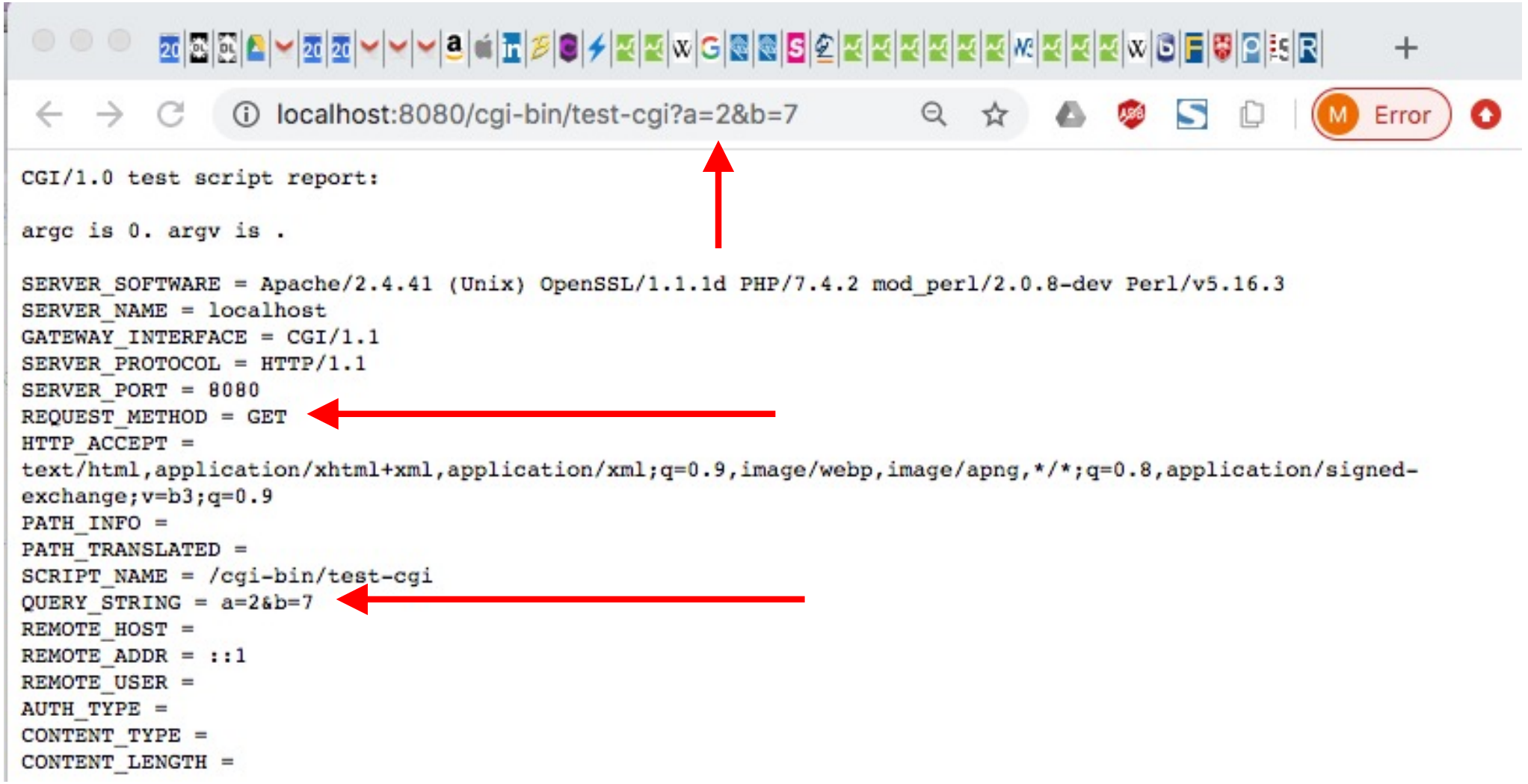
Dynamic content: programming the web servers

Q

How can we obtain dynamic responses from a Web server?

