



Computer Science 50

Introduction to Computer Science I

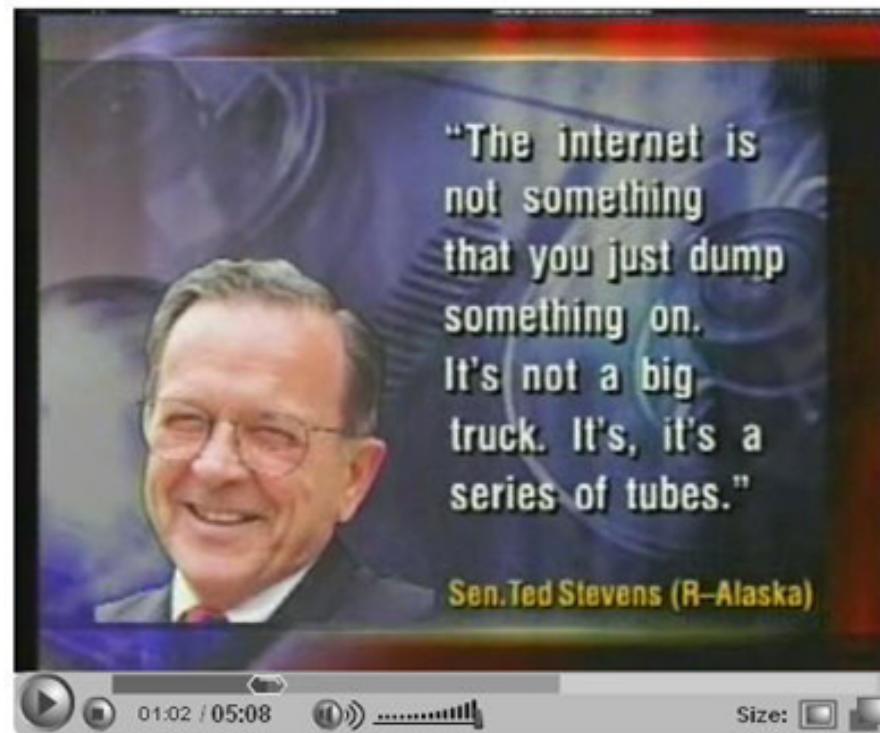
Harvard College

Week 8

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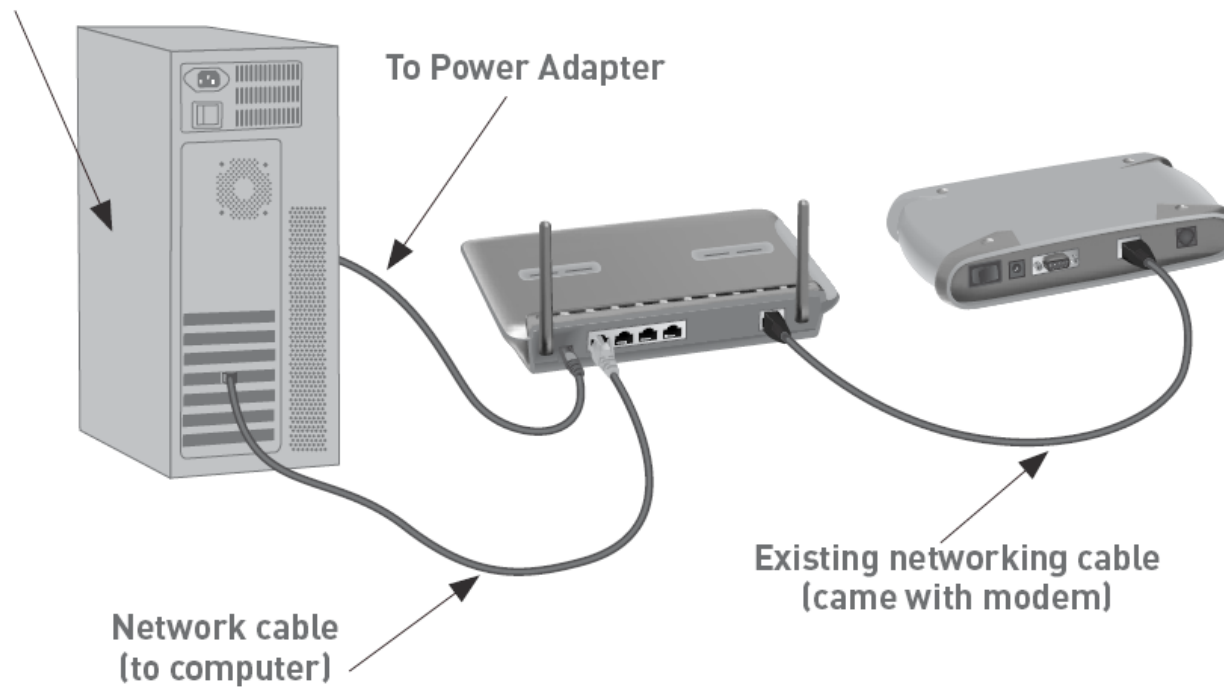
The Internet

