# CENG420
## Web Programming and Technologies

# Course Administration

- **Textbook:**
- Nixon:Learning PHP, MySQL, JavaScript, and CSS
- Sebesta: Programming the world wide web
- REFERENCES
- JQuery Cookbook by O Reilly ISBN: 978-0-596-15977-1 (free PDF available)
- **Prerequisites:**
  - CSCI300: Intermediate programming
  - CENG375: Introduction to Database
- **Grading:**
  - Test 15
  - Midterm 20
  - Final 30
  - Project 20
  - Assignments 10
  - Attendance 5

# Course Content

- Introduction to HTML and HTTP protocol.

- Introduction to Cascaded Style Sheet (CSS) and bootstrap

- Client-side scripting using JavaScript and Document Object Model, [Jquery and Ajax]

- Server-side scripting with PHP

- Handling user form data and requests

- Session Tracking

- Database connectivity

- Outline security and privacy risks associated with web applications.

# CENG420
# Chapter1

# Fundamentals
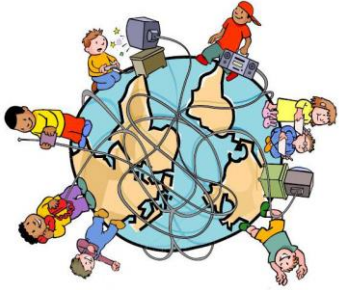
# Web or Internet?

- **Internet:** is a massive network of networks with their networking infrastructure. It connects millions of computers to communicate with each others as long as they are on the internet.

- Information that travels over the Internet does so via a variety of languages known as:

### Network protocols

e.g. HTTP, SMTP, DNS, FTP, etc (to be seen in **CENG415**)
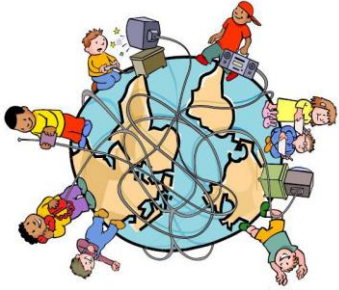
# Web or Internet?

- **World Wide Web (simply Web):** a way of accessing and sharing information over the Internet.

- Web uses the HTTP protocol, *only one of the protocols used over Internet*, to transmit data.

