

Web Servers

Apache and LAMP

CGI scripting for dynamic web pages

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Apache and LAMP
CGI scripting for dynamic
web pages

Interactive Web Pages

accepting user input

greatest common divisor on the web

Interactive Web Pages

accepting user input
greatest common divisor on
the web

MCS 260 Lecture 40
Introduction to Computer Science
Jan Vershelde, 30 November 2007

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the Web Server Apache

the A in LAMP

The combination of web server, scripting language, and database is often referred to as the LAMP system.

LAMP stands for

L is Linux, the operating system;

A is Apache, the web server;

M is MySQL, the database;

P is Python, the scripting language.

Observe that all four are open source software.

Apache makes a cute pun on “a patchy web server”, but its name is in honor of the Native American Apache tribe. Its web site is at <http://www.apache.org>.

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Running Apache

on a Mac OS X 10.5 (Leopard)

Apache is platform independent.

We will demonstrate on a Mac OS X 10.5 (Leopard).

1. Apache is already installed on Mac Leopard, launch Safari with `http://localhost/` to verify.
2. To enable web sharing, select Sharing from the System Preferences.
3. Instead of `public_html`, the `Sites` directory is where Mac users store their web pages.
4. Instead of `/var/www/cgi-bin`, CGI scripts are in `/Library/WebServer/CGI-Executables`.

Using `localhost` we remain working offline.

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Python Works!

our first CGI script

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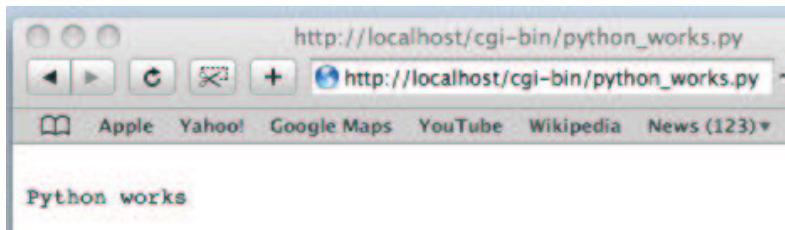
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The Python script `python_works.py`:

```
#!/Library/Frameworks/Python.framework/Versions/Current/bin/python
print "Content-Type: text/plain\n\n"
print "Python works"
```

The first line in the script is the full path name of the Python interpreter.

Python Works!

our first CGI script

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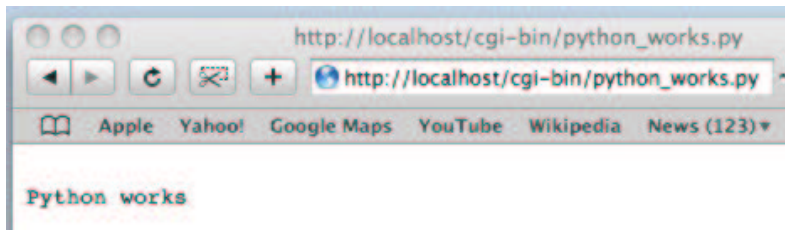
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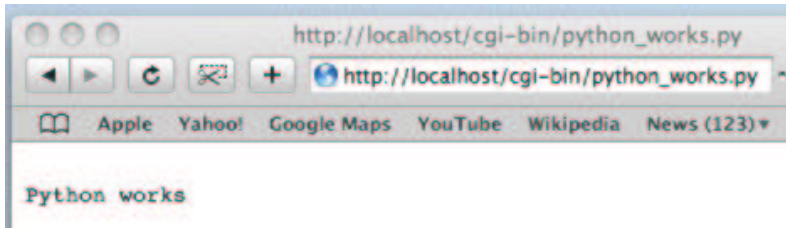
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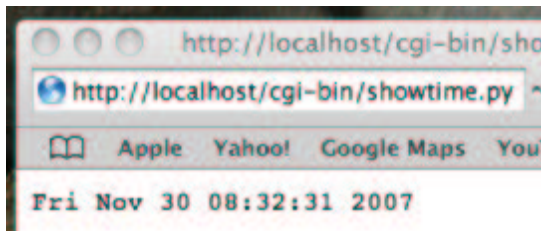
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Dynamic Web Pages

