INFORMATICS

Web technologies

Contents

1. HTML

HTML or **HyperText Mark-up Language** is a tool for creating web pages - the current version - HTML5 (HTML 5.2). This language is standardized by the W3C RGANISATION s.

Consists of   tag (s) and attribute (s).

HTML viewing takes place using a browser, that is in   several steps (= parsing).

- The browser retrieves the document and performs DTD syntax analysis
- Each element is assigned a style (display mode)
- Apply script scripting code
- Step-by-step rendering of the page

We design HTML tags by relevance to:

- Structural structures that help structure the document. Example: Paragraph (< p >), headings (< h1 > , < h2 > ...) ...
- Descriptive (semantic), describing the nature of the content of the element , eg: Title (< title >), address (< address >) ...
- Stylistic , which determines the appearance of an element when viewed, for example: Bold (< b >), italic (< i >), highlight (< strong >) ...

Each HTML document should follow the **basic schema**:

At the beginning is the DTD directive, the document type declaration:

```
<! DOCTYPE html >
```

Follows to the element:

```
< html > </ html >
```

A document's desk (Includes meta data):

```
< head >

    <meta charset = "utf-8"> - Encoding
    < title > Page title </ title >
```

Author, description, keywords, cascading styles…

```
</ head >
```

Behind the header follows the body of the document, which summarizes the content of the page as text, images, links, tables…

```
<body> </ body>
```

To write HTML, it is advisable to use a text editor that guides the colour syntax (colour coding for individual parts of the code - tags, properties, plain text) , d telling the marker, knowing the tabs, or managing to validate the document according to the prescribed specification.

For example: Notepad ++, PSPad…

Alternatively, you can use WISIWYG (What You See Is What You Get) editors that directly link to the finished page . The user does not need to know HTML - folds and page editor generates the appropriate code.

For example: Adobe Dreamweaver, Microsoft Expression Web, LibreOffice Writer / Web, Bluegrifon

2. CSS - CASCADING STYLES

CSS is a language for describing how elements are displayed on pages written in HTML, XHTML, or XML, developed and standardized by W3C. The current version is CSS 3.

CSS can be connected to HTML code in several ways:

- In html page code using element u < style > </ style>

```
<style = "text/css ">
  # head {
      width : 200px;
      height : 450px;
  }
</style>
```

- Help with external file - element <link>

```
<head>
  <link rel = 'style sheet' href = 'styles.css'
  type = 'text/css '>
<head>
```

- Direct inline style enrolment using the attribute   style

```
<p style = " color : red ; text- decoration : underline ">
This paragraph will be red and underlined. </ p>
```

PHP language is composed of Rules where each rule contains a selector and a block of declarations. Each block of declarations then contains individual declarations separated by a semicolon. Each declaration consists of property identifier, colons, and values. It can still be tagged! importatn , which increases the force of the declaration.

Why use CSS instead of HTML formatting?

CSS offers:

- more formatting options that HTML does not offer - for example : determining the distance of elements from the page margins .
- Easier to edit your appearance - change the colour of all headlines at once, change the font, ...
- Possibility to create a template for multiple pages at once
- Separation of structure and style - in HTML content, in CSS appearance

- Caching styles - Faster page retrieval (but extra one HTTP request to load an external file)
- Dynamic changes to CSS properties using JavaScript
- With CSS, any XML language can be formatted
- Display settings for individual devices - conditional CSS

The end user can write his own CSS style for any page - you can set all the links on each site to be always underlined, or that the font is always black on that particular site.

Combined with JavaScript, effective bookmarks can be created that can improve the appearance of the page. For example, remove all background images; change the background to white and the font to black, etc.

WITH   CSS also have some drawbacks. The main thing is that there is always enough support in most browsers or bugs in   implementation of CSS in browsers. This can be done by using different styles for different browsers.

Conditional comments can be used to set different browsers

```
<! - [ if IE]> <style = "text / css "> #
alert { color : blue; } </ style> <! [ endif ] ->
```

This code will only be interpreted by Internet Explorer, other browsers will see a common HTML comment and will not interpret the internal style sheet.

I CSS has some limits.

- CSS selectors do not provide access to parent elements
- For example, you cannot just strike those paragraphs that contain a link.
- Horizontal control of the elements on the page is intuitive and simple, while vertical styling requires a more comprehensive approach (eg: flexbox or grid).
- CSS does not provide the option to symbolically write variables or constants
- All values must be written directly into the code.
  - For example, if the same colour is used in multiple locations, symbolic entry color = red; and then just write the colour variable, the red value must be entered everywhere. This limitation removes CSS pre-processors (like SASS, LESS, Stylus).
- CSS2 does not offer any option for creating circular frames or other round objects. Works only with rectangles.
- CSS2 does not offer any option to assign multiple background images to one element.

3. CSS II

You need to clarify what CSS offers and defines.

CSS Version 1 introduces the syntax used in i   The following versions offer a way to select elements through selectors, multiple pseudo-classes, and define values and their units.

