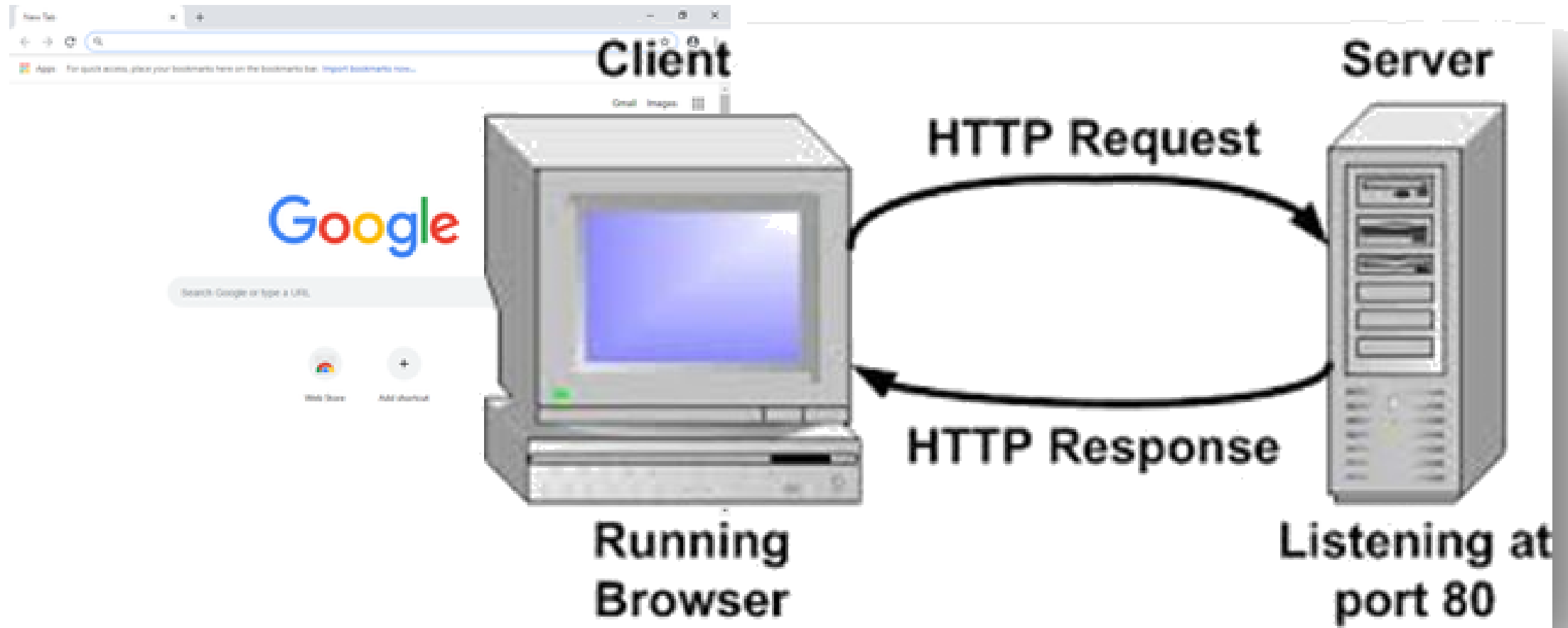


Application Design Using Java

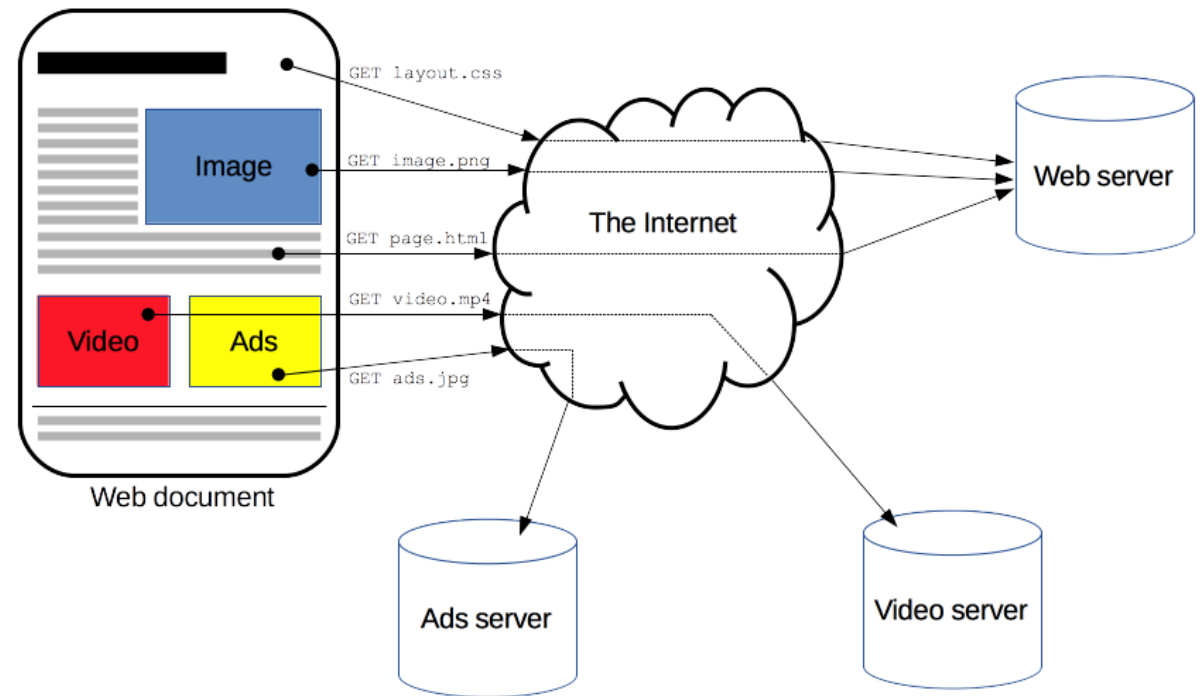
Lecture 17

World Wide Web (WWW)



