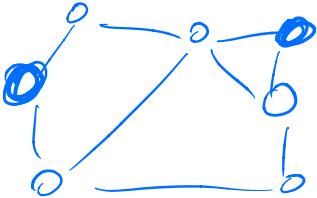


# François Bézier

web-programming.org

Internet - 1969



file transfer protocol  
ftp / email

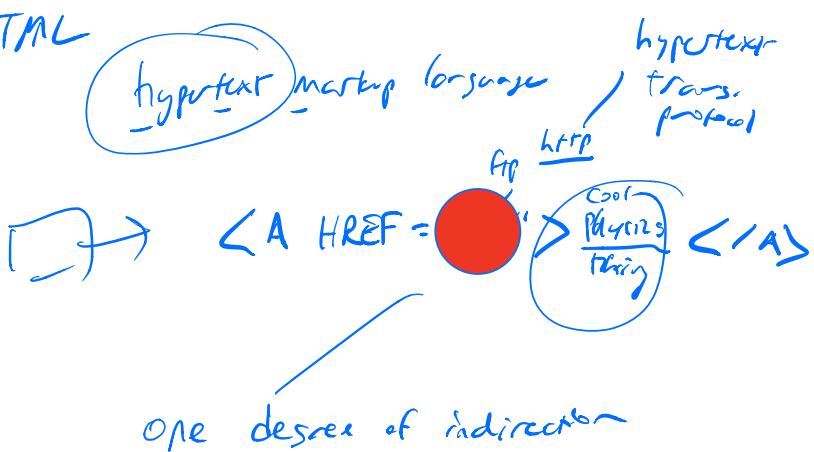
f1! f2 ! (f3) ! f4 ! - @ -  
single point of failure

SMTP

gopher

Tin Børres-Lee CERN

HTML

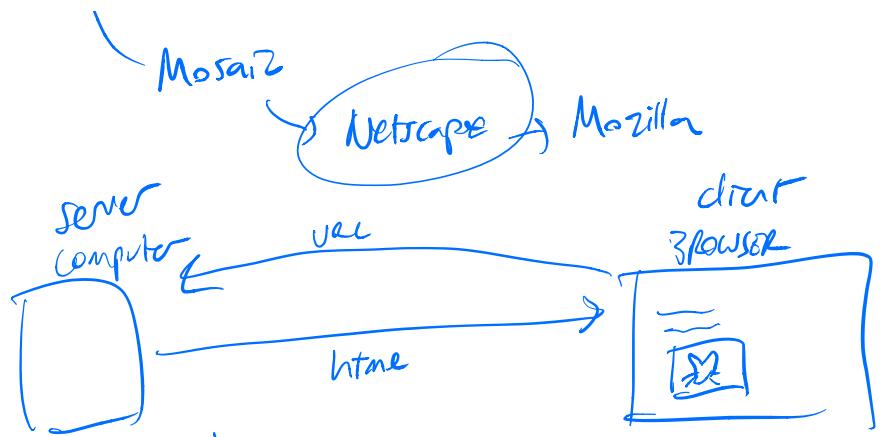


one degree of indirection

NCSA

<IMG SRC="">

\



HTTP  
— STATELESS

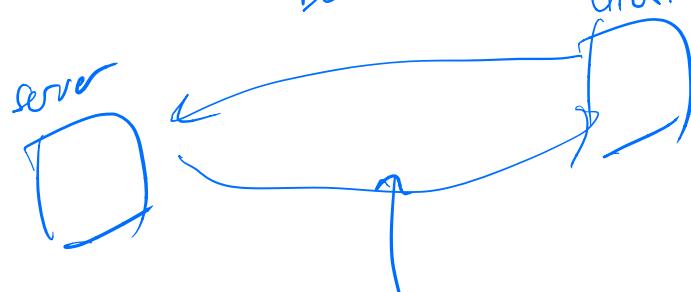
Wait for a URL  
decode URL  
Find directory - file  
Send it

Tim Berners-Lee

httpd

Apache — nginx

GET POST FORM  
BUTTONS



SUPER SLOW  
Network  
Server computation  
2400 bps

Surf HotJava Browser 1.0

] safe!  
sandbox

Mirror.EF  
↓  
ActiveX

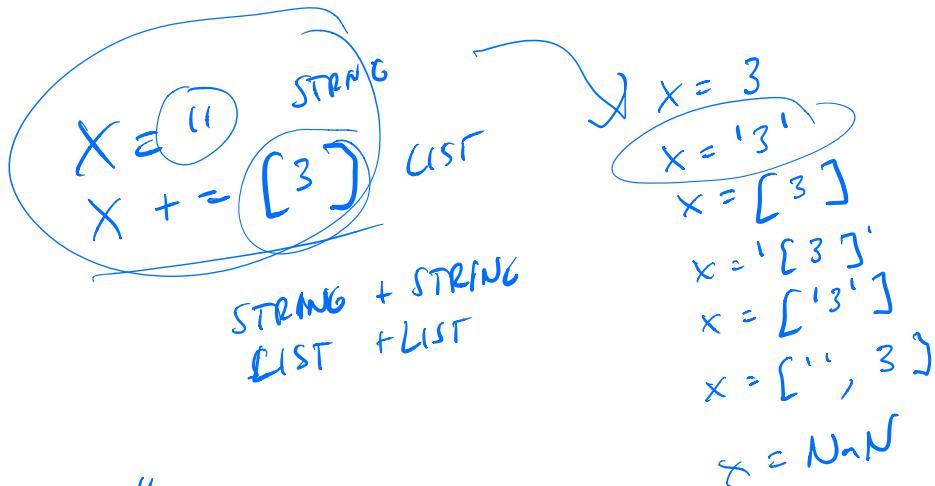
applet

Brandon Eich ~ JavaScript

/  
dynamically typed

Object-Oriented x

X = ""  
X = 1.0  
X += [3]  
X +=   



"WAT"

TypeScript

$x: string$   
 $x += [ ]$

$x = any$

console.log()