- Some computers run *Web servers* and provide services to the majority of computers that run *Web clients* or browsers (*Internet Explorer, Firefox, google chrome*)
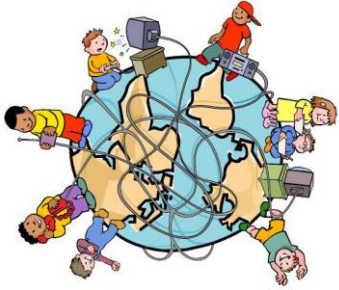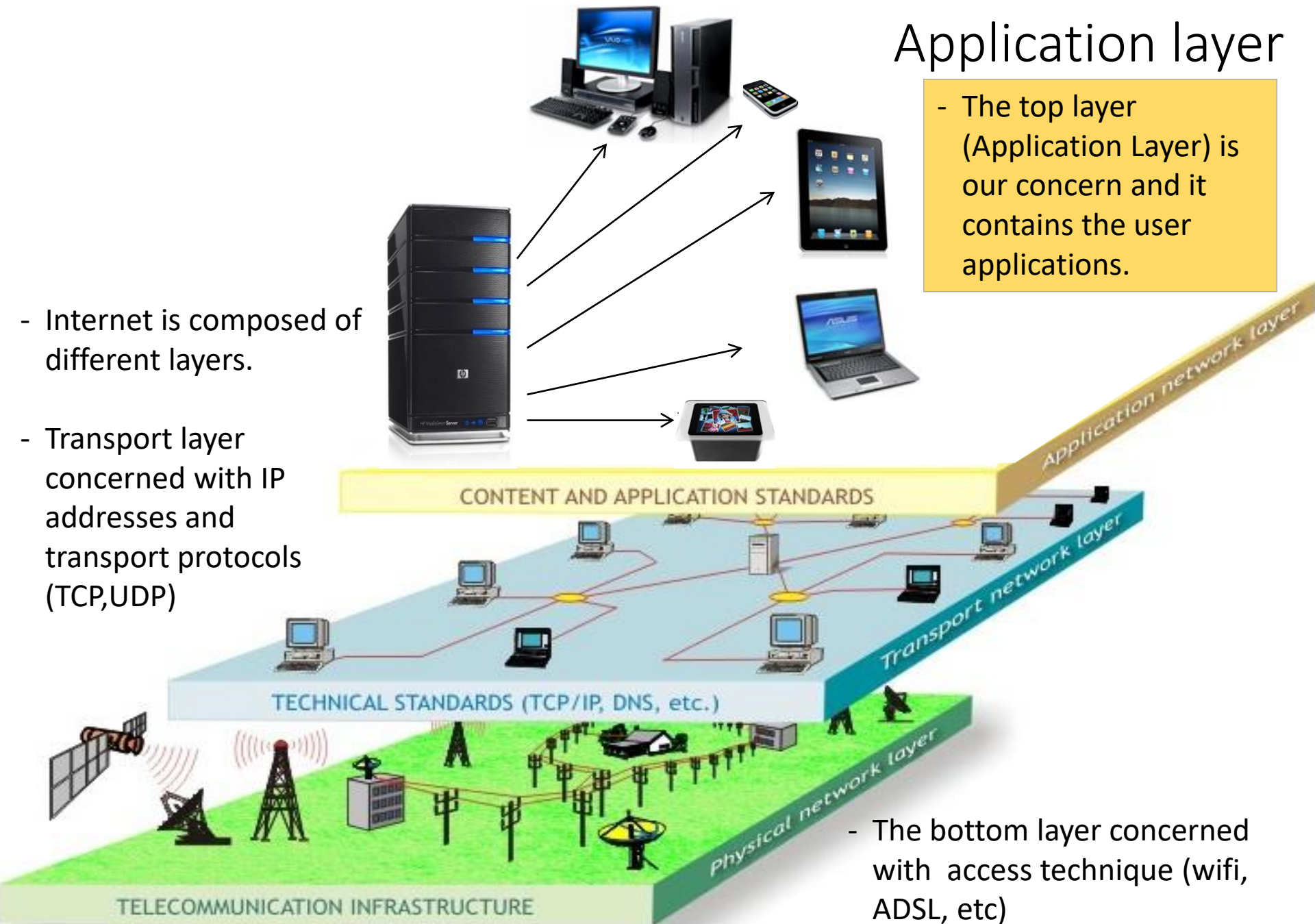
# Web or Internet?

**Conclusion:**

- Internet is NOT the Web, web is only a portion of the Internet (a huge portion as well ☺)

- Internet is also used for e-mail (SMTP), file sharing (FTP, Bittorrent), media communications, etc.

# Application layer

- The top layer (Application Layer) is our concern and it contains the user applications.

- Internet is composed of different layers.

- Transport layer concerned with IP addresses and transport protocols (TCP,UDP)

*Application network layer*

*Transport network layer*

*Physical network layer*

CONTENT AND APPLICATION STANDARDS

TECHNICAL STANDARDS (TCP/IP, DNS, etc.)

TELECOMMUNICATION INFRASTRUCTURE

- The bottom layer concerned with access technique (wifi, ADSL, etc)

# IP and DNS

- Each component on the Internet has an IP address to be recognized with
  - IP (V4) addresses consist in 32 bit written in groups of three digits from 0 to 254, e.g. 192.144.200.01 (refer to CENG415)

- IP addresses are so hard to memorize! Names are generally easier (hotmail, google, facebook,etc).
  - DNS (Domin Name System) is used to translate between IPs and names

