This is CS50
<table>
<thead>
<tr>
<th>&quot;GERMANE&quot;</th>
<th>&quot;ABSTRACT THAT AWAY&quot;</th>
<th>&quot;WHEREBY&quot;</th>
<th>&quot;LET ME PROPOSE&quot;</th>
<th>&quot;I CLAIM&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;SWEEP UNDER THE RUG&quot;</td>
<td>&quot;DELIBERATELY&quot;</td>
<td>&quot;MOREOVER&quot;</td>
<td>&quot;BY CONTRAST&quot;</td>
<td>SOMEONE AT HARVARD ASKS A QUESTION YOU CAN'T HEAR</td>
</tr>
<tr>
<td>&quot;HUMANS&quot; (as opposed to technology)</td>
<td>MALAN MOVES WEIRDLY TO MAKE THE LECTURE LOOK GOOD</td>
<td>&quot;HOPEFULLY BY NOW YOU UNDERSTAND [SOMETHING YOU DO NOT UNDERSTAND]&quot;</td>
<td>&quot;UNDERNEATH THE HOOD&quot;</td>
<td></td>
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<tr>
<td>&quot;IT TURNS OUT THAT...&quot;</td>
<td>&quot;MORE ON THAT LATER&quot;</td>
<td>&quot;PHEW!&quot;</td>
<td>&quot;SHORT ANSWER / LONG ANSWER&quot;</td>
<td>&quot;LET ME ACTUALLY GO AHEAD AND...&quot;</td>
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<tr>
<td>&quot;SO TO SPEAK&quot;</td>
<td>YALE SLANDER</td>
<td>&quot;FOR ALL INTENTS AND PURPOSES&quot;</td>
<td>&quot;ADMITTEDLY&quot;</td>
<td>YOU GET JEALOUS OF THE HARVARD KIDS' SNACK</td>
</tr>
</tbody>
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internet
The ARPANET in December 1969
routers
TCP/IP
<table>
<thead>
<tr>
<th>Version</th>
<th>IHL</th>
<th>Type of Service</th>
<th>Total Length</th>
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<tbody>
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</tbody>
</table>

Example Internet Datagram Header
TCP
ports
<table>
<thead>
<tr>
<th>Port</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>HTTP</td>
</tr>
<tr>
<td>443</td>
<td>HTTPS</td>
</tr>
</tbody>
</table>

...
TCP Header Format

<table>
<thead>
<tr>
<th>Source Port</th>
<th>Destination Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequence Number</td>
<td></td>
</tr>
<tr>
<td>Acknowledgment Number</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Offset</td>
</tr>
<tr>
<td>Reserved</td>
<td>Window</td>
</tr>
<tr>
<td></td>
<td>Options</td>
</tr>
<tr>
<td></td>
<td>Padding</td>
</tr>
<tr>
<td></td>
<td>data</td>
</tr>
</tbody>
</table>

TCP Header Format
<table>
<thead>
<tr>
<th>Fully Qualified Domain Name</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DHCP
HTTP
HTTPS
https://www.example.com
https://www.example.com/
https://www.example.com/path
https://www.example.com/folder/file.html
https://www.example.com/folder/file.html
GET
POST
...


GET / HTTP/2
Host: www.harvard.edu
...
developer tools
HTTP/2 301
Location: https://www.harvard.edu/
GET / HTTP/2
Host: harvard.edu
...
GET / HTTP/1.1
Host: safetyschool.org
...
HTML
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>
      hello, title
    </title>
  </head>
  <body>
    hello, body
  </body>
</html>
http-server
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>hello, title</title>
  </head>
  <body>
    hello, body
  </body>
</html>
<!DOCTYPE html>
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    </body>
</html>
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</html>
<!DOCTYPE html>

<html lang="en">
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            </title>
        </head>
        <body>
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        </body>
    </html>
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    </title>
  </head>
  <body>
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  </body>
</html>
https://www.example.com/path?key=value
https://www.example.com/path?key=value&key=value
break
<table>
<thead>
<tr>
<th>&quot;GERMANE&quot;</th>
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<tr>
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<td>&quot;YALE SLANDER&quot;</td>
<td>&quot;FOR ALL INTENTS AND PURPOSES&quot;</td>
<td>&quot;ADMITTEDLY&quot;</td>
<td>&quot;YOU GET JEALOUS OF THE HARVARD KIDS' SNACK&quot;</td>
</tr>
<tr>
<td>“GERMANE”</td>
<td>“ABSTRACT THAT AWAY”</td>
<td>“WHEREBY”</td>
<td>“LET ME PROPOSE”</td>
<td>“I CLAIM”</td>
</tr>
<tr>
<td>-----------------</td>
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<td>----------------------------------------</td>
</tr>
<tr>
<td>“Sweep Under the Rug”</td>
<td>“Deliberately”</td>
<td>“Moreover”</td>
<td>“By Contrast”</td>
<td>Someone at Harvard asks a question you can’t hear</td>
</tr>
<tr>
<td>“Humans” (as opposed to technology)</td>
<td>Malan moves weirdly to make the lecture look good</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“It turns out that…”</td>
<td>“More on that later”</td>
<td>“Phew!”</td>
<td>“Short Answer / Long Answer”</td>
<td>“Let me actually go ahead and…”</td>
</tr>
<tr>
<td>“So to speak”</td>
<td>“Yale Slander”</td>
<td>“For all intents and purposes”</td>
<td>“Admittedly”</td>
<td>You get jealous of the Harvard kids’ snack</td>
</tr>
</tbody>
</table>

**Free Space**
regular expressions
regexes
any single character (except line terminators)

* zero or more times

+ one or more times

? 0 or 1 time

{n} n occurrences

{n,m} at least n occurrences, at most m occurrences

...
[0123456789] any one of the enclosed characters
[0-9] any one of the range of characters
\d any digit
\D any character that is not a digit
...
developer tools
CSS
properties
type selector

class selector

ID selector

attribute selector

...
<!DOCTYPE html>

<html lang="en">
  <head>
    <style>
    
    </style>
  
  </head>
  
  <title>
    hello, title
  </title>

  <body>
    hello, body
  </body>

</html>
<!DOCTYPE html>
<html lang="en">
  <head>
    <link href="styles.css" rel="stylesheet">
    <title>
      hello, title
    </title>
  </head>
  <body>
    hello, body
  </body>
</html>
frameworks
Bootstrap
developer tools
JavaScript
blur
change
click
drag
focus
keyup
load
mousedown
mouseover
mouseup
submit
touchmove
unload
...
This is CS50