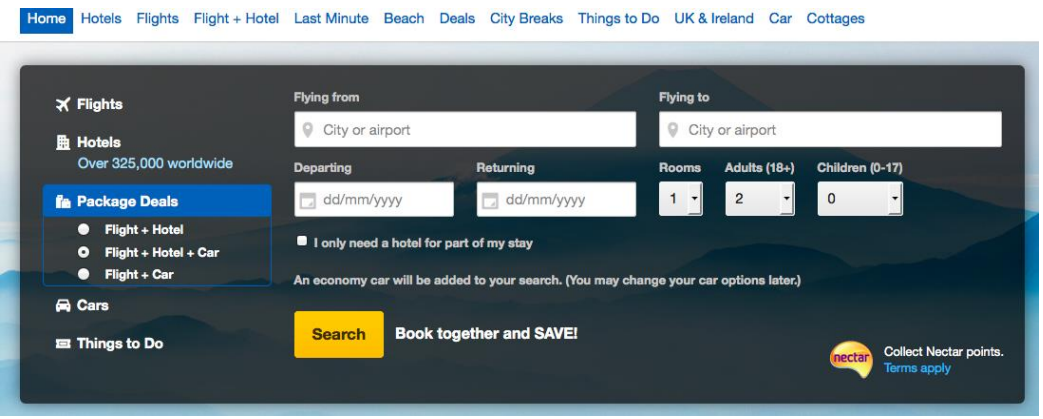
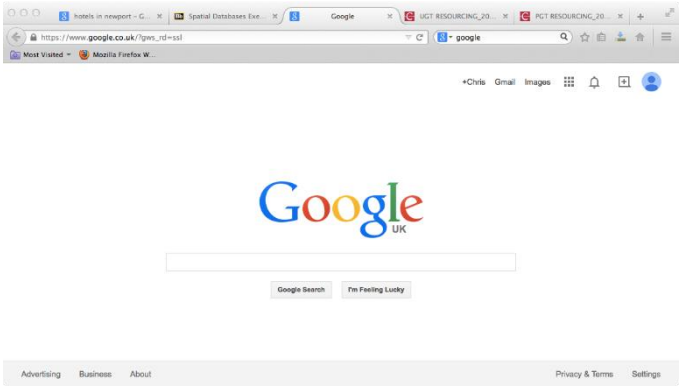
Web Applications

Forms & CGI with Python

Forms

Forms enable the user to enter data





Main applications: provide user input for

- programs and databases located on a web server
- generating a customized results web page

- or to client-side scripts for local processing

Example applications

- e-commerce, to enter name, address, details of purchase and credit-card number etc
  - request brochures from a company
  - make a booking for holiday, cinema etc.
  - buy a book, cd, etc
  - obtain a map giving directions to a shop
- to support input to a database query
- to obtain feedback on a web site
  + other type of polls or surveys.

Input types

- **text**
- **checkbox**
- **radio (buttons)**
- **password**
- **submit**
- **reset**
- **hidden**
- **file**
- **button**
- **image**
- **select**
  (options)
- **textarea**

+++ other HTML5 types

- See later

The `method` and `action` attributes

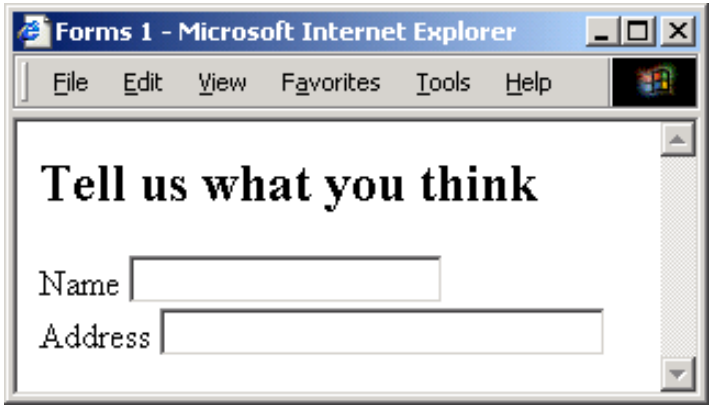
- The **`method`** attribute specifies the way that form data is sent to the server program
  - **`GET`** appends the data to the URL
  - **`POST`** sends the data in body of HTTP message
- The **`action`** attribute specifies a server program that processes the form data (often as a URL)

```
<body>
 <form method="POST" action="comments.py">
  <h2>Tell us what you think</h2>
  <!-- etc -->
 </form>
</body>
```