For example
www.google.com has the IP
216.58.208.238
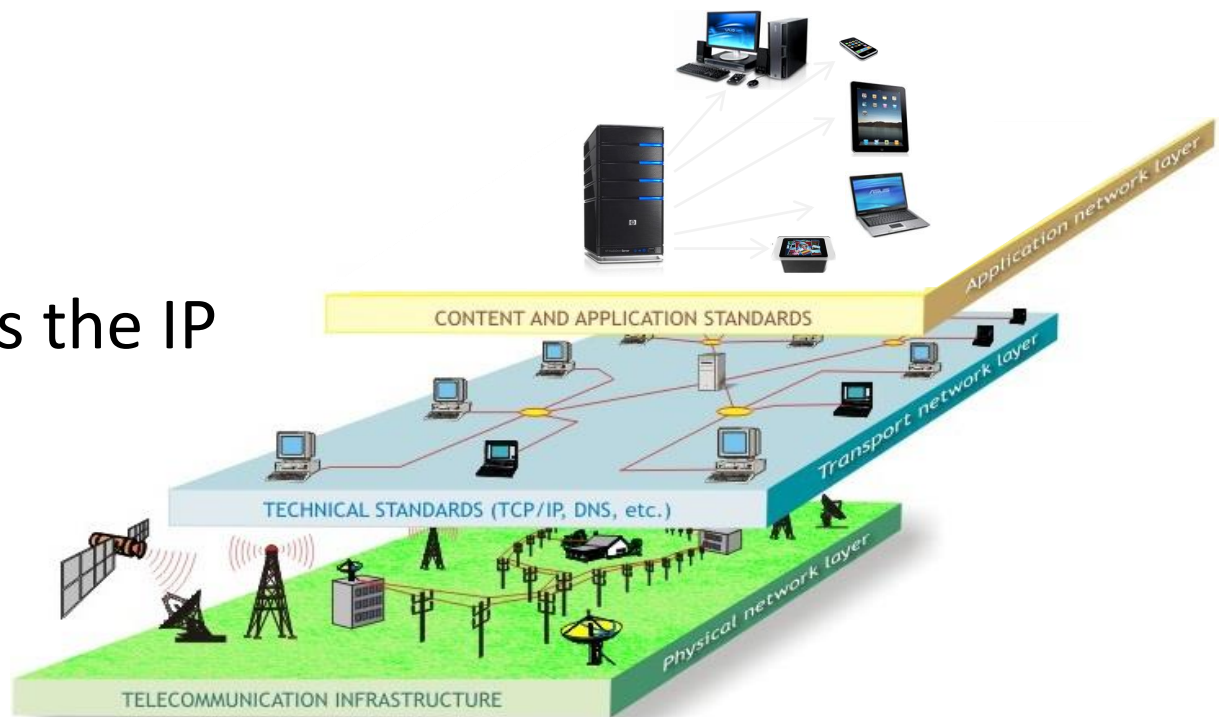
# IP and DNS



But what network protocol to get data from server to client!!

Any web browser on the client side will show the content

It is 69.63.176.0

OK, here you are the components to show

What is the IP for the website: Facebook.com

Get the main webpage of facebook

CONTENT AND APPLICATION STANDARDS

# HTTP Protocol @ Application layer

## HTTP: hypertext transfer protocol

- Web's application layer protocol
- client/server model
  - *client:* browser that requests, receives, "displays" Web objects
  - *server:* Web server sends objects in response to requests

**HTTP response**

Web server: e.g. Apache (Unix), Microsoft internet information server (IIS)

**But what are web objects!!**

**HTTP request**

CONTENT AND APPLICATION STANDARDS

Application network layer

# HTTP and Web objects

- HTTP is used to transfer web objects
- Each web page consists of several objects
- objects can be HTML file, JPEG image, Java applet, audio file, video file, ...
- web page consists of base HTML-file which includes several referenced objects
- each object is addressable by a URL
- **Example URL:**

```
http://www.someschool.edu/someDept/pic.gif
```

protocol

host + network name
("www" is host name)

path (full file) name
(or directory name, or "")

# Web servers

- Web servers also support `ftp, news and mailto`

- URLs:

# HTTP *request* message

- two types of HTTP messages: *request, response*
- HTTP request message:
  - ASCII (human-readable format)

