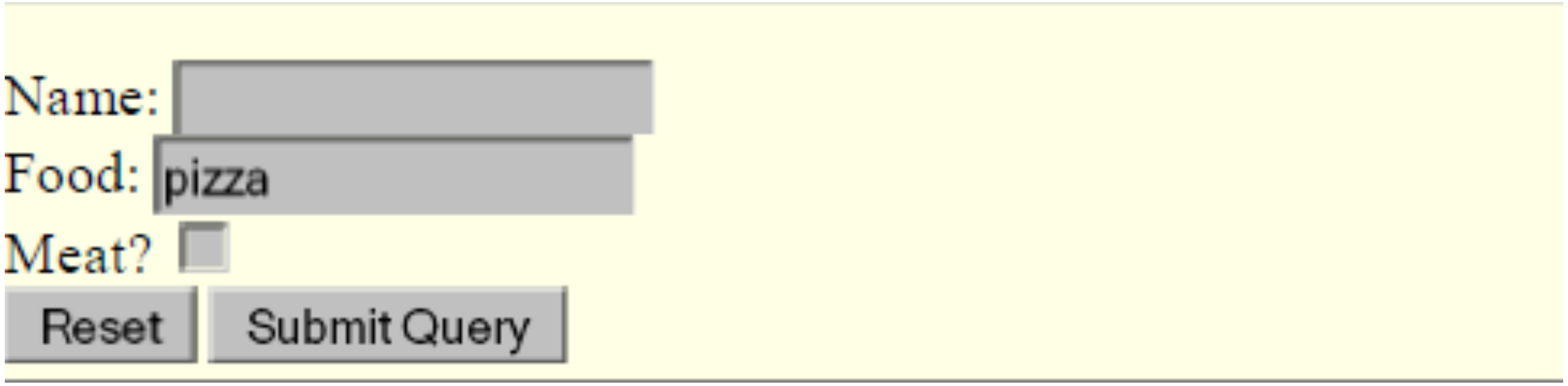
More forms

Reset Buttons

```
Name: <input type="text" name="name" /> <br />
Food: <input type="text" name="meal" value="pizza" /> <br />
<label>Meat? <input type="checkbox" name="meat" /></label> <br />
<input type="reset" />                                        HTML
```



- specify custom text on the button by setting its value attribute

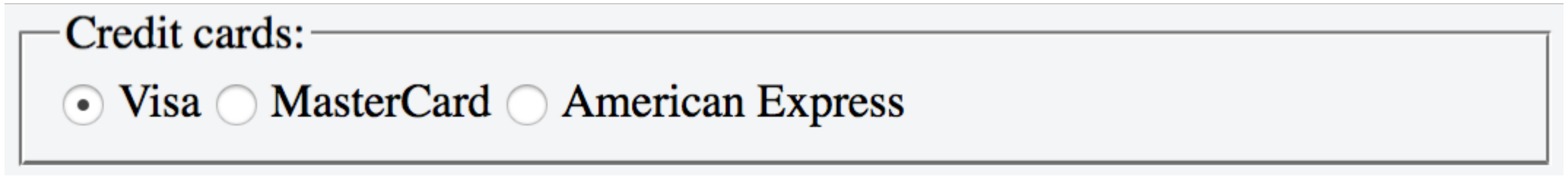
Grouping input: `<fieldset>,<legend>`

```html
<fieldset>
	<legend>Credit cards:</legend>
	<input type="radio" name="cc" value="visa"
	checked="checked" /> Visa
	<input type="radio" name="cc" value="mastercard" />
	MasterCard
	<input type="radio" name="cc" value="amex" />
	American Express
</fieldset>
```
HTML

- `fieldset` **groups related input fields, adds a border;** `legend` **supplies a caption**

Grouping input: `<fieldset>`,`<legend>`

```
<fieldset>
	<legend>Credit cards:</legend>
	<input type="radio" name="cc" value="visa"
	checked="checked" /> Visa
	<input type="radio" name="cc" value="mastercard" />
	MasterCard
	<input type="radio" name="cc" value="amex" />
	American Express
</fieldset>                                                    HTML
```