showing the current time

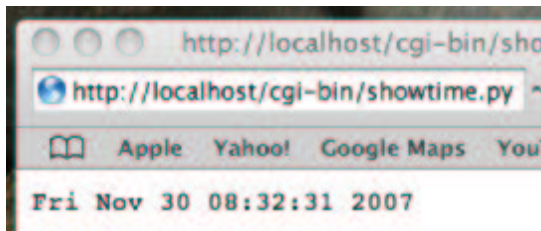


```
#!/Library/Frameworks/Python.framework/Versions/Current/bin/python
import time
print "Content-Type: text/plain\n"
print time.ctime(time.time())
```

The time gets updated every time the page refreshes.

Dynamic Web Pages

showing the current time

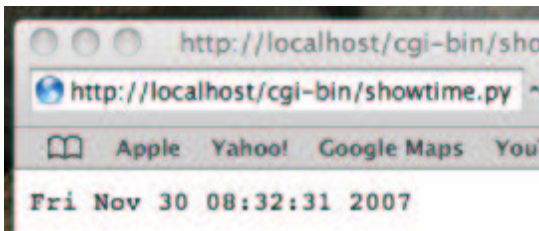


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Prompting for a Number

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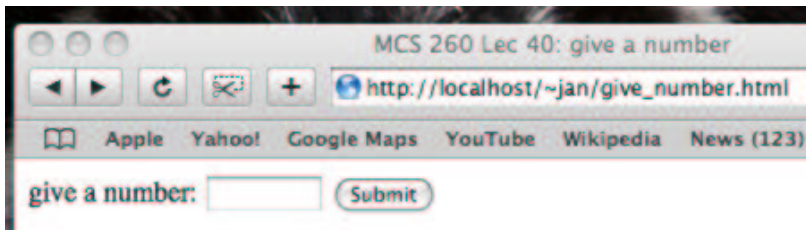
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1. The displayed web page uses a `form` element.
2. The `form` contains two `input` elements
3. After the user hits `submit`, a Python script will run.

Prompting for a Number

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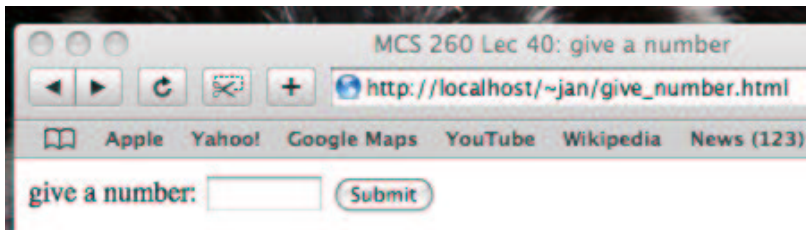
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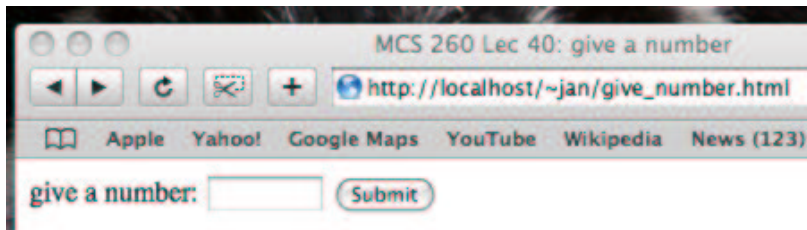
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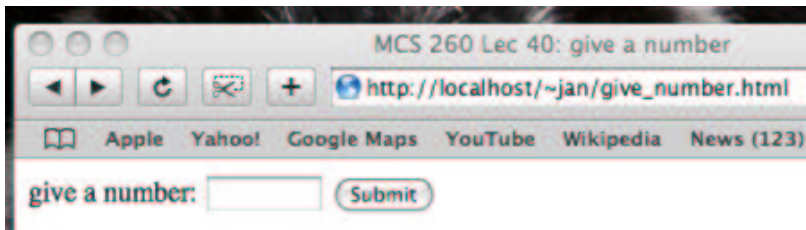
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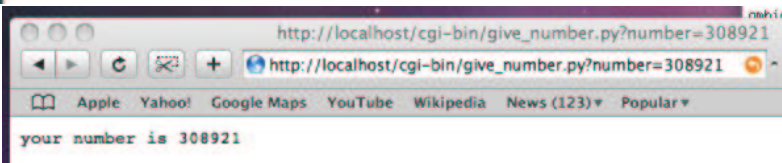
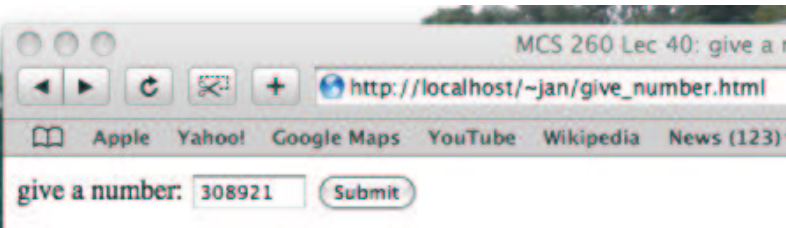
the User enters a Number