**request line
(GET, POST,
HEAD commands)**

**header
lines to be
seen in
CENG415**

**GET** **/somedir/page.html** **HTTP/1.1**
**Host: www.someschool.edu**
**User-agent: Mozilla/4.0**
**Connection: close**
**Accept-language:fr**

**—**

**—**

# HTTP *response* message

**status line (protocol status code status phrase)**

```
HTTP/1.1 200 OK
Connection close
Date: Thu, 06 Aug 1998 12:00:15 GMT
Server: Apache/1.3.0 (Unix)
Last-Modified: Mon, 22 Jun 1998 …...
Content-Length: 6821
Content-Type: text/html
```
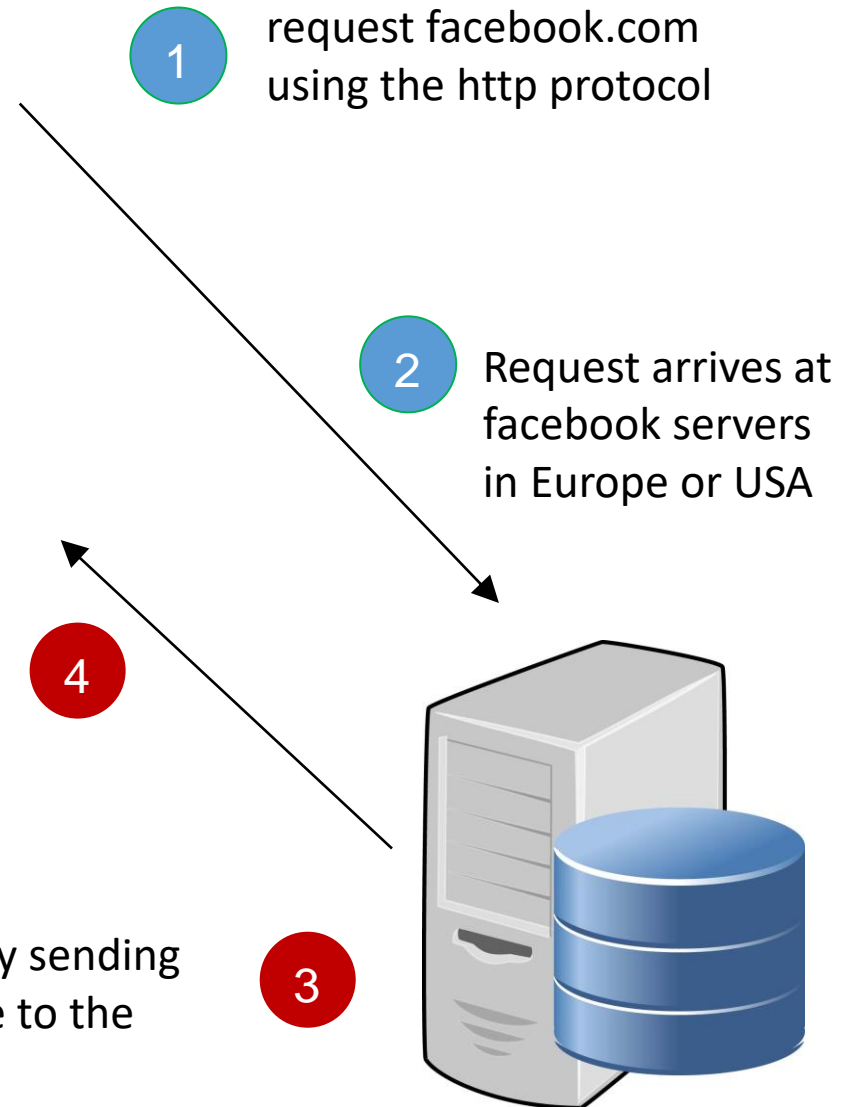
**header lines**