part 2: passing parameters

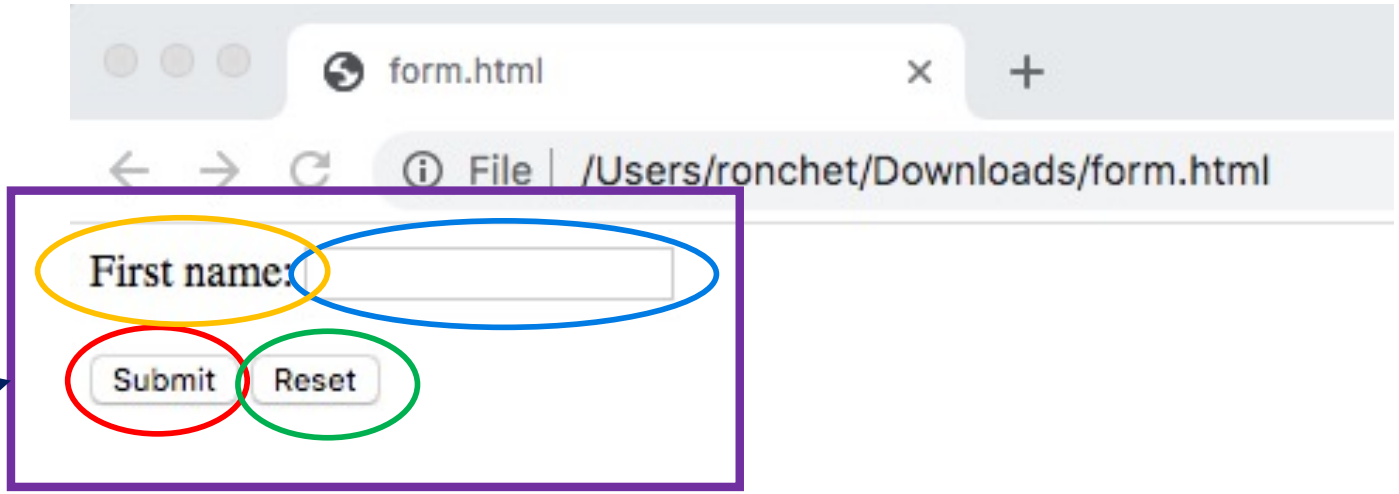
Parameters passing



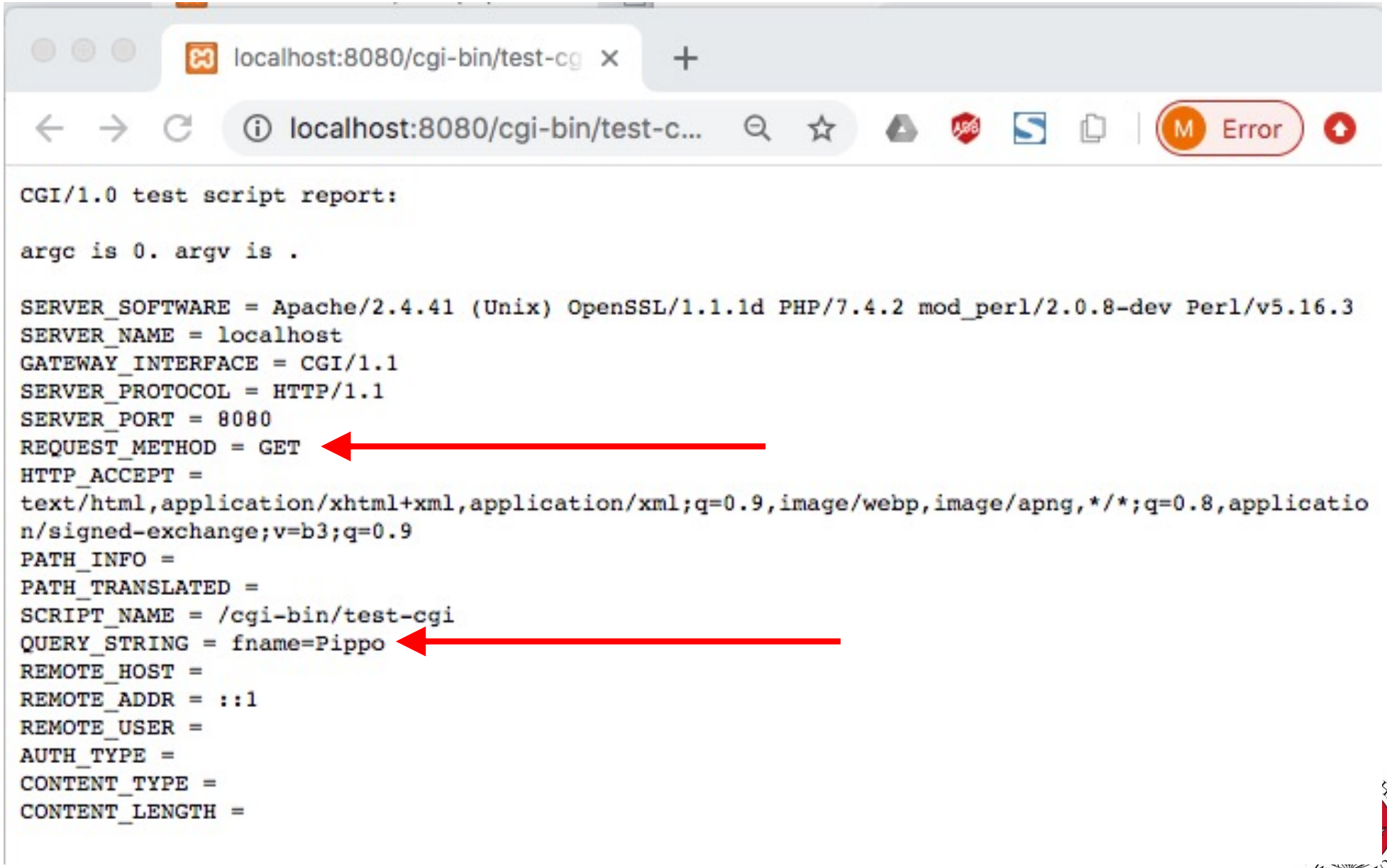
Parameters collection and passing

(HTML Forms)

```
<html>
<body>
<form action="http://localhost:8080/cgi-bin/test-cgi" method="GET">
   <label for="fname">First name:</label>
   <input type="text" name="fname"><br><br>
   <input type="submit" value="Submit">
   <input type="reset" value="Reset">
</form>
</body>
</html>
```

