WEB PROGRAMMING SCV1223

Introduction

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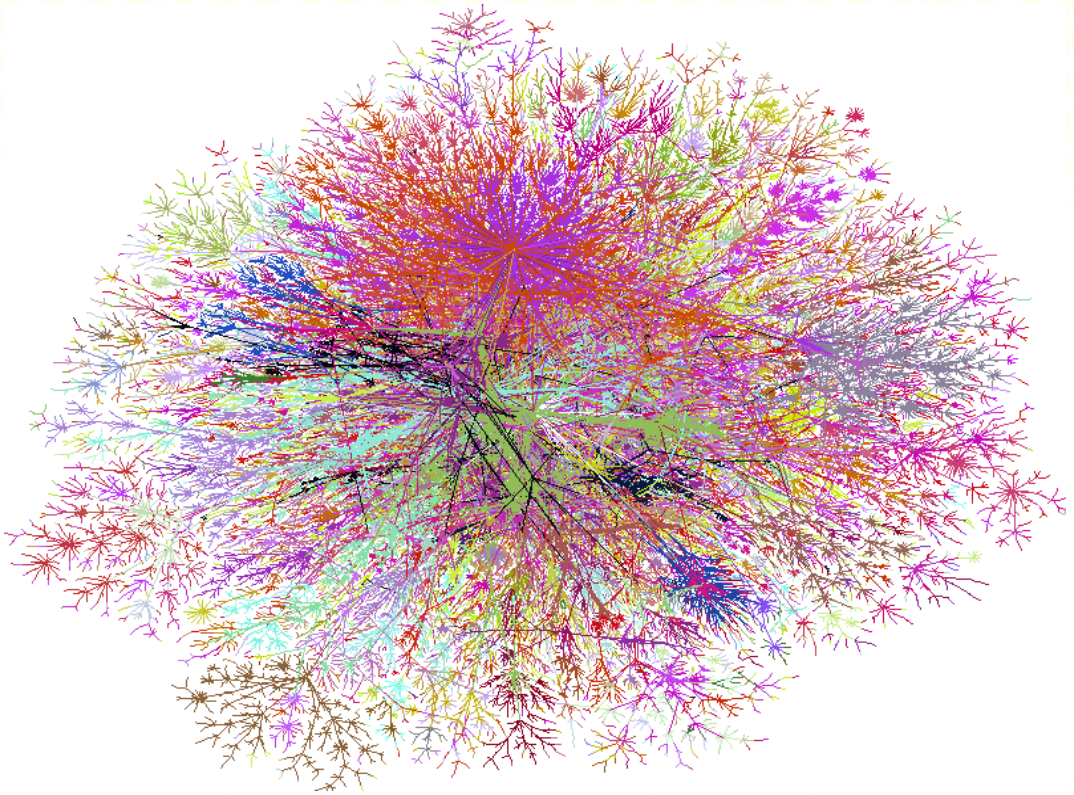
Topics

- Internet
- World Wide Web
- Web Architechture
- Common Gateway Interface
- CGI Programming

The Ever-changing Internet



Different colors based on IP address

http://research.lumeta.com/ches/map

What is the Internet?

- WWW
- Video conferencing
- ftp
- telnet
- Email
- Instant messaging
- …

A communication infrastructure

Usefulness is in exchanging information

On-line interactive communities... will be communities not of common location, but *of common interest*.... the total number of users...will be large enough to support extensive general purpose [computers]. All of these will be interconnected by telecommunications channels... [to] constitute a labile network of networks--ever changing in both content and configuration."