Categories for which CSS 1 defines values and units:

- font properties
- text colours and backgrounds
- text properties
- properties of block elements
- how to display elements
- position management

Values and units:

A decimal point is used for decimal values

Length units

- (none) - for dimensionless properties (e.g., line- height)
- % - Percent, unit relative to the implicit dimension, written without space
- pt - typographic point, default unit is 1/72 inch
- px - 0.75 pt
- PC - pica, 1 PC = 12 pt
- cm - centimeter
- mm - millimeter
- in -
- em - square , is equal to the base font height
- ex - the height of the letter "x" is relative to the font used

Colors in CSS are entered using the RGB palette and this:

- Either numerically # rrggbb - two-digit hexadecimal value (00 to ff) - 16 million colours
- # rgb - Hexadecimal single-digit (0 to f) - 4,096 colours.
- As a safe colour, which is an even smaller subset of colours: These are single-digit colours whose values increase by 3 - combinations of six values {0, 3, 6, 9, C, F} = 216 colours.
- rgb (r, g, b) - in decimal (0 to 255) and syntax as a function - 16 million colours
- rgb (r%, g%, b %) - values in the range (0 to 100)

Alternatively, you can use predefined constants text based names named colours. E.g. aqua (bright blue-green), black (black) = # 000, Blue, fuchsia (aniline red), gray, green, lime, maroon, navy, olive, purple, red, silver , teal , white (white) = #FFF, yellow. In CSS version 4.0, 148 colours are named.

Font in CSS 1 has its attributes.

- font-style: normal, italic (italic), oblique (inclined roman)
- font- size : medium; smaller sizes: xx-small , x- small , small ; bigger size: large , x-large , xx-large , smaller , larger , size in percent 100% is the standard size
- font- weight: boldness: normal, bold, bolder, thicker, you can enter the number: 100, 200 ... 900 (400 = normal, 700 = bold)
- font-variant: small-caps , normal
- font- decoration: underline (underlined), overline (overlined), blink (blinking), line-through (strikethrough) None (standard)

CSS 1 also introduces common types of fonts

- serif - classical font (eg Times New Roman)
- sans -serif - sans serif (eg Helvetica or Arial)
- cursive - italic
- fantasy - decorative font
- monospace – Non-proportional font (eg Courier)

Next, CSS 1 defines the URL element so that:

- construction   url (), where the source address is specified between brackets Absolute: url (http://www.example.com/ images / logo.png)
- Relative to server: url (/ images / logo.jpg)
- Relative to the current directory: url (images /logo.jpg)

If the URL contains commas, spaces, quotes, or the end of a bracket, these characters can be   escape   using a backslash.

Then Selectors:

- Type Selector: A - All Type A Elements
- Class selector: A. class - All elements A with attribute class = "class"
- ID selector: A # ID - All elements with ID
- Follower selector: AB - All B elements inside A

The definition of CCS 2 has brought further definitions:

- outline   - outer borders
- max-height , max-width , min- height , min- width   - Minimum and maximum width or height of the element

- content - adjustable element content
- counter - Chapter numbering tool
- quotes - Quote style
- clip - trimming
- cursor - cursor over the element
- position - possibility to position an element in a row, in a block, absolute, relative, …
- top, bottom , right , left Marginal values for position: absolute ;
- overflow - Overflow view
- visibility - visibility of the elements
- z-index - Overlap possibilities
- page-break , orphans , widows - typographic rules for page breaks
- Table-layout, border-collapse, border-spacing, caption-side, empty-cells - New options for viewing tables
- Direction - writing direction

CSS 2 allows you to use new types of selectors:

- Universal: * - Applies to all elements
- Child Selector: A> B - takes into account only those elements B that are nested to A directly
- A sibling selector: A + B - selects all B elements that have the same parent as A and which follow it directly

It also defines selectors using attributes:

- A [attr] - all elements A that have an attr attribute set
- A [attr = value] - all elements A that have the attribute attr = "value"
- A [attr ~ = value] - all elements A with an attr attribute whose value is a list of words separated by a space and just one of these words is the same as "value"
- A [attr | = value] - all the elements A whose value of the attr attribute begins with the "value" string, then the hyphen and the next string

It also introduces a pseudo-element and pseudo- classes system .

- Pseudoelements
  - First line - : first- line
  - First letter (initials) - : first-letter
  - Before - : before
  - For - : after
- Language pseudo-class
  - : lang
- Parental pseudo-class

- Pseudo-Class Links
  - Unvisited link - : link
  - Visited Link - : visited
  - Focused Link - : focus
  - Mouse Link - : hover
  - Active Link - : active

For everything to work properly, order of definitions need to be followed. Each pseudo-class has another priority.

Finally, the latest version of CSS3 that is connected to HTML5 offers:

- Animation - CSS3 directly supports the animation of elements (their properties), animations have been done through   DHTML, e.g.   jQuery
- additional options for styling backgrounds for block elements, including cropping backgrounds, drop shadows, or rounded edges
- additional rules for overflowing the contents of block elements
- opacity - the degree of opacity of the elements
- additional support for paged content - bookmarks and text splitting options
- flexible block elements
- destination links - how and where to open
- properties for   drag'n'drop
- additional attributes for fonts - retrieving fonts from an external source, size adjustment at low readability, font narrowing / scaling
- properties for the generated content - content shortening with expandability, moving elements further on the page
- grids (not yet implemented)
- new features for marquee
- automatic multi-column   layout
- Ruby's new features
- properties for read text
- 2D and 3D transformations
- features that work with navigation
- user-defined properties

4. JAVASCRIPT

JavaScript is a programming language used on web pages, written directly into HTML code and belongs to client scripts (performed on client side)

JavaScript is:

- interpreted - does not need to be compiled
- Object - uses browser objects and built-in objects
- browser-dependent - works in most browsers
- case sensitive - depends on the font size in the entry
- syntax similar to C, Java, and so on

FROM the essence of JavaScript it has certain limitations:

- It only works in the browser.
- The user can disable JavaScript
- There are different versions of language and browsers, which leads to frequent errors.
- Cannot access files (except cookies) or any system objects.
- Cannot save any data (except cookies).

Nevertheless, JavaScript is widely used and can often be used as a built-in scripting language for many applications.