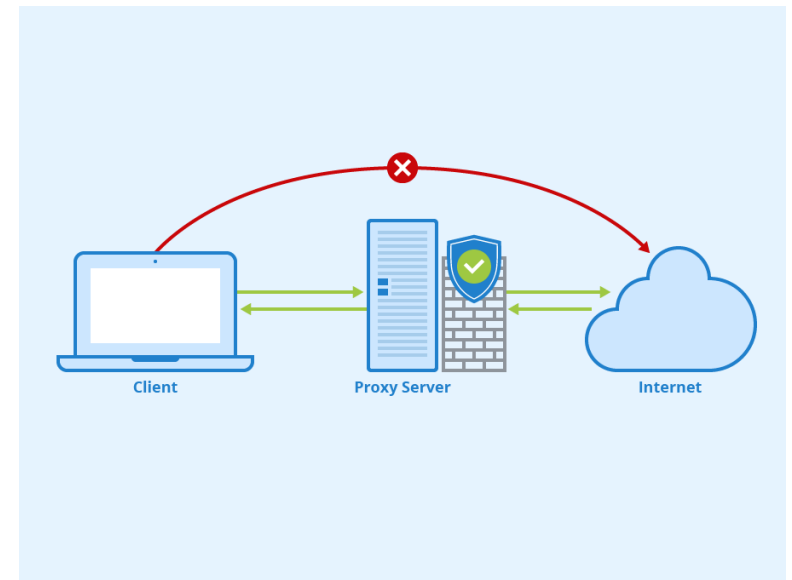
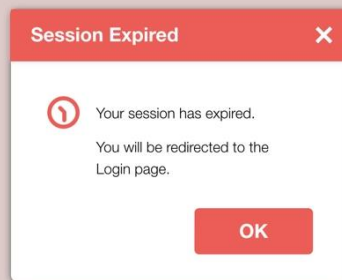
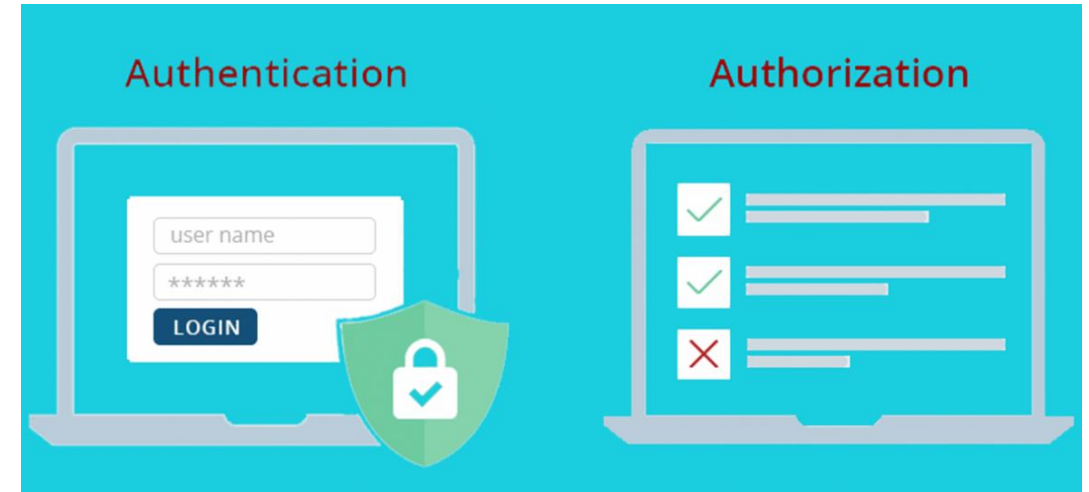
Hypertext Transfer Protocol (HTTP)