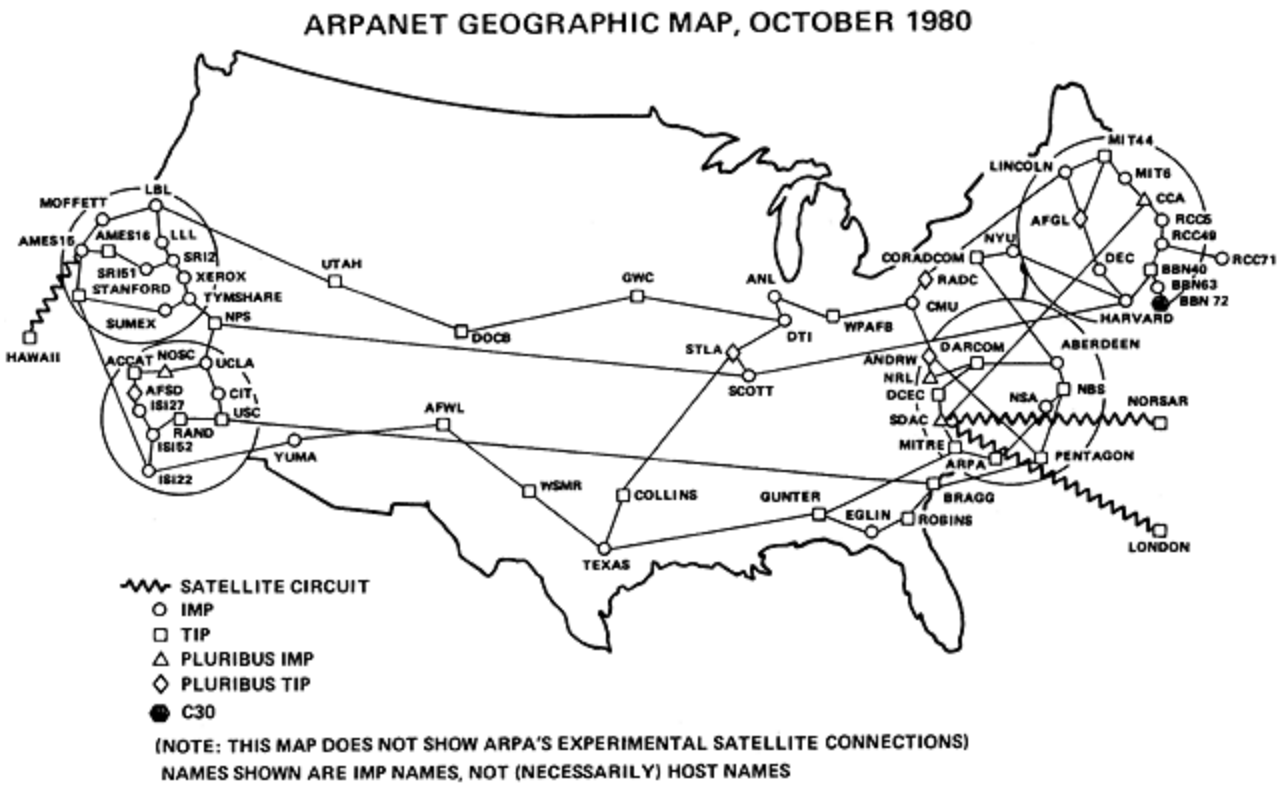
J. C. R. Licklider

Where Did It Come From?

- Early 1960's - DARPA (ARPA in 1960's) project headed by Licklider
- Late 1960's - ARPANET & research on packet switching by Roberts
  - First node installed by BBN (Bolt Beranek and Newmen Companay) at UCLA in September 1969
  - 1969 - Four host computers (UCLA, SRI, UCSB, University of Utah)

Get more info at:
http://www.isoc.org/internet/history/
http://www.packet.cc/internet.html

ARPANET, 1980



http://mappa.mundi.net/maps/maps_001/

History of the Internet

- 1969 – RFCs (Request for Comments) begun by S. Crocker (http://rfc.sunsite.dk/)
- 1972 - Email by Ray Tomlinson & Larry Roberts
- 1970's - TCP by Vint Cerf & Bob Kahn
  - Evolved into TCP/IP, and UDP
- 1980s – Hardware Explosion (LANs, PCs, and workstations)
  - 1983 – Ethernet by Metcalfe
- DNS – Distributed and scalable mechanism for resolving host names into IP addresses
- UC Berkeley implements TCP/IP into Unix BSD
- 1985 – Internet used by researchers and developers

History of the Internet

- Tim Berners-Lee at CERN (the European Internet) in 1989
  - Proposal for WWW in 1990
  - First web page on November 13, 1990
- Hypertext - Text that contains links to other text.
  - Ted Nelson's Xanadu
  - Vannevar Bush's Memex

(http://www.theatlantic.com/unbound/flashbks/computer/bushf.htm)

- W3C

Get more info at:
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Internet : Briefly ..

