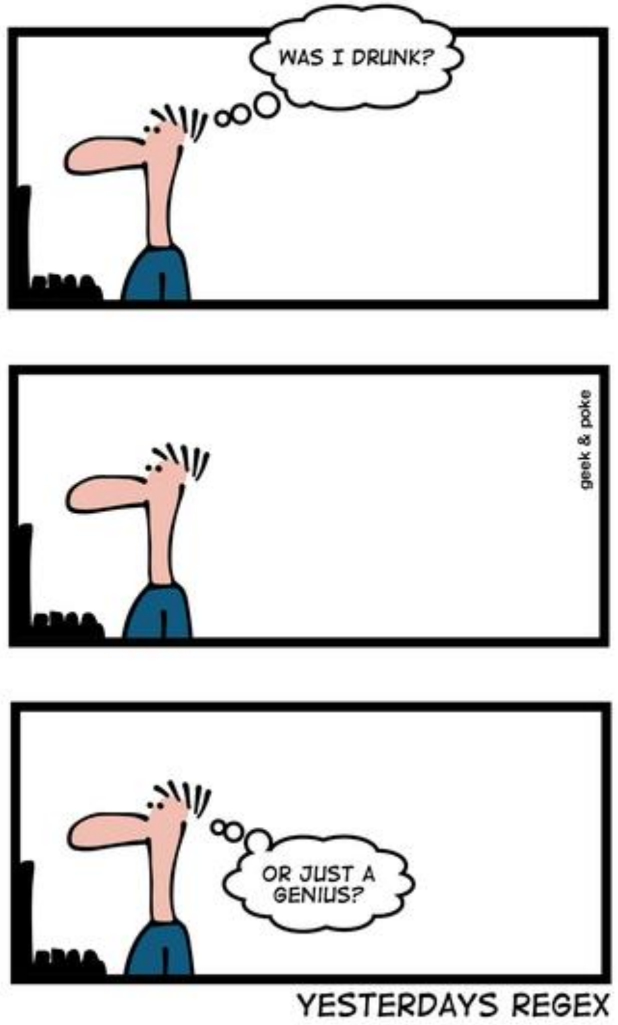
CSE 154

LECTURE 21: COOKIES



Regular expressions in PHP (PDF)

- regex syntax: strings that begin and end with /, such as "/[AEIOU]+/"

function	**description**
preg_match(*regex*, *string*)	returns TRUE if *string* matches *regex*
preg_replace(*regex*, *replacement*, *string*)	returns a new string with all substrings that match *regex* replaced by *replacement*
preg_split(*regex*, *string*)	returns an array of strings from given *string* broken apart using given *regex* as delimiter (like explode but more powerful)

PHP form validation w/ regexes

```
$state = $_POST["state"];
if (!preg_match("/^[A-Z]{2}$/", $state)) {
  print "Error, invalid state submitted.";
}                                                        PHP
```

- preg_match and regexes help you to validate parameters
- sites often *don't* want to give a descriptive error message here (why?)

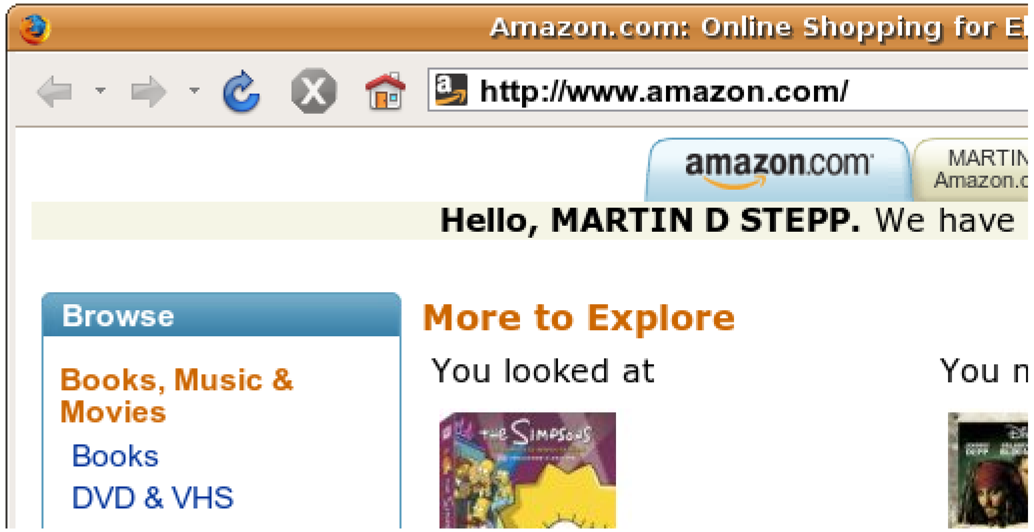
The die function

```
die("error message text");                                PHP
```