- Application-layer protocol for transmitting hypermedia documents
- Simple and human readable
- Plain text (insecure)
- Extensible (HTTP + SSL = HTTPS for security)
- Stateless but not sessionless
- Does not require a connection based transport protocol
- Versions
 - HTTP/1.0
 - HTTP/1.1



HTTP Features

- Caching
- Authentication
- Proxy and tunneling
- Sessions



Uniform Resource Locator (URL)

- Uniquely identifies a resource over the Web
- Syntax

protocol://hostname:port/path-and-file-name

Part	Description
protocol	The application-level protocol used by the client and server, e.g., HTTP, FTP, and telnet.
hostname	The DNS domain name (e.g., www.nowhere123.com) or IP address (e.g., 192.128.1.2) of the server.
port	The TCP port number that the server is listening for incoming requests from the clients.
path-and-file-name	The name and location of the requested resource, under the server document base directory.

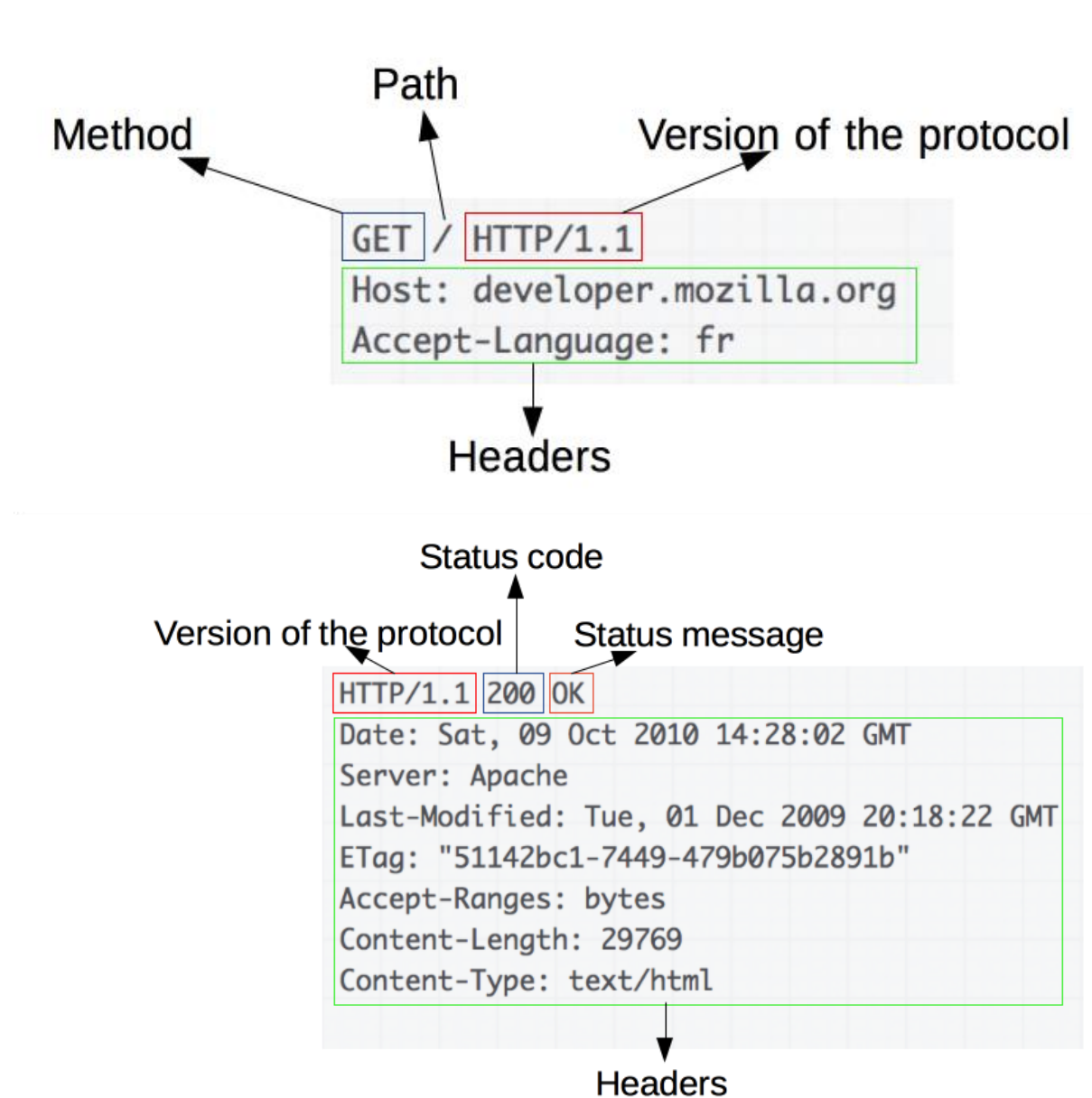
Well Known Ports



Port	Service Name
20, 21	File Transfer Protocol (FTP)
23	Telnet
25	Simple Mail Transfer Protocol (SMTP)
80	HyperText Transfer Protocol (HTTP)