Jon Stewart on Net Neutrality

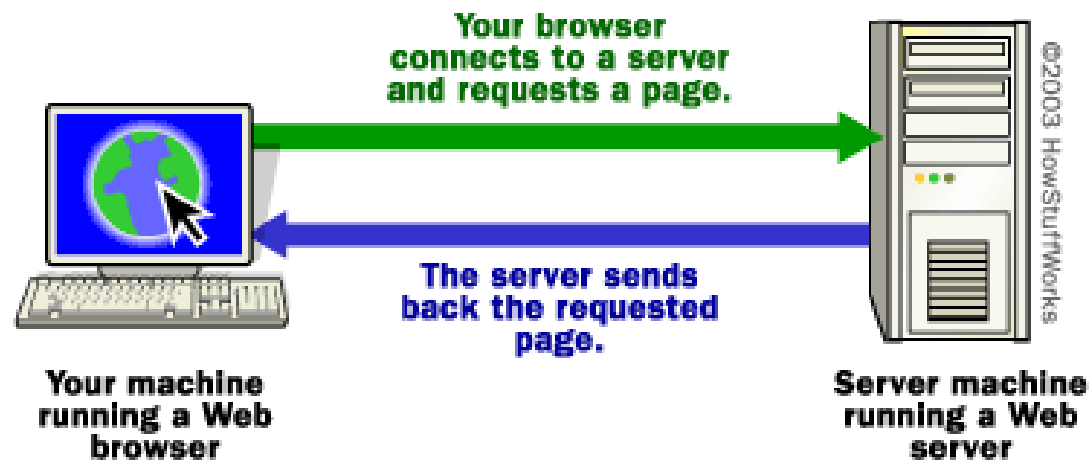


TCP/IP

Mac or PC computer that was originally connected to the cable or DSL modem



HTTP



Domain Names



Top-Level Domains (TLDs)

:: .biz	:: .aero	:: .us
:: .com	:: .asia	:: ...
:: .edu	:: .cat	
:: .gov	:: .coop	
:: .info	:: .jobs	
:: .int	:: .mobi	
:: .mil	:: .museum	
:: .name	:: .pro	
:: .net	:: .tel	
:: .org	:: .travel	

DNS Records

- :: A
- :: CNAME
- :: MX
- :: NS
- :: ...