Credit cards:

◉ Visa ○ MasterCard ○ American Express

Common UI control errors

- "I changed the form's HTML code ... but when I refresh, the page doesn't update!"
- By default, when you refresh a page, it leaves the previous values in all form controls
  - it does this in case you were filling out a long form and needed to refresh/return to it
  - if you want it to clear out all UI controls' state and values, you must do a full refresh
    - Firefox: Shift-Ctrl-R
    - Mac: Shift-Command-R

Styling form controls

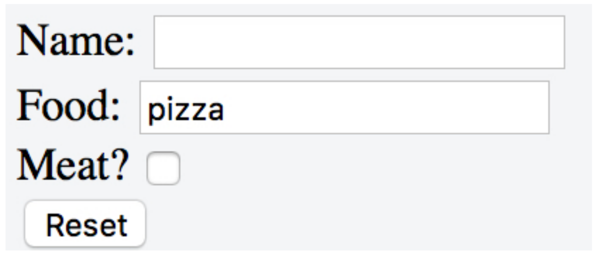
```
input[type="text"] {
        background-color: yellow;
        font-weight: bold;
}
```

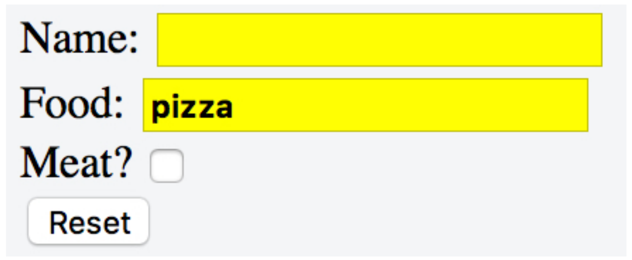
CSS

- attribute selector: matches only elements that have a particular attribute value
- useful for controls because many share the same element (input)

Styling form controls

```
input[type="text"] {
        background-color: yellow;
        font-weight: bold;
}
```
CSS





Hidden input parameters

```
<input type="text" name="username" /> Name <br />
<input type="text" name="sid" /> SID <br />
<input type="hidden" name="school" value="UW" />
<input type="hidden" name="year" value="2048" />
                                                 HTML
```

- an invisible parameter that is still passed to the server when the form is submitted
- useful for passing on additional state that isn't modified by the user
- A hidden field often stores a default value, or can have its value changed by a JavaScript

HTML <input> type Attribute

- HTML5 has the following new input types:
  - **color**: Defines a color picker
  - **date**: Defines a date control (year, month and day
  - **datetime-local**: Defines a date and time control
  - **month**: Defines a month and year control
  - **week**: Defines a week and year control
  - **Time**: Defines a control for entering a time
  - **email**: Defines a field for an e-mail address
  - number
  - **range**: Defines a control for entering a number whose exact value is not important
  - **search**: Defines a text field for entering a search string
  - **tel**: Defines a field for entering a telephone number
  - **url**: Defines a field for entering a URL

HTML <input> type Attribute

```
<form action="demo_form.asp">  Search Google: <input type="search"
name="googlesearch"><br>  <input type="submit"></form>
```

```
<form action="demo_form.asp">Points: <input type="range"
name="points" min="0" max="10"><input type="submit"></form>
```

Submitting data

Problems with submitting data

```html
<form action="http://localhost/test1.php" method="get">
<label><input type="radio" name="cc" /> Visa</label>
<label><input type="radio" name="cc" /> MasterCard</label>
<br />
Favorite Star Trek captain:
<select name="startrek">
       <option>James T. Kirk</option>
       <option>Jean-Luc Picard</option>
</select> <br />
</form>                                             HTML
```

- the form may look correct, but when you submit it...
  - `[cc] => on, [startrek] => Jean-Luc Picard`
- How can we resolve this conflict?