**data, e.g., requested HTML file**

```
data data data data data ...
```

15

# Example



① request facebook.com using the http protocol

② Request arrives at facebook servers in Europe or USA
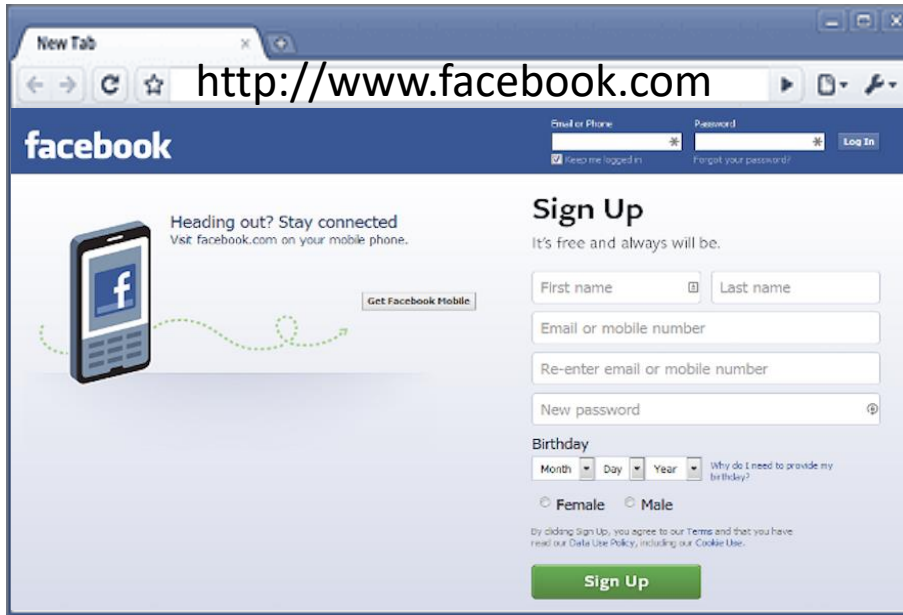
④ Client displays the page in the browser

③ Server responds by sending the facebook page to the client

# But what did the server send?

**What is actually this?**
**And how did the browser displayed these components: input fields, blue navigation bar, gray backgrounds, images, etc…**