DNS Records

Name	Type	Value	Select
mail	A	64.131.79.130	<input type="checkbox"/>
malanrouge.com.	A	64.131.79.130	<input type="checkbox"/>
www	A	64.131.79.130	<input type="checkbox"/>
malanrouge.com.	NS	ns1.cs75.net.	<input type="checkbox"/>
malanrouge.com.	NS	ns2.cs75.net.	<input type="checkbox"/>
mail	MX	10	<input type="checkbox"/>
supernews	CNAME	cnn.com.	<input type="checkbox"/>
malanrouge.com.	TXT	"v=spf1 a mx ip4:64.131.79.130 ?all"	<input type="checkbox"/>

DNS Records

```
$TTL 14400
@          IN      SOA     ns1.cs75.net.      root.malanrouge.com. (
                                2008020202
                                14400
                                3600
                                1209600
                                86400 )

malanrouge.com. 14400  IN      NS       ns1.cs75.net.
malanrouge.com. 14400  IN      NS       ns2.cs75.net.

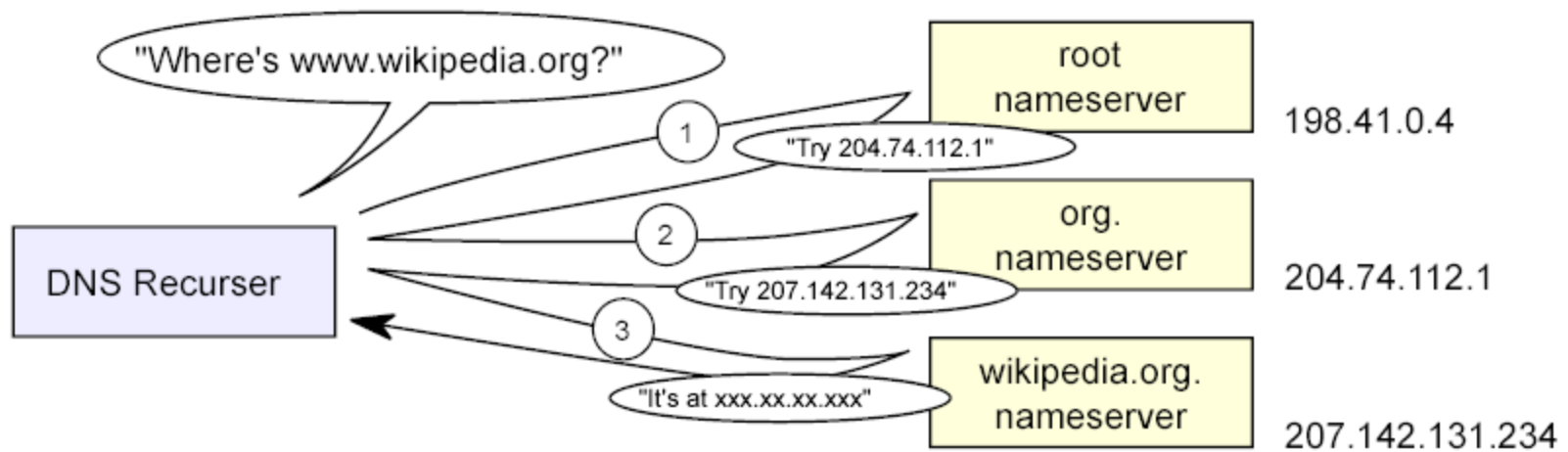
mail          14400  IN      A        64.131.79.130
malanrouge.com. 14400  IN      A        64.131.79.130
www          14400  IN      A        64.131.79.130

malanrouge.com. 14400  IN      MX       10 mail

supernews    14400  IN      CNAME    cnn.com.

malanrouge.com. 14400  IN      TXT      "v=spf1 a mx ip4:64.131.79.130 ?all"
```

DNS Lookups



Web Hosting



Web Panels



Your Account

- | | |
|------------------------|----------------------------------|
| Domain Setup | Site Summary / Statistics / Logs |
| Change Password | Subdomain Management |
| Login History | Frontpage Extensions |
| DNS Management | MySQL Management |
| Support Center | Password Protected Directories |
| Installed Perl Modules | File Manager |
| Create/Restore Backups | |



E-Mail Management

- | | |
|--------------------|-----------------------|
| E-Mail Accounts | Mailing Lists |
| Catch-All E-Mail | SPAM Filters |
| Forwarders | Webmail: Squirrelmail |
| Autoresponders | Webmail: UebiMiau |
| Vacation Messages | Webmail: Roundcube |
| Spamassassin Setup | MX Records |



