



Molecular Biomedical Informatics
分子生醫資訊實驗室

Web Programming
網際網路程式設計

CGI

Common Gateway Interface (CGI)

- Common
 - 通用
- Gateway
 - 閘道
- Interface
 - 介面



阿鬼 你还是说中文吧

It's an interface

- It allows browsers (and thus users) to communicate with web servers
 - In brief, an interface is a bulk of rules. If you program follows these rules, you can communicate with browsers. A program that fits these rules is called a CGI program.
 - CGI is over HTTP
- A CGI program is just a program where the only thing need to know is how its IO related to browsers' IO



HTML form

- Passing data to the server side
- `<form action="do">`
 - `<input name="nick" type="text" />
`
 - `<select name="color">`
 - `<option value="blue">Boy</option>`
 - `<option value="red">Girl</option>`
 - `</select>
`
 - `<button>Submit</button>`
- `</form>`
- [HTML Forms and Input](#)
- You know HTML, and thus you know the browsers' IO

CGI program

- CGI is not a language. If you follow the rules, you can use any programming language to implement a CGI program. But please don't try any...
 - Perl is a widely used language in CGI programming. In addition to Perl, shell script, Python, Ruby, PHP, Tcl, C/C++ and Visual Basic can be used for CGI programming ← by [通用網關介面 - 維基百科，自由的百科全書](#)

CGI IO in Perl

- # input

```
use CGI;
```

```
my $cgi = new CGI;
```

```
my $nick = $cgi->param('nick');
```

```
my $color = $cgi->param('color');
```

- # output

```
print "Content-type: text/html\n\n"; # HTTP header
```

```
print "Hello World!<br />"; # any valid HTML
```

```
print "$nick likes $color!"; # any valid HTML
```

- Easy? Let's see other languages

CGI IO in PHP

- `Hello World!
 <!-- any valid HTML -->`
`<?php`
`# input`
`$nick = $_GET['nick'];`
`$color = $_GET['color'];`
`# output`
`echo "$nick likes $color!";`
`?>`

CGI IO in JSP

- `Hello World!
 <!-- any valid HTML -->`
`<%`
`// input`
`String nick = request.getParameter("nick");`
`String color = request.getParameter("color");`
`// output`
`out.println("%s likes %s!", nick, color);`
`%>`

CGI IO in C

- `#include <stdio.h>`
`#include <stdlib.h>`

```
int main(void)
{
    // input
    char * query;
    char nick[256], color[256]; // dangerous
    data = getenv('QUERY_STRING');
    sscanf(query, "nick=%s&color=%s", &nick, &color);
    // output
    printf("Content-type: text/html\n\n"); // HTTP header
    printf("Hello World!<br />"); // any valid HTML
    printf("%s likes %s!", nick, color); # any valid HTML

    return 0;
}
```

- [永遠的UNIX > CGI之C語言篇](#)
- So just don't use it

You may change the content types, but how?

Test (debug) CGI programs

- Pass input data via the URL
- `http://merry.ee.ncku.edu.tw/~id/do?nick=dirty
&color=blue`
- Actually, browsers do the same thing while submitting a HTML form



Perl

- Script language
- The most advantages are string manipulation and hash
- The first line must be
 - `#!/usr/bin/perl -w`
- `use strict;`
 - be sure to include this line
 - Perl is an untyped (無型態) language where variables can be used without declaration, but the harm is larger (bugs) than the convenience
- You can use any language such as PHP, but try to prevent using C/C++ for CGI programming
 - native support, string manipulation, protection...
 - Perl can call C/C++ programs

File IO in Perl

- ```
open FH, 'res/member' or die; # open a file
while (<FH>) { # each line
 chomp; # truncate the last "\n" character
 my ($_name, $_nick) = split "\t"; # split by tab
 $_nick eq $nick and $name = $_name and last; # compare
}
close FH; # close the file
$_ = `/bin/cat _hello.html`; # use Linux command
s/{name}/$name/g; # replace
print "Content-type: text/html\n\n$_"; # output
```
- The magic `$_` variable
  - using it well will largely reduce the code (but less readable for rookies)
- Sometime Perl looks like English
- Call outer programs/commands
- The concept of `template` (模板)



# Some tips

- Set CGI programs to executable
  - `$ chmod 755 do`
- You may debug as a Perl program
  - `$ ./do # remember to fix the input`
- There is a module to help output error messages to browser
  - `use CGI::Carp "fatalToBrowser";`
- Writable file
  - `$ chmod 666 filename # make it writable to web server`
  - `open FH, ">filename" or die;`
  - `open FH, ">>filename" or die;`

# Script/interpreted languages

- Interpreted Languages: PHP, Perl, Python, Ruby (Sheet One)
- Interpreted Languages: PHP, Perl, Python, Ruby (Sheet Two)

 Any Questions?

# Today's assignment

## 今天的任務

# Make your web site memorable

- Implement at least one cross-computer (namely you cannot implement with only JavaScript) interaction with CGI
- Reference
  - [Perl 學習手札](#)
  - [Perl - 維基百科，自由的百科全書](#)
- Your web site (<http://merry.ee.ncku.edu.tw/~xxx/cur/>) will be checked not before 23:59 11/4 (Sun). You may send a report (such as some important modifications) to [me](#) in case I did not notice your features.

# Appendix

## 附錄

# If we have time...

- I'm sure that we won't have spare time today :p
- We won't have enough time to finish Perl in the whole semester so that I can only teach specific functions
- But I'm not sure **what functions you need**, so please think about it and feel free to discuss with me via any media