- A world-wide network of computer networks.
- All connections use TCP/IP
- TCP/IP hides the differences among devices connected to the Internet
- Internet provides several protocols: Telnet, FTP, mailto, HTTP, etc. All with different interfaces. A solution is the World Wide Web

World Wide Web

- Allows users from anywhere on the internet to retrieve documents from any other computers
- The main protocol is the HTTP – HyperText Transfer Protocol
- HTTP provides a standard form of communication between web browsers and web servers.
- Web or Internet?
  - *Internet* is a collection of computers.
  - *Web* is a collection of software and protocols

World Wide Web Success

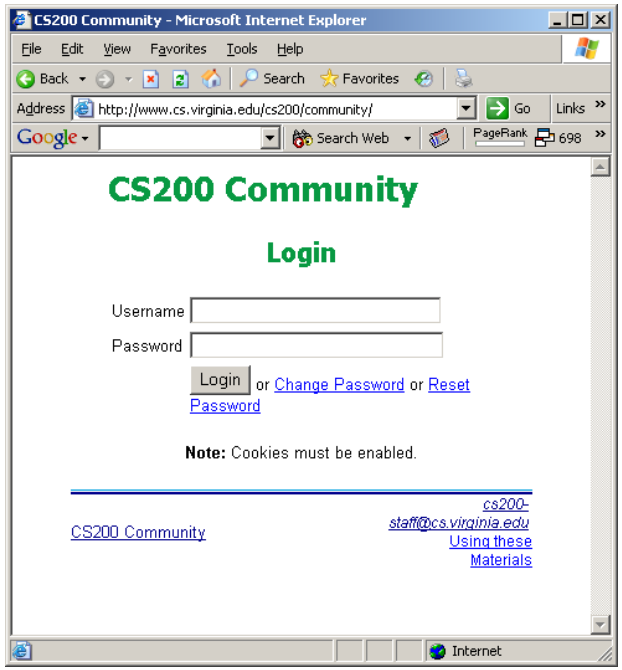
- World Wide Web succeeded because it was **simple**!
  - Didn't attempt to maintain links, just a common way to name things
  - Uniform Resource Locators (URL)

HyperText Transfer Protocol

World Wide Web (cont.)

- Web browsers
  - Programs running on client computers
  - Request for documents using URL
  - *eg. MS Internet Explorer, Netscape*
- Web servers
  - Programs that provide documents to browsers
  - *eg. Apache, IIS (microsoft Internet Information service)*
- URL – Uniform Resource Locator
  - A reference of a document on the web.
  - *eg. http://comp.fsksm.utm.my/**index.html***
  - *http://comp.fsksm.utm.my/images/**logo.jpg***

HyperText Transfer Protocol



Client (Browser)