- PHP's die function prints a message and then completely stops code execution
- it is sometimes useful to have your page "die" on invalid input
- problem: poor user experience (a partial, invalid page is sent back)

Stateful client/server interaction

Sites like amazon.com seem to "know who I am." How do they do this? How does a client uniquely identify itself to a server, and how does the server provide specific content to each client?



Hello, MARTIN D STEPP. We have

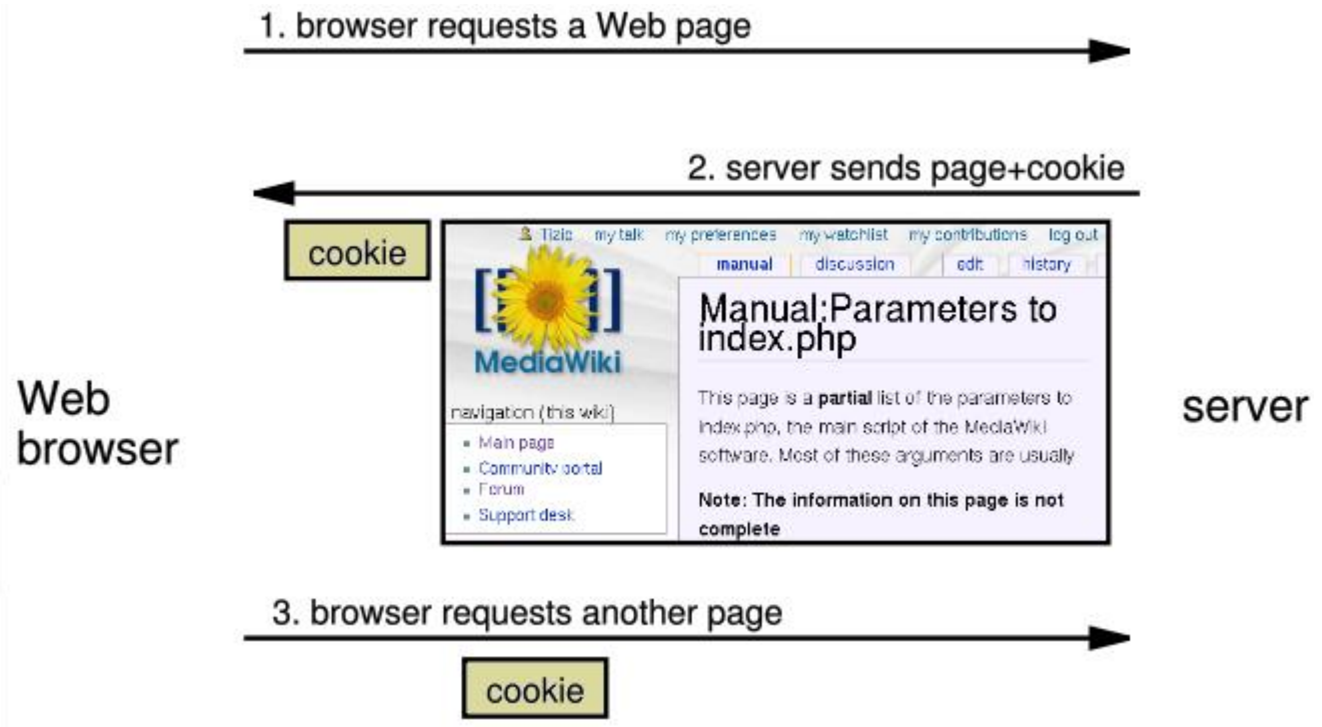
- HTTP is a **stateless** protocol; it simply allows a browser to request a single document from a web server
- today we'll learn about pieces of data called **cookies** used to work around this problem, which are used as the basis of higher-level **sessions** between clients and servers

What is a cookie?

