Web Systems & Technologies: An Introduction

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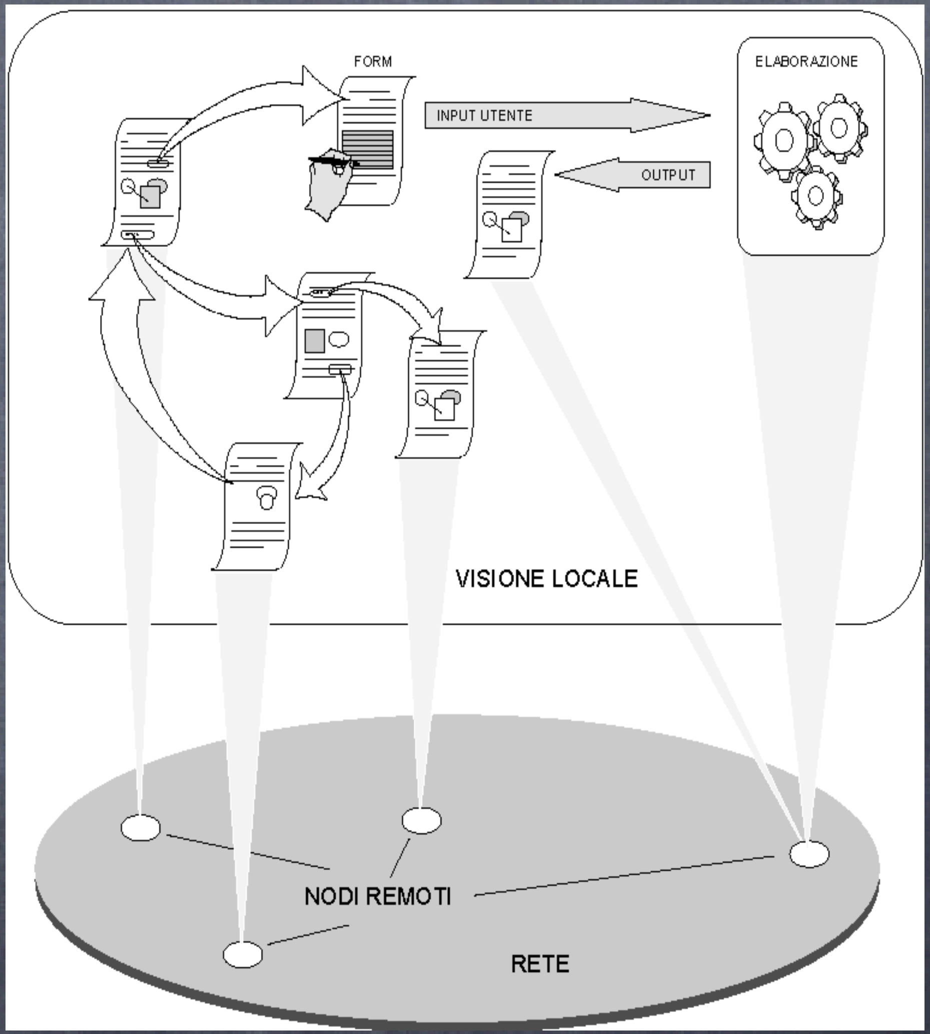
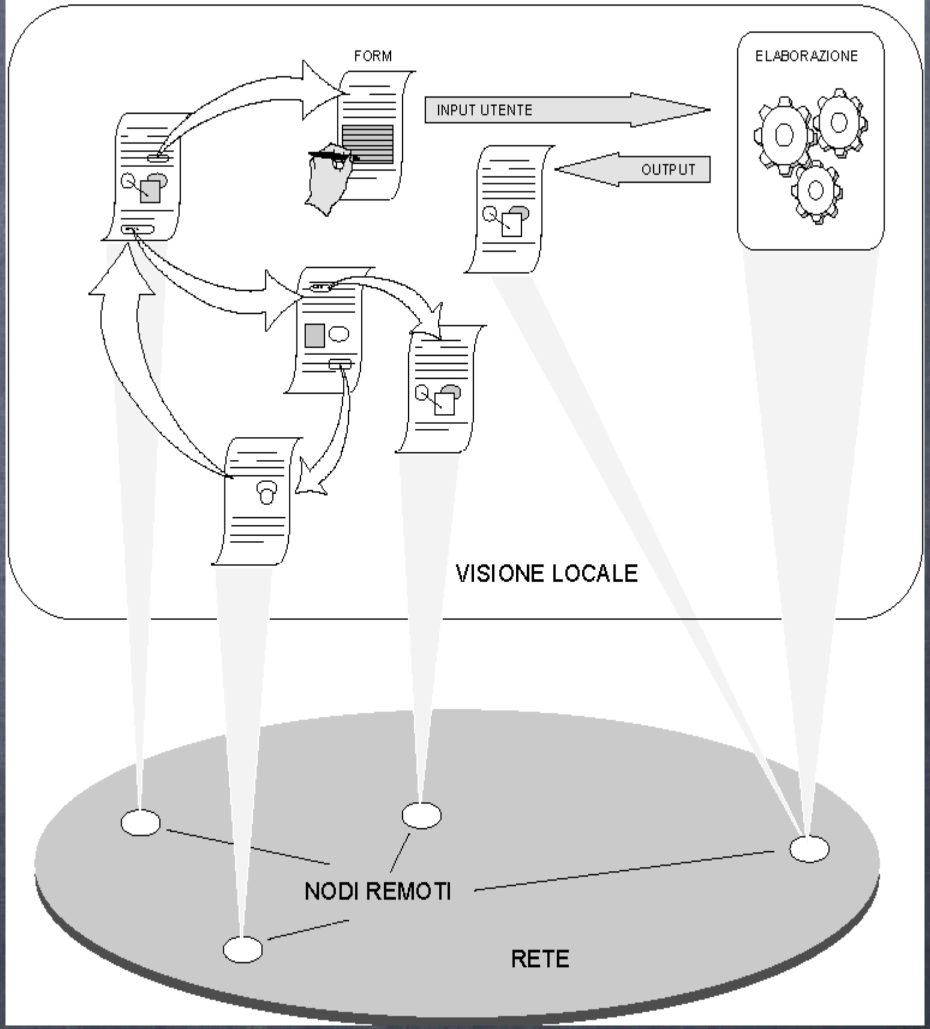
Web Systems Architecture