110	Post Office Protocol (POP3)
443	HTTP with Secure Sockets Layer (SSL)
465	Simple Mail Transfer Protocol with Secure Sockets Layer (SSL)
995	Post Office Protocol with Secure Sockets Layer (SSL)
3389	Remote Desktop Protocol

HTTP Messages

- Request
 - Method
 - Path
 - Version of the protocol
 - Headers
- Response
 - Version of the protocol
 - Status code
 - Status message
 - Headers



Common MIME Types

- Multipurpose Internet Mail Extensions (MIME)

MIME Type	Kind of document	Extension
video/x-msvideo	AVI: Audio Video Interleave	.avi
text/css	Cascading Style Sheets (CSS)	.css
text/csv	Comma-separated values (CSV)	.csv
text/html	HyperText Markup Language (HTML)	.htm .html
image/jpeg	JPEG images	.jpg .jpeg
application/json	JSON format	.json
text/javascript	JavaScript	.js
audio/mpeg	MP3 audio	.mp3
video/mpeg	MPEG Video	.mpeg
application/pdf	Adobe Portable Document Format (PDF)	.pdf
application/xml text/xml	XML	.xml
application/zip	ZIP archive	.zip

HTTP Status Codes/Messages Categories

1. Informational responses (100–199)
2. Successful responses (200–299)
3. Redirects (300–399)
4. Client errors (400–499)
5. Server errors (500–599)