It can be found in:

- Most extensions for web browsers
- Some NoSQL a dataset like MongoDB or CouchDB they accept queries written in JavaScript.
- Adobe - Acrobat and Adobe Reader, tools in Adobe Creative Suite (Photoshop, Illustrator, Dreamweaver, and InDesign)
- Office suite of applications OpenOffice allows JavaScript to be used as a scripting language.
- Interactive processing of the Max / MSP music signal
- The Apple Logic Pro X audio workstation digital software allows you to create custom MIDI effect plug-ins using JavaScript.
- ECMAScript (JavaScript) was included in the VRML97 VRML scripting standard.
- Game engine Unity 3D supports a modified version of JavaScript for scripting using Mono.
- DX Studio (3D engine) uses JavaScript implementation SpiderMonkey for games and simulation of logic.
- Maxwell Render provides the ECMA scripting engine for task automation.

- Google Apps Script on Google Tables and Google Sites allows users to create custom formulas, automate recurring tasks and also communicate with other products Google as Gmail.
- SpinetiX products use SpiderMonkey JavaScript for scripting in SVG files.

Javascript can also be used as a scripting engine:

- Active Technology Scripting from   Microsoft
- Programming language   Java   in the 6th version presented the package   javax.script
- Tool   Qt   C ++ includes a module   QtScript that interprets **JavaScript**   as well as a Java package   javax.script.

JavaScript can be written to HTML in several ways similar to CSS.

Tag < script > can be used to write the script directly into the HTML stream.

```
< script >
  alert ('Head Up, Worse!');
</ script >
```

Or attach an external script file.

```
< script src = "externi_skript.js"> </ script >
```

Another option is in-line enrolment

```
<P> <A href ="#" onClick =" alert('Hello');">
Click Me </a> </ p>
```

However, the combined use is most often used. External script defines functions, normal writing (using the <script>) variables are initialized and start functions and inline scripts call functions according to events depending on the user's responses.

JavaScript is used on web sites primarily for   Booting a page - distinguishing browsers, entering menus from a file, declaring functions, document.write () , or acting as a user   an event such as passing a mouse element, clicking, resizing a window, filling in a form ...

5.JAVASCRIPT - CONTINUED

JavaScript is an object-oriented programming language. It therefore supports the classic object model.

- object.method () - call method (function), command that does something
- object.property - refers to the property of a given object, it has value but does nothing
- object.subobject - reference to a nested object

JavaScript has access

- To Browser Object Objects (Window Class)
- To the elements of the page
- To Math and Date objects , string
- To created objects

Class Window (Window object) is the pinnacle of the hierarchy of objects (classes). Its sub-divisions are:

- location - the address of the loaded document
- history - Browsing history
- navigator - Information about the version and browser type
- screen - screen properties (width, height, color)
- frames - work with frames (frame , frameset)
- event - mouse events, keyboard
- document - pictures, forms, links, colors, individual HTML elements ...

The most widely used class is the document class that allows you to manipulate   HTML (and other type) document.

Its most important methods are:

- document.images
- document.forms
- document.applets
- document.links
- document.anchors
- document.all
- document.frames
- document.styleSheets
- document.scripts
- document.selection
- document.getElementById()

- document.getElementsByTagName()

The Math class is used to use higher math.

Contains the following methods:

- abs (x)
- exp (x)
- log (x)
- max (x, y)
- min (x, y)
- pow (a, x)
- random ()
- sqrt (x)
- ceil (x)
- floor (x)
- round (x)
- acos (x)
- asin (x)
- atan (x)
- atan2 (x, y)
- cos (x)
- sin (x)
- tan (x)
- Math.E
- Math.LN10
- Math.LN2
- Math.LOG10E
- Math.LOG2E
- Math.PI
- Math.SQRT2
- Math.SQRT1_2 - square root of 1/2

The Date class is used to work with   date and time (creating different countdowns, calendars …)

Main Methods of the Date Class :

- get / setFullYear ()
- get / setMonth ()
- get / setDate ()
- get / setDay ()
- get / setHours ()
- get / setMinutes ()

- get / setSeconds ()
- get / setMilliseconds ()
- get / setTime ()

The String class works with   text strings. You can apply a length property to text strings that returns the string length.

Main methods for working with   the strings are:

- toUpperCase ()
- toLowerCase ()
- toString ()
- charAt (n)
- charCodeAt (n)
- substring (a, b)
- substr (a, b)
- concat(string1, string2, stringN)
- fromCharCode(code1,code2,…, codeN)
- indexOf (substring)
- lastIndexOf (substring)
- split (separator)

6.XML AND JSON

XML or eXtensible Mark up Language is a markup language with tandardizovaný W3C. XML can be described as the Standards of format for the exchange of information with international support andinformation m m High High content em. It can easily be converted to other formats, there is an automatic document structure check and supports hypertext and links.

XML efficiency is strongly dependent on the structure, with a poorly designed structure, the XML document is unreadable and inefficient.

Each XML document

- Must have exactly one root (root) element.
- Non-empty elements must be bounded by the start and stop marks. Empty elements may be marked as "empty element".
- All attribute values must be enclosed in quotation marks - single (') or double ('). The opposite pair of quotation marks can be used inside the values.
- Elements can be nested but can not overlap; that is, each (non-root) element must be completely contained in another element.