- **cookie**: a small amount of information sent by a server to a browser, and then sent back by the browser on future page requests
- cookies have many uses:
  - authentication
  - user tracking
  - maintaining user preferences, shopping carts, etc.
- a cookie's data consists of a single name/value pair, sent in the header of the client's HTTP GET or POST request

How cookies are sent

- when the browser requests a page, the server may send back a cookie(s) with it
- if your server has previously sent any cookies to the browser, the browser will send them back on subsequent requests
- alternate model: client-side JavaScript code can set/get cookies


1. browser requests a Web page
2. server sends page+cookie
cookie
Web browser
server
3. browser requests another page
cookie
Tizio my talk my preferences my watchlist my contributions log out
manual discussion edit history
MediaWiki
navigation (this wiki)
Main page
Community portal
Forum
Support desk

Manual:Parameters to index.php

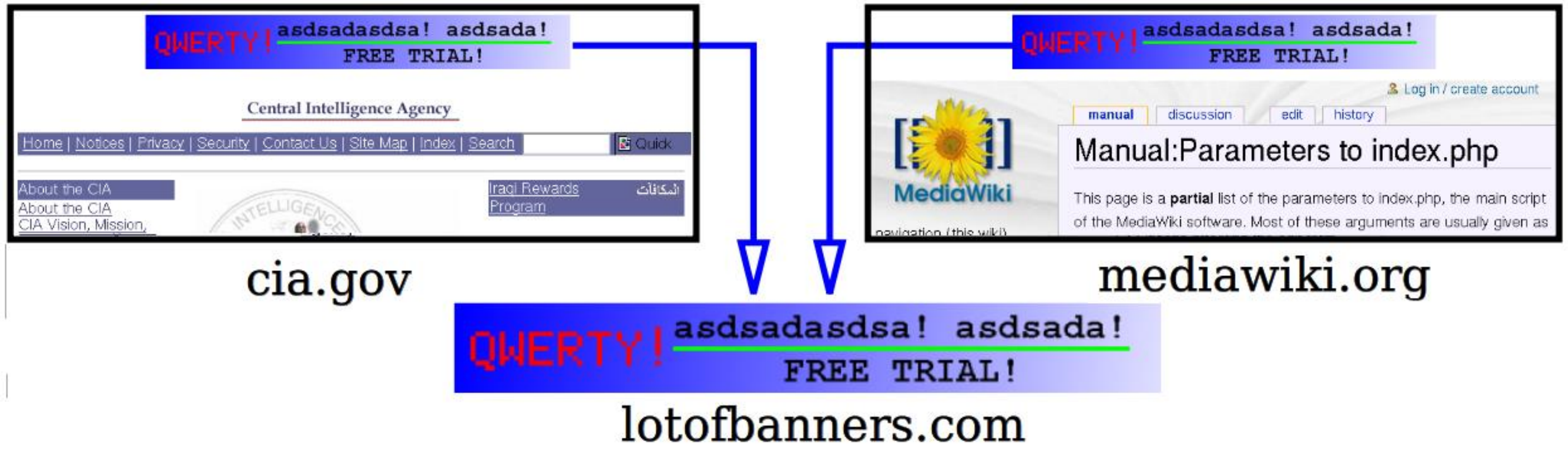
This page is a **partial** list of the parameters to index.php, the main script of the MediaWiki software. Most of these arguments are usually

Note: The information on this page is not complete

Myths about cookies

- Myths:
  - Cookies are like worms/viruses and can erase data from the user's hard disk.
  - Cookies are a form of spyware and can steal your personal information.
  - Cookies generate popups and spam.
  - Cookies are only used for advertising.
- Facts:
  - Cookies are only data, not program code.
  - Cookies cannot erase or read information from the user's computer.
  - Cookies are usually anonymous (do not contain personal information).
  - Cookies CAN be used to track your viewing habits on a particular site.