- Basic architecture
    - information is structured as ipertext
        - allocation transparency
        - resources as information
    - Use of graphical interfaces
        - ease of use
        - uniform access
            - to heterogeneous resources
            - from heterogeneous envs



Perception of Web Systems

- Clicking on a work/image, you can expand a portion of the document we are interested in
  - perceiving the fact that the document may / may not be a local one, it si not needed
- Clicking on link which representing a resource in order to access it
  - without worrying about the nature of the resource itself
    - whatevet it is, a doc, a text, a picture, whatever else



World Wide Web (WWW)

- CERN (1989)
    - scenario: ipertextual integration of Internet resources
- Goals
    - access & allocation transparency
        - usability
    - multimedial presentation
        - effectiveness
    - different protocols, the same interface
        - interoperability
    - accessing and sharing information
        - accessibility
- W3C: http://w3c.org

Basic Components: Client-side

- Browsers
  - doing presentation, handling requests
- Helper Applications
  - particular presentations & formats, such videos, sounds, animations
- Applets
  - local execution of Java applications
- Script
  - local execution of small applications written in JavaScript or other similar languages

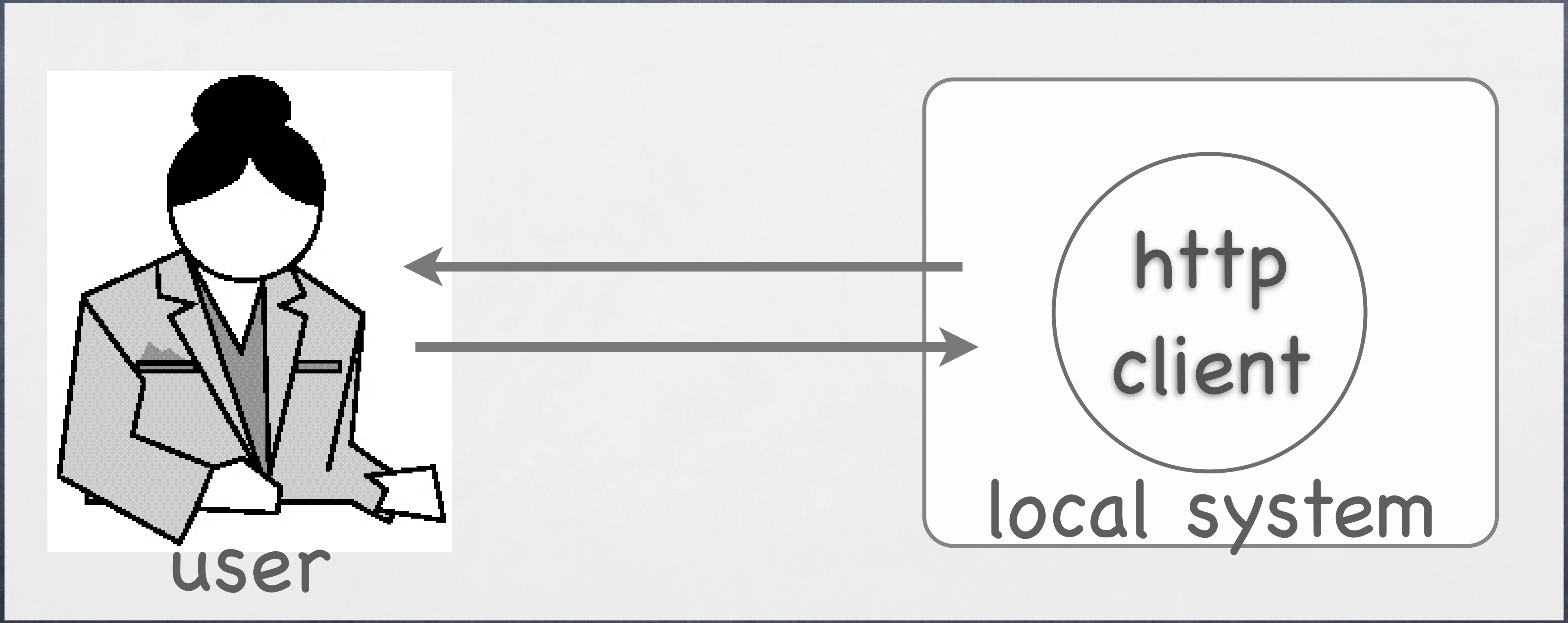
Basic Components: Server-side

- Web Server
  - managing access control, accepting requests, administering information
- Server-side Applications
  - remote execution
    - CGI, servlet, JSP, PHP, ASP...

Fundamental Standard Specifications & Languages

- Universal Addressing System
  - URI & URL
    - Uniform Resource Identifier/Location
- HTTP Protocol
  - HyperText Transfer Protocol
- HTML / XHTML + CSS
  - (eXtended) HyperText Markup Language
  - Cascading Style Sheets
- CGI
  - Common Gateway Interface
- Java language for Applet, Servlet & JSP

