Working with Forms

HTTP GET / POST, Validation, Escaping, Input Types, Submitting Arrays, URL Redirecting

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How Browsers talk with Servers?

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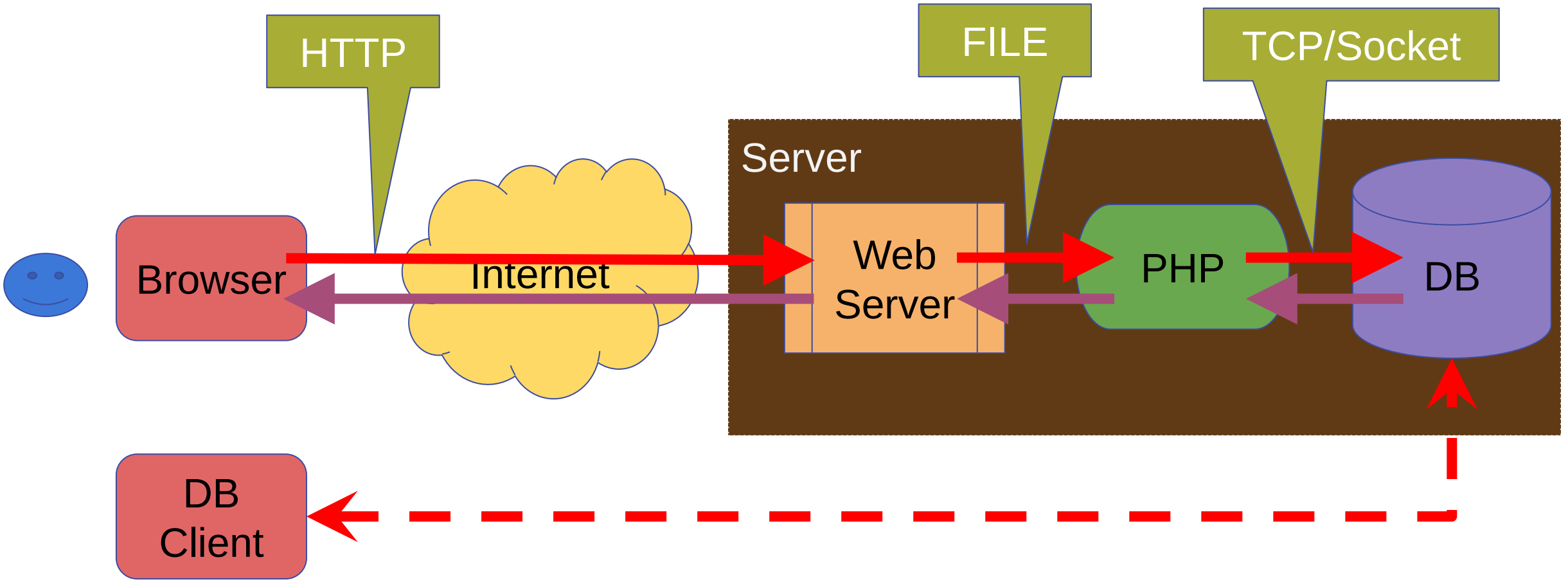
Big Picture



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What is HTTP

HyperText Transfer Protocol

- Main protocol for WEB communication
- Base on client-server principe
- Text based - easy to read, easy to debug
- Use request/response principe

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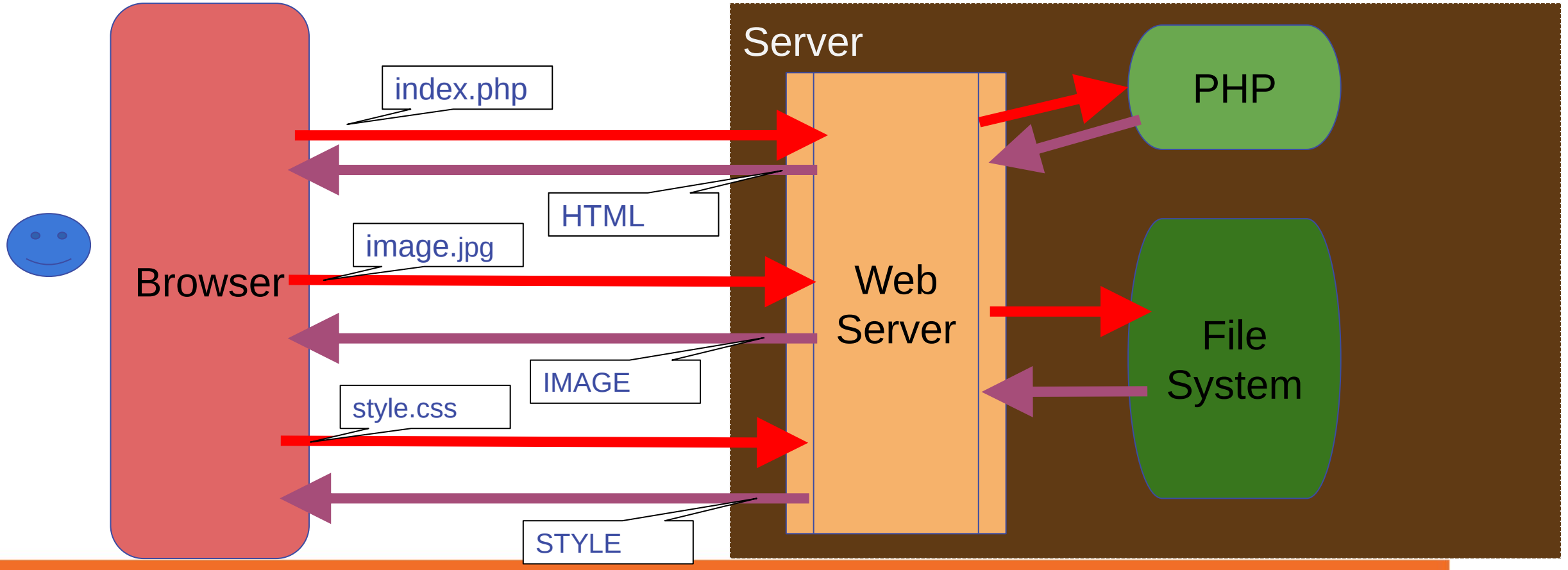
Web Page Loading



