

Perl语言高级编程专题

Lesson 15

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Both "GET" and "POST" method

- Useful Environment Variables:
REQUEST_METHOD & QUERY_STRING
- Data fetching and decoding

```
$Method = $ENV{'REQUEST_METHOD'}; #CGI方法
if ($Method eq "POST") {          #读取数据
    read(STDIN, $QueryString,
        $ENV{'CONTENT_LENGTH'});
} else {
    $QueryString = $ENV{'QUERY_STRING'};
}
@NameValuePairs = split(/&/, $QueryString);
foreach $NameValue (@NameValuePairs) {
    .....见前页.....          #解码
}
```

Debugging CGI script

- If returns script itself
 - Property of server & CGI's not set properly.
 - Missing the she-bang line (#!) in the beginning of script
- If "page not found" or "URL not exists"
 - Check "action=...." in form see if link is correct
- If server returns a blank page:
 - Check cgierr.txt (under xitami http server)
 - Run on console mode for syntax checking
- If the result is not expected:
 - "print" on result page
 - Use 3rd part tools (e.g. perlbuilder)

Let's debug a script

- Return a web page that displays all name=value pairs.

```
1.  #!/usr/bin/perl -w
2.  use strict;
3.
4.  my($Method, $DataLen, $QueryString, @NameValuePairs,
5.      $Name, $Value);
6.
7.  $Method = $ENV{'REQUEST_METHOD'};
8.  if ($Method eq "POST") {
9.      read(STDIN, $QueryString, $ENV{'QUERY_STRING'});
10. } else {
11.     $QueryString = $ENV{'QUERY_STRING'};
12. }
13.
14. @NameValuePairs = split(/&/, $QueryString);
15. foreach $NameValue (@NameValuePairs) {
16.     ($Name, $Value) = split(/=/, $NameValue);
17.     $Value =~ tr/+// ;
18.     $Value =~ s/%([\dA-Fa-f]{2})/pack("C",hex($1))/eg;
19.     print "Name = $Name, Value = $Value<br>\n";
20. }
21.
22. 1;
```

A counter

- 顺序： open-read-close-open-update-close
 1. open(COUNT, "MyCount");
 2. \$count = <COUNT>;
 3. close(COUNT);
 4. open(COUNT, ">MyCount");
 5. \$count++;
 6. print COUNT \$count;
 7. close(COUNT);
 8. print "<html><body>count is \$count</body></html>";
 9. 1;
- 问题： 多进程环境Multiple instance of counter.pl
 - open-read-close-open-update-close
 - A Critical Session 临界区域



Multi-task and Critical Session

- Issues under multi-task environment:
 - A sequence of operation not interruptible
 - A seq. of operation not allow task-switching
 - Exclusive access to a shared resource <<<
 - Inter-task/process/thread communication.....
- Solutions:
 - 禁止中断/调度Disable interruption/task switch
 - 互斥量、旗语(信号量)Mutex/Semaphores
 - 直接利用文件系统的独享打开文件的操作

```

use Fcntl;
$lockfile="mycount.lockfile";
unlink $lockfile;
sysopen(LOCKFILE, $lockfile, O_WRONLY | O_EXCL | O_CREAT)
    or die "Another instance already running!"; #或者sleep and re-try
.....
.....
close($lockfile);

```

Uasing CGI.pm

```
use CGI qw/:standard/;
```

- Interface to GET/POST, http, cookies, etc
- Get all the keys and values:

```
@keys = param( );
```

```
foreach $key (@keys) {
```

```
    print "$key => ", param($key), "\n";
```

```
}
```

- For multiple choice:

```
@values = param($key);
```

- And lots more in CGI.pm

CGI.pm, CGI interface

- 预装的未必是最新的,升级到CGI.pm v3.29
 - <http://search.cpan.org/~lds/CGI.pm-3.29/>
- Get key and values from client

```
#!/usr/bin/perl
use CGI qw/:standard/;
@keys = param( );
foreach $key (@keys) {
    print "$key => ", join(", ", param($key)), "\n";
}
#@values = param($key);
1;
```