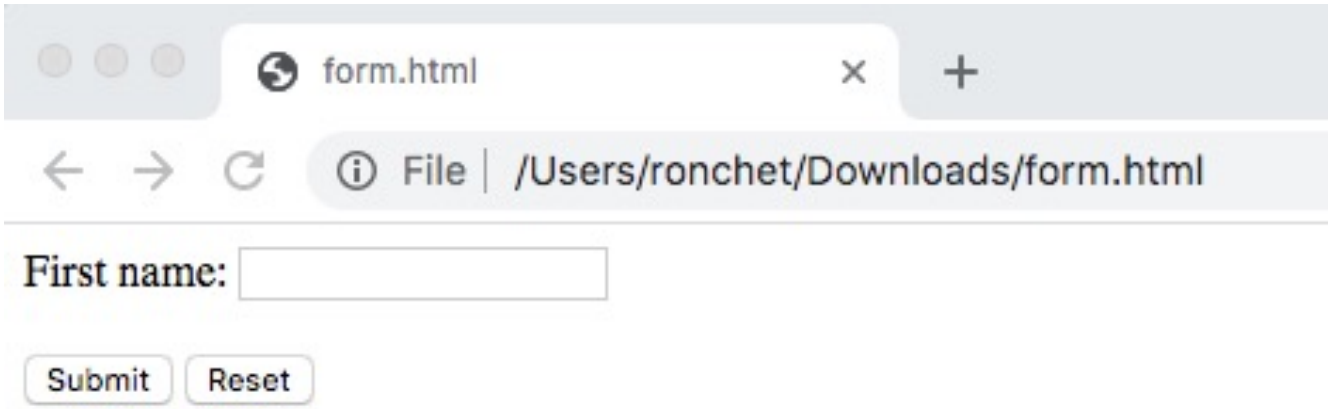


Parameters passing

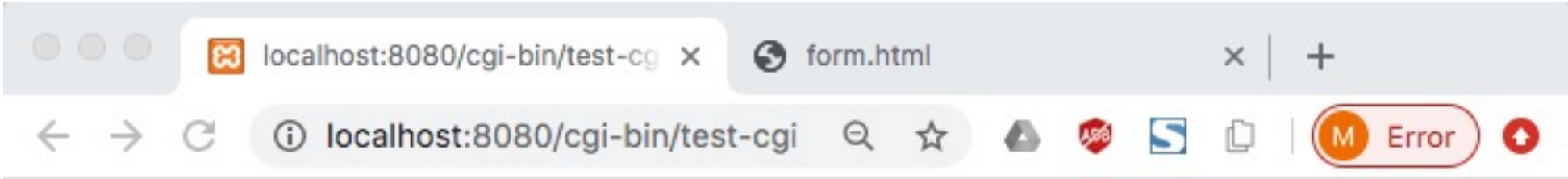


Parameters passing

```
<html>
<body>
<form action="http://localhost:8080/cgi-bin/test-cgi" method="post">
   <label for="fname">First name:</label>
   <input type="text" name="fname"><br><br>
   <input type="submit" value="Submit">
   <input type="reset" value="Reset">
</form>
</body>
</html>
```



Parameters passing




```
CGI/1.0 test script report:

argc is 0. argv is .

SERVER_SOFTWARE = Apache/2.4.41 (Unix) OpenSSL/1.1.1d PHP/7.4.2 mod_perl/2.0.8-dev Perl/v5.16.3
SERVER_NAME = localhost
GATEWAY_INTERFACE = CGI/1.1
SERVER_PROTOCOL = HTTP/1.1
SERVER_PORT = 8080
REQUEST_METHOD = POST
HTTP_ACCEPT =
text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8,applicatio
n/signed-exchange;v=b3;q=0.9
PATH_INFO =
PATH_TRANSLATED =
SCRIPT_NAME = /cgi-bin/test-cgi
QUERY_STRING =
REMOTE_HOST =
REMOTE_ADDR = ::1
REMOTE_USER =
AUTH_TYPE =
CONTENT_TYPE = application/x-www-form-urlencoded
CONTENT_LENGTH = 11
```

?? Where are the data ??

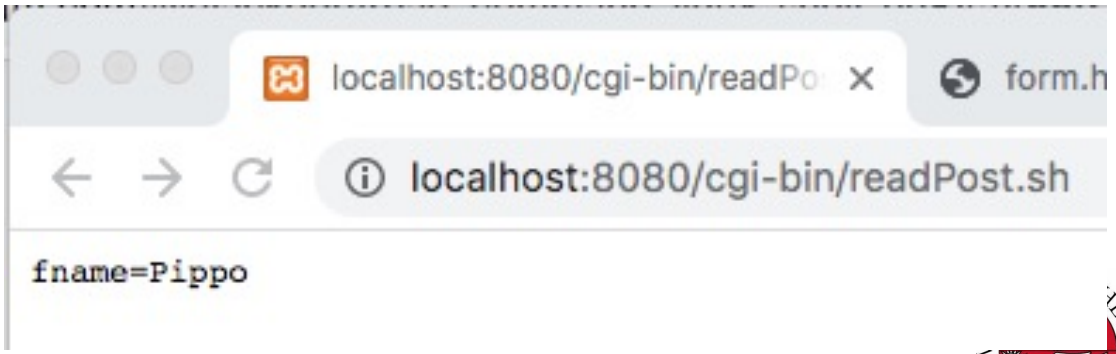
Let's read the POST DATA

readPost.sh

```
#!/bin/sh
read MYDATA
echo "Content-type: text/plain; charset=iso-8859-1"
echo
echo $MYDATA
```

