

# Fundamentals of Programming for Internet

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#### In this course:

#### You will learn:

- How to create a HTML page.
- How to design pages with CSS.
- How to make them dynamic and functional.
- How to publish your web site.
- How other people will find your site in the Internet.
- How to make websites with ASP.NET

#### Marks and Exams

You will have test on <u>each</u> of the exercises to check what you have learned from the previous classes.

There will be 1 final test at the end of the semester.

At the end of the semester you will get your final result according to the points you have collected in the exercises and tests.



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## Introduction to Web Programming

Lecture 1

# The World Wide Web ("The WEB")

- It is a collection of information stored on the networked computers over the world
- The WWW was proposed in 1991 by Tim Berners-Lee at CERN.



#### Web or Internet?

- They are not the same things.
- The Internet is a collection of computers or networking devices connected together.
  - They have communication between each other.
  - Decentralized design that there is no centralized body controls how the Internet functions.
- The Web is a collection of documents that are interconnected by hyper-links.
  - These documents are accessed by web browsers and provided by web servers.



## The invention

- 1989 Tim Berners Lee proposes at CERN a way to organize information using hyperlinks
- 1990 he develops the first <u>browser</u> "World Wide Web"
- 1991 first web server
- 1993 "Date on the declaration by CERN's directors that WWW technology would be freely usable by anyone, with no fees being payable to CERN. A milestone document."



# History of the web

- 1992-93 web sites of public and organizing entities worldbank.org, whitehouse.gov, ripe.net (manages ip's)
- 1994 Yahoo!
- 1994 the netscape browser
- 1994 World Wide Web Consortium (W3C) the organization concerned with standards on the Web
- 1995 altavista, e-bay, javascript, HTML (<u>http://en.wikipedia.org/wiki/HTML</u>), PHP
- 1996 ASP
- 1997 flash player 2 now on 99% on the computers on the web



# History of the web

- 1998 google
- 1999 microsoft passport (way to login with a single identity on multiple web sites)
- 1999 rss rich site summary get live updates from your favourite sites
- 1999 blogs first appeared
- 2000 XHTML appears
- 2001 wikipedia now the world's largest encyclopedia
- 2004 facebook



#### How the web evolved (Yahoo)

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## How the web evolved (Amazon)

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## Conclusions

- World wide web was first a way to link text documents
- It evolved into
  - Providing different kinds of content (images, video)
  - providing services for people (games, answers, news)
  - Providing means for people to create content (wikis, forums, social networking applications, blogs)
  - Providing services for computers
- The content was first static text pages that were rarely changed and only by the owner
  - Content became dynamic updated from the server's database
  - Content became updated real time (without refreshing the page using asynchronous technologies)
  - Content comes from different sources and it's aggregated on a page
- During this course we'll study the technologies that allowed these changes to happen



# Internet Terminology

#### Client

- Any computer on the network that requests services from another computer on the network.
- Server
  - Any computer that receives requests from client computers, processes and sends the output.
- Web Page
  - Any page that is hosted on the Internet.
- Web Development
  - The process of creating, modifying web pages.



# Web Browser (Web Client)

- It is a program that retrieves information from the Web.
  - Firefox,
  - Internet Explorer,
  - Google Chrome,
  - Opera,
  - Safari





## Web Server

- It is a computer system (or just software) that processes requests via HTTP, the basic network protocol used to distribute information on the World Wide Web.
  - Virtual hosting to serve many web sites using one IP address
  - Large file support to be able to serve files whose size is greater than 2
     GB on 32 bit OS
  - Bandwidth throttling to limit the speed of responses in order to not saturate the network and to be able to serve more clients
  - Server-side scripting to generate dynamic web pages, still keeping web server and website implementations separate from each other
- In-kernel: IIS (Windows), TUX (GNU/Linux)
- User-mode: Apache



# Client – Server architecture

- Clients communicate with a single server
- Server awaits connections
- Client initiates communication
- Server receives a request and sends a response
- Client receives the response and decide whether or not to continue the communication
- Examples: e-mail, DNS, HTTP



