simple的手册

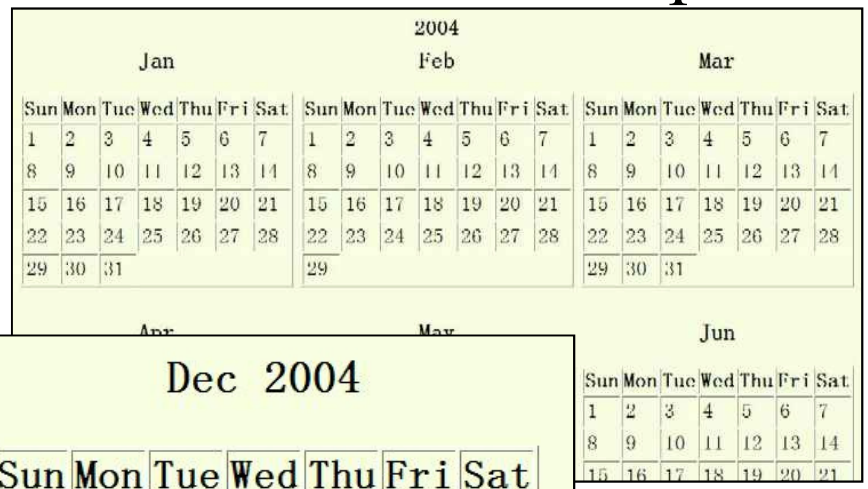
- 点击网页，或者perldoc HTML::Calendar::Simple
- 编写小程序并运行
  085calendar.pl

```
use HTML::Calendar::Simple;
my $cal = HTML::Calendar::Simple->new;
my $month = $cal->calendar_month;
my $year = HTML::Calendar::Simple
            ->calendar_year;

open M, ">093month.htm";
print M $month;
close M;

open Y, ">093year.htm";
print Y $year;
close Y;

1;
```



Dec 2004

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

```
D:> perl  085calendar.pl
D:> start 085month.htm
D:> start 085year.htm
```

在中文版windows下运行……

为什么结果是错的

<该错误存在于Win XP 32中文版下这个模块的早期版本>

- 找到387行(自己试试看，能否找到这一行)

```
my @seq   = map $self->_spacer,
 (1 .. $days{$start->format("%a")});
```

- 查看Date::Simple实现format的代码

```
return POSIX::strftime ($format,
_gmtime ($self));
```

- 查看POSIX::strftime的说明(说明过于简单)
- 上网查看C库函数strftime的说明(?用法复杂?)
- 运行简单的脚本，测试perl的POSIX::strftime

```
use Date::Simple;
my $td = Date::Simple->new(2009, 4, 2);
print "$_:", $td->format("\%$_"), "\t\t"
  for 'a' .. 'z', 'A' .. 'Z';
```

找到原因，临时打补丁

```
a:星期四          b:四月  c:2009-4-2 0:00:00      d:02    e:      f:
   g:     h:       i:       j:092   k:       l:       m:04    n:       o:
   p:上午  q:       r:       s:       t:       u:       v:       w:4
   x:2009-4-2       y:09     z:

A:星期四          B:四月  C:      D:      E:      F:      G:      H:00
   I:12   J:       K:       L:       M:00    N:       O:       P:       Q:
   R:       S:00    T:       U:13     V:       W:13     X:0:00:00
   Y:2009  Z:
```

- 原因查明：中文win32的"%a"返回"星期四", 不是"Thu"!
- 补丁：
  - 改用"%w"，直接得到星期几的数值，不必查%days

```
my @seq   = map $self->_spacer, (1 .. $start->format("%w"));
```

  - 或者改用"day_of_week()"方法
  - 记得nmake install
  - 若要发布的话，请重新确认各模块的依赖性和版本，并在各种平台上重新测试。
  - 要领: 编写模块时尽量减少模块间的依赖性，尽量完善测试

Perl里面调用C-code

- 学Perl-XS,看 *perlxstut*, *perlxs*, *perlguts*，以及*h2xs*工具
- 还得学习ExtUtils::MakeMaker/MM_Unix等模块
- 动态连接(.dll, .so)和静态连接(new *perl.exe*)
- 编译器和库的要求(影响移植性)草莓Perl自带gcc编译器
  - activeperl5.5.3→MS Visual C++ 5.0
  - activeperl5.6.1→MS Visual C++ 6.0
  - VC.net, if ActivePerl 5.8 (unicode支持)
  - 对应版本的gcc, if Perl on UNIX/Linux, etc
- 用法举例：自己做一个编译器前端
  - 词法分析－flex (C-code)
  - 语法分析－byacc (perl-code)
  - backend－in perl-code
- 具体内容可参考04年“Perl语言高级编程专题”课程的讲义, http://xfzhou.homeftp.org/courses/perladv/index.htm
- 入门捷径：C调用Perl，看perlembed；Perl调用C，看Inline::C

浏览一下预装的模块

- Archive::Zip 生成、处理、读写zip文件
- Digest::很多模块　产生文件指纹(加密)
- ExtUtils生成Makefile的模块（参考h2xs工具）
- File::Copy 复制文件 File::Find目录树中找文件
- Getopt::Std Getopt::Long 处理命令行参数
- 网络网页相关的：CGI, HTTP, HTML, Net, IO, LWP等
- B和perl编译器相关 DB 和perl调试器相关
- MIME类的模块和电子邮件编解码有关
- TK 图形界面
- Win32 和Win32平台有关的模块

  ……
- 还有数据库操作方面的很多DBD、DBI模块未预安装