XML example

<? xml version = "1.0" encoding = "UTF-8"?> XML declaration

< directory >   Root element

< person >   Nested element 1

< name > Adam < / name >   Nested Element 1.1

< phone > 777 777 777 < / phone >   Nested element 1.2

< email > adam@adam.com < / email >   Nested element 1.3

< / person >   Exiting the nested element 1

< person >   Nested element 2

< name > Bara < / name >   Nested element 2.1

< phone > 666 999 666 < / phone >   Nested element 2.2

< email > bara@bara.com < / email > Nested Element 2.3

< / person >   Exiting nested element 2

< / directory >   Exiting the root element

Json - JavaScript Object Notation - is a lightweight format for data exchange, simply readable and writable by a person, written in text format and completely independent of language.

It is composed of two structures:

- Pair Collection - Name / Value
    - Realization: Object , Record , Struct , Dictionary , Hash table, Keyed List, Asociative array
- Assigned list of values
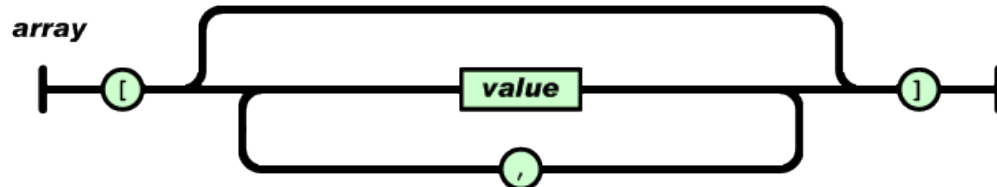   - Realization: array , vector , list, sequence

Object - Unordered Set of Pairs Name / Value
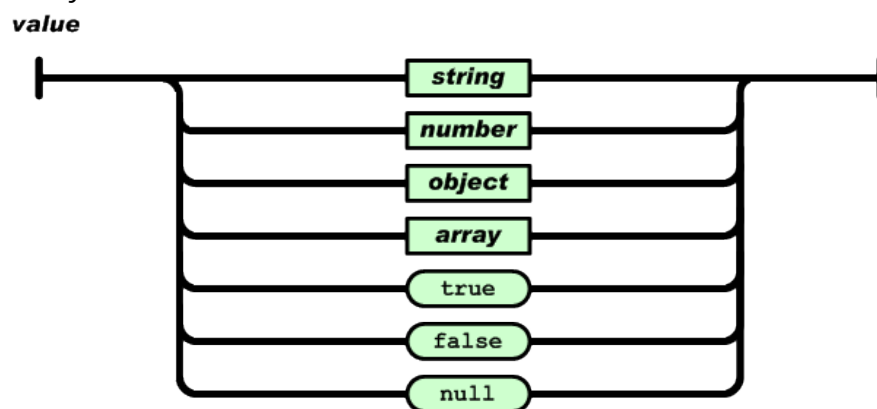
Write: {name1: value1, name2: value2}
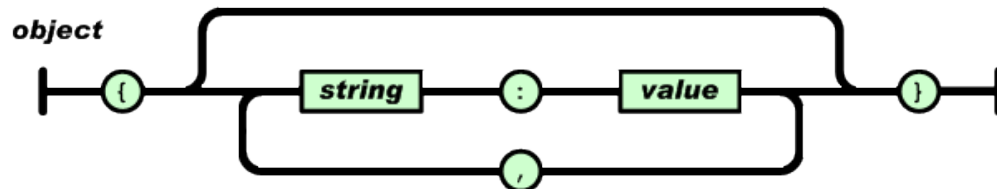
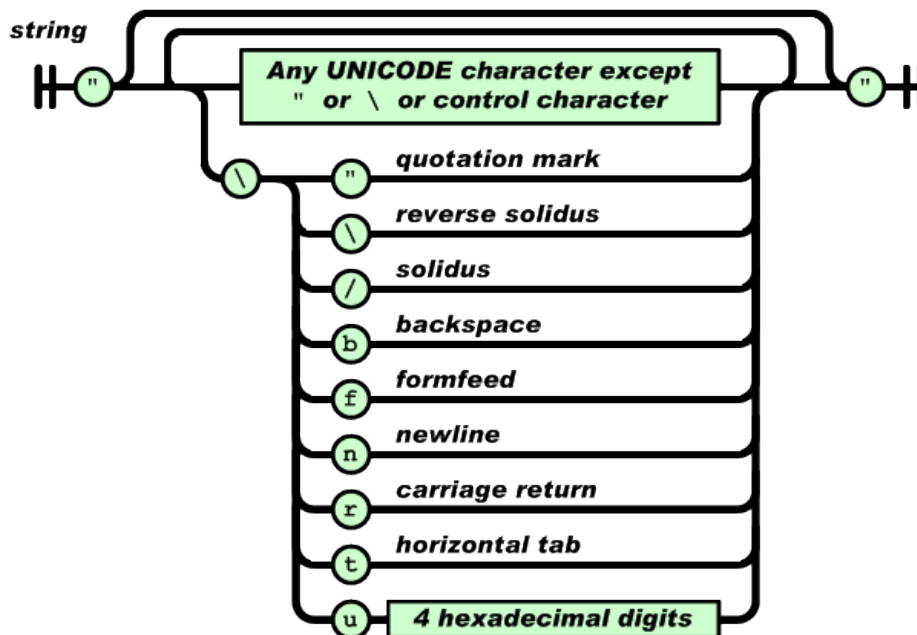Array - Ordered Value Collection

Writing: [value1, value2, value3]