This is just an arbitrarily chosen variable name

```
<html>
<body>
<form action="http://localhost:8080/cgi-bin/readPost.sh" method="post">
<label for="fname">First name:</label>
<input type="text" name="fname" "><br><br>
<input type="submit" value="Submit">
<input type="reset" value="Reset">
</form>
</body>
</html>
```



Let's read the POST DATA (full page)

readPost.sh

```
#!/bin/sh
read MYDATA
echo "Content-type: text/plain; charset=iso-8859-1"
echo
echo "<HTML>"
echo "<HEAD><TITLE>Showing Post Data </TITLE>"
echo "<BODY>"
echo "here are the post data:<br>"
echo $MYDATA
echo "</BODY></HTML> "
```

HTML is "printed out". Can we do better?

Getting deeper with HTML Forms

Forms

Give to the user the possibility to send information to the Web server

The FORM tag defines a form and has the following attributes:

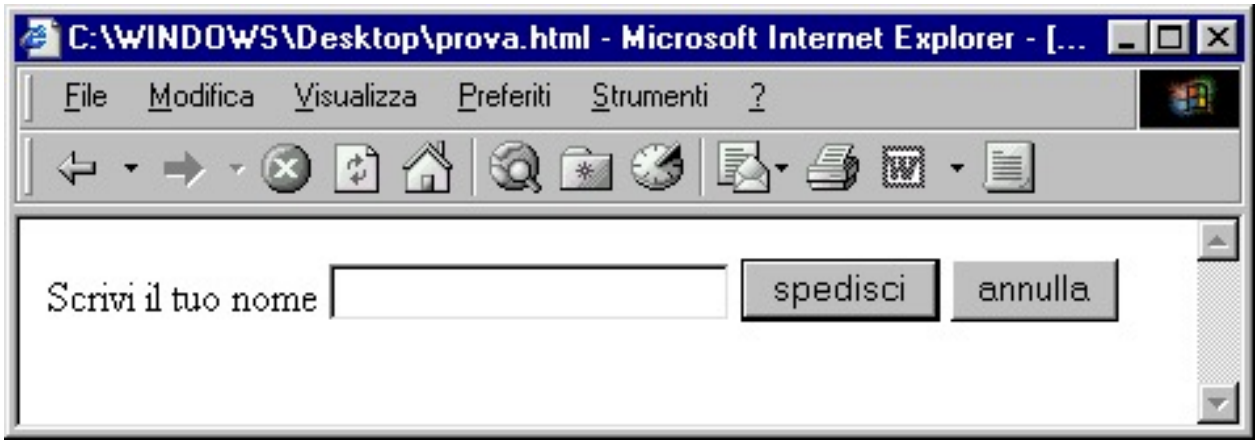
- •ACTION identifies the processing engine
- •ENCTYPE specificies the MIME type used to pass data to the server (Es. Text/html)

FORM contains the sub-tag (inner tags):

- •several tags for collecting data
- •An INPUT tag **must be** of type SUBMIT for sending the data
- •An INPUT can be of type RESET to cancel all the gathered data

Form - input

```
<FORM method="POST" action="/cgi-bin/elabora">
  Scrivi il tuo nome
  <Input type="text" size“=25" maxlength="15“ name=“a”>
  <Input type="submit" value="spedisci">
  <Input type="reset" value="annulla">
</FORM>
```



Sends a url of type
http://…/cgi-bin/elabora?a=MarcoRonchetti

Form – more input types

- <input type="button">
- <input type="checkbox">
- <input type="color">
- <input type="date">
- <input type="datetime-local">
- <input type="email">
- <input type="file">
- <input type="hidden">
- <input type="image">
- <input type="month">
- <input type="number">
- <input type="password">
- <input type="radio">
- <input type="range">
- <input type="reset">
- <input type="search">
- <input type="submit">
- <input type="tel">
- <input type="text">
- <input type="time">
- <input type="url">
- <input type="week">

https://www.w3schools.com/html/html_form_input_types.asp

Forms – how many buttons?