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Observe the URL: it contains the data.

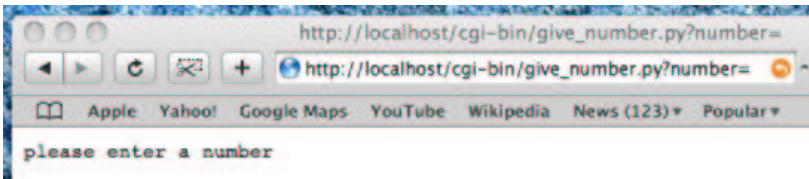
the User enters Nothing

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The user receives an error message.

Form and Input Elements

`give_number.html` defines the web page

```
<HTML>
<HEAD>
<TITLE> MCS 260 Lec 40: give a number </TITLE>
</HEAD>
<BODY>

<FORM action="http://localhost/cgi-bin/give_number.py">

give a number:

<INPUT type="text" name="number" size="8">

<INPUT type="submit">

</FORM>
</BODY>
</HTML>
```

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The Action of Python

the script `give_number.py`

```
#!/Library/Frameworks/Python.framework/Versions/Current/bin/python
import cgi
form = cgi.FieldStorage()
print "Content-Type: text/plain\n"
try:
    n = form['number'].value
    print "your number is " + n
except KeyError:
    print "please enter a number"
```

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accepting user input
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providing dynamic content
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Outline

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GCD on the Web

web computing of the greatest common divisor

MCS 260 L-40

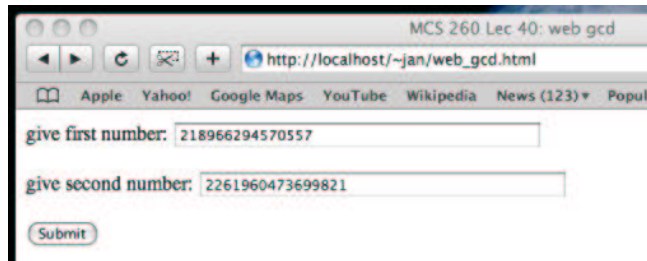
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A screenshot of a web browser window. The title bar reads "MCS 260 Lec 40: web gcd". The address bar shows "http://localhost/~jan/web_gcd.html". Below the address bar is a search bar with a magnifying glass icon and a list of search engines: Apple, Yahoo!, Google Maps, YouTube, Wikipedia, News (123), and Popular. The main content area contains two text input fields. The first is labeled "give first number:" and contains the value "218966294570557". The second is labeled "give second number:" and contains the value "2261960473699821". Below the input fields is a "Submit" button.

The html code extends naturally.

When the user submits the numbers, their greatest common divisor will be computed and displayed.