HTTP REQUEST METHODS

How Browsers Send Form Data?

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HTTP Request Methods

- Forms allow the user to enter data that is sent to a server for processing via HTTP request methods
  - The most used HTTP request methods: **GET** and **POST**
- In PHP the posted form data is stored in the **$_GET** or **$_POST** associative arrays

GET Request Method

- HTTP GET
  - Retrieves data from the server from given URL
- The form data is stored in **`$_GET`** associative array
- The whole query string can be accessed using **`$_SERVER['QUERY_STRING']`** environment variable

```
<form method="get" action="index.php">
      …
</form>
```

GET Request Method – Example

```
<form method="get">
    Name: <input type="text" name="name" />
    Age: <input type="text" name="age" />
    <input type="submit" />
</form>
```

```
<?php
// Check the keys "name" or "age" exist
if (isset($_GET["name"]) || isset($_GET["age"])) {
    echo "Welcome " . htmlspecialchars($_GET['name']) . ". <br />";
    echo "You are " . htmlspecialchars($_GET['age']). " years old.";
}
?>
```

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POST Request Method

- The **POST** method transfers data in the HTTP body
  - Not appended to the query string
- The posted data is stored in **$_POST** associative array
- By using **https://** you can protect your posted data
- POST can send text and binary data, e.g. upload files

```
<form method="post" action="index.php">
      …
</form>
```

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POST Request Method – Example

```
<form method="post">
    Name: <input type="text" name="name" />
    Age: <input type="text" name="age" />
    <input type="submit" />
</form>
```

```
<?php
// Check the keys "name" or "age" exist
if (isset($_POST["name"]) || isset($_POST["age"])) {
    echo "Welcome " . htmlspecialchars($_POST['name']) . ". <br />";
    echo "You are " . htmlspecialchars($_POST['age']). " years old.";
}
?>
```

HTML ESCAPING & DATA VALIDATION

HTML Escaping: Motivation

- Suppose we run this PHP script:

```
<form method="get">
    Enter your name: <input type="text" name="name" />
    <input type="submit" />
</form>

<?php
if (isset($_GET["name"]))
   echo "Hello, " . $_GET["name"];
?>
```

- What if we enter the following in the input field?

```
<script>alert('hi')</script>
```

HTML Escaping: htmlspecialchars()

- **htmlspecialchars(string)**
  - Converts HTML special characters to entities: **&** **"** **'** **<** and **>** become **&** **&quote;** **'** **<** and **>**

```
<form method="get">
    Enter your name: <input type="text" name="name" />
    <input type="submit" />
</form>

<?php
if (isset($_GET["name"]))
   echo "Hello, " . htmlspecialchars($_GET["name"]);
?>
```

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Principles of HTML Escaping

- How and when the HTML escape?
  - HTML escaping should be performed on all data printed in an HTML page, that could contain HTML special chars
  - Any other behavior is incorrect!
- Never escape data when you read it!
  - Escape the data when you print it in a HTML page
- Never store HTML-escaped data in the database!
- Never perform double HTML escaping

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Example of Correct HTML Escaping

- Sample form that can submit HTML special characters:

```
<form method="get">
  Name: <input type="text" name="name" value="&lt;br&gt;" />
  <input type="submit" />
</form>
```

