

# Dynamic Web Pages

MCS 275 L-20

29 February 2008

## Forms in Python Scripts

Python code to write HTML  
default input values

### Forms in Python Scripts

Python code to write HTML  
default input values

## Web Interface for Determinant

dynamic interactive forms  
asking for a matrix  
computing the determinant

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dynamic interactive forms  
asking for a matrix  
computing the determinant

## Exercises

### Exercises

MCS 275 Lecture 20  
Programming Tools and File Management  
Jan Verschelde, 29 February 2008

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## writing HTML

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What we did before:

1. form element in HTML page triggers action,  
example: submit user name and password.
2. Action triggered by submit button  
is defined by a Python script.

Advantage/disadvantage:

- + Separate HTML layout and actions.
- Submit brings up a new page each time.

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What we did before:

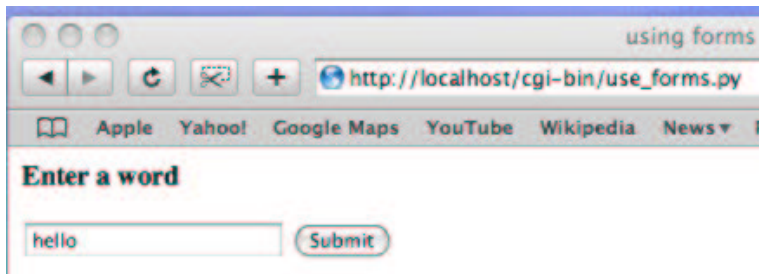
1. form element in HTML page triggers action,  
example: submit user name and password.
2. Action triggered by submit button  
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- + Separate HTML layout and actions.
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# Asking for a Word

running `use_forms.py`



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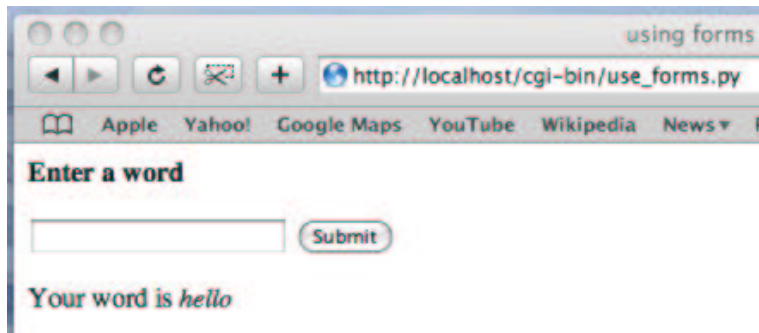
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# Confirming the Word

running `use_forms.py`



The screenshot shows a web browser window with the title "using forms". The address bar displays the URL `http://localhost/cgi-bin/use_forms.py`. 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, and News. The main content area of the browser contains a form with the heading "Enter a word" in bold. Below the heading is a text input field and a "Submit" button. After clicking the button, the text "Your word is *hello*" is displayed below the input field.

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# Printing a Header

start of `use_forms.py`

```
#!/Library/Frameworks/.../bin/python
import cgi
```

```
def PrintHeader(title):
    """
    writes title and header of page
    """
    print """Content-type: text/html
```

```
<html>
<head>
<title>%s</title>
</head>
<body>""" % title
```

```
PrintHeader("using forms")
```

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def PrintHeader(title):
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    """
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```

```
<html>
<head>
<title>%s</title>
</head>
<body>""" % title
```

```
PrintHeader("using forms")
```

# printing a form

script `use_forms.py` continued

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```
print """<b>Enter a word</b>
      <form method = "post" action = "use_forms.py">
      <p>
        <input type = "text" name = "word">
        <input type = "submit">
      </p>
    </form>"""
```

```
form = cgi.FieldStorage()
if form.has_key("word"):
    print """<p>Your word is <em>%s</em></p>
          """ % form["word"].value

print "</body></html>\n"
```

# printing a form

script `use_forms.py` continued

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        <input type = "submit">
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    </form>"""
```

```
form = cgi.FieldStorage()
if form.has_key("word"):
    print """<p>Your word is <em>%s</em></p>
          """ % form["word"].value
```

```
print "</body></html>\n"
```

# printing a form

script `use_forms.py` continued

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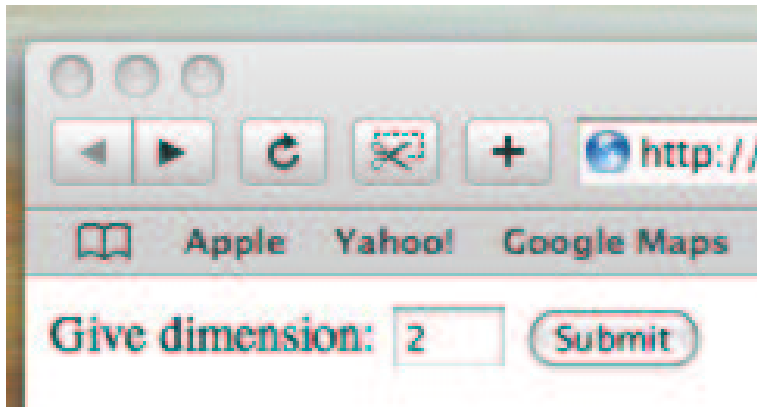
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## Exercises

# Default Values

in input fields



The "2" is filled in already, is default value.