GCD on the Web

web computing of the greatest common divisor

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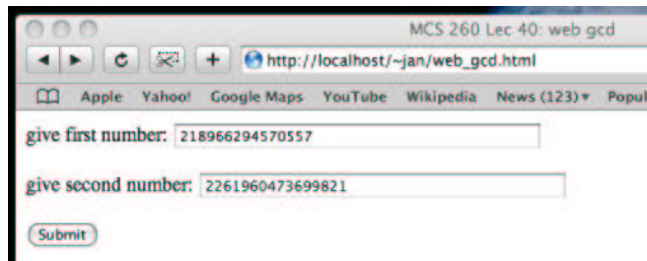
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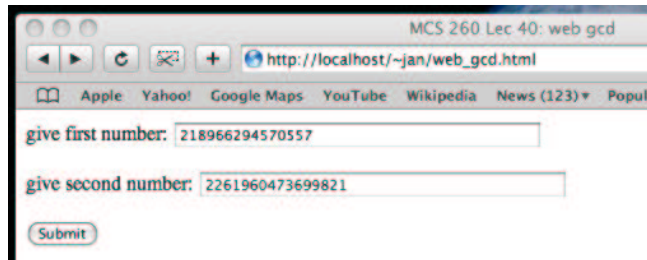
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Output of Web GCD

Euclid does web computing

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```
http://localhost/cgi-bin/web_gcd.py?A=218966294570557&B=2261960473699821
your first number is 218966294570557
your second number is 2261960473699821
gcd(218966294570557, 2261960473699821) = 59228567
```

Which computer does the computation?

Output of Web GCD

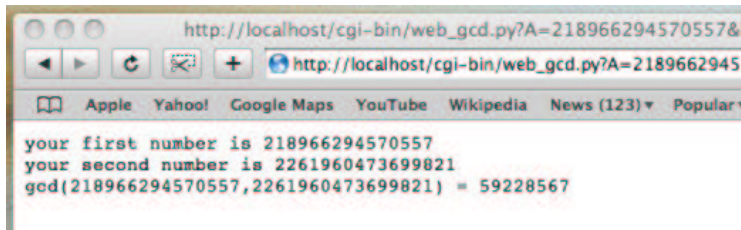
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```

Which computer does the computation?

The HTML Code

the file `web_gcd.html`

```
<HTML>
<HEAD>
<TITLE> MCS 260 Lec 40: web gcd </TITLE>
</HEAD>
<BODY>

<FORM action="http://localhost/cgi-bin/web_gcd.py">
<P> give first number:
<input type="text" name="A" size ="40"> </P>
<P>give second number:
<input type="text" name="B" size ="40"> </P>
<P> <input type="submit"> </P>
</FORM>

</BODY>
</HTML>
```

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<BODY>

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<P> give first number:
<input type="text" name="A" size ="40"> </P>
<P>give second number:
<input type="text" name="B" size ="40"> </P>
<P> <input type="submit"> </P>
</FORM>

</BODY>
</HTML>
```

The Python Script

in the file `web_gcd.py`

```
#!/Library/Frameworks/Python.framework/Versions/Current/bin
import cgi
form = cgi.FieldStorage()
print "Content-Type: text/plain\n"
try:
    x = form['A'].value
    print "your first number is " + x
except KeyError:
    print "please enter a first number"
try:
    y = form['B'].value
    print "your second number is " + y
except KeyError:
    print "please enter a second number"
```

Web Servers

Apache and LAMP

CGI scripting for dynamic
web pages

Interactive Web Pages

accepting user input

greatest common divisor on
the web

The Python Script

in the file `web_gcd.py`

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The Python Script continued

in the file `web_gcd.py`

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def gcd(a,b):      # the code from Lecture 1 !
    r = a % b
    if r == 0:
        return b
    else:
        return gcd(b,r)

ix = int(x)
iy = int(y)
print "gcd(%d,%d) = %d" % (ix,iy,gcd(ix,iy))
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Summary + Assignments

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We started chapter 14 in *Making Use of Python*.

Assignments:

1. Verify if Apache is installed on your computer.
2. Install Apache if necessary.
3. Make a interactive web page with the yield and balance computation of lecture 4

Final Exam is in LC A4, Mon 10 Dec, 1:00-3:00.