A "tracking cookie"

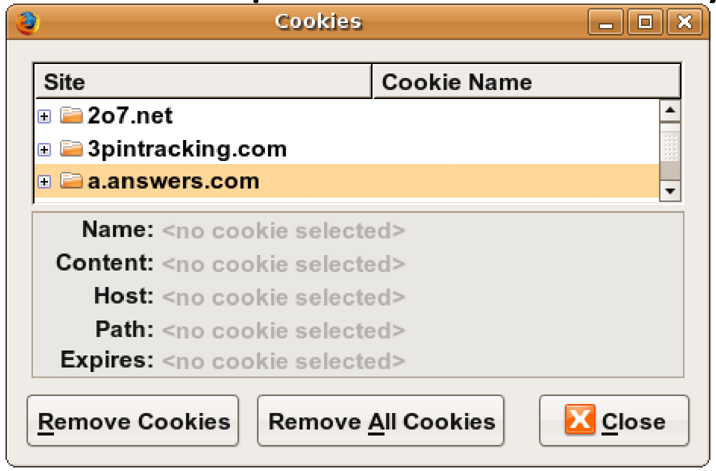

QWERTY! asdsadasdsa! asdsada! FREE TRIAL!
Central Intelligence Agency
Home | Notices | Privacy | Security | Contact Us | Site Map | Index | Search
cia.gov
Manual:Parameters to index.php
MediaWiki
mediawiki.org
QWERTY! asdsadasdsa! asdsada! FREE TRIAL!
lotofbanners.com

- an advertising company can put a cookie on your machine when you visit one site, and see it when you visit another site that also uses that advertising company
- therefore they can tell that the same person (you) visited both sites
- can be thwarted by telling your browser not to accept "third-party cookies"

Where are the cookies on my computer?

- IE: *HomeDirectory*\Cookies
  - e.g. C:\Documents and Settings\jsmith\Cookies
  - each is stored as a `.txt` file similar to the site's domain name
- Chrome:

  C:\Users\username\AppData\Local\Google\Chrome\User Data\Default
- Firefox: *HomeDirectory*\.mozilla\firefox\*???*.default\cookies.txt
  - view cookies in Firefox preferences: Privacy, Show Cookies...



2o7.net
3pintracking.com
a.answers.com

Name: <no cookie selected>
Content: <no cookie selected>
Host: <no cookie selected>
Path: <no cookie selected>
Expires: <no cookie selected>

How long does a cookie exist?

- **session cookie** : the default type; a temporary cookie that is stored only in the browser's memory
  - when the browser is closed, temporary cookies will be erased
  - can not be used for tracking long-term information
  - safer, because no programs other than the browser can access them
- **persistent cookie** : one that is stored in a file on the browser's computer
  - can track long-term information
  - potentially less secure, because users (or programs they run) can open cookie files, see/change the cookie values, etc.

Setting a cookie in PHP

```
setcookie("name", "value");                                PHP
```

```
setcookie("username", “allllison");
setcookie("age", 19);                                      PHP
```

- `setcookie` causes your script to send a cookie to the user's browser
- `setcookie` must be called before any output statements (HTML blocks, `print`, or `echo`)
- you can set multiple cookies (20-50) per user, each up to 3-4K bytes
- by default, the cookie expires when browser is closed (a "session cookie")

Retrieving information from a cookie

```
$variable = $_COOKIE["name"];    # retrieve value of the cookie
```

```
if (isset($_COOKIE["username"])) {
  $username = $_COOKIE["username"];
  print("Welcome back, $username.\n");
} else {
  print("Never heard of you.\n");
}
print("All cookies received:\n");
print_r($_COOKIE);                                          PHP
```

- any cookies sent by client are stored in `$_COOKIES` associative array
- use `isset` function to see whether a given cookie name exists

Expiration / persistent cookies

```
setcookie("name", "value", expiration);                    PHP
```

```
$expireTime = time() + 60*60*24*7;    # 1 week from now
setcookie("CouponNumber", "389752", $expireTime);
setcookie("CouponValue", "100.00", $expireTime);          PHP
```

- to set a persistent cookie, pass a third parameter for when it should expire
- indicated as an integer representing a number of seconds, often relative to current timestamp
- if no expiration passed, cookie is a session cookie; expires when browser is closed
- `time` function returns the current time in seconds
  - `date` function can convert a time in seconds to a readable date