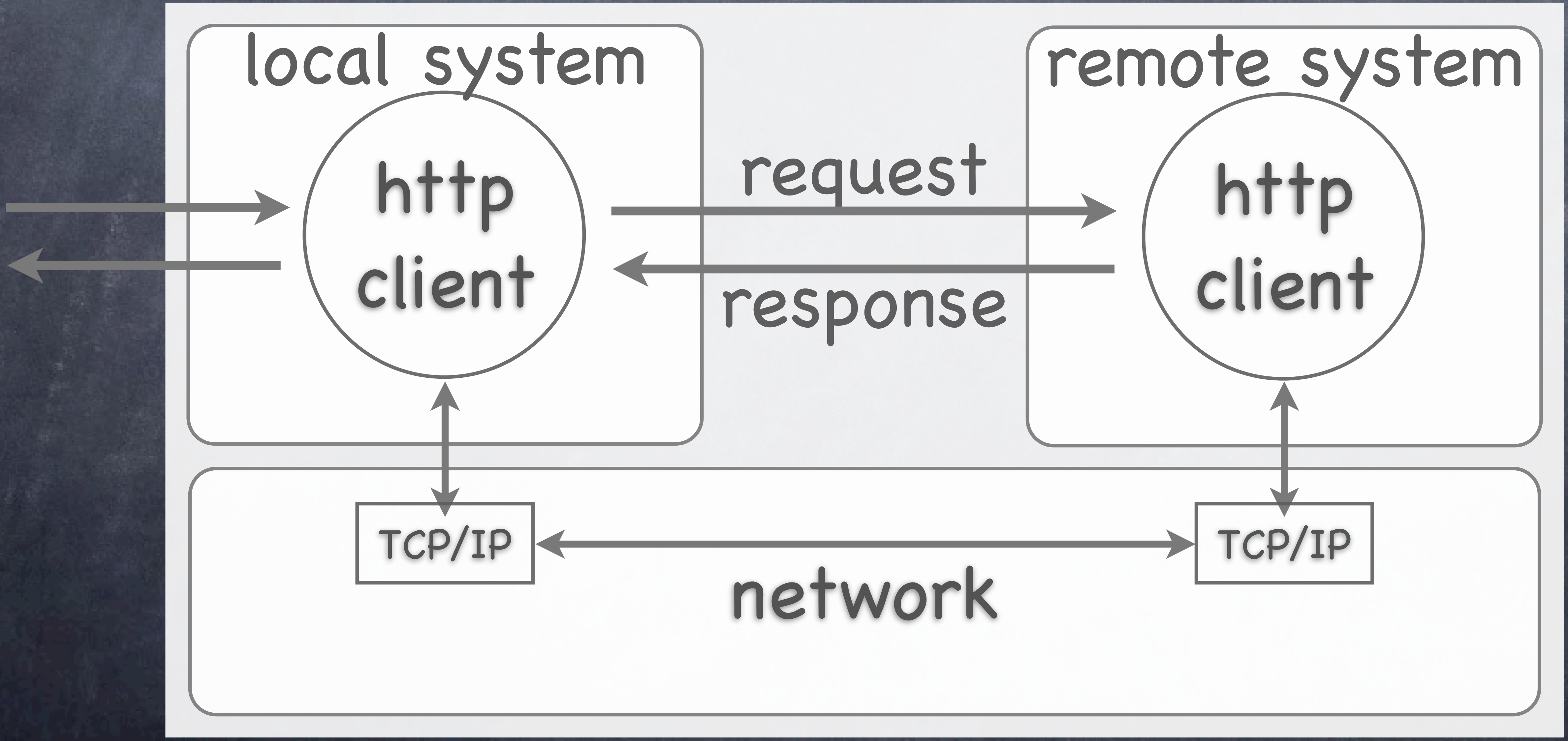
WWW: Base Architecture



Client / Server Connection

- HTTP Client
  - client/server pattern toward one HTTP server at a time
  - by specifying an URL (either writing or clicking)
  - HTML page requests via HTTP
  - HTTP response as HTML pages + other contents (images, scripts...)
- One-shot connection
  - one different connection per each object
  - e.g.: an HTML page with a JPEG image = 2 HTTP connections

HTTP Connection



Uniform Resource Locators

- Unique names for system resources, specified by clients to determine the server
- Uniform Resource Locators (URL)
  - node providing the resource
  - resource access protocol (e.g. http, gopher)
  - TCP port number (service default port)
  - local path of the resource within the server
    - <protocol>[://<host>][:<port>][<path>]
    - e.g.: http://www.address.edu:1234/path/subdir/file.ext
- Internet services and their protocols are recognised
  - http, gopher, ftp, wais, telnet, news, nntp, e mail (mailto)
- http://www.w3.org/Addressing/

HTTP for Dummies (I)

- HyperText Transfer Protocol
  - client / server interface protocol
  - based on TCP connections
    - default port 80
- HTTP version 1.0
  - Request/response: only data are requested / sent
  - One-shot connection: TCP connection maintained only as long as necessary to send data
  - Stateless: no information is kept by server between two subsequent requests
    - then, information should be kept by clients

HTTP for Dummies (II)

- typical HTTP interaction
  - client request containing information for server (i.e., page local path)
  - server response containing information (i.e, requested page, or error message)
  - some negotiation possible on information and services
    - e.g., give me a page only if changed since my last request
- HTTP version 1.1: some improvements
  - http://www.w3.org/Protocols/
- It will be the subject of future courses, like “Computer Networks” (Reti di calcolatori)

HTML for Dummies (I)

- http://www.w3.org/MarkUp/
- HyperText Markup Language
  - specification language to encode information
  - derived from SGML (Standard Generalized Markup Language)