Value - a string enclosed in double quotation marks, number, true , false , null , object, or array. These structures can be nested
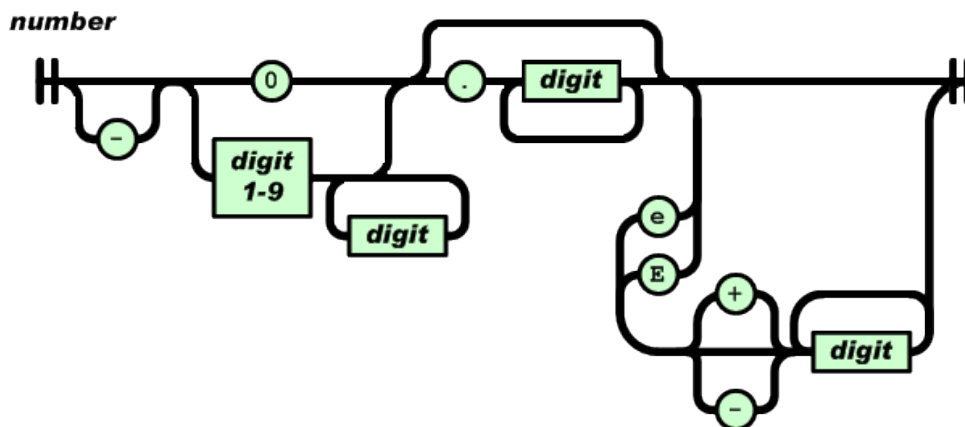
String - zero or more Unicode characters, enclosed in double quotes and using escape sequence using a backslash.

Character - String with a single character

A number - similar to C and Java numbers - does not use octal or hexadecimal entries

7.SERVER PARTS OF WEB TECHNOLO-GIES

First you need to say what a web server is.

As web server you can designate a computer that is responsible for handling HTTP (S) requests from clients (most often web browsers). By fulfilling the requirements is meant sending a specified URL destination (typically a web page, but also a static text, image, or other file). Web pages are usually HTML documents. Or a computer program that performs the activities described above (a daemon).

HTTP is an Internet protocol designed to exchange hypertext documents in HTML format , uses the so-called Uniform Resource Locator (URL), which specifies the unambiguous location of a source in Internet . HTTP does not allow encryption or data integrity security, HTTPS serves it.

HTTPS is a protocol that enables secure communication on a computer network , uses HTTP along with SSL or TLS .

HTTPS benefits are

- authentication
- confidentiality of transmitted data
- integrity of content
- the ability to use the HTTP/2 protocol
- Google search favours

Disadvantages:

- decrease in performance on older hardware
- the need for a certificate and its renewal
- does not allow blocking specific URLs only to block the entire site
- slightly more complicated web server configuration
- possible complications with older web browsers

Each web server is connected to a computer network and receives HTTP requests. Requirements handle and the computer returns a response, usually an HTML document. (or text, image , etc.) . The server response is in the HTTP format, with a header containing the status code followed by the content itself.

Web server replies (status code)

- 2xx - successfully completing the request
- 3xx - redirect problems
- 4xx - errors related to request handling (page not available, etc.)

- 5xx - internal server errors

Source of Server information can be:

- Static content - pre-prepared data files (HTML pages), significantly faster than dynamic.
- Dynamic Content - Based on the request, data is collected (read from a file, database, or some end device), formatted and ready for presentation in HTML format and provided to a web browser
- Dynamic Content Creation - A variety of technologies (Perl, PHP, ASP, ASP.NET , JSP, Python, etc.) can provide much more information and can respond to various "ad hoc" queries

In practice, both approaches are combined - caching, node.js, ...

In real-time traffic, the Web server may be overloaded.

Overload symptoms:

- slow server response (from units to hundreds)
- Errors 500, 502, 503, 504
- The TCP connection is forced to restart before the answer arrives
- the server sends incomplete content (this behaviour is mostly caused by an error)

Reasons for overload:

- Classic overload (too many people join at the same time but not for attack)
- DDoS Attack, A computer virus that attacks many computers and forces them to connect
- Internet boot
- Overloading physical network
- Content is spread over multiple servers and none of them available. All queries must be served by only one server

Techniques to avoid overload:

- network traffic control using firewalls, HTTP traffic managers and traffic shaping
- using web caches
- using different domain names for static and dynamic queries
- use of different domain names and / or computers to separate large files so that the small ones can be stored in cache
- using multiple web servers on one computer, each with a custom network card
- using multiple computers connected together and outward looking like one big server
- adding more hardware (RAM, CPU)
- tuning the used software

8. SERVER PARTS OF WEB TECHNOLO-GIES II

There are several types of web servers. The most common are:

- Apache HTTP server
- IIS - Internet Information Service
- nginx
- GWS - Google Web Server

Apache HTTP server is open source software web server for GNU / Linux, BSD, Solaris, Mac OS X, Microsoft Windows and other platforms.

It supports a wide range of functions - compiled modules expanding core programming languages on the server side (Perl, Python, Tcl, PHP ...), various authentication schemes (mod_access, mod_auth, mod_digest and mod_auth_digest), support for SSL, TLS (mod_ssl), a proxy (mod_proxy), URL rewriter known as rewrite engine from mod_rewrite, configuration of log files (mod_log_config) and filtering (mod_include and mod_ext_filter)

Includes an external data compression module (mod_gzip), an open source module for protecting and preventing web applications from attack (mod_security)

Logs can be analyzed using browser and scripts such as AWStats / W3Perl or Visitors.

Support for many graphical environments (GUIs)

Virtual hosting - One Apache installation on one physical computer serves multiple web-sitesIIS - Internet Information Service is a software web server with a collection of expansion modules, created by Microsoft for the Windows operating system .