Server

GET /cs200/community/ HTTP/1.0

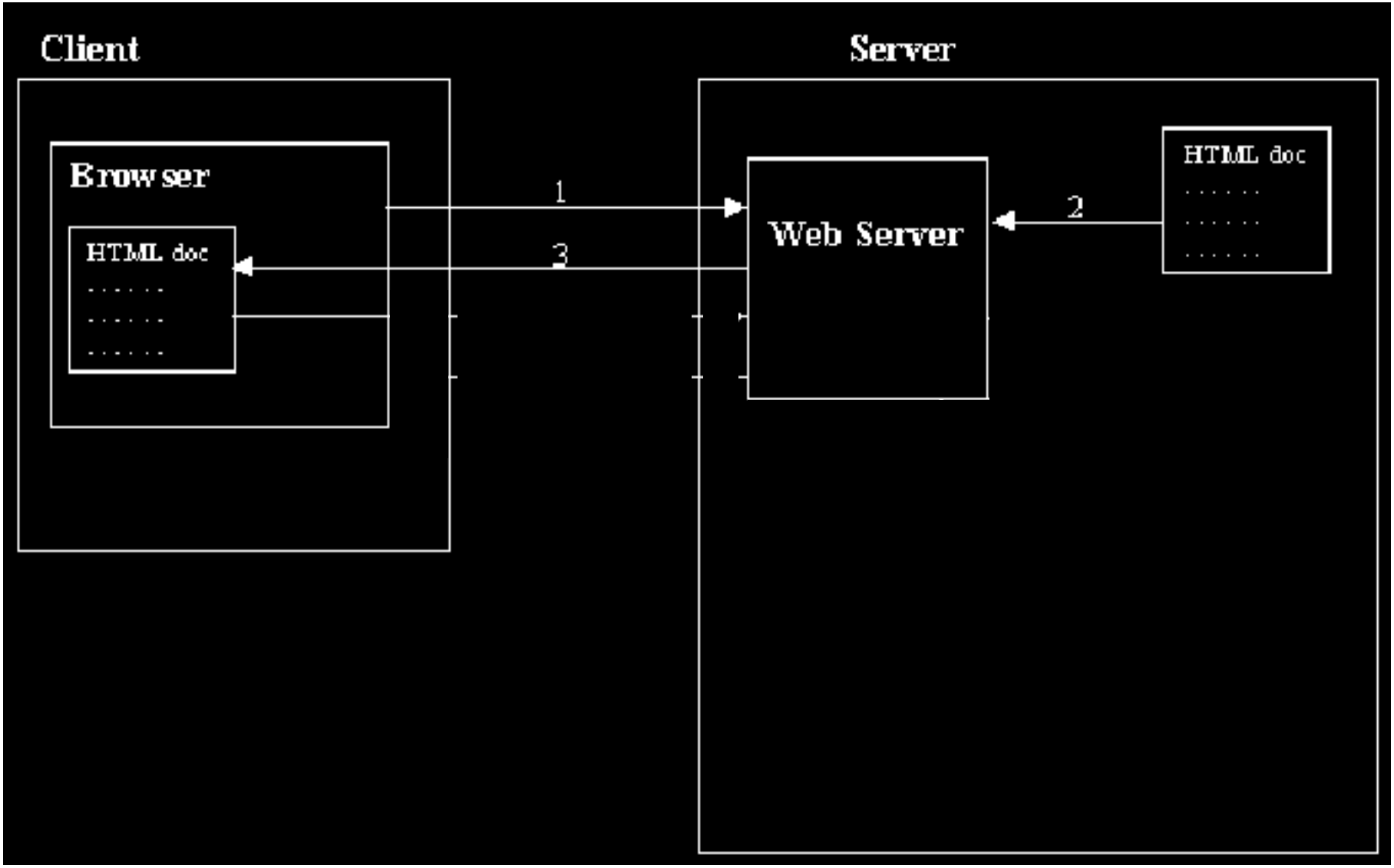
```
<html>
<head>
...
```

Contents of file

HTML
HyperText Markup Language

Web Architechture

How the Web works for static contents (basic architecture)