The `input` element: `type="text"`

`type` attribute specifies the type of user input

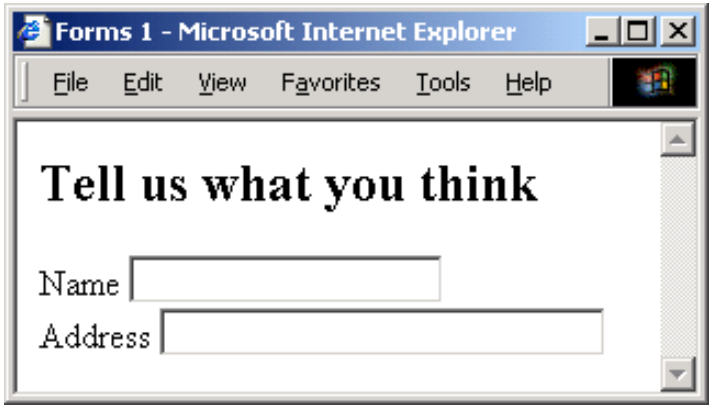
`name` attribute gives an identifier to the input data – *used by the server program*




```
<form method="POST" action="comments.py">
  <h2>Tell us what you think</h2>
  Name <input type="text" name="AName" size="20" />  <br/>
  Address <input type="text" name="address" size="30" />
</form>
```

The `input` element: `type="text"`

`size` attribute specifies the length of a `text` input field in characters



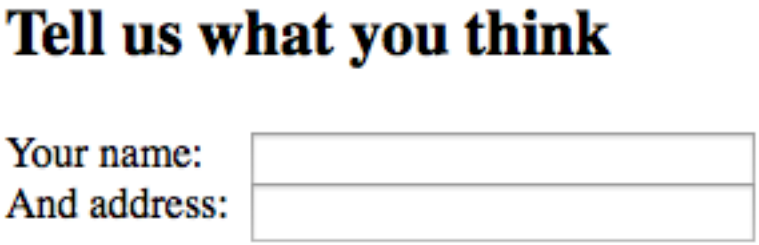
`value` attribute specifies an initial value for the input data (optional)

```
<form method="POST" action="comments.py">
  <h2>Tell us what you think</h2>
  Name <input type="text" name="AName" size="20" />  <br/>
  Address <input type="text" name="address" size="30" />
</form>
```

<label> connects a prompt to the input

important for accessibility

`for` attribute provides **`id`** of associated control



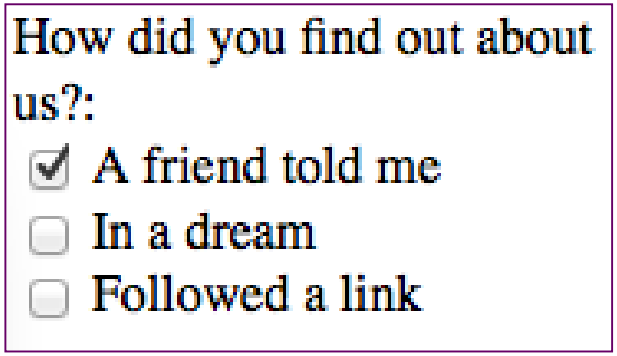

```
<form action="feedback.py" >
<h2>Tell us what you think</h2>
<label for="user">Your name: </label>
<input type="text" id="user" name="username"
                                        size="35"/>
<label for="address">And address:</label>
<input type="text" id="address" name="address"
                                        size="35"/>
```