Advanced Features

- | | |
|--------------------|--------------------|
| Server Information | Custom Error Pages |
| SSL Certificates | phpMyAdmin |
| Cronjobs | Site Redirection |
| Mime Types | Domain Pointers |
| Apache Handlers | |

XHTML

```
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>hello, world</title>
  </head>
  <body>
    hello, world
  </body>
</html>
```

XHTML

```
<element attribute="value"></element>
```

```
<element attribute="value" />
```

chmod

- :: PHP files
 - :: 600
- :: Directories
 - :: 711 (to access contents)
 - :: 755 (to see contents)
- :: Everything Else (XHTML, CSS, GIF, JS, JPEG, ...)
 - :: 644

CSS

```
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <style type="text/css">
      <!--

      -->
    </style>
    <title>hello, world</title>
  </head>
  <body>
    hello, world
  </body>
</html>
```


CSS

```
element
{
  property: value;
  property: value;
}
```

```
#id
{
  property: value;
  property: value;
}
```

```
.class
{
  property: value;
  property: value;
}
```

CSS

```
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <link href="styles.css" rel="stylesheet" type="text/css" />
    <title>hello, world</title>
  </head>
  <body>
    hello, world
  </body>
</html>
```

Cross-Browser Issues

- :: Chrome
- :: Firefox
- :: Internet Explorer
- :: Opera
- :: Safari
- :: ...

<http://browsershots.org/>

Validation

<http://validator.w3.org/>



Forms



Forms

:: Text Fields

```
<input name="email" type="text" />
```

:: Text Areas

```
<textarea name="comments" rows="24" cols="80"></textarea>
```

:: Password Fields

```
<input name="password" type="password" />
```

:: Checkboxes

```
<input name="save" type="checkbox" />
```

:: Radio Buttons

```
<input name="gender" type="radio" value="F" />
```

```
<input name="gender" type="radio" value="M" />
```

:: Drop-Down Menus

```
<select name="dorm">  
  <option value=""></option>  
  <option value="Matthews"></option>  
  <option value="Weld"></option>  
</select>
```

PHP

<http://us3.php.net/manual/en/>



Variables

- :: `boolean`
- :: `integer`
- :: `float`
- :: `string`

- :: `array`
- :: `object`

- :: `resource`
- :: `NULL`

- :: `mixed`
- :: `number`
- :: `callback`

Superglobals

```
:: $_COOKIE  
:: $_ENV  
:: $_FILES  
:: $_GET  
:: $_POST  
:: $_REQUEST  
:: $_SERVER  
:: $_SESSION
```

Arrays

<http://us2.php.net/array>

Loops

```
:: for  
:: while  
:: do ... while  
:: foreach
```

Regular Expressions

<http://us3.php.net/pcre>

Regular Expression	Will match...
foo	The string "foo"
^foo	"foo" at the start of a string
foo\$	"foo" at the end of a string
^foo\$	"foo" when it is alone on a string
[abc]	a, b, or c
[a-z]	Any lowercase letter
[^A-Z]	Any character that is not a uppercase letter
(gif jpg)	Matches either "gif" or "jpeg"
[a-z]+	One or more lowercase letters
[0-9\.\-]	Any number, dot, or minus sign
^[a-zA-Z0-9_]{1,}\$	Any word of at least one letter, number or _
([wx])([yz])	wy, wz, xy, or xz
[^A-Za-z0-9]	Any symbol (not a number or a letter)
([A-Z]{3} [0-9]{4})	Matches three letters or four numbers

Language Reference

<http://us2.php.net/manual/en/langref.php>

Mispellings

```
$dictionary[$word] = 1;
```

Cookies



Image from sgc.se.

Sessions



SQL

:: CREATE TABLE

:: DROP TABLE

:: . . .