- Example of **correct** HTML escaping (data only!):

```
<?php
if (isset($_GET["name"]))
   echo "Hi, <i>" . htmlspecialchars($_GET["name"] . "</i>");
?>
```

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Example of Incorrect HTML Escaping

- Sample form that can submit HTML special characters:

```
<form method="get">
  Name: <input type="text" name="name" value="&lt;br&gt;" />
  <input type="submit" />
</form>
```

- Example of incorrect HTML escaping (don't escape everything):

```
<?php
if (isset($_GET["name"]))
   echo htmlspecialchars("Hi, <i>" . $_GET["name"] . "</i>");
?>
```

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Data Normalization

- **addcslashes()** – escapes given list of characters in a string

```
echo addcslashes("say('hi')", ';|<>\'"');
// Result: say(\'hi\')
```

- **quotemeta()** – escapes the symbols **. \ + * ? [^] ($)**
- **htmlspecialchars()** – convert special characters to HTML entities, as seen in examples
- **htmlentities()** – escapes all HTML entities (**£** → **£**)
  - Escapes special symbols in a string: **&**, **"**, **'**, **<**, **>**

```
echo htmlentities("A '£' is <b>bold</b>");
// Outputs: A '&pound;' is &lt;b&gt;bold&lt;/b&gt;
```

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PHP Automatic Escaping Engine - WARNING!

- PHP supported the **`magic_quotes`** engine
  - It escapes all necessary characters in the **`$_GET`**, **`$_POST`** and **`$_COOKIE`** array automatically
  - In versions before 5.2 it is turned on by default
  - Considered dangerous approach - deprecated in PHP 5.4
  - **DO NOT USE IT!!!**
  - Developers should handle escaping manually

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Validating User Input

- Data validation ensures the data we collect is correct
  - May be performed by **`filter_var()`** in PHP

```
<?php
$ip_a = '127.0.0.1';
$ip_b = '42.42';
if (filter_var($ip_a, FILTER_VALIDATE_IP)) {
    echo "This (ip_a) IP address is considered valid.";
}
if (filter_var($ip_b , FILTER_VALIDATE_IP)) {
    echo "This (ip_b) IP address is considered valid.";
}
?>
```

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Validating User Input (2)

```
<form>
    <input type="text" name="num" />
    <input type="submit" />
</form>
<?php
if (isset($_GET['num'])) {
    $num = intval($_GET['num']);
    if ($num < 1 || $num > 100) {
        echo "Please enter an integer number in range [1..100].";
        die;
    }
    echo "You entered valid number: $num.";
}
?>
```

HTML ESCAPING & DATA VALIDATION

Live Demo

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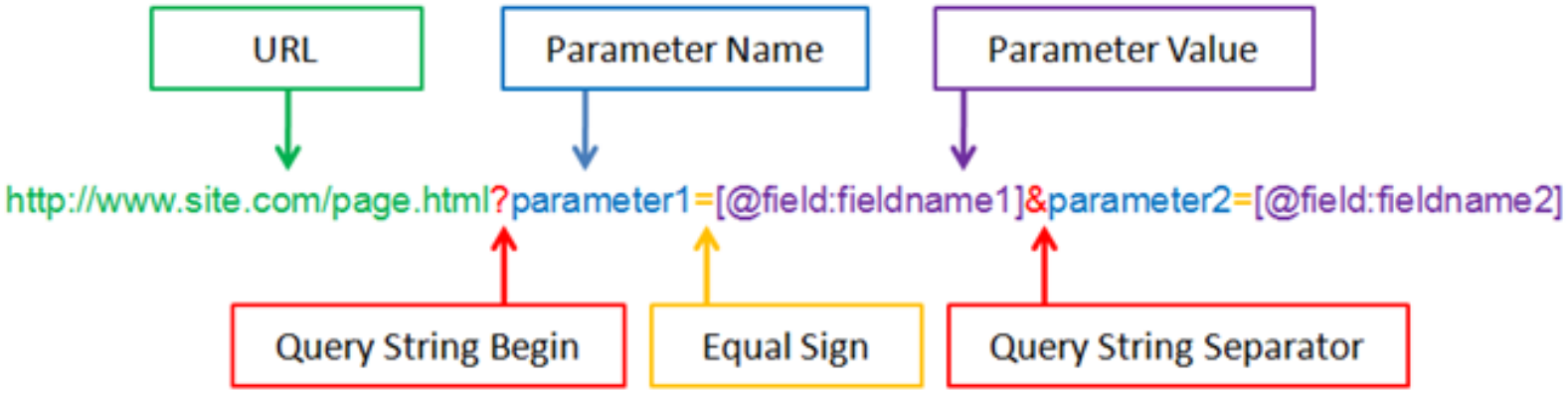
QUERY STRING



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What is a Query String?