It supports a number of protocols - HTTP, HTTPS, FTP, FTPS, SMTP and NNTP

Modules for IIS 7.5

- FTP Publishing Service - Publish content securely to IIS 7 servers with SSL authentication and data transfer.
- Administration Pack - Support for managing UI management features in IIS 7, including ASP.NET privileges, custom errors, FastCGI configuration, and request filtering.
- Application Request Routing - Provides a proxy- routing module that passes HTTP requests to content servers based on HTTP header of server variables and alignment algorithms.
- Database Manager - Easily manage local and remote databases within IIS Manager.
- Media Services - Connects the media platform with IIS to manage and manage multimedia and other web content.

- URL Rewrite Module - Provides a rewrite mechanism that changes the URL request before it is processed on a web server.
- WebDAV - Allows site authors to publish content securely on IIS 7 servers.
- Web Deployment Tool - Synchronizes IIS 6.0 and IIS 7 servers. Changes IIS 6.0 to IIS 7

Nginx is a software web server with load Management and Reverse Proxy with Open Source Code. It works with HTTP (and HTTPS), SMTP, POP3, IMAP, and SSL protocols. It focuses primarily on high performance and low memory demands. It is extensible on Unix, Linux and Unix- like systems under BSD, there are variants for Solaris, macOS and MS Windows .

The basic objective of m em Nginx is the fast distribution of static content, the possibility of distributing the load on other servers according to the set priority.

The system allows you to define a backup server to which the Nginx request passes, unless the primary server responds to a specified limit

Inbound requests Nginx processes and processes asynchronously

An incoming HTTP (or HTTPS) request first attempts to search in its cache (it has a configurable size and retention time), if it finds it, it answers straight away . Otherwise, they turn to one of the defined set of servers (each server has a defined priority). If the server is able to answer within a defined time, he / she will reply; otherwise, it turns to the backup server (of course, if defined). The answer, if it can, store in its cache, and subsequent queries to timeout lifetime cache handles being cached.

Possibility to set connection limit from one IP address

Nginx is a modular system

One of the modules - GEO Locations - allows, for example, country to pass requests for defined servers, or to disable access to sites from some countries

Module redirects according to defined rules, password security, gzip compression support, streaming (FLV, MP4)...

9. PHP: HYPERTEXT PRE-PROCESSOR

Programming paradigm of PHP - imperative, object-oriented, procedural, reflective

It was created in 1995 , and his author is Rasmus Lerdorf . The first release was June 8, 1995, and the latest version is 7.2.0 (November 30, 2017)

PHP is characterized by weak and dynamic type control.

The main implementations of PHP are Zend Engine, Phalanger , Quercus , Project Zero , HipHop

PHP is a programming language designed specifically for programming dynamic web sites and web applications. The scripts are done on the server side - the user is transferred to the result of their activity. PHP script interpreters can be called using the command line, HTTP queries or web services. The syntax of language is inspired by several programming languages (Perl, C, Pascal, and Java)

PHP language is platform-independent, the differences in different operating systems are limited to several system-dependent functions, and scripts can usually be transferred between operating systems without any modifications. It supports many libraries for various purposes - eg. Word processing, graphics, file handling, access to most database systems (eg. MySQL, ODBC, Oracle, PostgreSQL, MSSQL), ranks among Internet protocols (HTTP, SMTP, SNMP, FTP, IMAP, POP3, LDAP ...).

PHP is the most widely used scripting language for the web

PHP properties:

- PHP language is dynamically typed - the data type of the variable is bound to a value, not a variable.
- Fields are associative
- Strings can be written in PHP in 2 different ways:
    - to quote the quotes (the evaluation is done by replacing the variables inside)
    - Closing in apostrophes (only the escape sequence \ ' is replaced).
- Variables can be created and disturbed
- Constants can be defined, cannot be deleted
- Variables have their visibility levels and rules for their persistence.
- Supports references that can be used to store references to any other variables or variables in the field

- As a reference, the function parameters can also be called - for each variable, it records how much it is referenced by the reference, and therefore decides when it can cancel the variable.

Advantages:

- PHP is dedicated to websites.
- Extensive set of functions in the PHP basic library (over five and a half thousand), additional features in PECL .
- Native support for many database systems.
- Multiplatform (especially Linux and Microsoft Windows)
- The ability to use native operating system features (possibly incompatibility with another OS)
- Strict learning curve.
- Huge support for hosting services
- A huge number of projects and codes that can be used for free (WordPress , phpBB, and more).
- Relatively decent documentation
- Very free license

Disadvantages:

- PHP language has long been defined only by its implementation, the official language specification was announced at the end of July 2014
- Inconsistent naming of features
    - strpos (), strchr (), but str_replace (), str_pad ().
- Non-uniform nomenclature of function groups
    - mysql_XXXX , imap_XXXX , json_XXXX (with underscore) versus imageXXXX , bcXXXX , gzXXXX (without underscore).
- Non-uniform order of parameters, eg: array_map () vs. array_filter ().
- Although the language supports exceptions, its library is rarely used.
- Weaker Unicode support, only through the PHP library (in versions after PHP 5, the Unicode string should be the basic type).
- In the standard distribution of missing debugging (debugging) tool.
- After processing the request, it does not maintain the context of the application, it always creates it again (weakens performance).

PHP language is not only for small projects and pages; it can be programmed into any application.

