

HTTP

COMS10012 / COMSM0085

Software Tools

HTTP

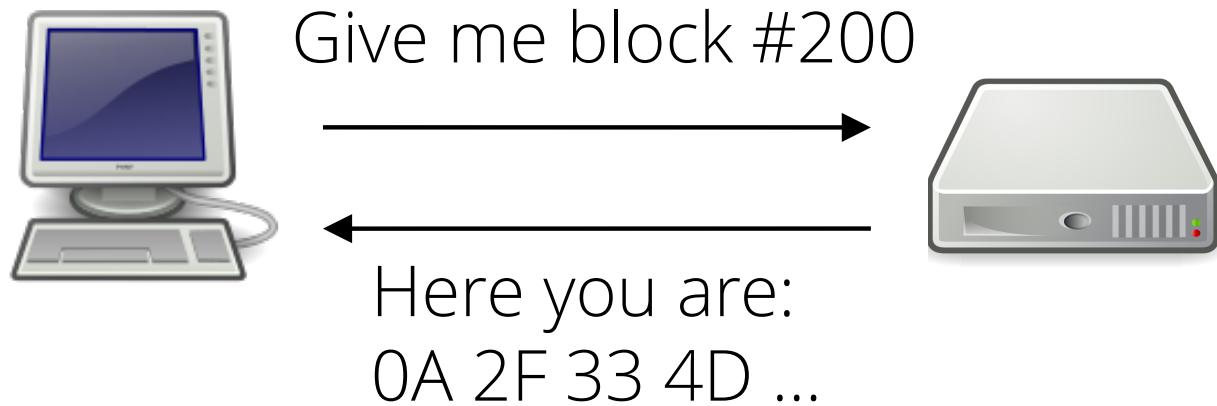
HTTP

HyperText Transfer Protocol

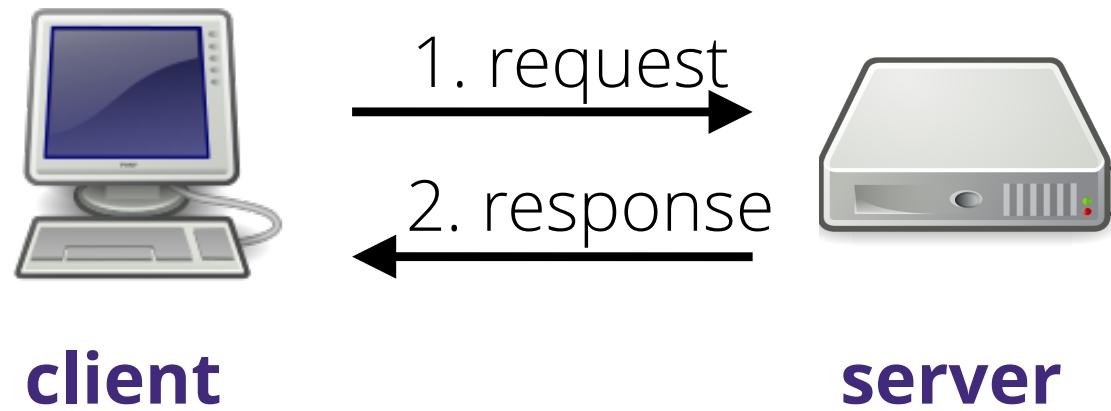
Tim Berners-Lee, CERN, 1989

version 1.1, RFC 7230-7235

Protocols



Client-Server



Server

```
while (1) {  
    req = read();  
    resp = serve(req);  
    write(resp);  
}
```

HTTP

DevTools - www.bristol.ac.uk/

Network

F12

Name

- www.bristol.ac.uk
 - polyfill.min.js
 - styles-dd6c99186201640aa60
 - component---src-pages-inde
 - commons-d2e5e454e4db736
 - app-9de628552211ccb275a9.
 - webpack-runtime-5f1d9c8b5.
 - page-data.json
 - gtm.js?id=GTM-MWCJ929
 - FSRufus-02cdd0ba13558d7c2
 - FSRufus-Light-0ec714fe30fd3
 - FSRufus-Bold-05839510b752.
 - OpenSans-Regular-737e96ca.
 - OpenSans-Bold-72059a18e01
 - google-analytics_analytics.js?
 - data:image/jpeg;bas...
 - data:image/png;base...
 - app-data.json
 - 1621609304-open-day-panor
 - 5-1acb771ecfbdaaa07688.js
 - anison?rss.url=https%3A%2
- 22 requests | 104 kB transferred

Headers Preview Response Initiator Timing Cookies

General

Request URL: https://www.bristol.ac.uk/
Request Method: GET
Status Code: 200 OK
Remote Address: 137.222.0.38:443
Referrer Policy: strict-origin-when-cross-origin

Response Headers

Accept-Ranges: bytes
Content-Length: 98577
Keep-Alive: timeout=5, max=255
Connection: Keep-Alive
Content-Type: text/html

Request Headers

GET / HTTP/1.1
Host: www.bristol.ac.uk
Connection: keep-alive
Cache-Control: max-age=0

HTTP Request

GET /index.html HTTP/1.1

Host: www.bristol.ac.uk

Connection: close

Methods

GET

HEAD

POST

PUT, DELETE, ...

HTTP Response

HTTP/1.1 200 OK

Content-Type: text/html;
charset=UTF-8

Content-Length: 1009

```
<!DOCTYPE html>
<html lang="en">
```

...

Response codes

1xx: information

2xx: success (200 OK, 201 Created, ...)