CGI.pm, HTML Generator

- Generate html page on-the-fly

```
use CGI qw/:standard/;  
my $name = param("name");  
my $host = $ENV{"REMOTE_HOST"};  
print header,  
    start_html("Hello"),  
    h1("Hello, $name from $host"),  
    end_html;  
1;
```

header, start_html, end_html

- Function *header*, the HTTP header
 - MIME type: `header(-type => 'text/plain')`
 - Chinese GB: `header(-charset => 'GB2312')`
 - Redirect: `redirect('http://www.perl.com/')`
- *start_html*, attribute: title, meta, bgcolor, ...
 - `start_html('Hello to my webpage');`
 - `start_html(-title => 'Hello to my webpage',
 -background=>'URL_to_image',
 -text=>'darkgreen',
 -bgcolor => 'lightgreen',);`
 - embed script by `-onLoad`, `onUnload`, etc
- *end_html*, the "`</body></html>`"

HTML element

- `h1()`...`h6()`, `p()`, a paragraph
 - `p('This is a paragraph')`
 - `p({-align=>'right'}, 'A right-side paragraph')`
- `em()`, `i()`, `b()`, `u()`, `big()`, `small()`, `Sub`, `sup`...
- `` `` list
 - `ol(li('aaaa'), li('bbbb'), ul(li('uuuu'), li('vvvv')))`
- `a({-href=>"URL"}, text)`
- `img {src=>'fred.gif',align=>'LEFT',alt='text'};`
- `table({-board=>1},caption('string'), Tr(\@row))`
- row of table: `th('headline').td(['r1', 'r2', 'r3'...])`

Create Forms via CGI.pm

- `start_form`, `end_form`
 - `start_form('POST', '/cgi-bin/script.pl')`
- Fields:
 - `textfield(-name=>>'?', -default=>>'?', -size=>>'?', -maxlength=>'?')`
 - `textarea(): -name/-default/-row/-cols`
 - `password_field(): -name/-default/-size/-maxlength`
 - `checkbox(): -name/-checked/-value/-label`
 - `checkbox_group(): -name/-values/-default/-linebreak/-labels`
 - `-values` and `-default`: ref to array. `-labels`: ref to hash

Create Forms via CGI.pm (cont.)

- Fields (cont.)
 - `radio_group()`: **-name/-values/-default/-linebreak/-labels**, **-values**: ref to array. **-labels**: ref to hash
 - `popup_menu()`: **-name/-values/-default/-labels**
 - `scrolling_list()`: **-name/-values/-default/-size/-multiple('true' 多选)/-labels**
 - `hidden()`: **-name/-value**
 - `submit('name', 'value')`, `submit(name=>?,value=>?)`
 - `reset('lable')`
- Examples

猜数游戏 I

```
#!/usr/bin/perl -w
use strict;
use CGI qw/:standard/;

my ($goal, @history, $guess);

my @keys = param( );

print @keys ? checkGuess() : newGuess();

1;
```

CGI模块面向对象的写法:
my \$query = CGI->new;
my @keys = \$query->param;

猜数游戏 II

```
sub newGuess {  
    $goal = int rand 100;  
    @history = ();  
    $guess = "";  
    header .  
    start_html(  
        -title =>    'New Guess',  
        -text  =>    'darkgreen',  
        -bgcolor=> 'lightgreen',  
    ) .  
    h3('Guess a number between 0 .. 99') .  
    form() .  
    end_html;  
}
```

猜数游戏 III

```
sub checkGuess {  
    $goal = param('goal');  
    @history = split /_/, join '_', param('history');  
    $guess = param('guess');  
    Delete_all();  
    push @history, $guess if $guess =~ /^[0-9]+$/;  
    return ($guess == $goal) ? madeGuess() :  
        continueGuess();  
}
```