Recall: The name attribute is used to reference elements in a JavaScript, or to reference form data after a form is submitted.

The `value` attribute

```
<label><input type="radio" name="cc" value="visa" />
Visa</label>
<label><input type="radio" name="cc" value="mastercard" />
MasterCard</label> <br />
Favorite Star Trek captain:
<select name="startrek">
       <option value="kirk">James T. Kirk</option>
       <option value="picard">Jean-Luc Picard</option>
<input type="submit" value="submit" />
</select> <br />                                         HTML
```

- value attribute sets what will be submitted if a control is selected
- `[cc] => visa, [startrek] => picard`

URL-encoding

- certain characters are not allowed in URL query parameters:
  - examples: " ", "/", "=", "&"
- when passing a parameter, it is URL-encoded
  - “Xenia's cool!?" → “Xenia%27s+cool%3F%21"
- you don't usually need to worry about this:
  - the browser automatically encodes parameters before sending them
  - the PHP $_REQUEST array automatically decodes them
  - ... but occasionally the encoded version does pop up (e.g. in Firebug)

Submitting data to a web server

- though browsers mostly retrieve data, sometimes you want to submit data to a server
  - Hotmail: Send a message
  - Flickr: Upload a photo
  - Google Calendar: Create an appointment
- the data is sent in HTTP requests to the server
  - with HTML forms
  - with **Ajax** (seen later)
- the data is placed into the request as parameters

HTTP GET vs. POST requests

- `GET` : asks a server for a page or data
  - if the request has parameters, they are sent in the URL as a query string
- `POST` : submits data to a web server and retrieves the server's response
  - if the request has parameters, they are embedded in the request's HTTP packet, not the URL

HTTP GET vs. POST requests

- For submitting data, a `POST` request is more appropriate than a `GET`
  - `GET` requests embed their parameters in their URLs
  - URLs are limited in length (~ 1024 characters)
  - URLs cannot contain special characters without encoding
  - private data in a URL can be seen or modified by users

Form `POST` example

```
<form action="http://localhost/app.php" method="post">
<div>
       Name: <input type="text" name="name" /> <br />
       Food: <input type="text" name="meal" /> <br />
       <label>Meat? <input type="checkbox" name="meat" /></label>
<br />
       <input type="submit" />
<div>
</form>
```

HTML

GET or POST?

```
if ($_SERVER["REQUEST_METHOD"] == "GET") {
        # process a GET request
...
} elseif ($_SERVER["REQUEST_METHOD"] == "POST") {
        # process a POST request
...
}
```
PHP

- some PHP pages process both GET and POST requests
- to find out which kind of request we are currently processing, look at the global `$_SERVER` array's "`REQUEST_METHOD`" element

Uploading files

```
<form action="http://webster.cs.washington.edu/params.php"
method="post" enctype="multipart/form-data">
      Upload an image as your avatar:
      <input type="file" name="avatar" />
      <input type="submit" />
</form>                                                    HTML
```

- add a file upload to your form as an input tag with type of file
- must also set the `enctype` attribute of the form

Processing form data in PHP

"Superglobal" arrays

Array	Description
$_REQUEST	parameters passed to any type of request
$_GET, $_POST	parameters passed to GET and POST requests
$_SERVER, $_ENV	information about the web server
$_FILES	files uploaded with the web request
$_SESSION, $_COOKIE	"cookies" used to identify the user (seen later)

- PHP superglobal arrays contain information about the current request, server, etc.
- These are special kinds of arrays called associative arrays.

Associative arrays

```
$blackbook = array();
$blackbook[“xenia”] = "206-685-2181";
$blackbook[“anne”] = "206-685-9138";
...
print “Xenia's number is " . $blackbook[“xenia"] . ".\n";
```
PHP

- associative array (a.k.a. map, dictionary, hash table) : uses non-integer indexes
- associates a particular index "key" with a value
  - key “xenia" maps to value "206-685-2181"

Example: exponents

```php
<?php
        $base = $_REQUEST["base"];
        $exp = $_REQUEST["exponent"];
        $result = pow($base, $exp);
?>
<?= $base ?> ^ <?= $exp ?> = <?= $result ?>
```

PHP

- What should we do to run this with xampp?