- Up to HTML 4:
  - At most 2: “exec” and ”cancel”

- HTML 5: as many as you want!

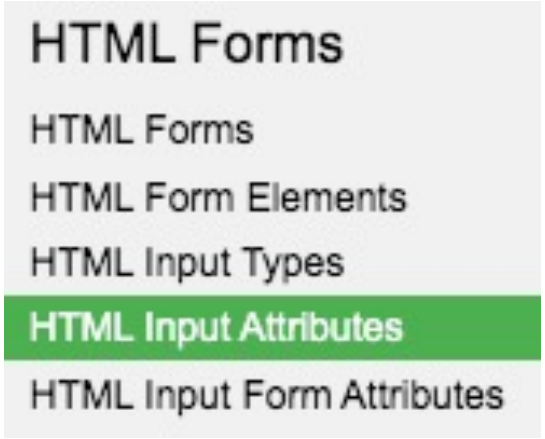
```
<form action="/action_page.php">
  <label for="fname">First name:</label>
  <input type="text" id="fname" name="fname"><br><br>
  <label for="lname">Last name:</label>
  <input type="text" id="lname" name="lname"><br><br>
  <input type="submit" value="Submit">
  <input type="submit" formaction="/action_page2.php" value="Submit as Admin">
</form>
```

HTML Form: attributes

Various attributes allow customizing Input and forms, e.g.:

- formaction
- formenctype
- formmethod
- formtarget

W3schools:



https://www.w3schools.com/html/html_form_attributes_form.asp

HTML Form, with (some) validation

- https://www.w3schools.com/html/html_forms.asp

HTML Form, with (some) validation

Attribute	Description
checked	Specifies that an input field should be pre-selected when the page loads (for type="checkbox" or type="radio")
disabled	Specifies that an input field should be disabled
max	Specifies the maximum value for an input field
maxlength	Specifies the maximum number of character for an input field
min	Specifies the minimum value for an input field
pattern	Specifies a regular expression to check the input value against
readonly	Specifies that an input field is read only (cannot be changed)
required	Specifies that an input field is required (must be filled out)
size	Specifies the width (in characters) of an input field
step	Specifies the legal number intervals for an input field
value	Specifies the default value for an input field

https://www.w3schools.com/html/html_form_attributes.asp

Forms – restrictions: patterns

```
<form>
  <label for="phone">Enter your phone number:</label>
  <input type="tel" id="phone" name="phone"
         pattern="[0-9]{3}-[0-9]{2}-[0-9]{3}">
</form>
```

The pattern attribute works with the following input types: text, date, search, url, tel, email, and password.

Step 4:
introducing
“Web server languages”

Let's read the POST DATA (full page)

readPost.sh

```
#!/bin/sh
read MYDATA
echo "Content-type: text/plain; charset=iso-8859-1"
echo
echo "<HTML>"
echo "<HEAD><TITLE>Showing Post Data </TITLE>"
echo "<BODY>"
echo "here are the post data:<br>"
echo $MYDATA
echo "</BODY></HTML> "
```

HTML is "printed out". Can we do better?