3xx: redirect (301 Moved Permanently, ...)

4xx: client error (400 Bad Request,
403 Forbidden, 404 Not Found, ...)

5xx: server error (500 Internal Server Error ...)

Content-type

Content-Type: text/html; charset=UTF-8

text/plain, text/html, ...

image/jpeg, application/pdf, video/mp4 ...

First priority for the browser!

Encoding



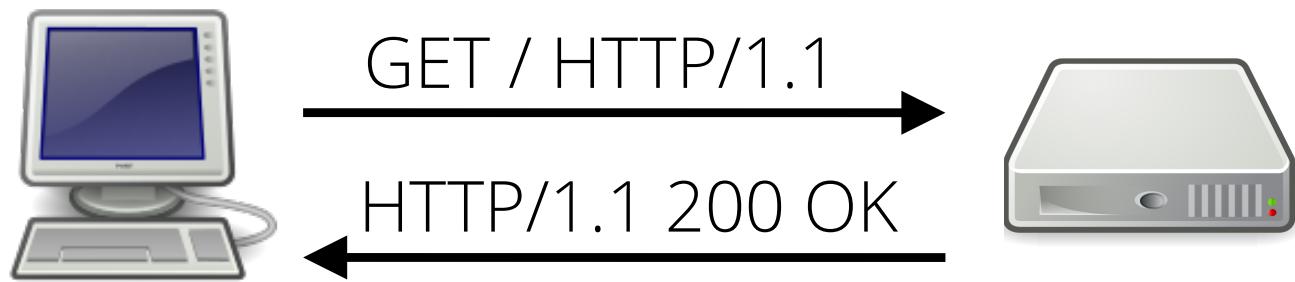
François Dupressoir



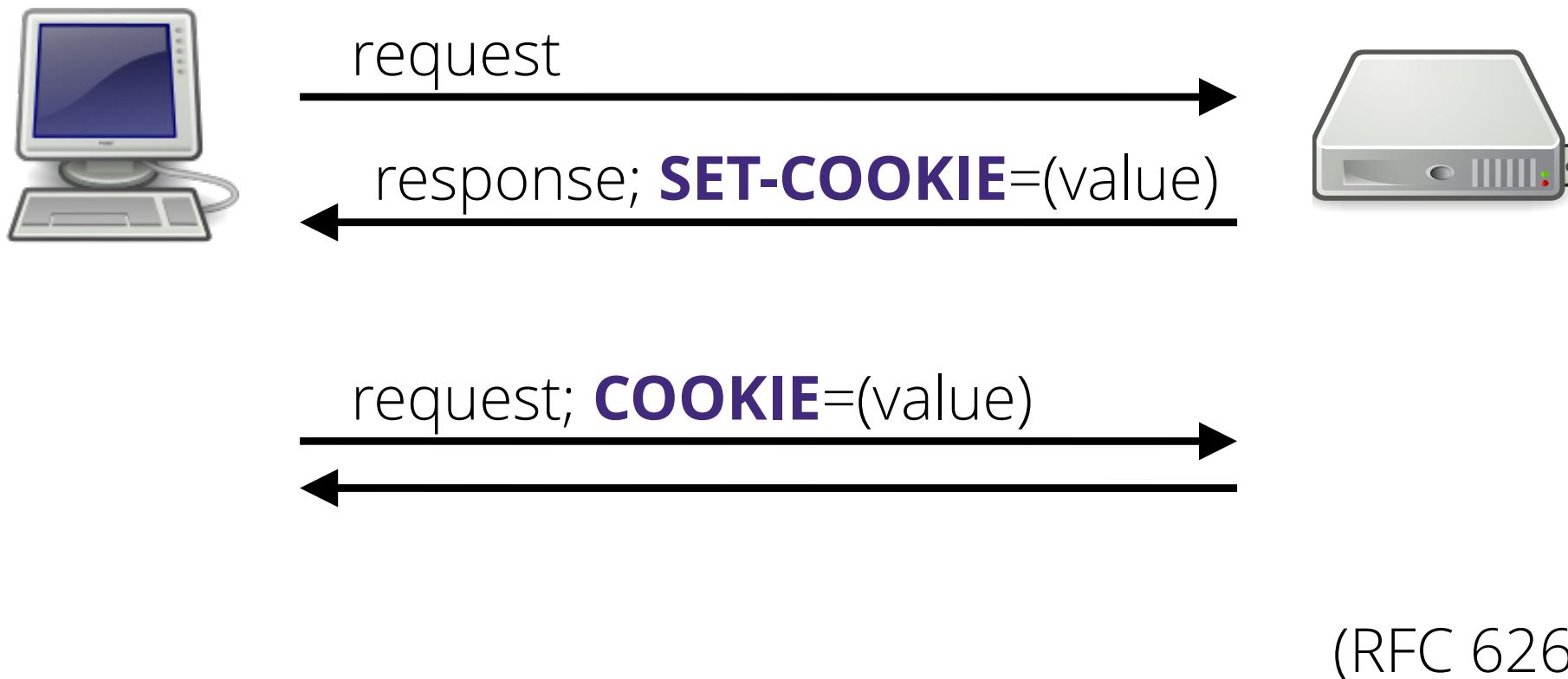
François Dupressoir

Cookies

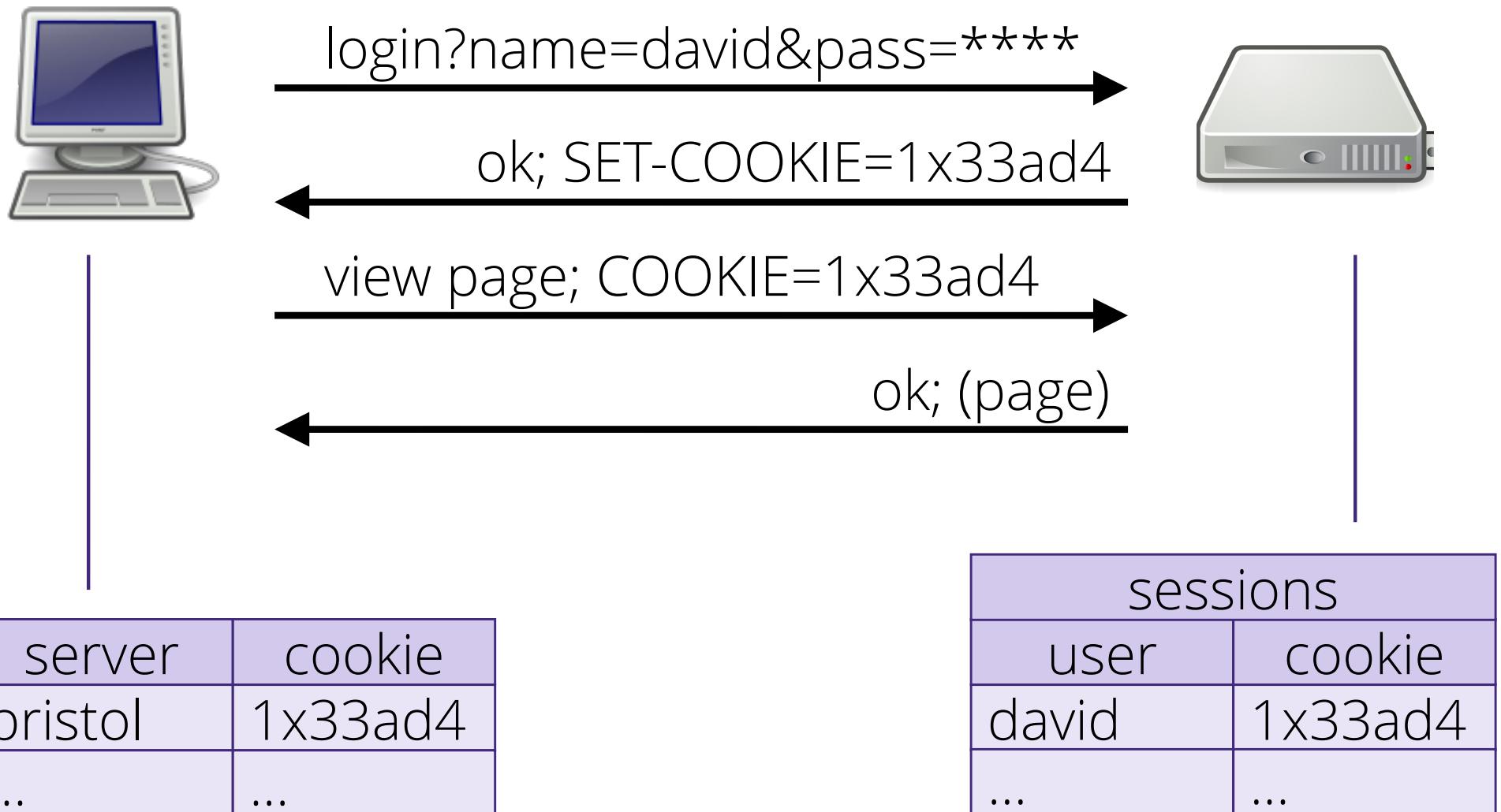
Stateless



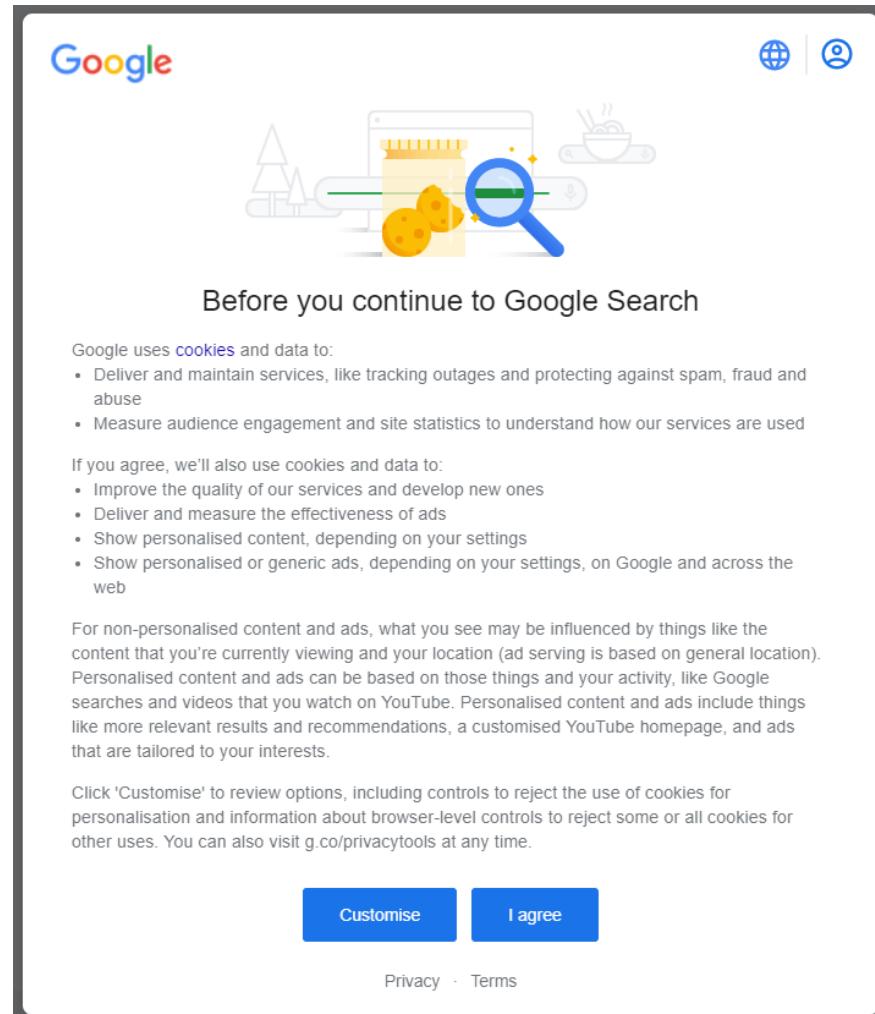
Cookie protocol



Sessions



Tracking cookies



The image shows a screenshot of a Google cookie consent banner. At the top left is the Google logo. On the right are icons for a globe and a user profile. Below the logo is a cartoon illustration of a magnifying glass over a cookie jar and a bowl of cereal. The main heading reads "Before you continue to Google Search". A paragraph explains that Google uses cookies and data for services like tracking outages