Example: Print all parameters

```php
<?php
foreach ($_REQUEST as $param => $value) {
  ?>
  <p>Parameter <?= $param ?> has value <?= $value ?></p>
  <?php
}
?>
```
PHP

- What should we do to run this with xampp?

Processing an uploaded file in PHP

- uploaded files are placed into global array `$_FILES`, not `$_REQUEST`
- each element of `$_FILES` is itself an associative array, containing:
  - `name`: the local filename that the user uploaded
  - `type`: the MIME type of data that was uploaded, such as image/jpeg
  - `size` : file's size in bytes
  - `tmp_name` : a filename where PHP has temporarily saved the uploaded file
    - to permanently store the file, move it from this location into some other file

Uploading files

```
<input type="file" name="avatar" />
```
HTML

- example: if you upload tobby.jpg as a parameter named avatar,
  - $_FILES["avatar"]["name"] will be “tobby.jpg"
  - $_FILES["avatar"]["type"] will be "image/jpeg"
  - $_FILES["avatar"]["tmp_name"] will be something like "/var/tmp/phpZtR4TI"

```
Array
(
    [file1] => Array
        (
            [name] => MyFile.txt (comes from the browser, so
treat as tainted)
            [type] => text/plain  (not sure where it gets this
from - assume the browser, so treat as tainted)
            [tmp_name] => /tmp/php/php1h4j1o (could be anywhere
on your system, depending on your config settings, but the user
has no control, so this isn't tainted)
            [error] => UPLOAD_ERR_OK  (= 0)
            [size] => 123   (the size in bytes)
        )
   [file2] => Array
        (
            [name] => MyFile.jpg
            [type] => image/jpeg
            [tmp_name] => /tmp/php/php6hst32
            [error] => UPLOAD_ERR_OK
            [size] => 98174
        )
)
```

PHP

Processing uploaded file example

```php
$username = $_REQUEST["username"];
if (is_uploaded_file($_FILES["avatar"]["tmp_name"])) {
move_uploaded_file($_FILES["avatar"]["tmp_name"],
"$username/avatar.jpg");
	print "Saved uploaded file as
$username/avatar.jpg\n";
} else {
	print "Error: required file not uploaded";
}
```
PHP

- functions for dealing with uploaded files:
  - is_uploaded_file(filename)
    returns TRUE if the given filename was uploaded by the user
  - move_uploaded_file(from, to)
    moves from a temporary file location to a more permanent file