The `input` element: `type="checkbox"`

`name` attribute is used to define a set of checkboxes

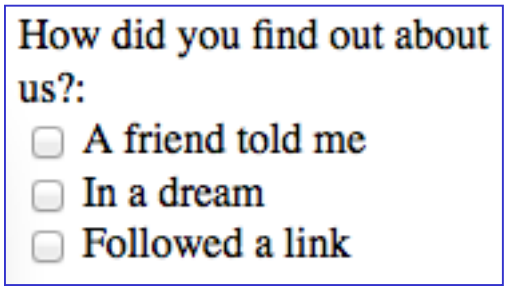
`value` attribute identifies the individual checkbox

If the **`checked`** attribute is set to "checked" the box is initially checked




```
<input type="checkbox" name="howheard"
  id="friend" value="friend" checked="checked">
  A friend told me <br />
<input type="checkbox" name="howheard" id="dream"
 value="dream"> In a dream <br />
<input type="checkbox" name="howheard" id="link"
  value="link"> Followed a link
```

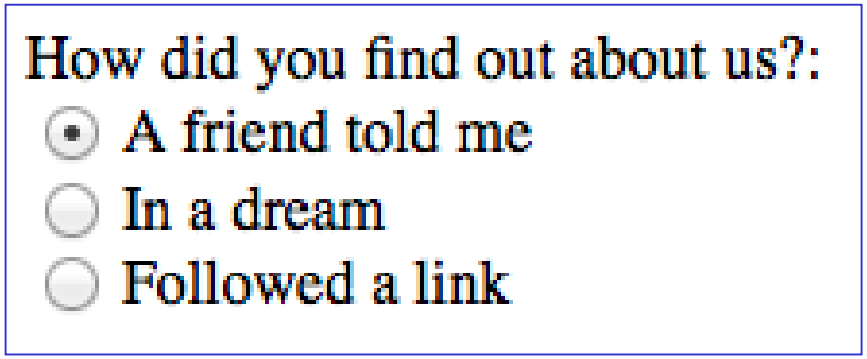
For checkbox and radio, user can click on the label text to set the control




```
How did you find out about this web site?: <br>
<input type="checkbox" name="howheard"
                    id="friend" value="friend">
<label for="friend"> A friend told me</label><br>
<input type="checkbox" name="howheard"
                    id="dream" value="dream">
<label for="dream"> In a dream </label><br>
<input type="checkbox" name="howheard"
                    id="link" value="link">
<label for="link"> Followed a link </label>
```

The `input` element: `type="radio"`

- Radio buttons are similar to checkboxes, but only one of a set can be selected
- To select a button by default, use the **`checked`** attribute (for one button only)



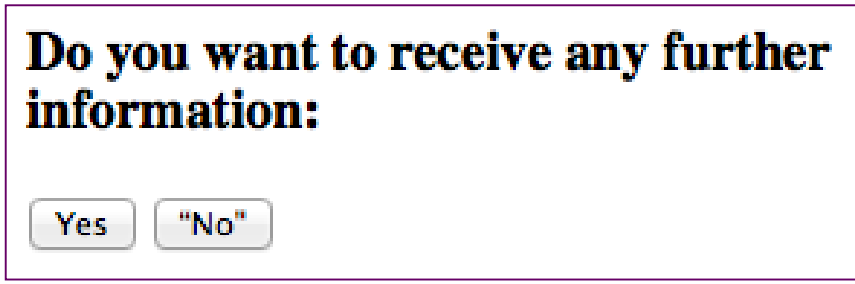

```
<input type="radio" name="howheard" id="friend"
value="friend" checked="checked">
                                A friend told me <br >
<input type="radio" name="howheard" id="dream"
value="dream"> In a dream <br>
<input type="radio" name="howheard" id="link"
value="link"> Followed a link
```

The `input` element: `type="button"`

`name` attribute uniquely identifies a button

`value` attribute gives a label to the button

Actions can be associated with buttons using JavaScript




```
<h3>Do you want to receive any further
information: </h3>
<input type="button" name="yes" value='Yes' />
<input type="button" name="no" value='No' />
```

The `input` element: submit and reset

`type="submit"`

- clicking this button sends the form data to the program (URL) specified in the **`action`** attribute of the form

`type="reset"`

- clicking this button clears all data entered so far

```
Thank you <br>
<input type="submit" name="send" value="Send" >
<input type="reset" name="clear" value="Clear" >
```

The `input` element (cont.)