WASM  
Web Assembly

C C++ Rust  
~~JS~~  
assembly

$x = \overbrace{x + 1}^{INC AX}$

$x = \overbrace{x + 1}^{WTF ?}$

$X++$

David Ursar

↳ self

GC

generational GC

↑  
IF

JIT

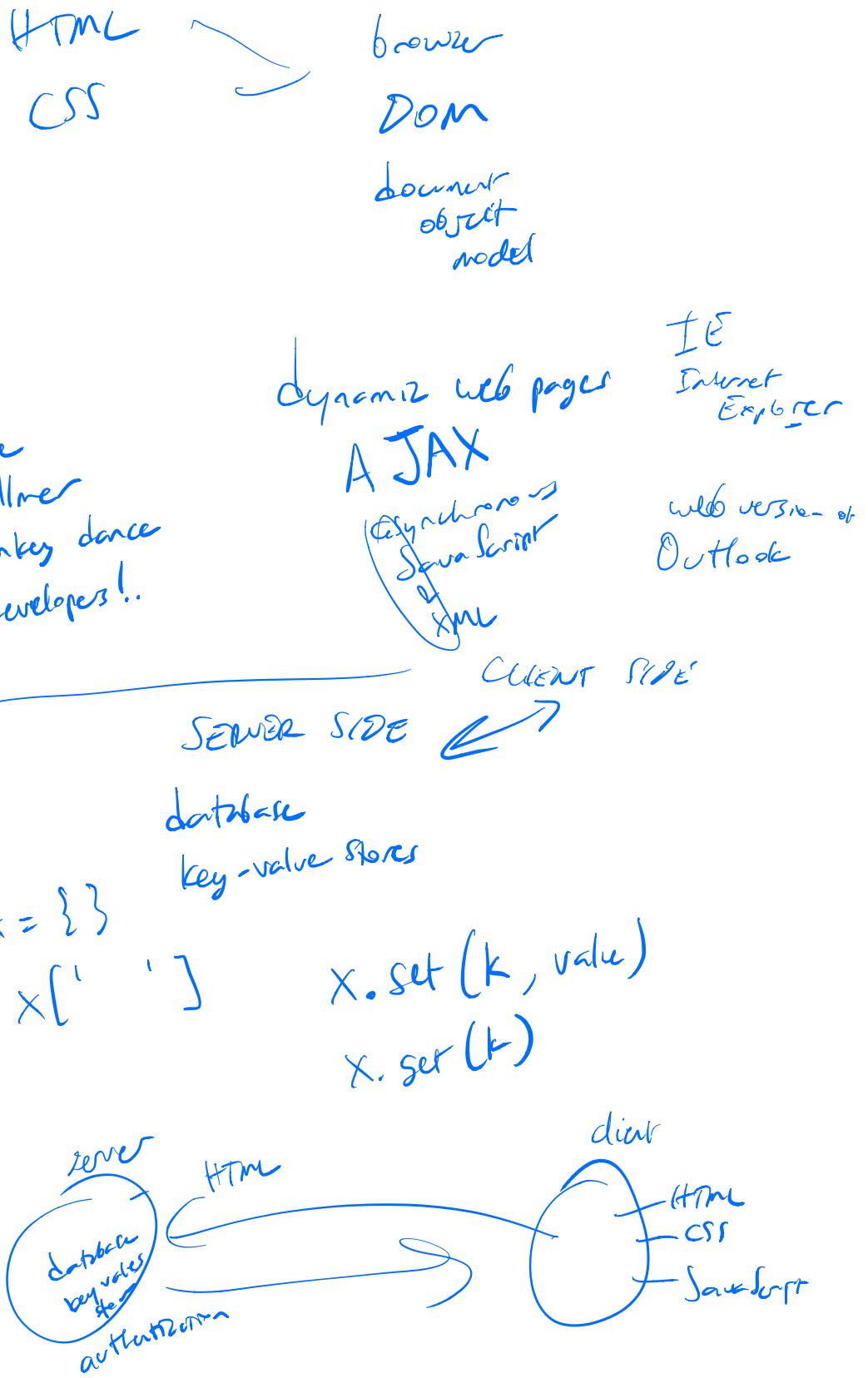
Craig Chambers

Urs Holzle

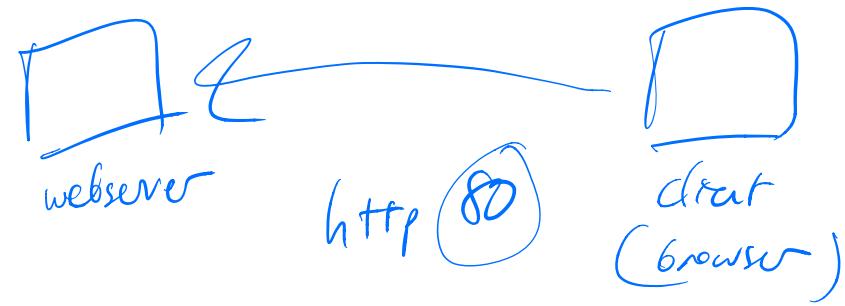
Google

just-in-time compiler

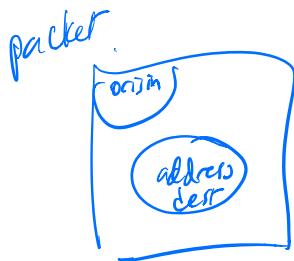
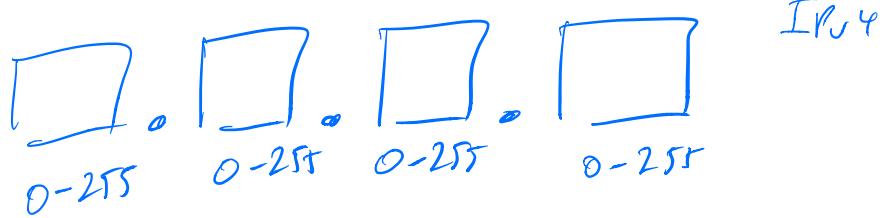
lead architect of V8 JIT