    - it is a markup language (TeX, RTF)
    - markup languages use tags to add features to enclosed text
  - very simple so as not to make clients computationally complex

HTML for Dummies (II)

- tag HTML: examples
  - header level 1
    - <h1>text</h1>
  - bold text
    - <strong>text</strong > or <B>text</B>
    - browser-dependent visualisation
  - link
    - <a href = "destination"> description </a>
  - image
    - <img src = "myimage.gif">
  - Java applet
    - <applet code="Hello.class" width=”100” height=”80”>

XHTML for Dummies

- eXtended HyperText Markup Language
- goals
  - solve HTML problems
  - toward XML
  - some backward compatibility toward HTML
    - to avoid migration problems to programmers and tools
- in this course, we mainly deal with XHTML

Web Style Sheets for Dummies

- http://www.w3.org/Style/
- Style sheets decribe how elements of a web page should be represented on a specific medium
  - screen, audio, paper, ecc.
- CSS-1 e CSS-2
  - Cascading Stye Sheets
  - for HTML pages
- XSL (Extensible Stylesheet Language Family)
  - for XML sheets
  - XSL Transformations (XSLT)
  - XML Path Language (XPath)
  - XSL Formatting Objects (XSL-FO)

Other Topics

- JavaScript
  - [the main block of the course, only for LTI-LA]
  - associating computations to Web pages (and browser events)
  - to be execute by clients (browsers)
- PHP (maybe)
  - a simple but powerful interpreted language for server-side computations

Browsers:
the Ancient Times

version	browser	properties
1.0	historic	header, lists, emph
2.0	Mosaic	inline images, forms
2.1	Netscape/Microsoft	tables, alignment
3.2	Netscape/Microsoft	frames, ...
4.0	Netscape/Microsoft	styles, JavaScript

Browsers Today…

- Mozilla / Firefox & Company
    - a world-wide project
    - the reference browser engine for this course
    - also for web page construction / verification
        - Composer is fine, Front Page NOT allowed
- Different versions of Internet Explorer
    - bad seeds we should coexist with
- Safari, Opera, Konqueror, …
    - good
    - however, remember to verify compliance to standards
        - both in theory [they claim to]
        - and in practice [they actually do]