`type="password"`

- similar to **`type="text"`** except that the input is echoed with asterisks (so not visible)

`type="file"`

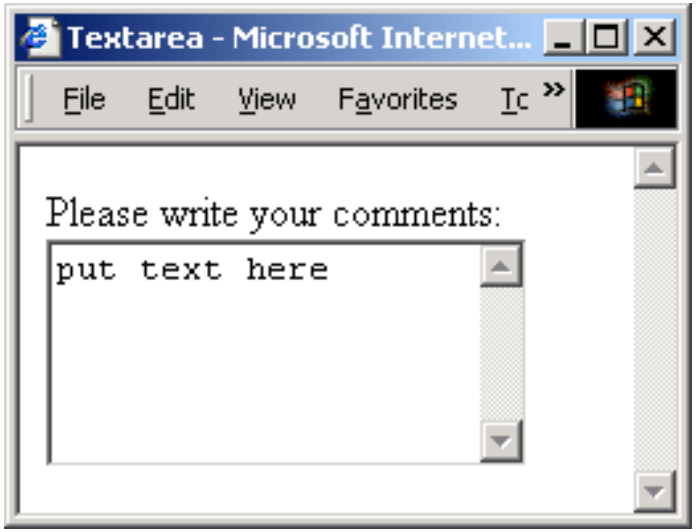
- provides a file dialogue box to specify a file that is sent to the server

`type="hidden"`

- similar to text input, but the **`value`** attribute is used to specify data that is to be sent to the server. Nothing appears on the screen.

The `textarea` element

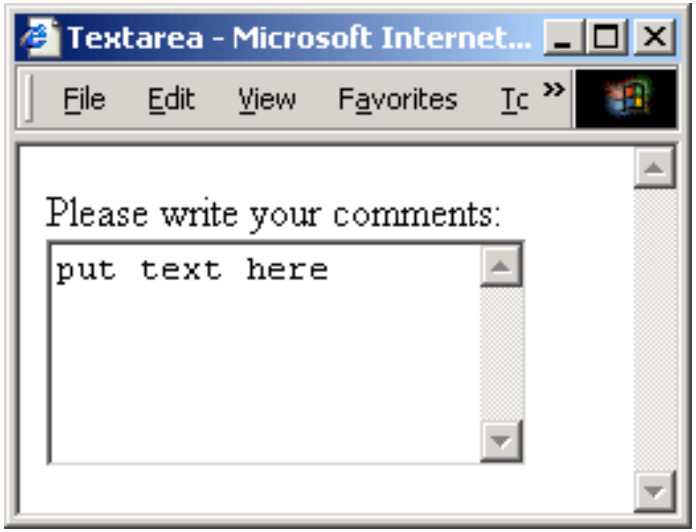
- Used for multi-line text input
- The size of the input area in characters is specified with the `cols` and `rows` attributes
- Any text placed inside the element appears in the input area (this can be deleted).




```
Please write your comments:<br>
<textarea name="comments" rows="5" cols="20">
  put text here
</textarea>
```

The `textarea` element

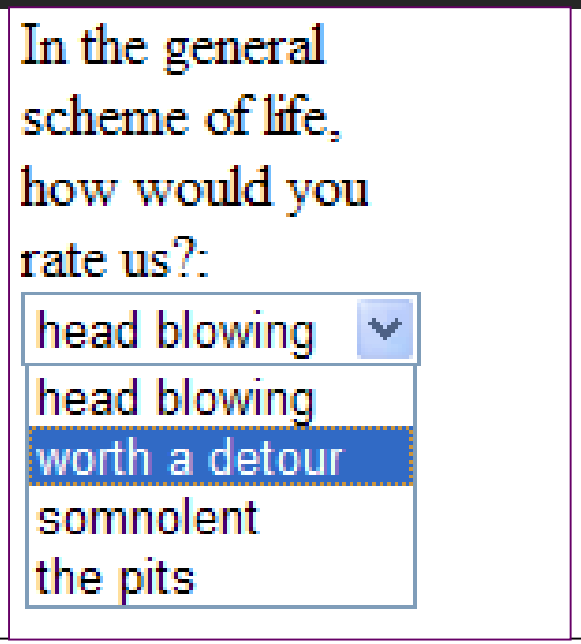
- Used for multi-line text input
- The size of the input area in characters is specified with the `cols` and `rows` attributes
- Use the `placeholder` attribute for text displayed as temporary suggestions




```
Please write your comments:<br>
<textarea name="comments" rows="5" cols="20"
placeholder="put text here">
</textarea>
```