Select HTTP Status Codes/Messages




Code/message	Meaning
100 Continue	Everything so far is OK and that the client should continue with the request or ignore it if it is already finished
200 OK	Request has succeeded
301 Moved Permanently	Resource requested has been definitively moved
401 Unauthorized	Request has not been applied because it lacks valid authentication credentials for the target resource
404 Not Found	The server can't find the requested resource
500 Internal Server Error	The server encountered an unexpected condition that prevented it from fulfilling the request
503 Service Unavailable	The server is not ready to handle the request

Select HTTP verbs

verb noun

 Save Word

\ 'vɜrb \ 

Definition of *verb* (Entry 1 of 2)

: a word that characteristically is the grammatical center of a predicate and expresses an **act**, occurrence, or mode of being, that in various languages is inflected for agreement with the subject, for tense, for voice, for mood, or for aspect, and that

is
inking

Verb	Action
GET	Requests a representation of the specified resource. Requests using GET should only retrieve data.
HEAD	Asks for a response identical to that of a GET request, but without the response body.
POST	Submits an entity to the specified resource, often causing a change in state or side effects on the server.
PUT	Replaces all current representations of the target resource with the request payload.
DELETE	Deletes the specified resource

GET method

- No body in the request
- Body in the successful response
- Syntax
 - GET /index.html
 - GET /test.html HTTP/1.1

POST method

- Body in the request
- Body in the successful response
- Sends data to the server
- Type of the body of the request is indicated by the Content-Type header
- PUT is idempotent
 - Calling it once or several times successively has the same effect (that is no *side* effect)
- POST is not idempotent
 - Successive identical POST may have additional effects, like passing an order several times
- Syntax
 - POST /test
 - POST /index.html HTTP/1.1

HTML Forms

- `<form method="get" action="/bin/process">`
- Controls
 - Text Box: `<input type="text">`
 - Password Box: `<input type="password">`
 - Radio Button: `<input type="radio">`
 - Checkbox: `<input type="checkbox">`
 - Selection: `<select>` and `<option>`
 - Text Area: `<textarea>`
 - **Submit Button:** `<input type="submit">`
 - Reset Button: `<input type="reset">`
 - Hidden Field: `<input type="hidden">`
 - Button: `<input type="button">`

```
<html>
<head><title>A Sample HTML Form</title></head>
<body>
  <h2 align="left">A Sample HTML Data Entry Form</h2>
  <form method="get" action="/bin/process">
    Enter your name: <input type="text" name="username"><br />
    Enter your password: <input type="password" name="password"><br />
    Which year?
    <input type="radio" name="year" value="2" />Yr 1
    <input type="radio" name="year" value="2" />Yr 2
    <input type="radio" name="year" value="3" />Yr 3<br />
    Subject registered:
    <input type="checkbox" name="subject" value="e101" />E101
    <input type="checkbox" name="subject" value="e102" />E102
    <input type="checkbox" name="subject" value="e103" />E103<br />
    Select Day:
    <select name="day">
      <option value="mon">Monday</option>
      <option value="wed">Wednesday</option>
      <option value="fri">Friday</option>
    </select><br />
    <textarea rows="3" cols="30">Enter your special request here</textarea><br />
    <input type="submit" value="SEND" />
    <input type="reset" value="CLEAR" />
    <input type="hidden" name="action" value="registration" />
  </form>
</body>
</html>
```

A Sample HTML Data Entry Form

Enter your name:

Enter your password:

Which year? ☐ Yr 1 ☐ Yr 2 ☐ Yr 3

Subject registered: ☐ E101 ☐ E102 ☐ E103

Select Day:

Enter your special request here

Static vs. Dynamic Web Pages

Static Web Pages

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#), [Policy](#), November's [W3 news](#), [Frequently Asked Questions](#).