## Security through obscurity



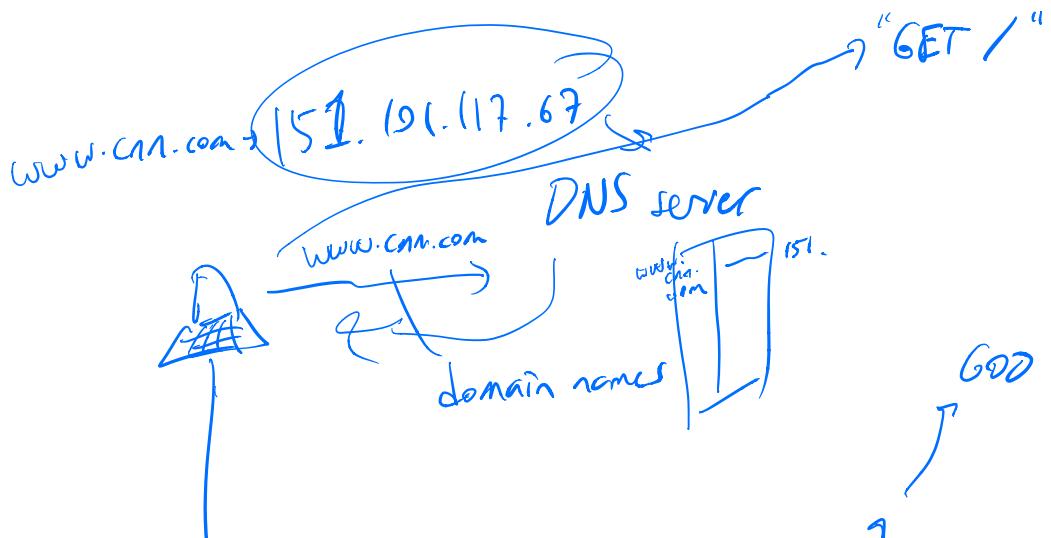
(IP address)

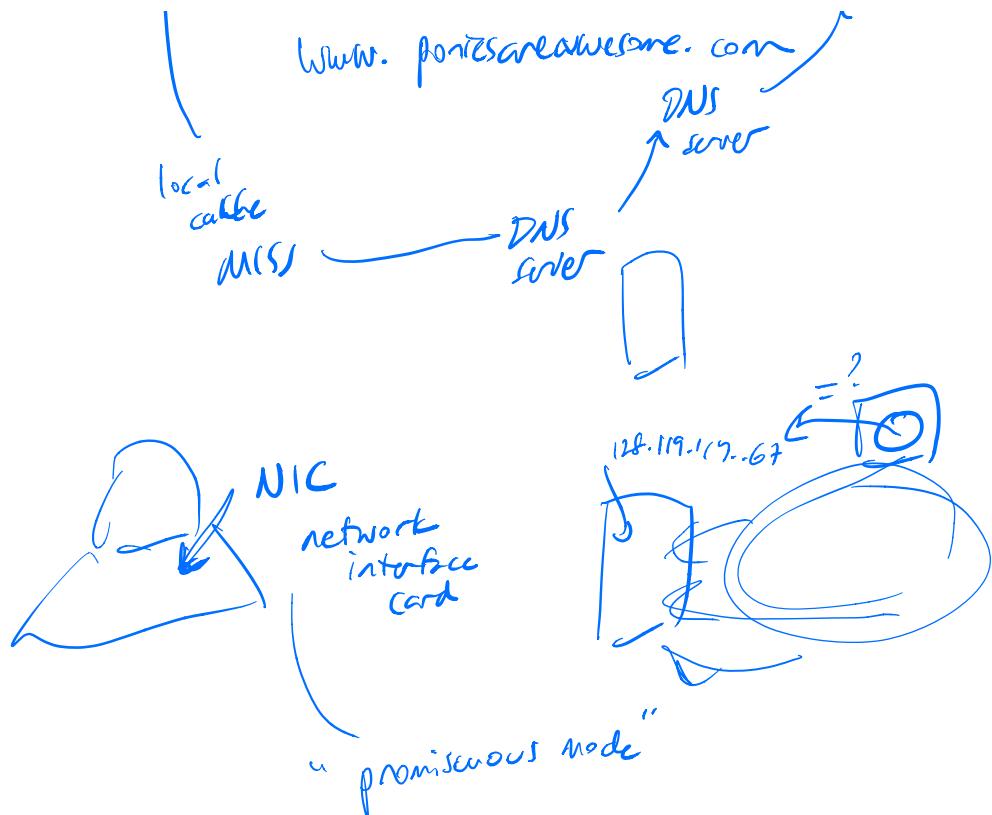


"localhost"