and protecting against spam, fraud, and abuse. It also measures audience engagement and site statistics. If agreed, Google will use cookies and data to improve service quality, measure ad effectiveness, show personalized content, and show personalized or generic ads. For non-personalized content and ads, what is seen may be influenced by things like the content being viewed and location. Personalized content and ads can be based on activity like Google searches and YouTube videos. The text ends with a link to g.co/privacymenu. At the bottom are two blue buttons: "Customise" and "I agree". A small link at the very bottom says "Privacy · Terms".

Before you continue to Google Search

Google uses [cookies](#) and data to:

- Deliver and maintain services, like tracking outages and protecting against spam, fraud and abuse
- Measure audience engagement and site statistics to understand how our services are used

If you agree, we'll also use cookies and data to:

- Improve the quality of our services and develop new ones
- Deliver and measure the effectiveness of ads
- Show personalised content, depending on your settings
- Show personalised or generic ads, depending on your settings, on Google and across the web

For non-personalised content and ads, what you see may be influenced by things like the content that you're currently viewing and your location (ad serving is based on general location). Personalised content and ads can be based on those things and your activity, like Google searches and videos that you watch on YouTube. Personalised content and ads include things like more relevant results and recommendations, a customised YouTube homepage, and ads that are tailored to your interests.

Click 'Customise' to review options, including controls to reject the use of cookies for personalisation and information about browser-level controls to reject some or all cookies for other uses. You can also visit g.co/privacymenu at any time.

[Customise](#) [I agree](#)

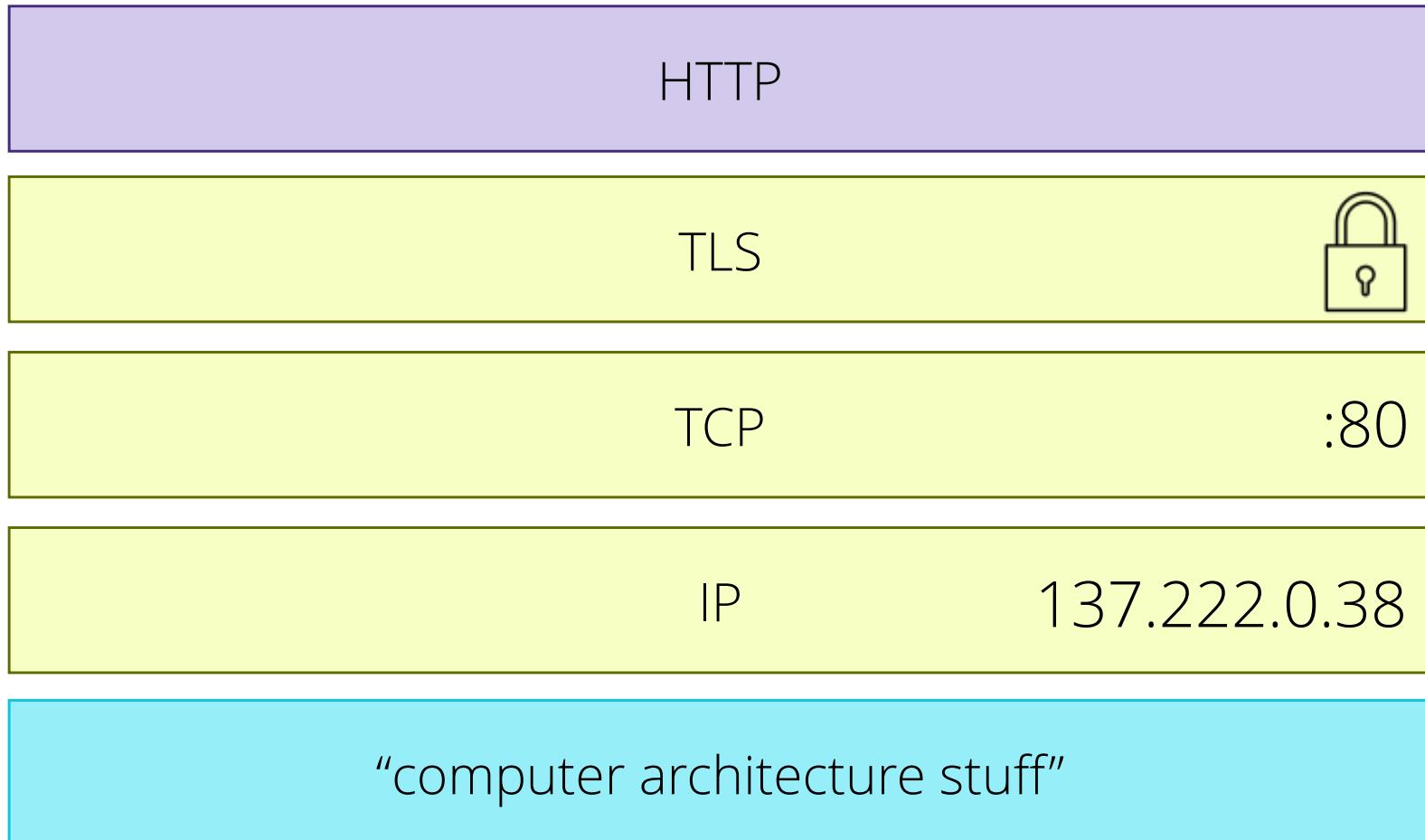
[Privacy](#) · [Terms](#)