A simpler idea

Instead of embedding

HTML into the code, we could embed the code into HTML…

Template page

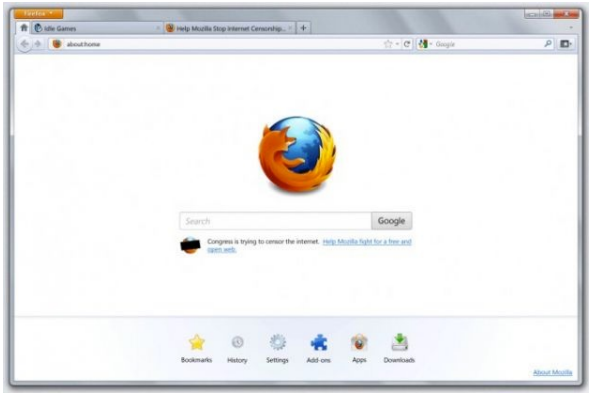
```
<HTML>
SOME HTML STUFF
%SOME CODE%
MORE HTML STUFF
</HTML>
```

```
<HTML>
SOME HTML STUFF
CODE OUTPUT
MORE HTML STUFF
</HTML>
```

A simpler idea

Augment the web server with an engine capable of parsing a web page, and executing code in it

Request URL



Retrieve template page from file system

```
<HTML>
SOME HTML STUFF
%SOME CODE%
MORE HTML STUFF
</HTML>
```

Evaluate code

```
<HTML>
SOME HTML STUFF
CODE OUTPUT
MORE HTML STUFF
</HTML>
```

Response

PHP – PHP Hypertext Processor

originally Personal Home Page

whatsTheTime.php

```
<!DOCTYPE html>
<html>
<body>
<i>Sir, the current time is
<?php
echo  date("h:i:sa");
?>
</i><br/>
(as far as I know!)
</body>
</html>
```

Sir, the current time is 04:20:11pm
(as far as I know!)

PHP: the language

Interpreted

Non-typed language

Case insensitive

Tutorials:
https://www.tutorialspoint.com/php/index.htm
https://www.w3schools.com/php/default.asp

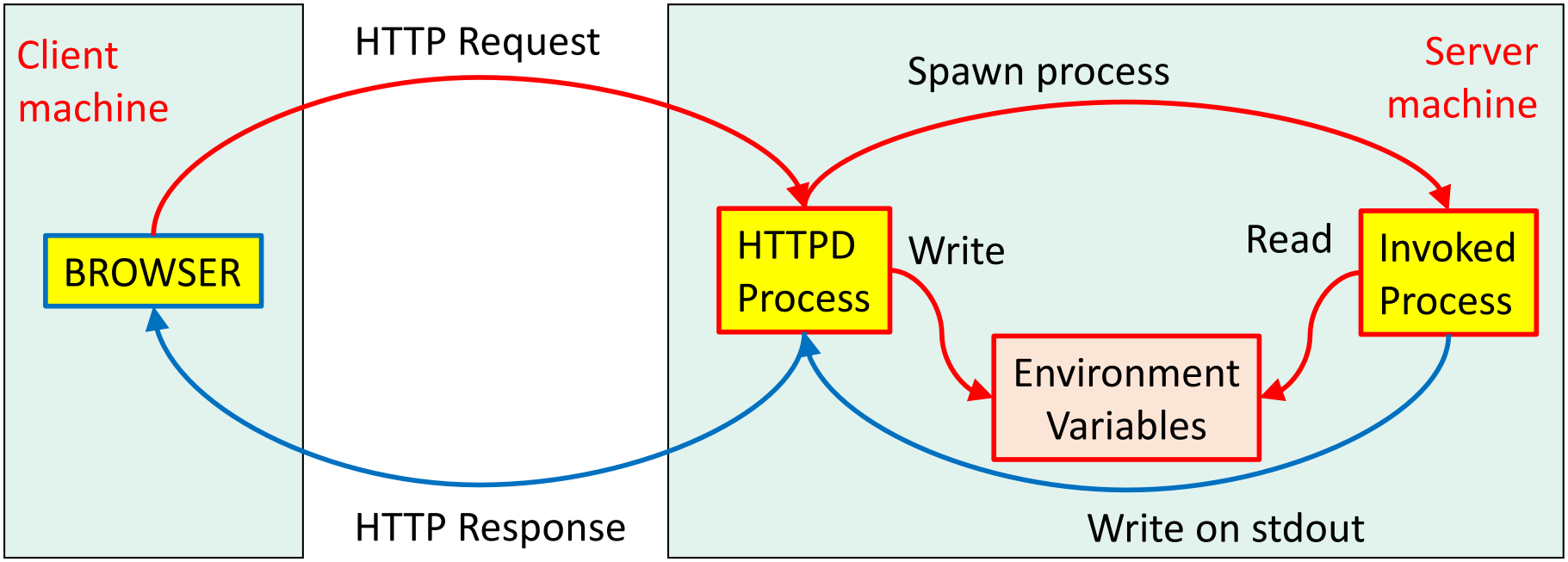
PHP Superglobals variables

A **superglobal** variable is visible everywhere.