→ 127.0.0.1

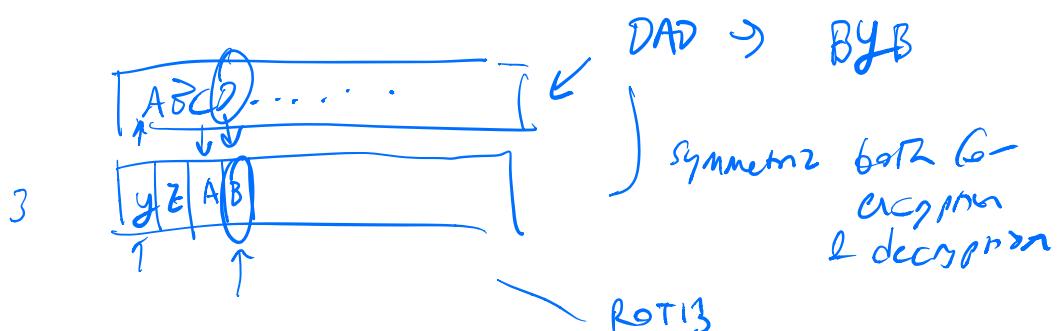
128.119.101.3



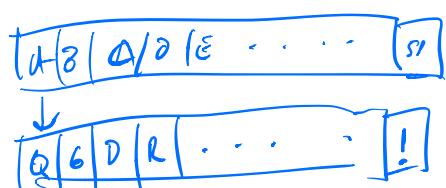


https    secure    RSA  
Symmetric encryption

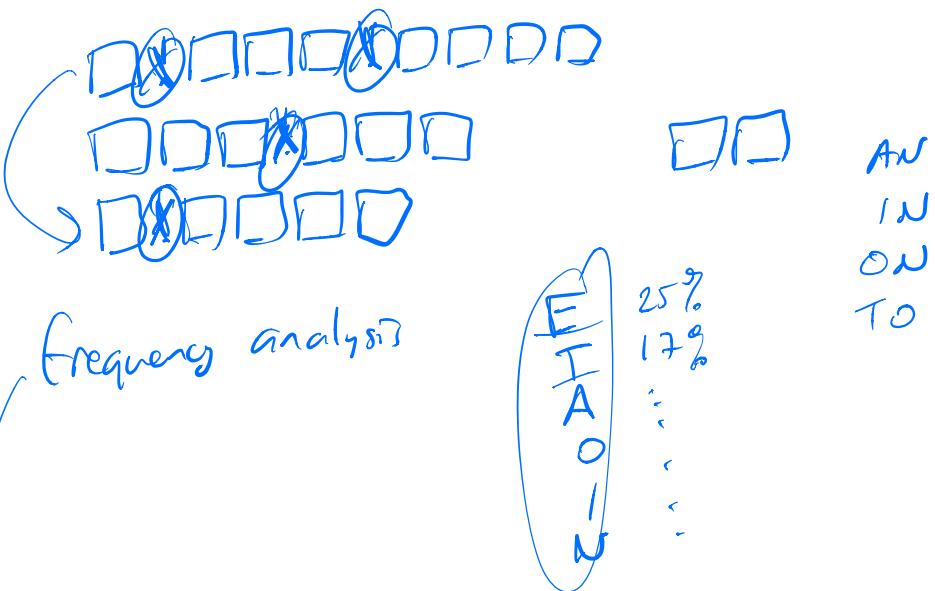
Caesar cipher



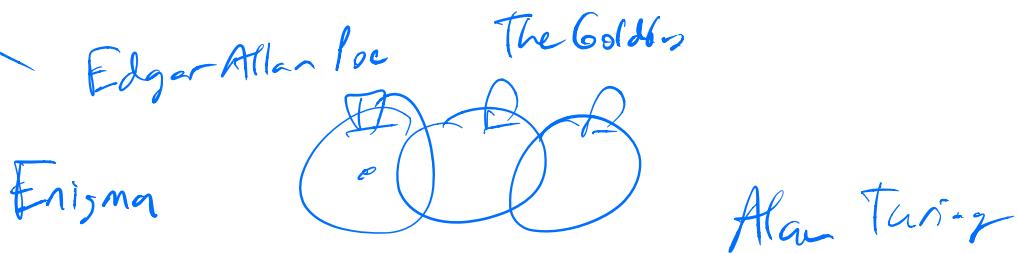
transposition cipher



$$\frac{26!}{2} \gg \frac{26}{2}$$



CXME\_TZ\_TQE\_MAZZ



"computer"  
automatic computers  
key - private secret!

RSA  
Rivest  
Shamir  
Adleman

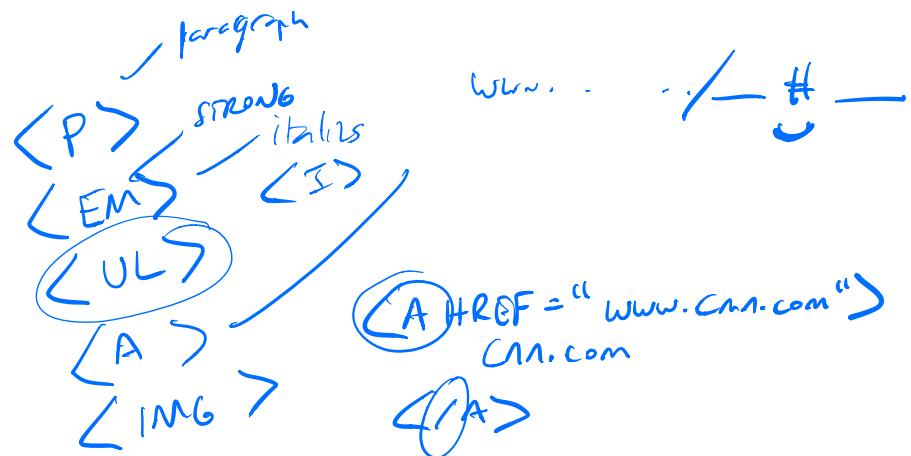
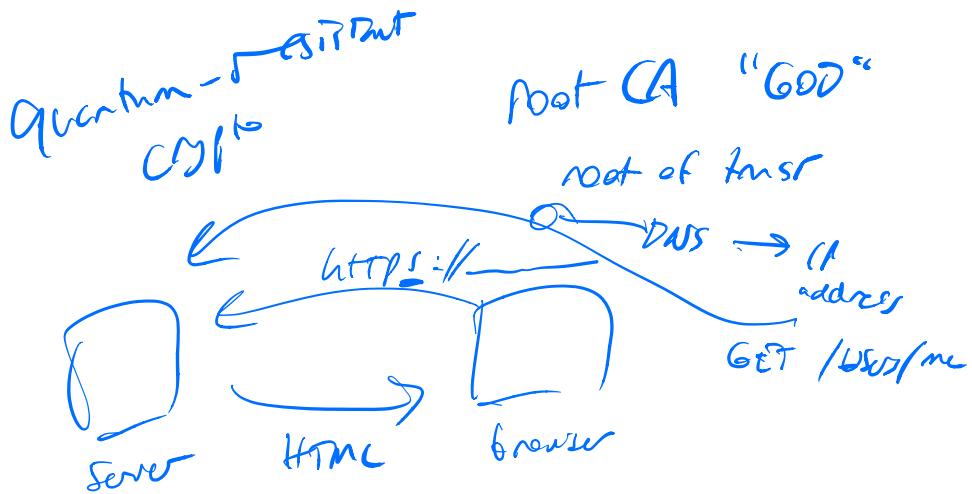
public key encryption  
hardness of  
factoring prime numbers