[What's out there?](#)

Pointers to the world's online information, [subjects](#), [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#), [X11 Viola](#), [NeXTStep](#), [Servers](#), [Tools](#), [Mail robot](#), [Library](#))

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

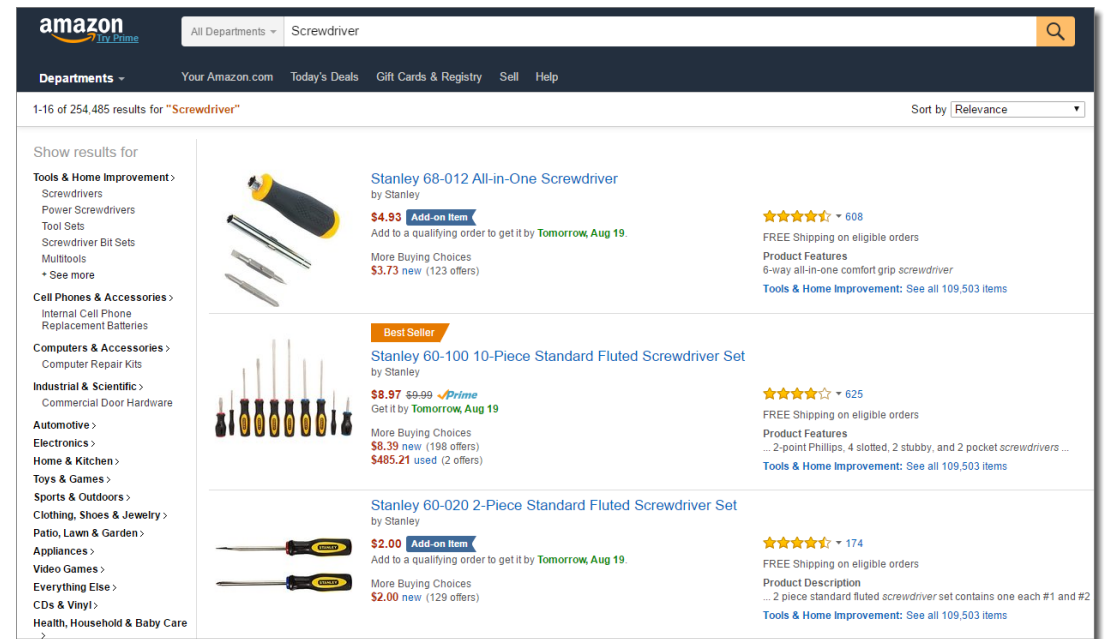
[How can I help?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#), etc.

Dynamic Web Pages



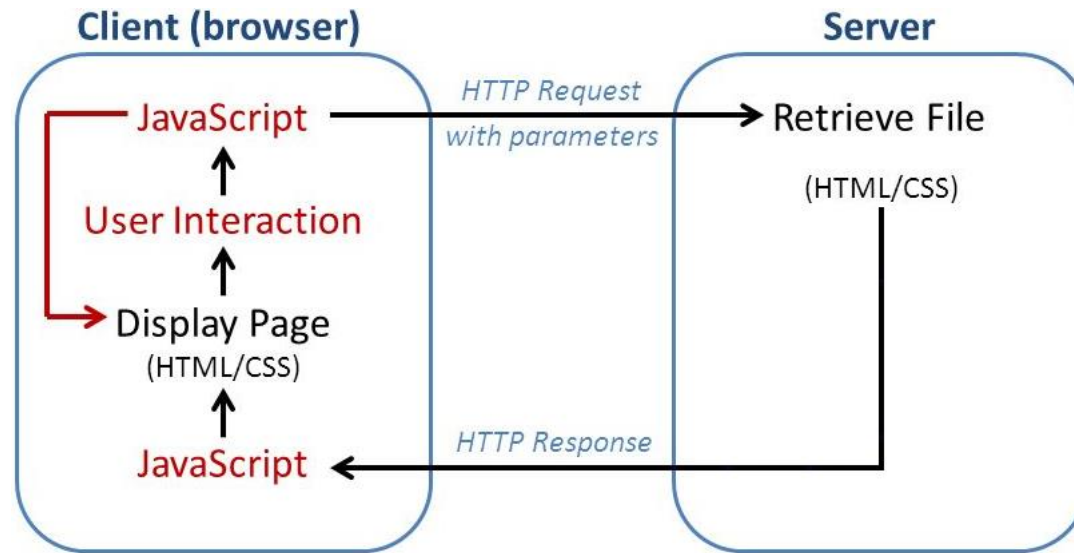
The screenshot shows the Amazon website interface with a search for 'Screwdriver'. The top navigation bar includes the Amazon logo, a search bar with 'Screwdriver' entered, and links for 'All Departments', 'Your Amazon.com', 'Today's Deals', 'Gift Cards & Registry', 'Sell', and 'Help'. Below the navigation bar, it shows '1-16 of 254,485 results for "Screwdriver"' and a 'Sort by Relevance' dropdown. The main content area displays three product listings:

- Stanley 68-012 All-in-One Screwdriver** by Stanley. Price: \$4.93. Add-on item. Add to a qualifying order to get it by **Tomorrow, Aug 19**. More Buying Choices: \$3.73 new (123 offers). Product Features: 6-way all-in-one comfort grip screwdriver. Tools & Home Improvement: See all 109,503 items.
- Stanley 60-100 10-Piece Standard Fluted Screwdriver Set** by Stanley. Price: \$8.97. Prime. Get it by **Tomorrow, Aug 19**. More Buying Choices: \$8.39 new (198 offers), \$485.21 used (2 offers). Product Features: 2-point Phillips, 4 slotted, 2 stubby, and 2 pocket screwdrivers. Tools & Home Improvement: See all 109,503 items.
- Stanley 60-020 2-Piece Standard Fluted Screwdriver Set** by Stanley. Price: \$2.00. Add-on item. Add to a qualifying order to get it by **Tomorrow, Aug 19**. More Buying Choices: \$2.00 new (129 offers). Product Description: 2 piece standard fluted screwdriver set contains one each #1 and #2. Tools & Home Improvement: See all 109,503 items.

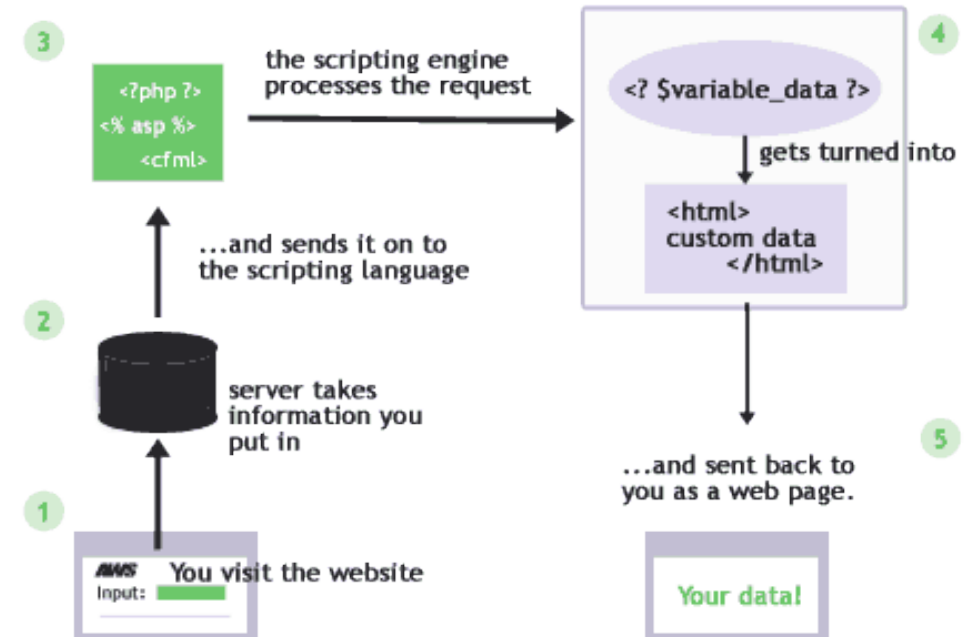
A left sidebar lists various product categories: Tools & Home Improvement, Cell Phones & Accessories, Computers & Accessories, Industrial & Scientific, Automotive, Electronics, Home & Kitchen, Toys & Games, Sports & Outdoors, Clothing, Shoes & Jewelry, Patio, Lawn & Garden, Appliances, Video Games, Everything Else, CDs & Vinyl, and Health, Household & Baby Care.