- A query string is a part of a **URL** following a question mark (**?**)
- Commonly used in searches and dynamic pages
- Accessed by **$_SERVER['QUERY_STRING']**

```
<form>
    <input type="text" name="firstName" />
    <input type="submit" />
</form>
<?php
echo $_SERVER['QUERY_STRING'];
?>
```

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Creating a Query String

- Most common way is by using a form with a **`GET`** method
- You can also use scripts to add to the query string or simply write your links with the query strings in the **`href`** attribute

WORKING WITH CHECKBOXES

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Checkoxes

- Checkboxes are created by setting an input with type "checkbox"

```
<input type="checkbox" name="two-way-ticket" />
```

- A checkbox is only submitted if it's actually checked

```
if (isset($_GET['two-way-ticket']) ) {
   echo "Two-way ticket";
} else {
   echo "One-way ticket";
}
```

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HIDDEN FIELDS

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Hidden Fields

- Created by setting the type of input to hidden
- Submit information that is not entered by the user
- Not visible to the user, but visible with [F12]

```
<form method="post">
    <input type="text" name="user" />
    <input type="submit" />
    <?php if (isset($_POST['user'])) { ?>
    <input type="hidden" name="hiddenName"
        value="<?php echo sha1($_POST['user']) ?>" />
    <?php } ?>
</form>
```

Applies sha1 hashing to a string

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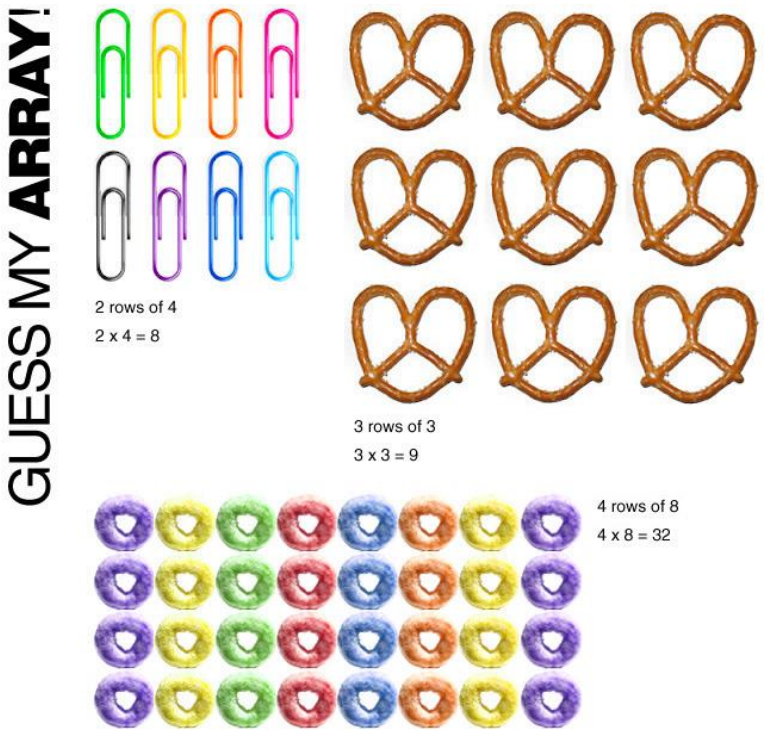

SUBMITTING ARRAYS

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Submitting Arrays

- In order for an input to be treated as an array, you must put brackets "**[ ]**" in the **name** attribute:

```
<form method="post">
    <select name="people[]" multiple="multiple">
        <option value="Mario">Mario</option>
        <option value="Svetlin">Svetlin</option>
        <option value="Teodor">Teodor</option>
    </select>
    <input type="submit" value="submit"/>
</form>
```

Submitting Arrays (2)

- The selected form elements come as an array:

```
<?php
if (isset($_POST['people'])) {
    foreach($_POST['people'] as $person) {
        echo htmlspecialchars($person) . '</br>';
    }
}
?>
```

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OTHER INPUT TYPES

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Other Input Types

- Radio, date, datetime, time, number, range, color, …

```
<form method="post">
    Male <input type="radio" name="gender" value="male" /> <br/>
    Female <input type="radio" name="gender" value="female" /> <br/>
    <input type="submit" value="submit"/>
</form>
<?php
if (isset($_POST['gender'])) {
    $selected_radio = $_POST['gender'];
    echo "Selected: $selected_radio";
}
?>
```

REDIRECTING THE BROWSER

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Redirecting the Browser

- Done by using the HTTP "**Location**" header

```
header('Location: http://greenwich.edu.vn');
```

- This sends HTTP 302 "Found" in the HTTP response status code
  - Tells the browser to open a new URL

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Summary

- HTTP request methods – **GET**, **POST**, etc.
- Normalization and validation
- Working with query strings
- You can easily combine **PHP** and **HTML**
- You can get input as array
- Special input fields – checkboxes, hidden fields