Including files: include

```
include("header.php");
```
PHP

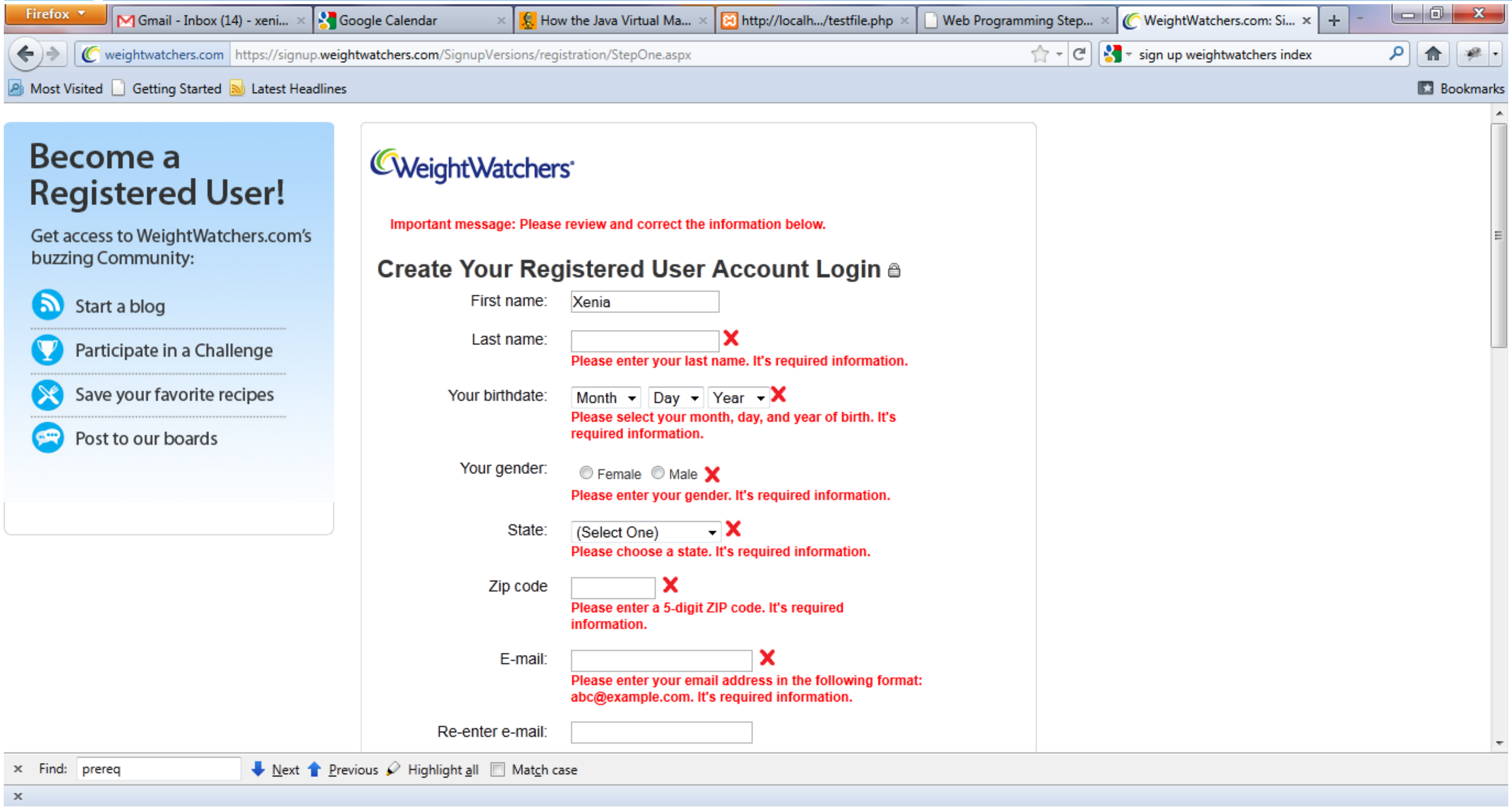
- inserts the entire contents of the given file into the PHP script's output page
- encourages modularity
- useful for defining reused functions needed by multiple pages

Form Validation

What is form validation?

- **validation:** ensuring that form's values are correct
- some types of validation:
  - preventing blank values (email address)
  - ensuring the type of values
    - integer, real number, currency, phone number, Social Security number, postal
  - address, email address, date, credit card number, ...
  - ensuring the format and range of values (ZIP code must be a 5-digit integer)
  - ensuring that values fit together (user types email twice, and the two must match)

A real Form that uses validation



https://signup.weightwatchers.com/SignupVersions/registration/StepOne.aspx

Find: prereq

Become a Registered User!

Get access to WeightWatchers.com's buzzing Community:

- Start a blog
- Participate in a Challenge
- Save your favorite recipes
- Post to our boards

WeightWatchers

Important message: Please review and correct the information below.