Client Side vs. Server Side scripting

Client Side



Server Side

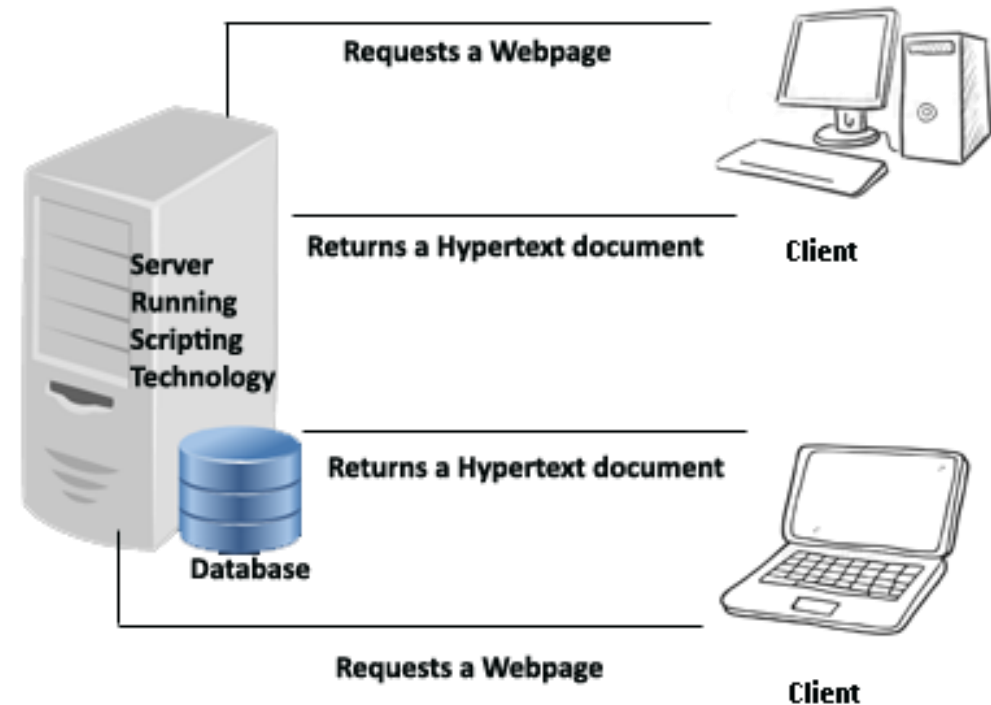


Client Side Scripting

- JavaScript
 - No relation to Java!!!
 - The official name and standard is called ECMAScript (European Computer Manufacturers Association (ECMA))
 - Universally supported
 - Other languages, like VBScript or PerlScript are rare
- Interactive and highly responsive
 - No page reload
 - Runs locally
- Reduced server and network load
- Can be disabled by the client
- Runs within the process of the Web browser
 - JavaScript is single-threaded
 - Separate JavaScript thread per tab or per domain
- Has no access to server resources
- Restricted access to local resources (security!)

Server Side Scripting

- A plethora of technologies and programming languages
 - Java
 - .NET Framework (C#, etc.)
 - PHP
 - Python
 - C and CGI
- Increased server and network load
- Longer turnaround time
 - A full request – response
 - AJAX partially address this issue
- Access to server resources
- No access to client resources, more secure
- Cannot be disabled by the client
- Code only runs on the server
- Can be run on parallel server hardware



//TODO before next lecture:

- Homework 3 due on 3/29 at 11:59 pm EDT. Must be submitted on Submittity.
- Drafts of Article Review and Presentation are due on 3/29 at 11:59 pm EDT. Must be submitted on Submittity.
- Final Project proposal due on 3/26 at 11:59 pm EDT. Must be submitted on Submittity.