hint: 取到表单参数后,调用Delete_all删除所以缺省参数

猜数游戏 IV

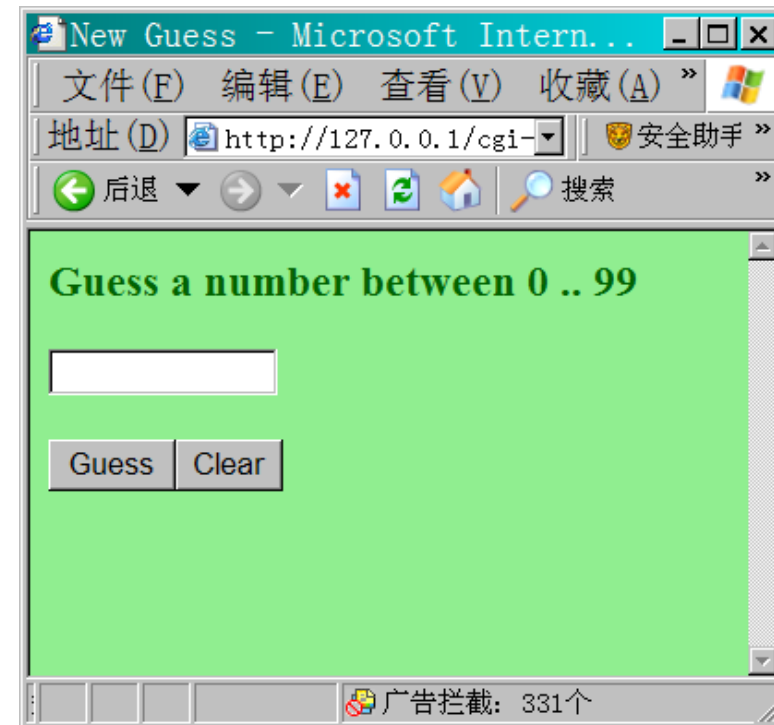
```
sub continueGuess {  
    header .  
    start_html(  
        -title =>    'Guess continue',  
        -text  =>    'darkgreen',  
        -bgcolor=> 'lightgreen',  
    ) .  
    p($guess =~ /^[0-9]+$/ ?  
        $guess > $goal ? "$guess is too big" :  
        "$guess is too small" : "Input a number") .  
    form() .  
    end_html;  
}
```

猜数游戏 V

```
sub madeGuess {  
    header .  
    start_html(  
        -title =>    'Guess made',  
        -text  =>    'darkgreen',  
        -bgcolor=> 'lightgreen',  
    ).  
    h3('Great!') .  
    'History of your guess:' .  
    p(join(',', @history)) .  
    p(a({-href=>'/cgi-bin/guess.pl'}, 'New game')) .  
    end_html;  
}
```

猜数游戏 VI

```
sub form {  
    start_form('GET', '/cgi-bin/guess.pl') .  
    "Guess: " .  
    textfield(  
        -name => 'guess',  
        -default => $guess,  
        -size => '5',  
        -maxlength => '2',  
    ).  
    hidden(  
        -name => 'goal',  
        -default => [$goal],  
    ).  
    hidden(  
        -name => 'history',  
        -default => [join('_', @history)],  
    ).  
    p() .  
    submit(  
        -name => 'submit',  
        -value => 'Guess'  
    ).  
    reset('Clear') .  
    end_form();  
}
```



Debugging CGI script (CGI.pm)

- Simulate "GET":
 - perl form2.pl name=My_Name k2=v2 ...
 - perl form2.pl name=My_Name&k2=v2&...
- Simulate "POST":
 - use *CGI* qw/:standard -debug/;
 - enter name=value pairs on console
 - enter ^Z (or ^D on most UNIX) to continue
- Disable debugging features:
 - use *CGI* qw/:standard -no_debug/;

猜字游戏—基本原理

- 下面句子里面选择一个字记住(例如“龙”)
“鼠牛虎兔龙蛇马羊猴鸡狗猪天南地北”
- 回答下面4个问题：
你想的字是否在这里？
 - 猴鸡狗猪天南地北 No.
 - 龙蛇马羊天南地北 Yes.
 - 虎兔马羊狗猪地北 No.
 - 牛兔蛇羊鸡猪南北 No.
- 答案是0100—Decimal 4，所以你选择的字就是右起“第”4个（最左边位置算第“0”个）

Homework 13

- 安装调试Xitami 2.5，更新CGI.pm模块
- 编写一个CGI程序，实现上页的猜字游戏：
 - 第一步(New Game)显示一个16个汉字的字串，
 - 如“食野之蒿 我有嘉宾 德音孔昭 视民不忮”
 - 汉字不重复，而后让客户选择并记住其中某个字
 - 第二、三、四、五步分让客户回答Yes、No
 - 第六步显示客户选择的字
 - CGI程序无状态，支持多链接同时猜字
- 在Xitami-CGI Perl环境下调试通过，建议使用CGI.pm
- 学号-13.pl