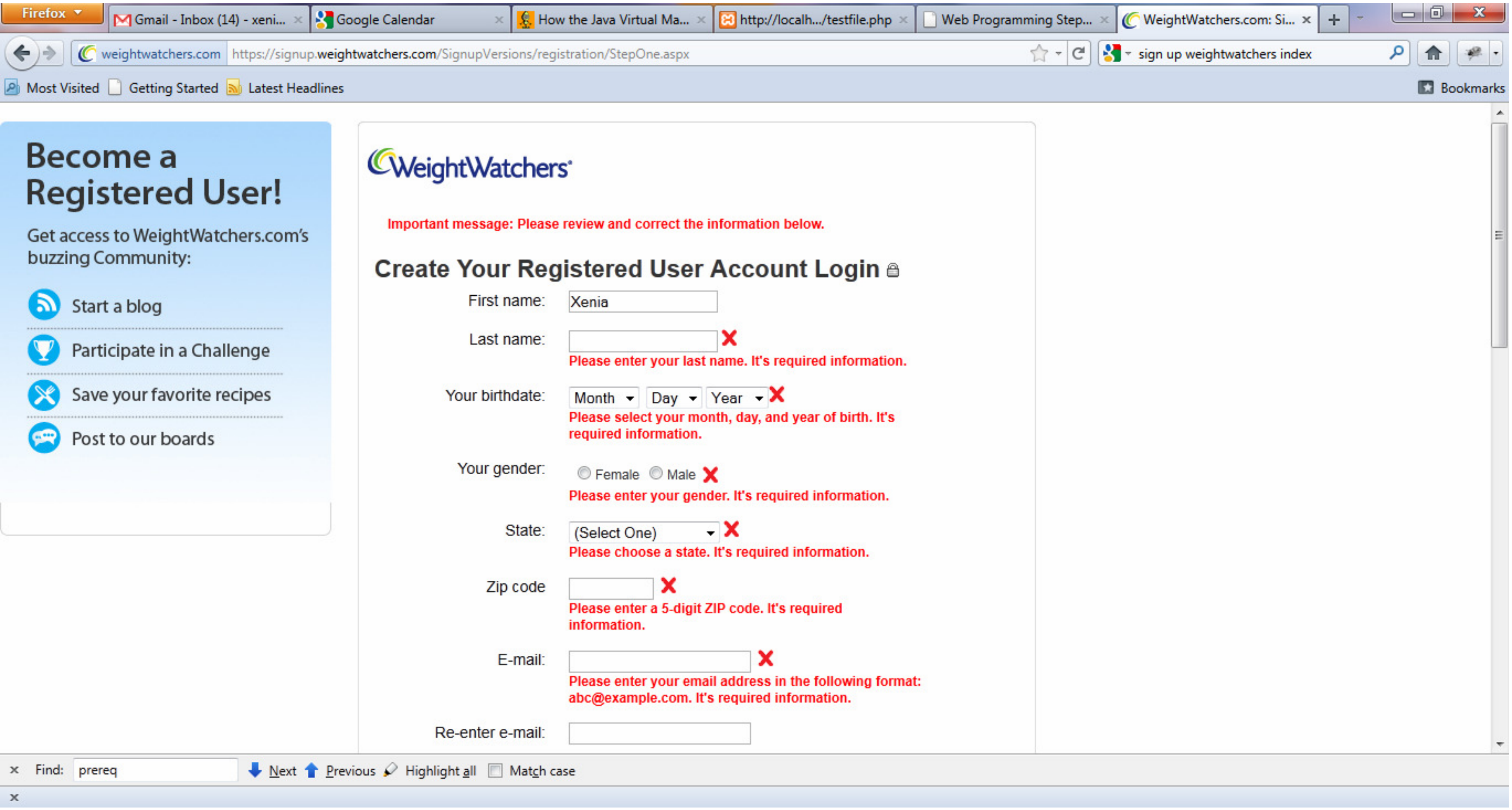
# Form Validation

# 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

# A real Form that uses validation


Firefox
Gmail - Inbox (14) - xeni...
Google Calendar
How the Java Virtual Ma...
http://localh.../testfile.php
Web Programming Step...
WeightWatchers.com: Si...
weightwatchers.com
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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: | |

Find: prereq  Next  Previous  Highlight all  Match case

# 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

```
$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