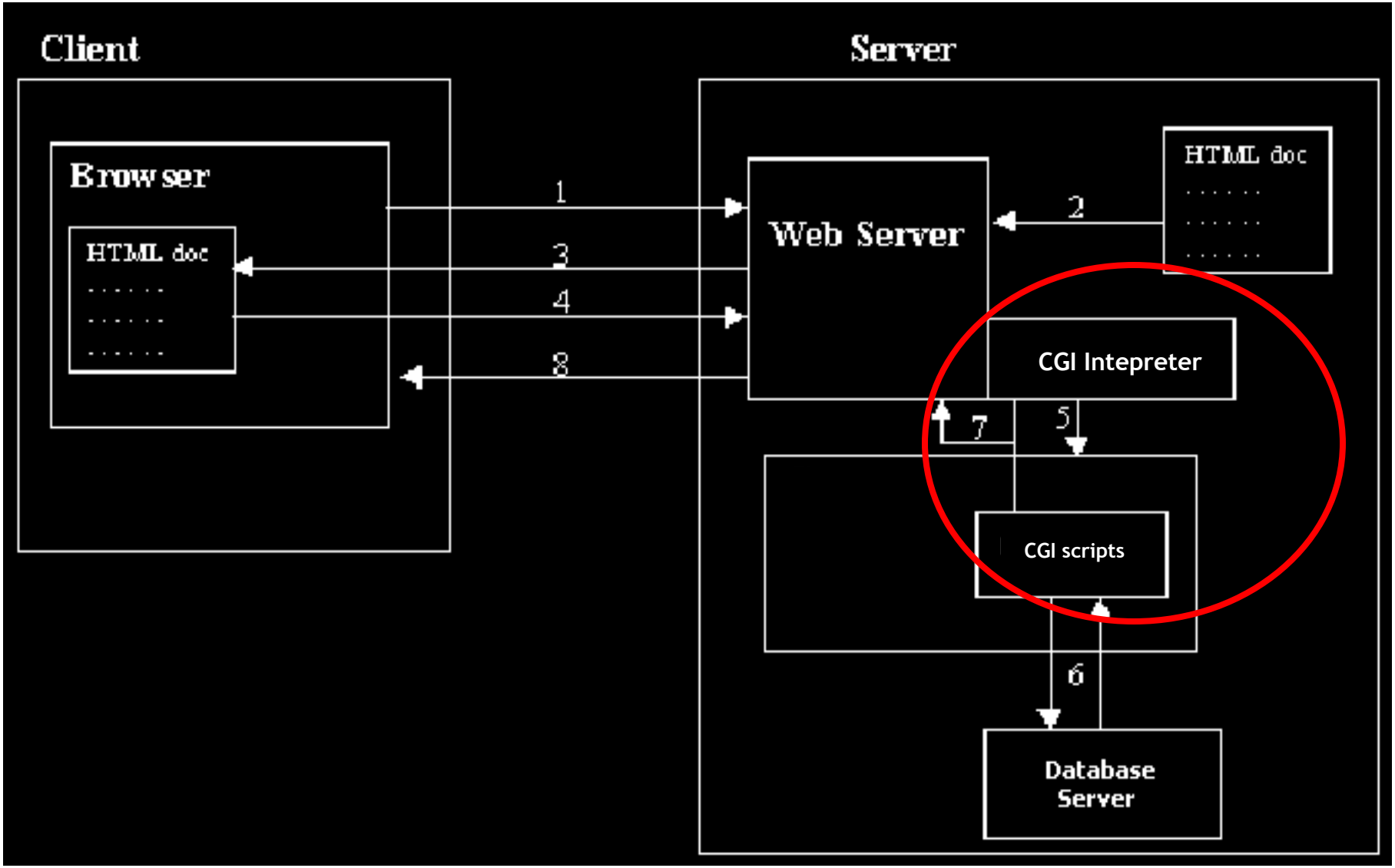


Common Gateway Interface

- An interface specification for communicating the web with other systems.
- HTTP only provides specifications for delivering documents over the web.
- How about access information from databases or other systems or other sources?
  - Need to rewrite the web server program.
  - But can rise other problems.
  - Solution: create an interface => CGI.

Common Gateway Interface (cont.)

How the Web works for dynamic contents



Common Gateway Interface (cont.)

- A CGI program is a program that follows the CGI specifications.
- The main role of CGI programs is producing documents in HTML format – ie. the only language that the web browsers can understand.
- eg. getting data from a database,
  - A CGI program submits SQL queries to the database server.
  - After getting the result, the program formats it into HTML, then give it to the web server.
  - The web servers then passes the HTML document to web browsers.

CGI Programming

- CGI programs can be written using any programming language
- The languages can be categorized into two types: Server-Pages and Conventional CGI
- Server-pages languages:
  - The CGI codes are embedded into HTML
  - *eg. PHP, JSP and ASP*
- Conventional CGI:
  - using common programming languages
  - *eg. C, Pascal, Perl, Python, etc.*

CGI Programming (cont.)

- HTML and CGI

Accessing cgi program through a form

```
<form method="POST" name="form1" action="login.php">
        ……..
                ……..
</form>
```

Accessing cgi program through an URL

eg. ***http://comp.fsksm.utm.my/****view.php? id=1235&order=ASC*

HTML vs. Javascript vs. CGI

- HTML
  - is the main language for delivering document over the web.
  - is the only language that web browsers can understand.

- Javascript
  - Documents that are created by HTML are static. HTML doesn't support logical features.
  - Javascript is used to make the document dynamic.
  - Eg. before we can perform any delete operation, the browser should ask the user first for confirmation. This cannot be done by the HTML. Javascript can.

- CGI
  - Javascript is executed at client computers – ie. in web browsers. It is called client-side scripting language.
  - Databases or other resources are located at the server computer. We need another programs to access them – ie. CGI programs.
  - CGI languages such as PHP, JSP, Perl, etc are called server-side scripting languages, because they are executed at the server.

Scripting language that we are going to learn at server and client side