# Forms with Defaults

in input fields

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```
print """<form method = "post"
        action = "web_det.py">

<p>
    Give dimension:
    <input type = "text" name = "dim"
          size = 4 value = 2>

    <input type = "submit">
</p>
</form>"""
```

# Forms with Defaults

in input fields

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```
print """<form method = "post"
        action = "web_det.py">

<p>
    Give dimension:
    <input type = "text" name = "dim"
          size = 4 value = 2>

    <input type = "submit">

</p>
</form>"""
```

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# Asking for a Matrix

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The screenshot shows a web browser window with the address bar displaying `http://localhost/cgi-bin/web_det.py`. The page title is "compute deter". The interface includes a search bar with links to Apple, Yahoo!, Google Maps, YouTube, Wikipedia, and News. The main content area has the following elements:

- A label "Give dimension:" followed by a text input field containing the value "2" and a "Submit" button.
- A label "The dimension:" followed by a text input field containing the value "3".
- A label "Enter matrix :" followed by a 3x3 grid of text input fields containing the following values:

4	-0.2	4
8	6	12
5	-1.2	34
- A "Submit" button at the bottom of the matrix grid.

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# Computing the Determinant

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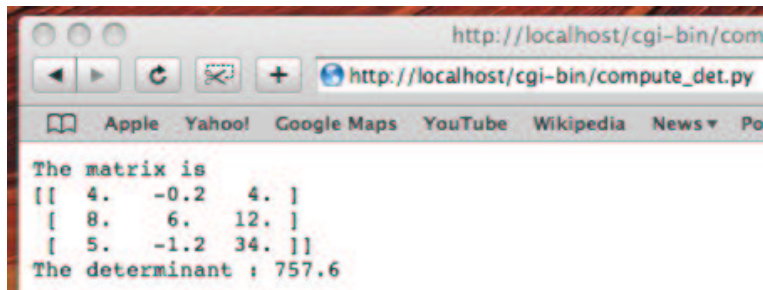
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The screenshot shows a web browser window with the address bar displaying `http://localhost/cgi-bin/com`. The address bar also contains a search bar with the text `http://localhost/cgi-bin/compute_det.py`. Below the address bar, there is a search bar with the text `Apple Yahoo! Google Maps YouTube Wikipedia News Po`. The main content area of the browser displays the following text:

```
The matrix is
[[ 4.  -0.2  4. ]
 [ 8.   6. 12. ]
 [ 5.  -1.2 34. ]]
The determinant : 757.6
```

The script is a sequence of two forms:

1. we ask for *the dimension* of the matrix  
The dimension is then used to generate a table of input elements to give the entries of the matrix.
2. we ask for *the entries* of the matrix  
The second form is processed by the same script.  
The action of this form brings up a new page with the matrix and the determinant.

The dimension is passed from one form to the other  
*through an input element.*

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1. we ask for *the dimension* of the matrix

The dimension is then used to generate a table of input elements to give the entries of the matrix.

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# The Main Function

of `web_det.py`

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```
def main():
    """
    web interface to compute a determinant
    """
    PrintHeader("compute determinant")
    AskDimension()
    form = cgi.FieldStorage()
    if form.has_key("dim"):
        n = int(form["dim"].value)
        AskMatrix(n)

    print "</body></html>\n"

main()
```

# The Main Function

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# The Function AskMatrix()

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```
def AskMatrix(n):  
    """  
    form to enter an n-by-n matrix  
    """  
    print """<form method = "post"  
            action = "compute_det.py">"""  
    print """The dimension:  
        <input type = "text" name = "dim"  
            size = 4 value = %d>""" % n
```

Observe how the value of the dimension is set  
in the input element `dim` of the form.

# The Function AskMatrix()

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# AskMatrix() continued

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```
print "<p>Enter matrix :</p>"
print "<table>"
for i in range(0,n):
    print "<tr>"
    for j in range(0,n):
        print ""<td><input type = "text"
        name = %d,%d size = 4></td>"" % (i,j)
    print "</tr>"
print "</table>"
print ""<input type = "submit">""
print "</form>"
```

The names of the entries are strings  $i,j$ .

# AskMatrix() continued

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# Beginning of compute\_det.py

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```
#!/Library/Frameworks/.../bin/python
import cgi
```

```
from numpy import matrix, zeros
from numpy.linalg import det
```

# The Main Function

in compute\_det

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```
def main():  
    """  
    web interface to compute a determinant  
    """  
    print "Content-type: text/plain\n"  
    form = cgi.FieldStorage()  
    if form.has_key("dim"):  
        n = int(form["dim"].value)  
        d = Determinant(form,n)  
        print "The determinant :", d
```

# The Main Function

in `compute_det`

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```

# The Determinant() Function

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```
def Determinant(form,n):
    """
    returns the determinant of the matrix
    available in the form
    """
    A = zeros((n,n),float)
    for i in range(0,n):
        for j in range(0,n):
            info = "%d,%d" % (i,j)
            if form.has_key(info):
                A[i,j] = float(form[info].value)
    print "The matrix is"
    print A
    return det(A)
```

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# Exercises

MCS 275 L-20

29 February 2008

1. Modify the `use_forms.py` so that it places by default one word in the input element, *with all vowels removed*. Ask the user to supply the missing vowels. In reaction to the submit, compare the word of the user with the original word and give feedback.
2. Write a Python script `web_sum.py` to sum  $n$  numbers. Like in `web_det.py`, first the user is asked to supply  $n$  and then  $n$  input elements have to be filled out before another script `compute_sum.py` can compute the sum.
3. The current version of `web_det.py` takes undefined entries to equal zero. Change it so the user is asked to return and provide the missing entries.
4. Make a recursive form. The input element asks the user for a number. With each submit, the number is doubled.

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