Create Your Registered User Account Login

First name:	Xenia
Last name:	✗ Please enter your last name. It's required information.
Your birthdate:	Month Day Year ✗ Please select your month, day, and year of birth. It's required information.
Your gender:	○ Female ○ Male ✗ Please enter your gender. It's required information.
State:	(Select One) ✗ Please choose a state. It's required information.
Zip code	✗ Please enter a 5-digit ZIP code. It's required information.
E-mail:	✗ Please enter your email address in the following format: abc@example.com. It's required information.
Re-enter e-mail:	

Client vs. server-side validation

- Validation can be performed:
  - **client-side** (before the form is submitted)
    - can lead to a better user experience, but not secure (why not?)
  - **server-side** (in PHP code, after the form is submitted)
    - needed for truly secure validation, but slower
  - both
  - best mix of convenience and security, but requires most effort to program

An example form to be validated

```
<form action="http://foo.com/foo.php" method="get">
	<div>
		City: <input name="city" /> <br />
		State: <input name="state" size="2" maxlength="2" />
<br />
		ZIP: <input name="zip" size="5" maxlength="5" /> <br
/>
		<input type="submit" />
	</div>
</form>                                              HTML
```

- Let's validate this form's data on the server...

Basic server-side validation code

```php
…
$city = $_REQUEST["city"];
$state = $_REQUEST["state"];
$zip = $_REQUEST["zip"];
if (!$city || strlen($state) != 2 || strlen($zip) != 5) {
?>
       <h2>Error, invalid city/state submitted.</h2>
<?php
}
?>
```
PHP

- basic idea: examine parameter values, and if they are bad, show an error message and abort

Basic server-side validation code

- validation code can take a lot of time / lines to write
  - How do you test for integers vs. real numbers vs. strings?
  - How do you test for a valid credit card number?
  - How do you test that a person's name has a middle initial?
  - How do you test whether a given string matches a particular complex format?

Regular expressions

```
[a-z]at                 #cat, rat, bat…
[aeiou]
[a-zA-Z]
[^a-z]                  #not a-z
[[:alnum:]]+            #at least one alphanumeric char
(very) *large           #large, very very very large…
(very){1, 3}                  #counting "very" up to 3
^bob                    #bob at the beginning
com$                    #com at the end                   PHPRegExp
```

- Regular expression: a pattern in a piece of text
- PHP has:
  - POSIX
  - **Perl regular expressions**

Delimiters

```
/[a-z]/at             #cat, rat, bat…
#[aeiou]#
/[a-zA-Z]/
~[^a-z]~              #not a-z
/[[:alnum:]]+/        #at least one alphanumeric char
#(very) *#large       #large, very very very large…
~(very){1, 3}~              #counting "very" up to 3
/^bob/                      #bob at the beginning
/com$/                      #com at the end

/http:\/\
// #http://#                #better readability
```

PHPRegExp

- Used for Perl regular expressions (preg)

Basic Regular Expression

```
/abc/
```

- in PHP, regexes are strings that begin and end with /
- the simplest regexes simply match a particular substring
- the above regular expression matches any string containing "abc":
  - YES: "abc", "abcdef", "defabc", ".=.abc.=.", ...
  - NO: "fedcba", "ab c", "PHP", ...

Wildcards

- A dot . matches any character except a \n line break
  - "/.oo.y/" matches "Doocy", "goofy", "LooNy", ...
- A trailing i at the end of a regex (after the closing /) signifies a case-insensitive match
  - "/xen/i" matches “Xenia", “xenophobic", “Xena the warrior princess", “XEN technologies” ...

Special characters: |, (), ^, \

- | means *OR*
  - "/abc|def|g/" matches "abc", "def", or "g"
  - There's no *AND* symbol. Why not?
- () are for grouping
  - "/(Homer|Marge) Simpson/" matches "Homer Simpson" or "Marge Simpson"
- ^ matches the beginning of a line; $ the end
  - "/^<!--$/" matches a line that consists entirely of "<!--"

Special characters: |, (), ^, \

- \ starts an escape sequence
  - many characters must be escaped to match them literally: / \ $. [ ] ( ) ^ * + ?
  - "/<br \/>/" matches lines containing <br /> tags

Quantifiers: *, +, ?