$$q = p_1 \times p_2$$

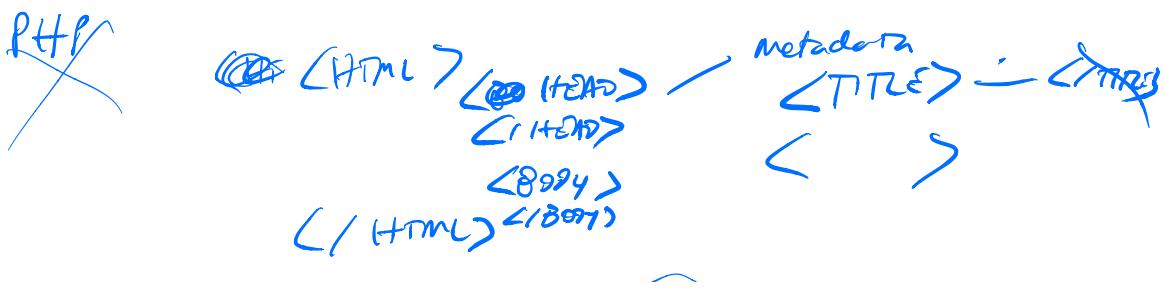
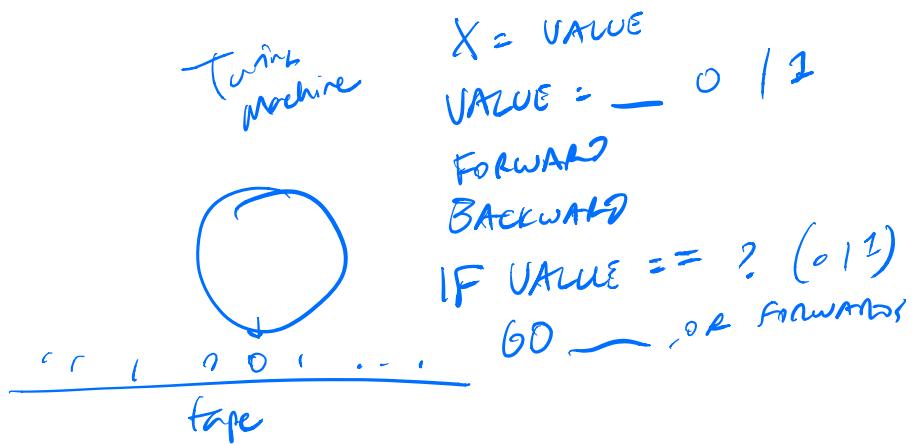
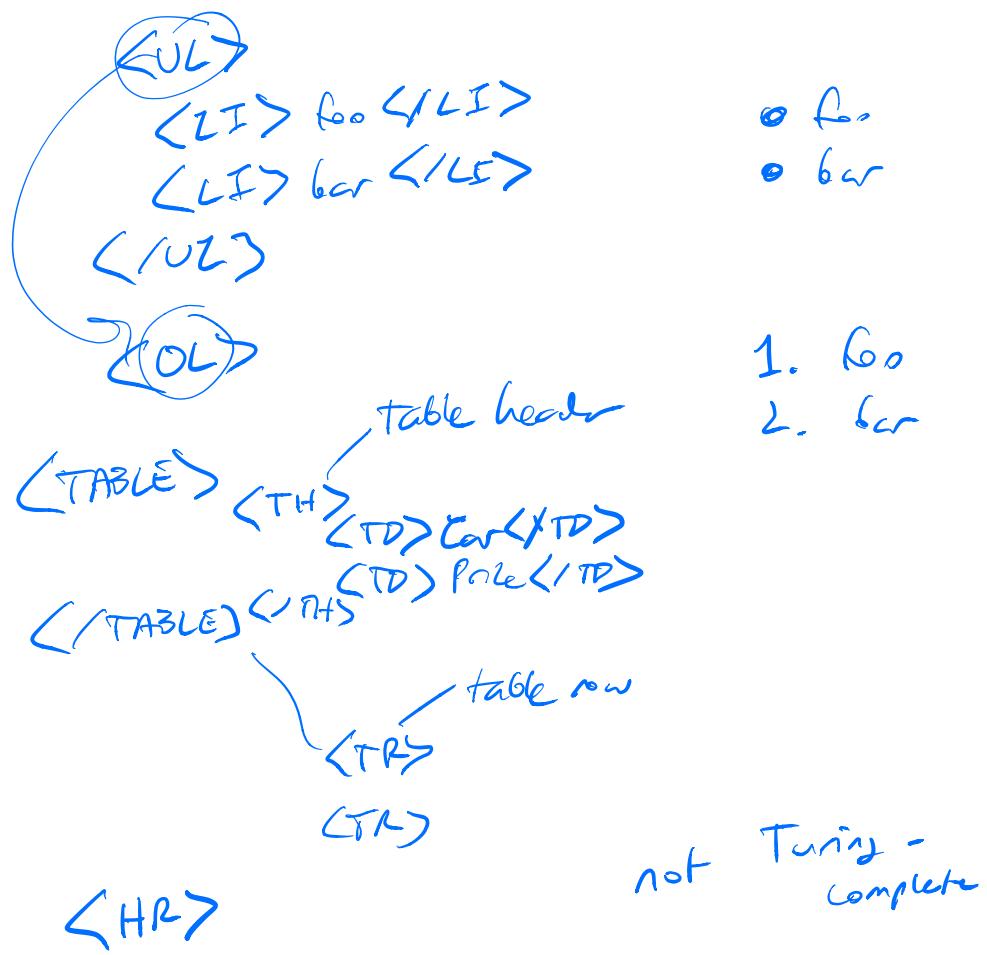
https