Selected major projects in PHP:

- MediaWiki - software for creating wiki web projects,
- phpBB - a package for running a web forum
- WordPress - a publishing system for blogging and similar applications
- Adminer - Web application for managing MySQL database system
- phpMyAdmin - Web application for managing MySQL database system
- Texy! - Intuitive syntax compiler for formatting text to HTML
- Nette Framework - a framework for creating web applications in PHP
- Facebook

10. PHP II - SYNTAX

PHP script can be tagged in HTML in several ways

> <? [PHP code] ?>
>
> <? php [PHP code] ?>
>
> <SCRIPT LANGUAGE = " php "> php [PHP code] </ SCRIPT>

The individual instructions (commands) are separated by a semicolon. Comments are preceded by a double slash or grid. Multi-line comments are written between the forward slash - star slash (// , # , / * multiline text * /)

Types of variables in PHP

- Variables
- Logical type - Boolean - True / False, written as TRUE and FALSE (size does not matter)
- the integer type - Integer - a positive or negative number (a zero) from some -2 to + 2 trillion trillion
- Decimal number - Float , Real - with accuracy to 14 decimal places
- String - String - text strings

The type of variable is determined at the time the value is assigned, during the program the variable can change its type, either through code instruction or as a result of a calculation . Each variable must have a unique name, starting with the dollar sign ($) and without a space followed by a name. The first character of that naming must be either the letter az or the underscore. It cannot be a number or anything else. Variable names distinguish between uppercase and lowercase letters. For assignment, a character equal to (=) is used

PHP allows you to define three types of fields:

- Indexed
- Associative
- Multi-dimensional

These are used as lists, dictionaries simulation and collection of elements. We can work with arrays as stacks or queues, and they can also represent tree structures (a field element may be a field) .

Fields can be returned from PHP (database) functions.

PHP is among the PPE languages.

```
Class ClassName
{
  var $ VariableName
  function Function Name (parameters)
  {
       body function
  }
}
```

Beware of inheritance - PHP does not have private methods (functions).

In addition, PHP allows you to enter and change NONDECLARED attributes!

Many finished libraries and parts of the PHP object code are used, you can only have one "level" of objects without inheritance. An object can exist without methods, with attributes only. But sometimes it is better to use the field. Someone in PHP, for "assigning" each attribute, creates a method or methods. When using objects, it's more than ever that you should think and follow conventions (somebody starts with methods that should not be called by an underscore).

II. WEB APPLICATIONS WORKING WITH DATABASES

How to process a web request into a database?
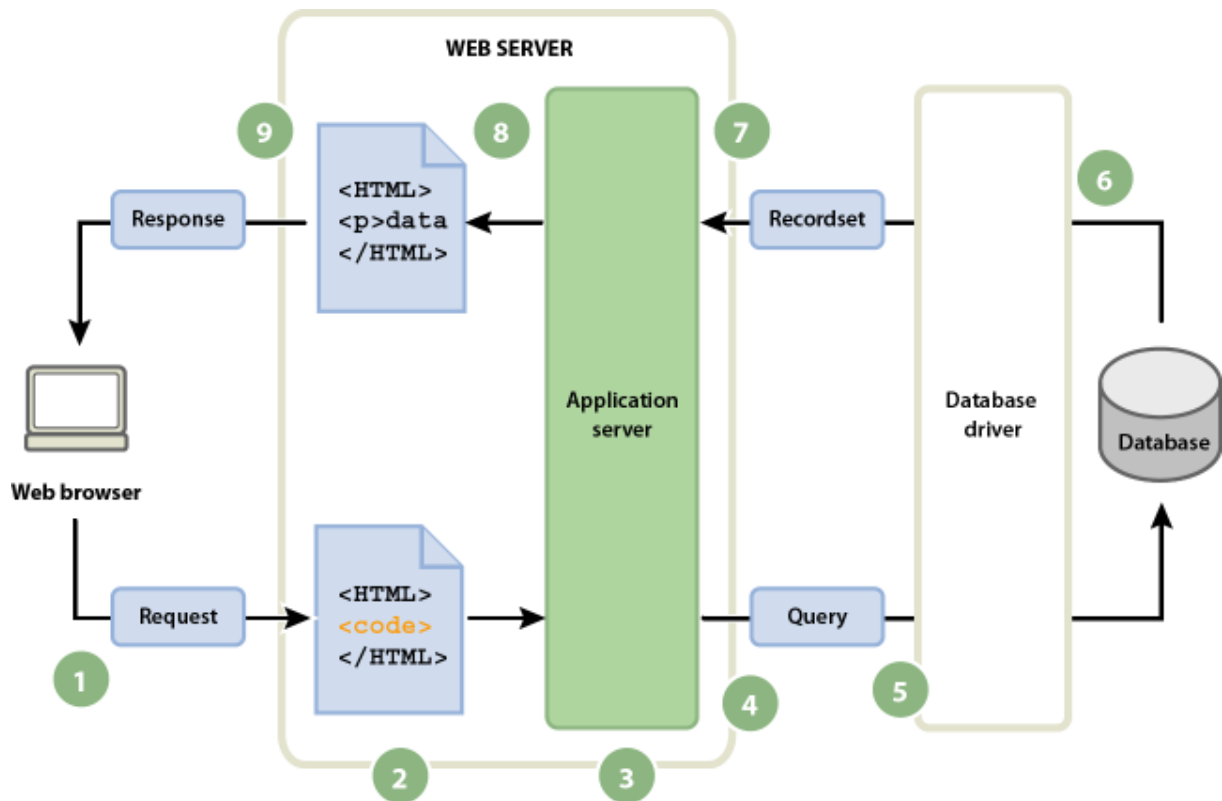
1. Request - request
2. HTML code
3. Application server
4. Query - Query
5. Database driver
6. Output from database
7. Recordset for the server
8. Translate to HTML
9. Answer - Response

The basis for working with the database is SQL.

SQL - Structured Query Language - with a tricky language for working with relational databases

The database is a file system with a fixed record structure, where the files are interconnected using the keys.