**Client - Server** 





## Peer to peer architecture

- There's no server in the network
- The clients are communicating between them
- There are no intermediary entities
- Used primarily in resource sharing
- Examples: napster, kazaa, direct connect, bitTorrent



## Advantages and disadvantages of the Client-Server architecture

- Advantages
  - Many different types of clients, one common protocol
  - Resources are centralized on a server easier to find and to distribute
- Disadvantages
  - Single point of failure (if the server is down the clients don't receive their responses any more)
  - The more clients there are the more crowded the server and the response time is longer



## Some definitions

#### • HTTP

- The HyperText Transfer Protocol
- The language used by a WWW client (e.g. Internet Explorer, Mozilla, Chrome) to request documents from a WWW server (i.e. The program running at Web sites like amazon.com or yahoo.com)



## Some definitions

- HTML
  - The HyperText Markup Language
  - The language used to design web pages



# How things happen?

- User uses HTTP client (Web Browser)
- It has a URL (e.g. http://www.tu-sofia.bg/)
- Makes a request to the server
- Server sends back data (the response)
- User clicks on the client side...





# What is an URL?

- URL = "http:" "//" host [ ":" port ] [ abs\_path [ "?" query ]]
- Examples:
  - http://www.google.com
  - http://www.google.com:80/ig?refresh=1
- The port 80 is default
- Hosts are case insensitive
- Paths are case sensitive
- Some reserved characters are "encoded"
  - Encoding means representing as hex an ASCII code
  - Example: " " = "%20"
  - http://tools.ietf.org/html/rfc2396



- Request line / Status line
  - Example: GET /index.html HTTP/1.1
  - GET=Request Method
- Headers
  - See <u>here</u>
- Empty line
- Optional message body



HTTP Request Methods (most important)

- GET requests a specific resource (can send parameters that alters resources but it's better not to)
- POST submits data (usually a form) to be processed
- PUT uploads a specific resource
- HEAD identical to a GET resource but receives only the headers
- DELETE deletes a specific resource



## HTML Characteristics

- Just a Text File!
  - Portable
  - Human Readable/Writable
- Defines the Structure (not Appearance) of the Document
  - Client (Browser) defines the appearance
    - Font preferences, window width, ...
  - Pours into Browser (PDAs, Bigger/Smaller)



## **Document Structure**

#### <html>

- <head><title>My First Web Page</title>
- </head>
- <body bgcolor="red">
- A Paragraph of Text.
- </body>
- </html>



## Nested Tags

- Like a tree, each element is contained inside a parent element
- Each element may have any number of attributes





#### **Basic Tags**

- <html>
- <head><title>My First Web Page</title>
- </head>
- <body bgcolor="red">
- A Paragraph of Text.
- </body>
- </html>



## **Basic Tags**

 <!doctype html public "-//w3c//dtd html 4.0 transitional//en">

Preamble which identifies content as HTML

• <h1>...</h1>

- H1-6 where larger number means smaller heading

• ...

– Includes vertical whitespace unlike <br />



## **Basic Tags**

- <hr />
- <br />
- <b>...</b>
- <i>...</i>

horizontal line new line bold italicize text in between



#### Lists

- Unordered Lists
  - Apples Oranges
- Ordered Lists

  - One
  - Two
- Can be nested

#### Example

- Apples
  - 1. Fuji
  - 2. Granny Smith
- Oranges



## Image Files

- <img src="URL of image file" />
- JPEG
  - Best for photos
  - Public standard
- GIF
  - Best for simple images
  - Older standard
- PNG Portable Network Graphics
  - Public standard replacement for GIF
- SVG Scalable Vector Graphics
  - Series of drawing commands
  - Uses XML

 16.10.2014
 - Today

 14:00 h
 - After this lecture

 Hall 12602
 - After this lecture

*"Future of IT technologies in 2020"* Lecture by Pat Gelsinger, Chief Executive Officer of VMWare



#### **Questions?**

# Thank you for your attention!