Deleting a cookie

```
setcookie("name", FALSE);                                  PHP
```

```
setcookie("CouponNumber", FALSE);                          PHP
```

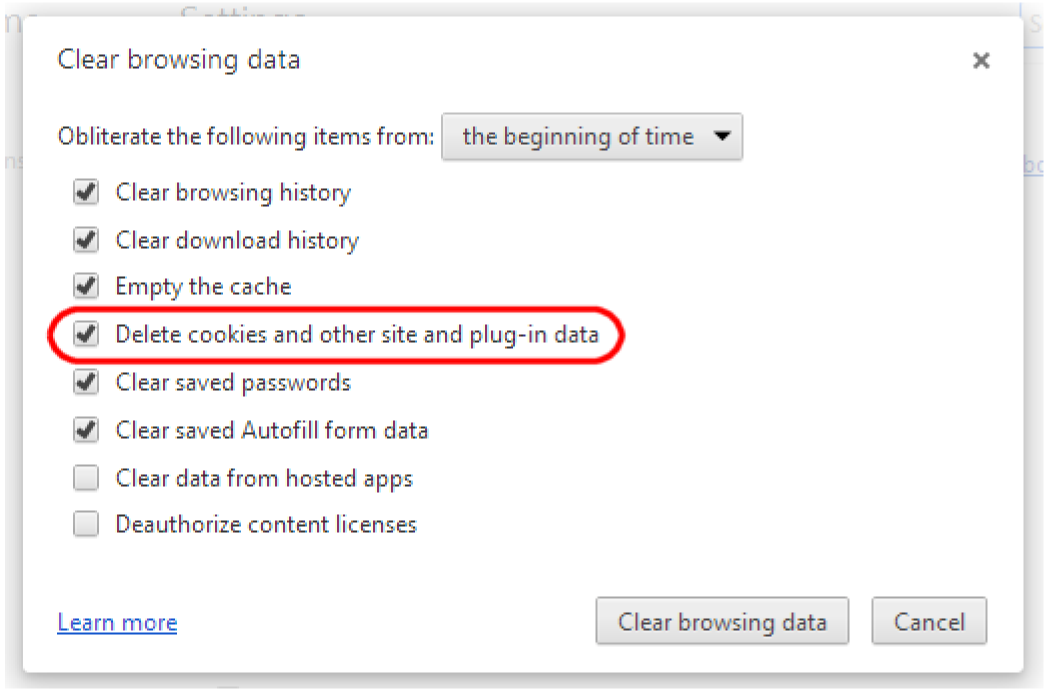
- setting the cookie to FALSE erases it
- you can also set the cookie but with an expiration that is before the present time:

```
setcookie("count", 42, time() - 1);                        PHP
```

- remember that the cookie will also be deleted automatically when it expires, or can be deleted manually by the user by clearing their browser cookies

Clearing cookies in your browser

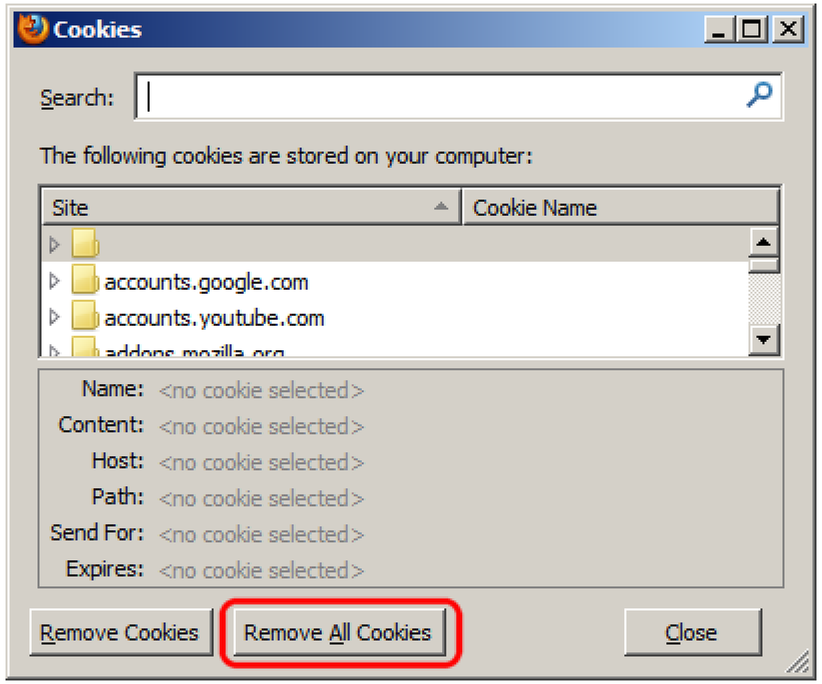
- **Chrome:** Wrench → History → Clear all browsing data...
- **Firefox:** Firefox menu → Options → Privacy → Show Cookies... → Remove (All) Cookies