Database types

- Hierarchical database
- Network database
- Relational databases
- Object database
- Object-based relational databases

Database Objects

- TABLE - a basic database object used to directly store data in the relational database storage space
- VIEW - a database object that provides the user with a preview of the data contained in the table
- INDEX (KEY) - for speeding up search and query processes, defining a unique value with table peeling, search optimization
- CONSTRAINT - allows you to create restrictions on the conditions that must be met for the values of its columns when inserting or changing records
- TRANSACTION - a group of commands that convert the database from one consistent state to another
- TRIGGER - defines the actions to be performed in the event of a defined event above the database table

SQL Data Handling Commands (DML)

- SELECT - selects data from the database, allows selection of sub-conditions and data sorting.
- INSERT - inserts new data into the database.
- UPDATE - Changes database data (editing).
- MERGE - INSERT and UPDATE combine the data (if there is no corresponding key) if it exists, then modify them in the UPDATE style.
- DELETE - removes data from the database.
- EXPLAIN - a special command that displays the SQL statement processing procedure. Helps the user to optimize commands so they are faster.
- SHOW - a less common command allowing you to view databases, tables or their definitions

SQL commands for data definition language (DDL)

- CREATE - Creating new objects.
- ALTER - Changes to existing objects.
- DROP - removing objects.

SQL commands for data management (DCL)

- GRANT - a command for assigning permissions to the user to certain objects.
- REVOKE - Removal command for user.
- START TRANSACTION - starts the transaction.
- COMMIT - Transaction Confirmation.
- ROLLBACK - Cancels the transaction, returns to the original state.

Keywords SQL for querying

- TOP - returns the first N rows
- LIMIT - Limit the number of lines returned by the SE LECT command
- JOIN (FULL LEFT RIGHT INNER CROSS) ON - combining the result of a SELECT query from two input sets (typically a table to a relational database)
- UNION - Unification of query result from two or more SELECT query input sets
- ORDER BY - sort the entries selected using the SELECT statement
- WHERE - limits the selection of rows from tables using conditions
- GROUP BY - the aggregation of records selected by the SELECT statement
- WITH ROLLUP - with a standard dump, a line with a NULL value appears instead of a column, according to which the data is aggregated (if specified)
- HAVING - allows you to restrict the rows that are processed by the aggregation function

Databases and database servers

- Microsoft Access
- MySQL
- Oracle
- Microsoft SQL Server
- SQLite

12. DOM - DOCUMENT OBJECT MODEL

DOM is the Document Object Model, API (application programming interface) that defines a common standard for accessing any valid HTML document or a properly structured XML document is entirely independent of the programming language

Using DOM, it is possible to handle individual elements (objects) using JavaScript.

DOM definitions describe individual levels

- **Level 0**

  o Intermediate DOM support that existed prior to creating DOM Level 1. For example, DHTML Object Model developed by Microsoft, or Netscape's un-named Intermediate DOM . Level 0 is not a formal specification published by W3C, but is used as a comprehensible abbreviation referring to things existing before the standardization process.

- **Level 1**

  o Navigate in the DOM (HTML and XML) of the document (or its tree structure) and manipulate the content (including adding elements). Specific HTML elements are also included.

- **Level 2**

  o Support for namespaces, events, and filtered views.

- **Level 3**

  o Standardized loading and storage mechanism and support for XML schemas. Allows dynamic insertion of content into a document and adds new methods and properties.

- **Level 4**

  o Merging the previous standards DOM Level 3 Core, Element Traversal , Selectors API Level 2 DOM Level 3 Events and DOM Level 2 Traversal and Range and simplification approach and existing standards, particularly specifications JavaScript and HTML5. Specifications will also simplify frequent DOM operations.

Basic ideas of DOM are to consider all HTML elements as objects. Then each object has properties - attributes - and can respond to events.

Each object must be identified; it is necessarily for changing the properties or content by using a script. Identification is by id or name.

DOM - Universal Properties and Methods for Crawling and Reading (Usage: Document.Name)

- documentElement - returns the root (root) document element
- getElementsByTagName () - returns the field of all elements of the given name
- parentNode - returns the parent object of the object
- nextSibling - returns the next sibling of the current object if it exists, otherwise it returns null
- previousSibling - returns the previous sibling of the current object if it exists
- firstChild - Returns the child's first child
- lastChild - returns the child's last child
- childNodes [] - returns the array of all objects (nodelists) that are the children of the object
- nodeName - returns the name of the object
- nodeValue - Returns the value (content) of the object
- data - returns the value (content) of the Text object
- className - returns the value of the class attribute (HTML only)
- id - returns the value of the attribute of the object id, which must be an element type, for HTML only
- title - returns the value of the title attribute of the element, HTML only
- item () - specifies a specified object field (nodelist) specified by the index

DOM - Methods for manipulating nodes

- createElement (name) - create a new element
- setAttribute (name, value) - setting the attribute
- createTextNode (value) - Creates a text node
- splitText (division) - splitting the text node into nodes two
- normalize () - Merge sister nodes of the Text type into one node
- appendChild (object) - Adds a child node
- insertBefore (object, object) - 2 parameters - the first is the node to be inserted and the other one is the node to which we will insert
- cloneNode (true | false) - creates a copy of the object
- replaceChild (object, object) - 2 parameters - the first parameter is a node that replaces the node given as the second parameter
- removeChild (Object) - Applies to the parent of the node to be removed
- removeAttribute (name) - Removes the attribute node

DOM can also be used to efficiently create dynamic tables or dynamically modify page formatting using CSS.