The `select` element

- The **`select`** element provides a drop down menu of options
- An option can be selected by default using the **`selected`** attribute (otherwise the first in the list is initially selected)




```
In the general scheme of life, how would you rate us?:
<select name="quality">
  <option value="headblowing">head blowing</option>
  <option value="worthadetour">worth a detour</option>
  <option value="somnolent">somnolent</option>
  <option value="thepits">the pits</option>
</select>
```

<button> element

Place text or/and image inside the element

Doesn't have to be inside a form element
– use **`form`** attribute to specify id of the associated form

```
<button form="theform" name="jackpot"
type="submit"> Press to win the jackpot
</button>
```

```
<button form="theform" name="dt"
type="submit">     <h3>Hi Dylan</h3>
<img src="DylanThomas.jpg" alt="Dylan"
width="50" height="60">  </button>
```

HTML5 additional <input> types and attributes

HTML5 provides support for various types of input – but may be handled differently by different browsers

e.g.:

`date, email, url, number, range, color, pattern` (regular expression)…

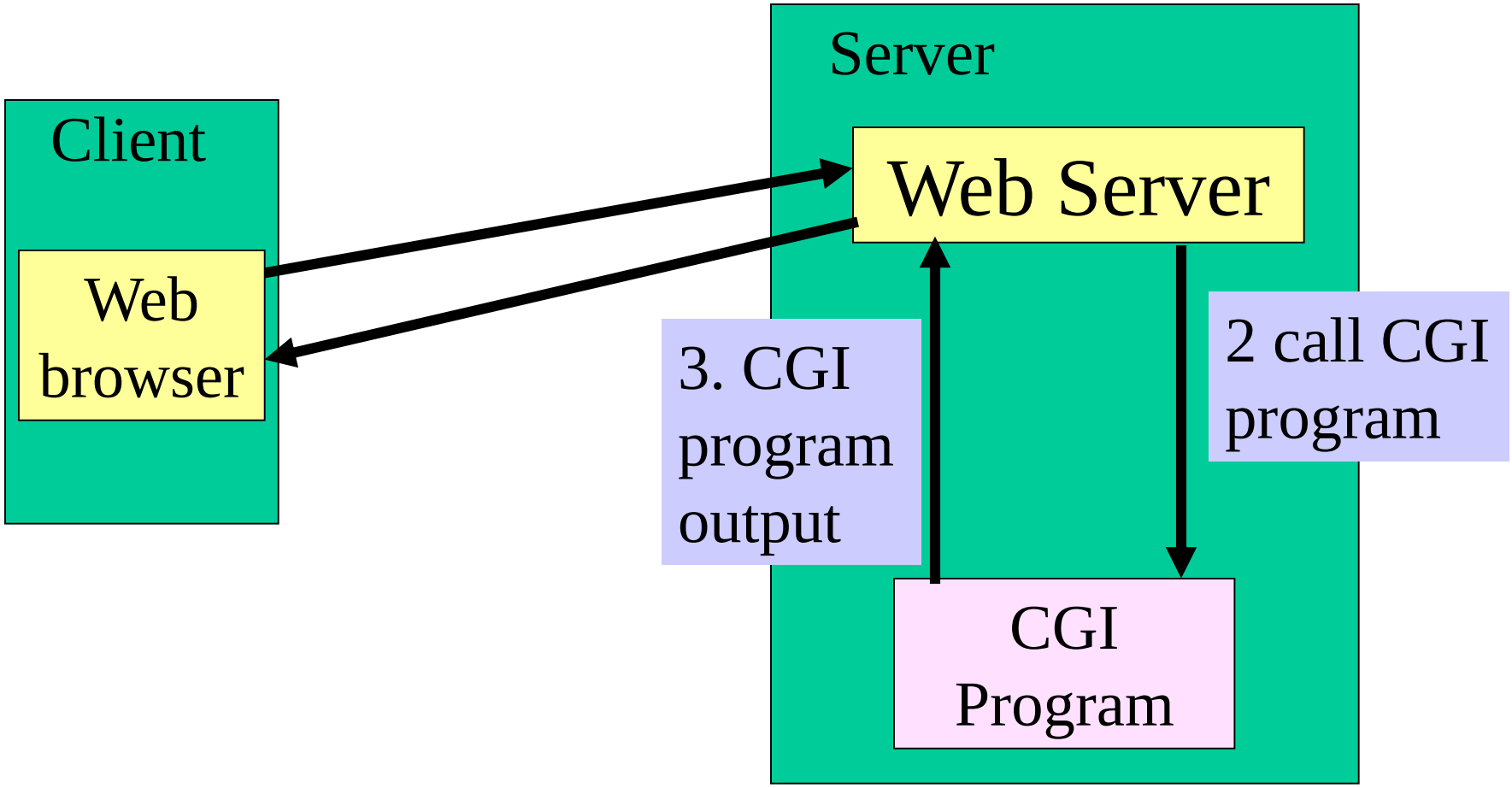
Attribute **`required`** results in automatic check that data are entered in appropriate format