# It's **HTML!**

- and other things too (but let's stick now to HTML)
- The browser receives something like this:

```html
<!DOCTYPE html>
<html>
    <head>
        <title>Example<title>
        <link rel="stylesheet" href="sty
    </head>
    <body>
        <h1>
            <a href="/">Header</a>
        </h1>
        <nav>
            <a href="one/">One</a>
            <a href="two/">Two</a>
            <a href="three/">Three</a>
        </nav>
```
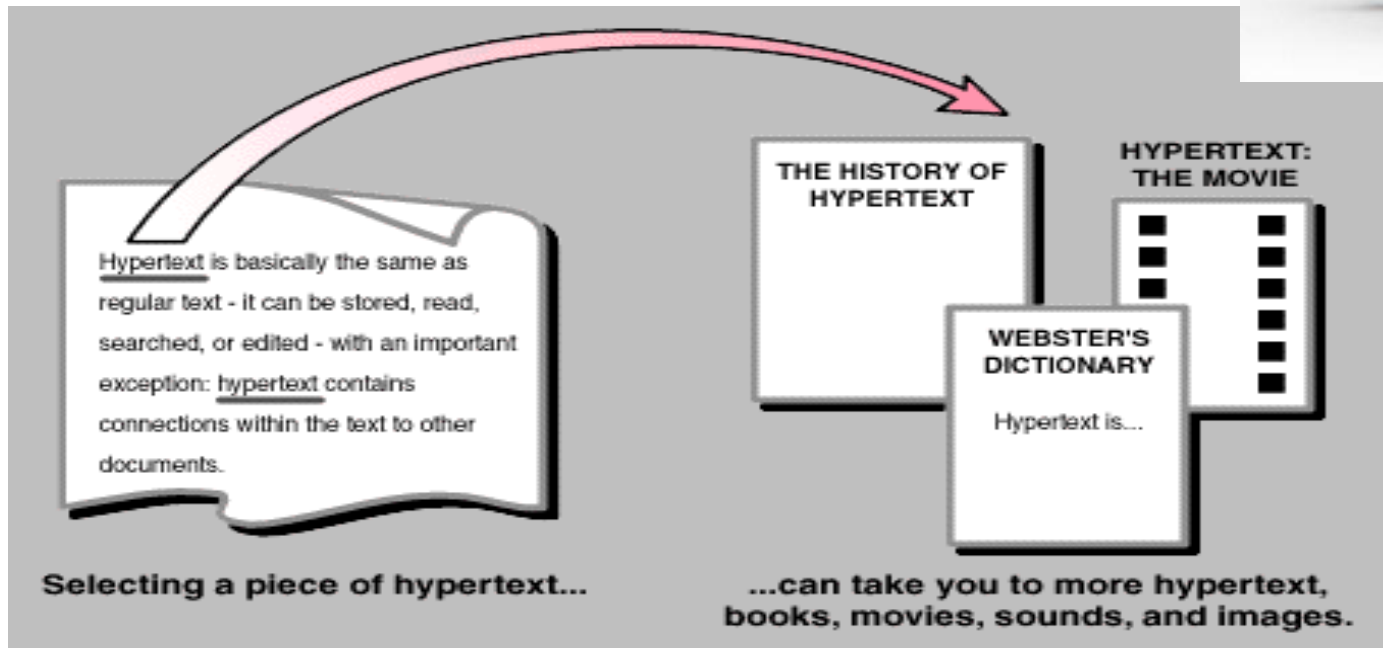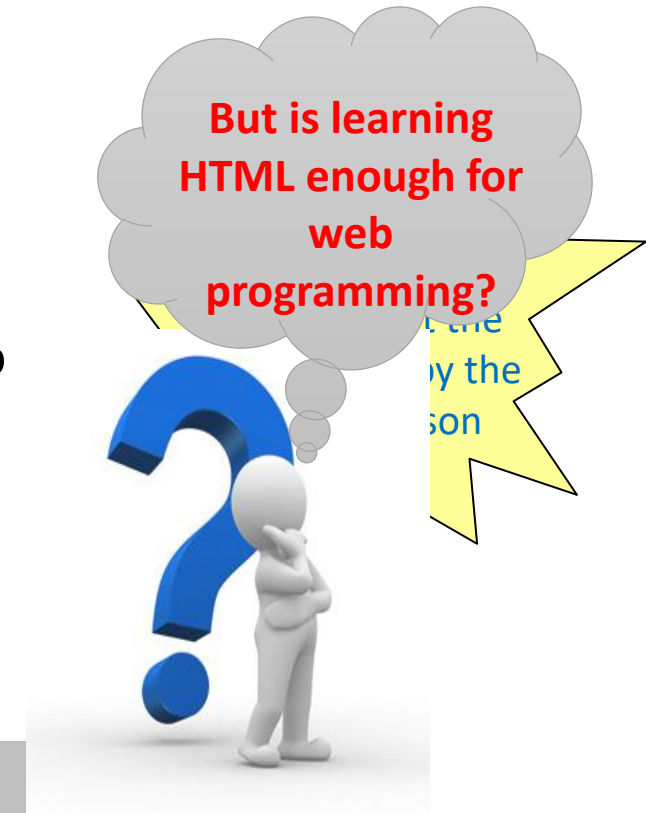
# HTTP vs HTML

- HTTP:  hypertext transfer protocol
  - The rules governing the conversation between a Web client and a Web server

- HTML:  hypertext markup language
  - Definitions of tags that are added to Web documents to control their appearance.

**But is learning HTML enough for web programming?**

the
by the
son



Hypertext is basically the same as regular text - it can be stored, read, searched, or edited - with an important exception: hypertext contains connections within the text to other documents.

THE HISTORY OF HYPERTEXT

WEBSTER'S DICTIONARY

Hypertext is....

HYPERTEXT: THE MOVIE

Selecting a piece of hypertext...

...can take you to more hypertext, books, movies, sounds, and images.

# Besides HTML:



a style sheet language used for describing the look and formatting of a document written in a markup language such as HTML

a server scripting language, and a powerful tool for making dynamic and interactive Web pages quickly. PHP files can contain text, HTML, CSS, JavaScript, and PHP code. These codes are executed on the server, and the result is returned to the browser as plain HTML

a dynamic computer programming language to implement client-side scripts