The Internet

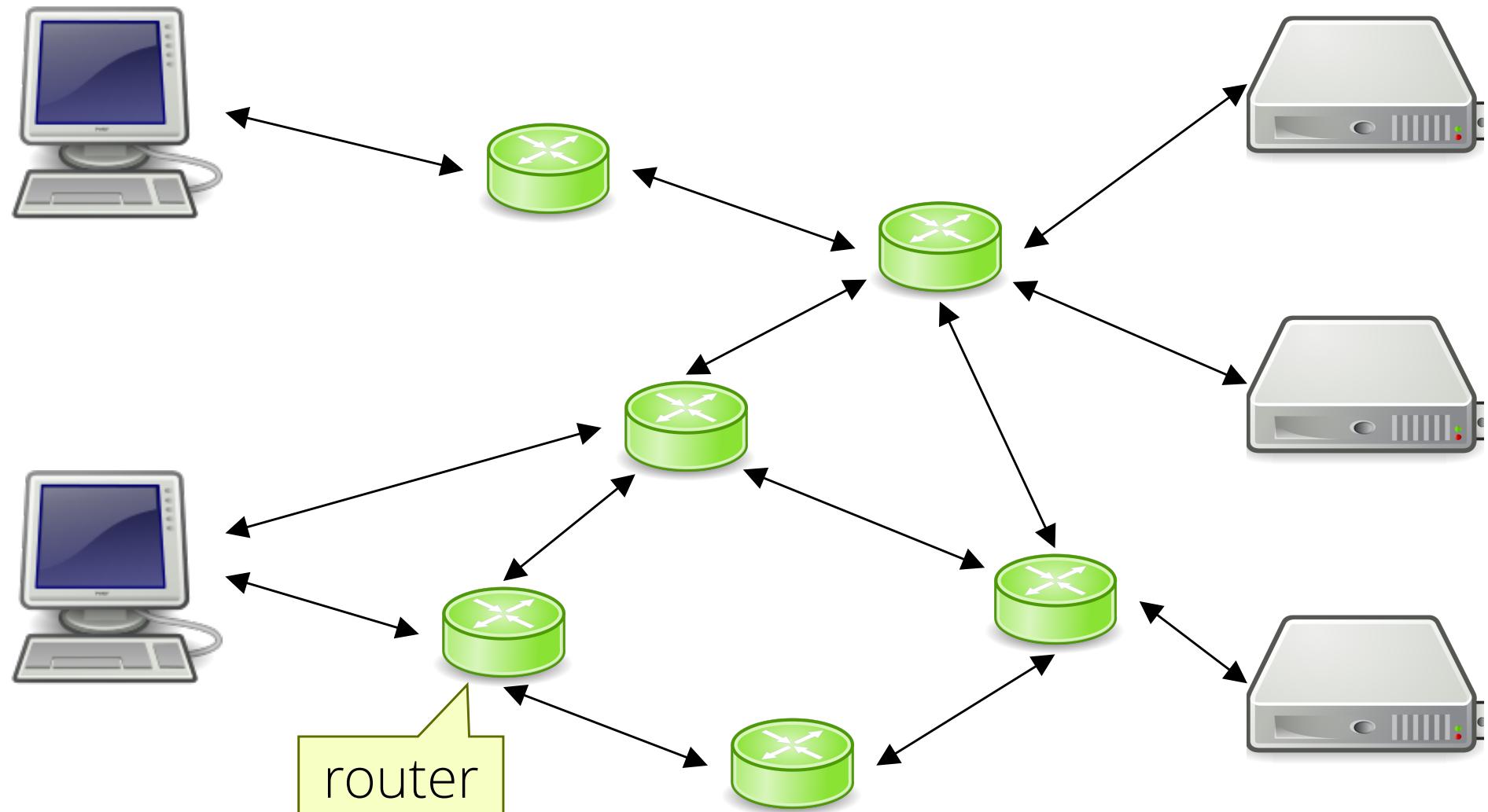
COMS10012 / COMSM0085

Software Tools

Network stack

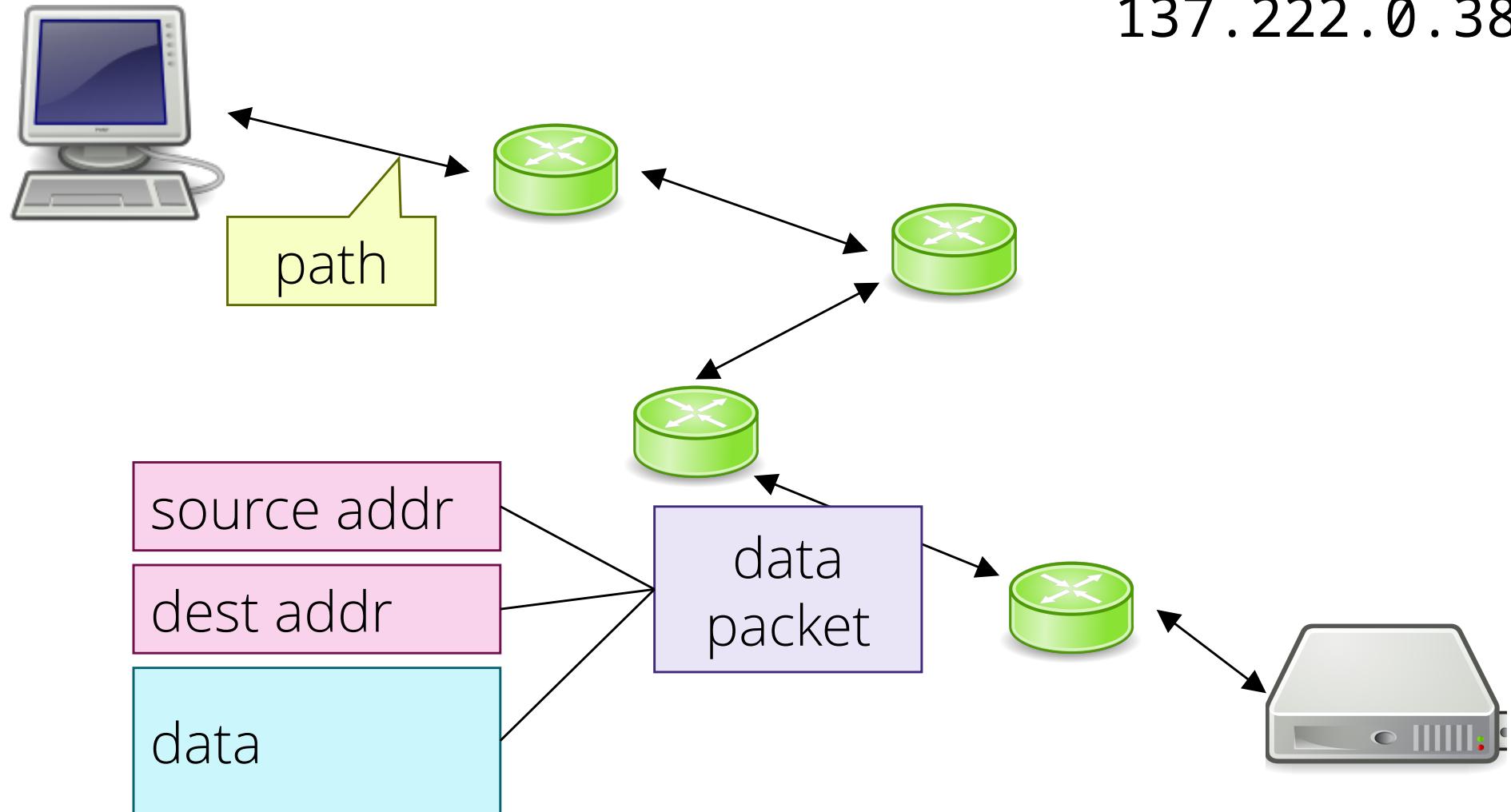


The Internet

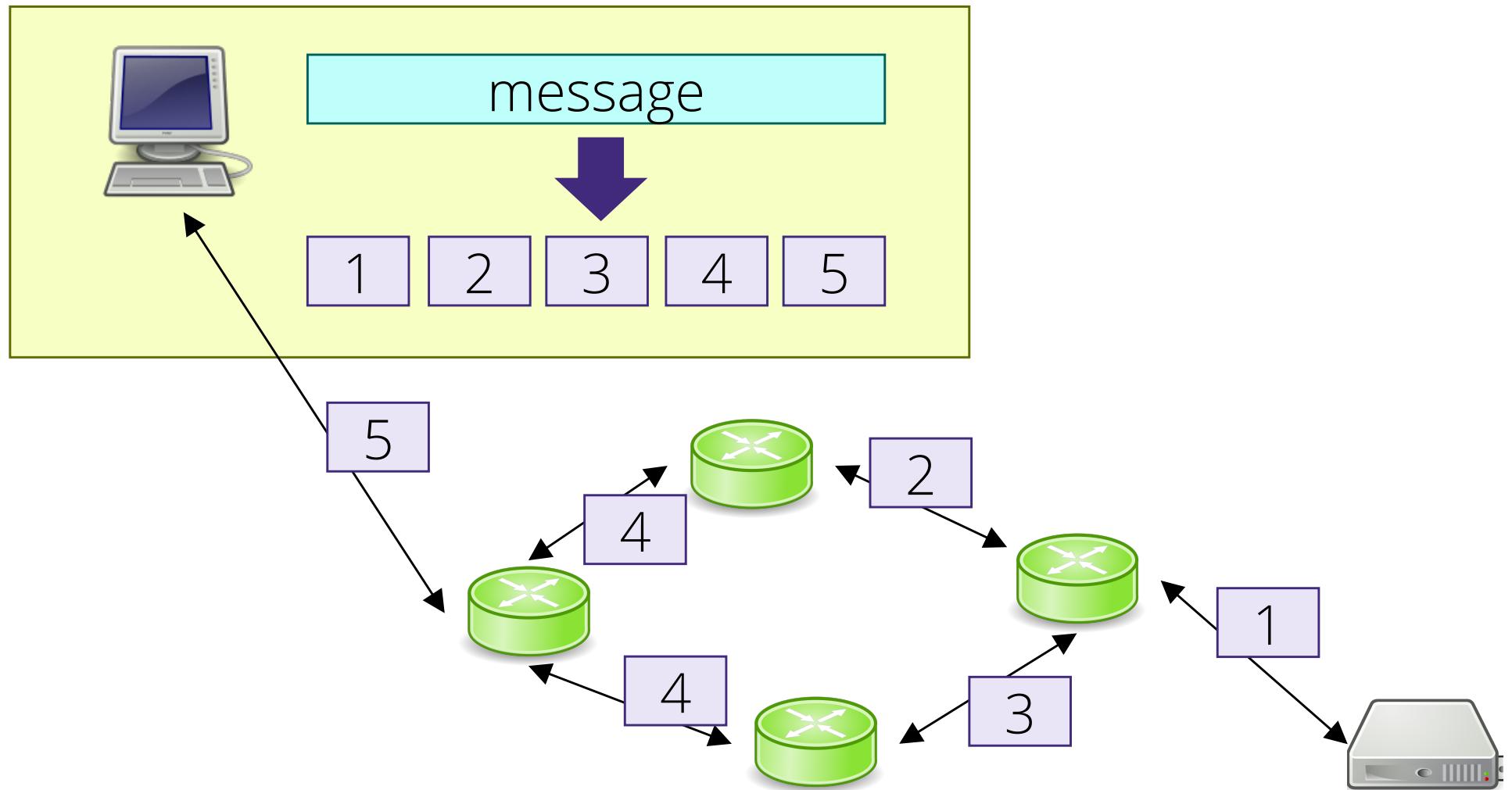


IP: Internet Protocol