Attribute **`autocomplete`** can be used to specify whether the browser should remember and suggest previously filled in data (set this to **`"off"`** for sensitive date like credit card numbers!)

CGI – Common Gateway Interface

A method of running programs on the server

CGI – Common Gateway Interface



CGI with Python

The Python program can access the values of all data items from the form
- with **`cgi.FieldStorage()`** function

```
form = cgi.FieldStorage()
num1 = form.getvalue('theNumber')
```

Where **`theNumber`** is the name of a data item as specified with the **`name`** attribute, i.e. **`name="theNumber"`**
It returns a string – *so if you are expecting a number convert the string to appropriate type*

The Python program generates a new web page by writing HTML with the **`print`** statement

The form

```
<!DOCTYPE html>
<html lang="en" >
<head>
  <meta charset="utf-8" >
  <title>Test CGI Python number squared</title>
</head>
<body>
  <form action="cgi-bin/NumSquared.py" >
    <label for="theNumber">Enter a number
          to be squared</label>
    <input type="text" id="theNumber"
          name="theNumber" /> <br />
    <input type="submit" value="submit" />
  </form>
</body>
</html>
```

Python CGI
NumSquared.py

```
#!/usr/bin/python3
import cgi, cgitb
form = cgi.FieldStorage()
num1 = form.getvalue('theNumber')
squared = float(num1)**2

print('Content-Type: text/html; charset=utf-8')
print('')
print('<!DOCTYPE html>')
print('<html>')
print('<head> <title> Python script to output the square
   of a number </title>  </head>')
print('<body>')
print('<p>')
print('The square of %s is %g' % (num1, squared))
print('</p>')
print('</body>')
print('</html>')
```

Inside the <head>

Elements in the <head> section include

- **<title>**, **<base>**, **<link>**, **<meta>**, **<script>**, **<style>**

Example of <meta>:

```
<meta name="keywords"
      content="desks, chairs, pens" />
```

Name attribute can have other values such as “author”, “description”, date-last-modified…

MIME file types

MIME – Multipurpose Internet Mail Extension

= Internet Media Type

Examples : type/subtype

text e.g. **`text/html, text/plain, text/javascript, text/css`**

image e.g. **`image/gif, image/jpeg, image/png`**

video e.g. **`video/mpeg, video/mp4, video/ogg`**

audio e.g. **`audio/mpeg, audio/ogg, audio/mp4`**

HTML Validation

Check validity of your document

http://validator.w3.org/

(be aware, however, that not *all* errors might be detected)

(also, distinguish *errors* from *warnings*)

More Information

book Rob Larsen “Beginning HTML and CSS”
(Chapter 6)

online tutorials at http://w3schools.com
(seach for “HTML forms”)

using Python for CGI:
http://docs.python.org/3/library/cgi.html

lots of detail about web technology and the standards at http://www.w3.org/