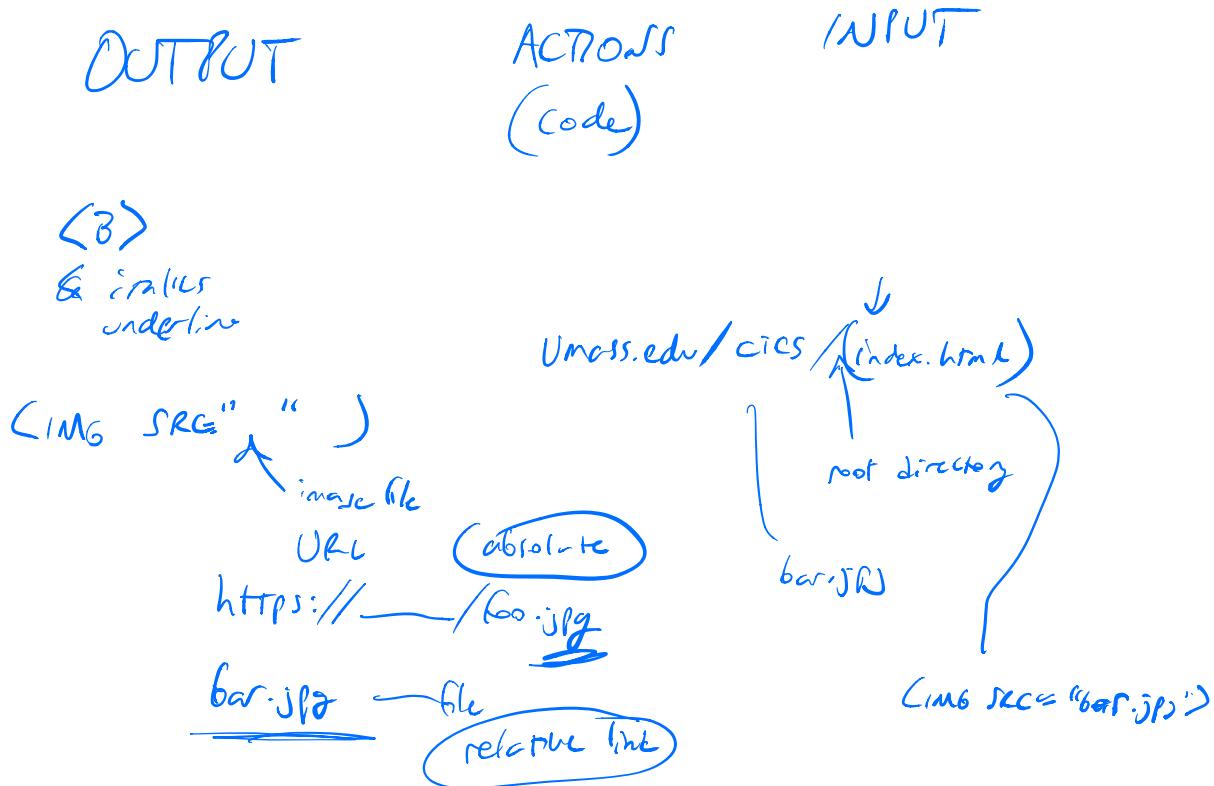
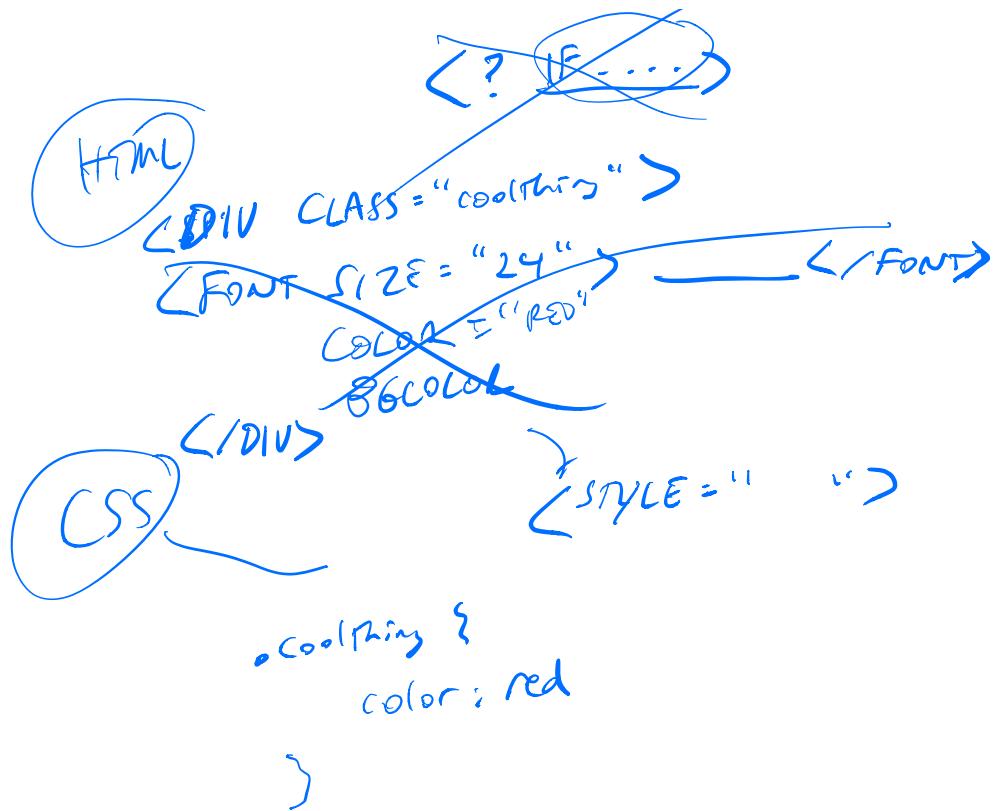
PKI public key infrastructure