- * means 0 or more occurrences
  - "/abc*/" matches "ab", "abc", "abcc", "abccc", ...
  - "/a(bc)*/" matches "a", "abc", "abcbc", "abcbcbc", ...
  - "/a.*a/" matches "aa", "aba", "a8qa", "a!?_a", ...
- + means 1 or more occurrences
  - "/a(bc)+/" matches "abc", "abcbc", "abcbcbc", ...
  - "/Goo+gle/" matches "Google", "Gooogle", "Goooogle", ...
- ? means 0 or 1 occurrences
  - "/a(bc)?/" matches "a" or "abc"

More quantifiers: {min,max}

- {min,max} means between min and max occurrences (inclusive)
  - "/a(bc){2,4}/" matches "abcbc", "abcbcbc", or "abcbcbcbc"
- min or max may be omitted to specify any number
  - {2,} means 2 or more
  - {,6} means up to 6
  - {3} means exactly 3

Character sets: []

- [] group characters into a character set; will match any single character from the set
  - "/[bcd]art/" matches strings containing "bart", "cart", and "dart"
  - equivalent to "/(b|c|d)art/" but shorter
- inside [], many of the modifier keys act as normal characters
  - "/what[!*?]*/" matches "what", "what!", "what?**!", "what??!",
- What regular expression matches DNA (strings of A, C, G, or T)?

Character ranges: [start-end]

- inside a character set, specify a range of characters with -
  - "/[a-z]/" matches any lowercase letter
  - "/[a-zA-Z0-9]/" matches any lower- or uppercase letter or digit
- an initial ^ inside a character set negates it
  - "/[^abcd]/" matches any character other than a, b, c, or d

Character ranges: [start-end]

- inside a character set, - must be escaped to be matched
  - "/[+\-]?[0-9]+/" matches an optional + or -, followed by at least one digit
- What regular expression matches letter grades such as A, B+, or D- ?

Escape sequences

- special escape sequence character sets:
  - \d matches any digit (same as [0-9]); \D any non-digit ([^0-9])
  - \w matches any "word character" (same as [a-zA-Z_0-9]); \W any non-word
- char
  - \s matches any whitespace character (, \t, \n, etc.); \S any non-whitespace
- What regular expression matches dollar amounts of at least $100.00 ?

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 the given regex as the delimiter (similar to explode but more powerful)

Regular expressions example

```
echo preg_match ('/test/', "a test of preg_match");
echo preg_match ('/tutorial/', "a test of preg_match
");

$matchesarray[0] = "http://www.tipsntutorials.com/"
$matchesarray[1] = "http://"
$matchesarray[2] = "www.tipsntutorials.com/"
preg_match ('/(http://)(.*)/', "http://www.tipsntuto
rials.com/", $matchesarray)
```

PHP

Regular expressions example

```
# replace vowels with stars
$str = "the quick brown fox";
$str = preg_replace("/[aeiou]/", "*", $str);
# "th* q**ck br*wn f*x"
# break apart into words
$words = preg_split("/[ ]+/", $str);
# ("th*", "q**ck", "br*wn", "f*x")
# capitalize words that had 2+ consecutive vowels
for ($i = 0; $i < count($words); $i++) {
if (preg_match("/\\*{2,}/", $words[$i])) {
$words[$i] = strtoupper($words[$i]);
}
} # ("th*", "Q**CK", "br*wn", "f*x")
```

PHP

PHP form validation w/ regexes

```
$state = $_REQUEST["state"];
if (!preg_match("/[A-Z]{2}/", $state)) {
?>
<h2>Error, invalid state submitted.</h2>
<?php
}
```

PHP

- using preg_match and well-chosen regexes allows you to quickly validate query parameters against complex patterns

Another PHP experiment

- Write a PHP script that tests whether an e-mail address is input correctly. Test using valid and invalid addresses
- Use array
- Use function