MySQL Types

```
:: CHAR
:: VARCHAR
:: TEXT
:: TINYTEXT
:: MEDIUMTEXT
:: LONGTEXT

:: DATE
:: DATETIME
:: YEAR
:: TIME
:: TIMESTAMP

:: TINYINT
:: SMALLINT
:: MEDIUMINT
:: INT
:: BIGINT

:: FLOAT
:: DOUBLE
:: DECIMAL

:: TINYBLOB
:: BLOB
:: MEDIUMBLOB
:: LONGBLOB

:: BINARY
:: VARBINARY
:: ENUM
:: SET
```

Indexes, Constraints

- :: PRIMARY KEY
- :: INDEX
- :: UNIQUE
- :: FULLTEXT

SQL

:: SELECT

:: INSERT

:: UPDATE

:: DELETE

:: . . .

MySQL Functions

<http://dev.mysql.com/doc/refman/5.0/en/functions.html>

:: `AES_ENCRYPT(key, key_str)`

:: `DATE_FORMAT(date, format)`

http://dev.mysql.com/doc/refman/5.0/en/date-and-time-functions.html#function_date-format

:: `TIME_FORMAT(time, format)`

http://dev.mysql.com/doc/refman/5.0/en/date-and-time-functions.html#function_time-format

:: ...

JOIN

Employees:

Employee_ID	Name
01	Hansen, Ola
02	Svendson, Tove
03	Svendson, Stephen
04	Pettersen, Kari

Orders:

Prod_ID	Product	Employee_ID
234	Printer	01
657	Table	03
865	Chair	03

```
SELECT Employees.Name, Orders.Product
FROM Employees, Orders
WHERE Employees.Employee_ID=Orders.Employee_ID
```

JOIN

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SELECT Employees.Name, Orders.Product  
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```

Name	Product
Hansen, Ola	Printer
Svendson, Stephen	Table
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JOIN

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```
SELECT Employees.Name, Orders.Product
FROM Employees
JOIN Orders ON Employees.Employee_ID=Orders.Employee_ID
```

Name	Product
Hansen, Ola	Printer
Svendson, Stephen	Table
Svendson, Stephen	Chair

Race Conditions



Atomic Queries

```
INSERT INTO table (a,b,c) VALUES (1,2,3)
ON DUPLICATE KEY UPDATE c=c+1;

UPDATE table SET c=c+1 WHERE a=1;
```

Transactions (InnoDB)

```
START TRANSACTION;  
UPDATE account SET balance = balance - 1000 WHERE number = 2;  
UPDATE account SET balance = balance + 1000 WHERE number = 1;  
COMMIT;
```

Transactions (InnoDB)

```
START TRANSACTION;  
UPDATE account SET balance = balance - 1000 WHERE number = 2;  
UPDATE account SET balance = balance + 1000 WHERE number = 1;  
SELECT balance FROM account WHERE number = 2;  
# select tells us that account #2 has a negative balance!  
# we'd better abort  
ROLLBACK;
```

Transactions (InnoDB)

- 1) Log In
- 2) Register
- 3) Get Quotes
- 4) Sell Stocks
- 5) Buy Stocks
- 6) History
- 7) . . .

C\$50 Finance

- 1) Log In
- 2) Register
- 3) Get Quotes
- 4) Sell Stocks
- 5) Buy Stocks
- 6) History
- 7) . . .

CSV



“RTFM”

- :: **PHP Manual**

<http://us.php.net/manual/en/>

- :: **MySQL 5.0 Reference Manual**

<http://dev.mysql.com/doc/refman/5.0/en/>

Recommended Reading

:: **TCP/IP Tutorial**

<http://www.w3schools.com/tcpip/>

:: **How Web Servers Work**

<http://computer.howstuffworks.com/web-server.htm>

:: **XHTML Tutorial**

<http://www.w3schools.com/xhtml/>

:: **CSS Tutorial**

<http://www.w3schools.com/css/>

:: **PHP Tutorial**

<http://www.w3schools.com/php/>

:: **SQL Tutorial**

<http://www.w3schools.com/sql/>

Good Luck!





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