CA Certificate authorities

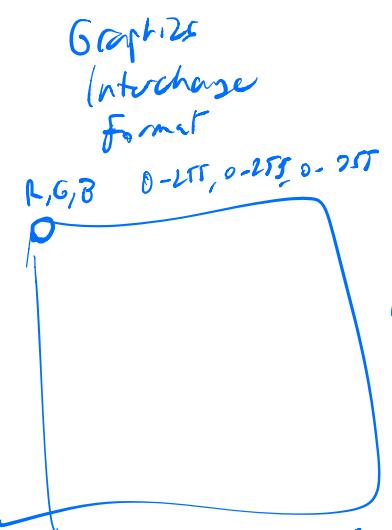


`<P>` ~  
~~~~~  
`</P>`  
`<P>` ~~~~~  
`</P>`





GIF



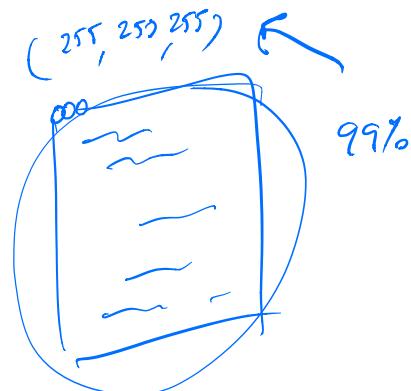
JPEG

Lossy

PNG

Portable  
graphics

TIFF



99%

Compression

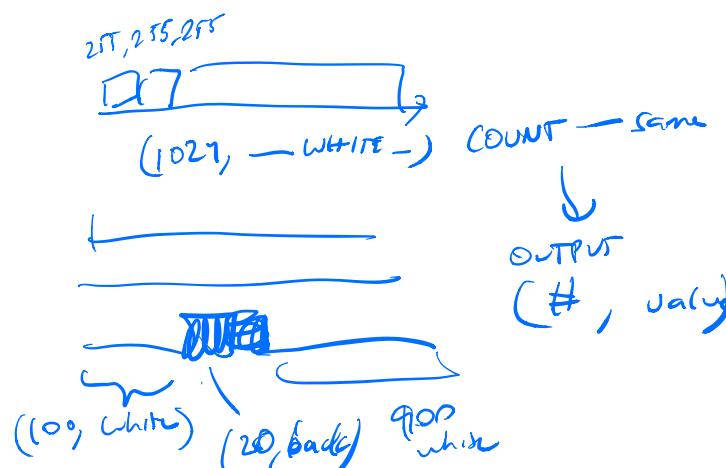
RLE  
run-length  
encoding

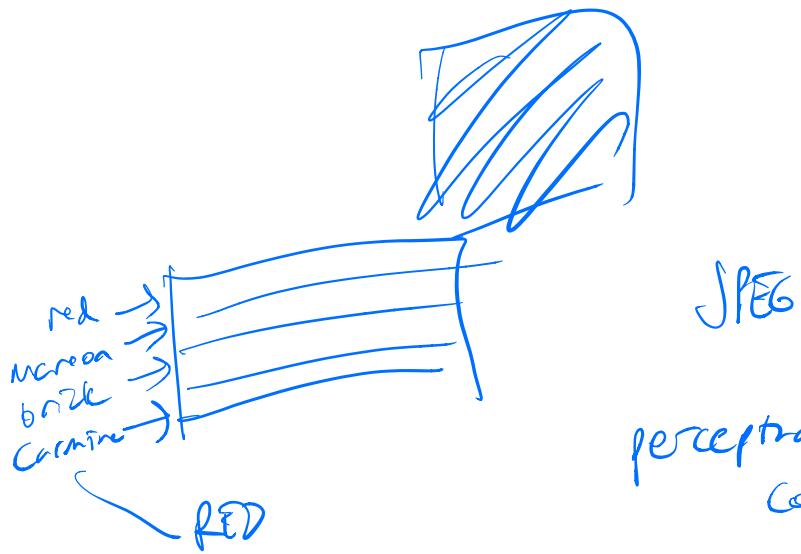
JPEG

Lossy — graphic - original & compressed ) loses information

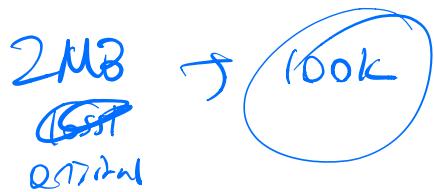
LOSSLESS — =

GIF PNG





perceptual-based  
compression



MPEG

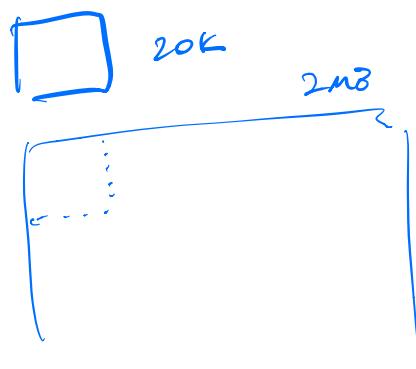
load speed

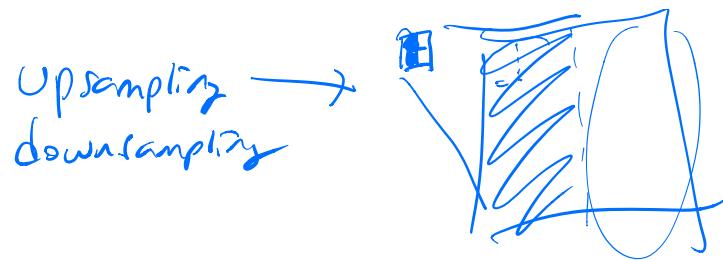
GIF

LZ77  
length=2<sup>10</sup>

<IMG SRC = " "  
HEIGHT =  $\frac{2\text{in}}{\text{2in}}$   
WIDTH =  $\frac{2\text{in}}{\text{2in}}$  >

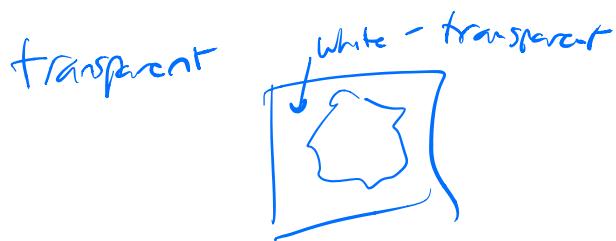
X image editor  
Save it at  
desired size



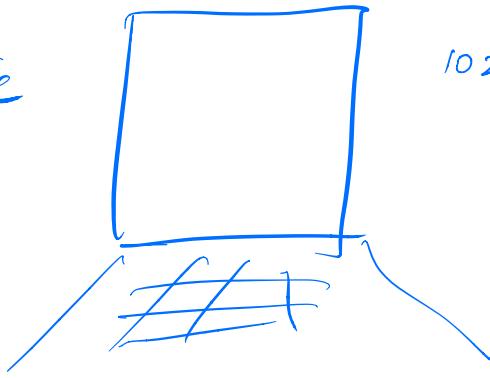


w  
l aspect ratio

A hand-drawn diagram of a rectangle with its width labeled 'w' and its height labeled 'l'. The text "aspect ratio" is written next to the rectangle.



Screens used to be



"responsive" — dynamically adjusts  
desktop & mobile

Bootstrap style and layout

"favicon"

<link rel="icon" href="--" />

audio  
video

<audio>  
<video>

}

HTML5

Adobe  
Flash

Action Script

vector for malware

Apple II, Apple II plus  
visiCalc

Apple III  
IIc

Xerox PARC

Palo Alto Research Center

laser printer

Java -  
no buffer overflow  
no use after free  
- GC

Steve Jobs

- iPhone

X Flash - Adobe  
X Java - sun/ oracle

death  
of  
Java  
on  
"client"

AT&T  
- Bell Labs

Unix C  
modem

IBM - TJ Watson  
Research Lab

Microsoft

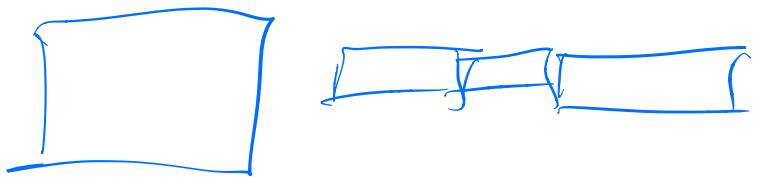
MS-DOS  
PC-DOS

Microsoft Research

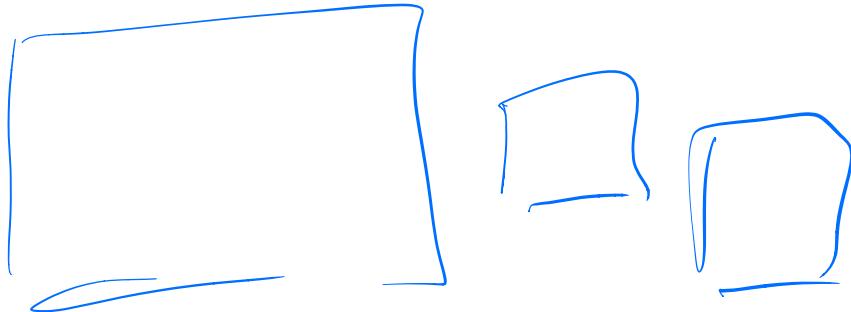
STYLE="" CLASS=""

getS(↓)

<DIV> .. </DIV> → p → CSS  
<SPAN> .. </SPAN> → .



<IMG>      <VIDEO>      <AUDIO>      ALT = " " → accessibility  
but man alt tag.

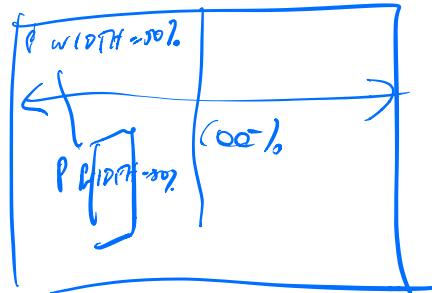


## HTML layout

“block” table  
(P)

:

← cm  
→ in  
→ px  
<P WIDTH = “50%”>



OUTPUT

ACTIONS