Clear browsing data

Obliterate the following items from: the beginning of time

- [✓] Clear browsing history
- [✓] Clear download history
- [✓] Empty the cache
- [✓] Delete cookies and other site and plug-in data
- [✓] Clear saved passwords
- [✓] Clear saved Autofill form data
- [ ] Clear data from hosted apps
- [ ] Deauthorize content licenses



Cookies

Search:

The following cookies are stored on your computer:

Site	Cookie Name
accounts.google.com	
accounts.youtube.com	
addons.mozilla.org	

Name: <no cookie selected>
Content: <no cookie selected>
Host: <no cookie selected>
Path: <no cookie selected>
Send For: <no cookie selected>
Expires: <no cookie selected>

Common cookie bugs

When you call `setcookie`, the cookie will be available in `$_COOKIE` on the *next* page load, but not the current one. If you need the value during the current page request, also store it in a variable:

```
setcookie("name", "joe");
print $_COOKIE["name"];        # undefined                    PHP
```

```
$name = "joe";
setcookie("name", $name);
print $name;                   # joe                          PHP
```

- `setcookie` must be called before your code prints any output or HTML content:

```
<!DOCTYPE html><html>
<?php
setcookie("name", "joe");      # should precede HTML content!
```

The header function

```
header("HTTP header text");    # in general
header("Location: url");       # for browser redirection       PHP
```

- PHP's header function can be used for several common HTTP messages
  - sending back HTTP error codes (404 not found, 403 forbidden, etc.)
  - redirecting from one page to another
  - indicating content types, languages, caching policies, server info, ...
- you can use a Location header to tell the browser to redirect itself to another page
  - useful to redirect if the user makes a validation error
  - **must** appear before any other HTML output generated by the script

Using header to redirect between pages

```php
header("Location: url");
```
PHP

```php
$city  = $_POST["city"];
$state = $_POST["state"];
$zip   = $_POST["zip"];
if (!$city || strlen($state) != 2 || strlen($zip) != 5) {
  header("Location: start-page.php");    # invalid input; redirect
}
```
PHP

- *one problem*: User is redirected back to original form without any clear error message or understanding of why the redirect occurred.

Including files: include

```
include("filename");                                    PHP
```

```
include("header.html");
include("shared-code.php");                             PHP
```

- inserts the entire contents of the given file into the PHP script's output page
- encourages modularity
- useful for defining reused functions needed by multiple pages
- related: include_once, require, require_once

Including a common HTML file

```html
<!DOCTYPE html>
<!-- this is top.html -->
<html><head><title>This is some common code</title>
...
```

HTML

```php
include("top.html");     # this PHP file re-uses top.html's HTML content
```

- Including a .html file injects that HTML output into your PHP page at that point

- useful if you have shared regions of pure HTML tags that don't contain any PHP content

Including a common PHP file

```php
<?php
# this is common.php
function useful($x) { return $x * $x; }
function top() {
  ?>
  <!DOCTYPE html>
  <html><head><title>This is some common code</title>
  ...
  <?php
}
```

PHP

```php
include("common.php");    # this PHP file re-uses common.php's PHP code
$y = useful(42);          # call a shared function
top();                    # produce HTML output
...
```

- including a .php file injects that PHP code into your PHP file at that point
- if the included PHP file contains functions, you can call them