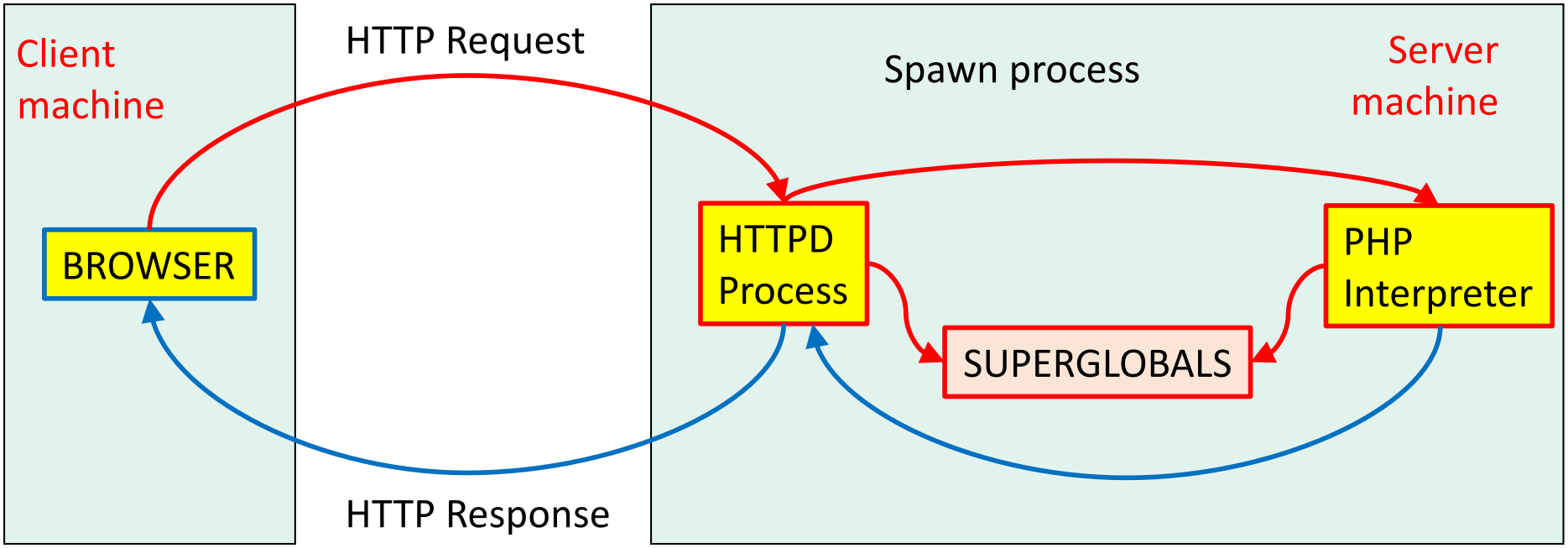
The PHP superglobal variables are:

- $GLOBALS
- $_SERVER
- $_REQUEST
- $_POST
- $_GET
- $_FILES
- $_ENV
- $_COOKIE
- $_SESSION

Getting info about the request



Getting info about the request



ASP.Net Core

ASP (Active Server Pages) was a Microsoft, Windows-only technology based on the same idea.

Its evolution was ASP.Net first, and now ASP.Net Core.

ASP.Net Core is based on .Net Core, a portable implementation of the previously Windows-only DLLs.

https://docs.microsoft.com/it-it/dotnet/core/