```

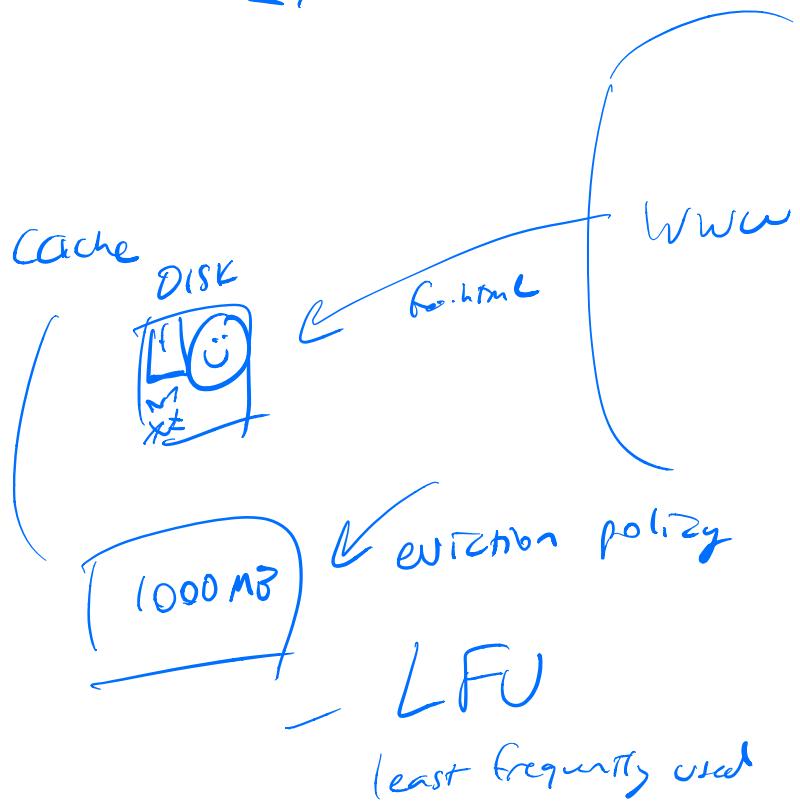
graph LR
    A["<script>"] -- "fountain" --> B["<script>"]
    A -- "X" --> C["<script src='\\'><script>"]
    C -- "file" --> D["foo.js"]
    B -- "INLINE JS" --> E["</script>"]
    C -- "INLINE JS" --> F["</script>"]
    D -- "INLINE JS" --> G["</script>"]
  
```

INLINE JS

EXTERNAL JS

INLINE JS WITH FILE REFERENCE

## Caching



- LRU  
least recently used
- RANDOM