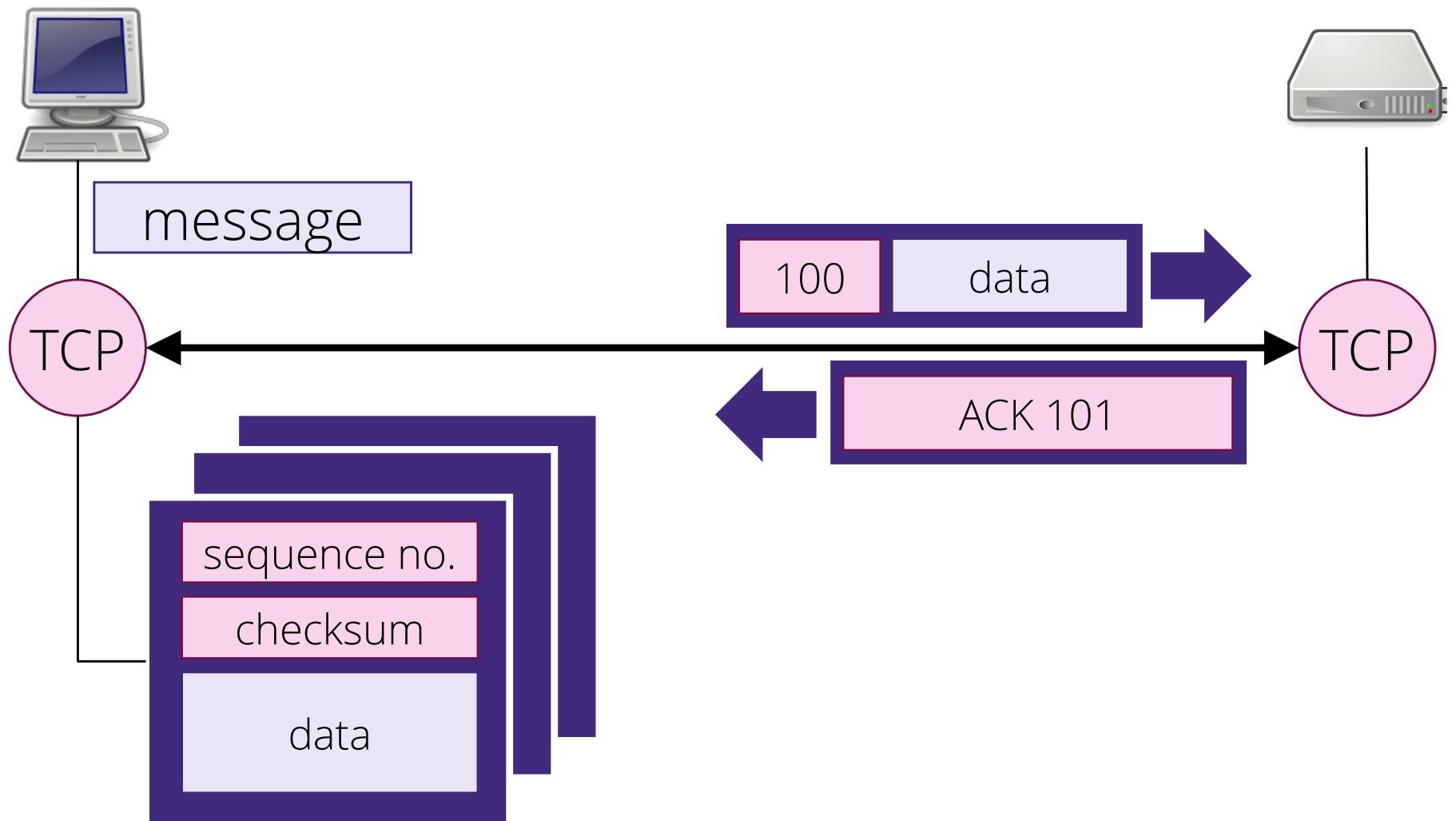
137.222.0.38



TCP: Transmission Control Protocol



TCP



TCP ports

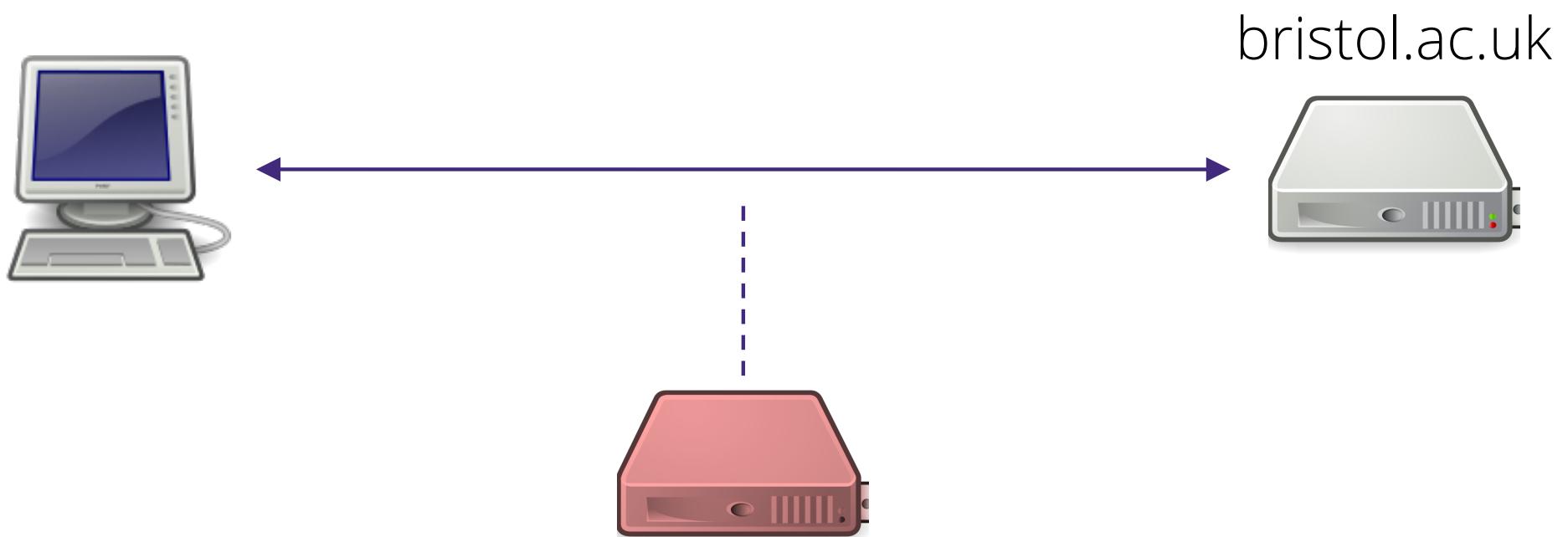
80 HTTP

443 TLS

22 SSH

8000, 8080, ... development (unofficial)

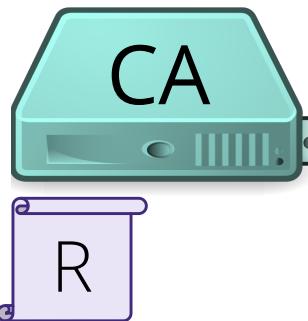
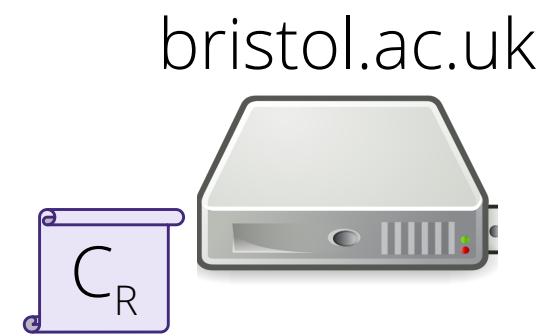
TLS



TLS



TLS



bristol.ac.uk

TLS



bristol.ac.uk



[Not secure | example.org](http://example.org)

URLs

COMS10012 / COMSM0085

Software Tools

URL

URL

RFC 3986:

- Uniform
- Resource
- Locator (/Identifier – URI)

[https://bristol.ac.uk/engineering/
departments/computerscience](https://bristol.ac.uk/engineering/departments/computerscience)

URL parts

`https://bristol.ac.uk/engineering/departments`

scheme

host

path

URL parts

`https://example.com/pages
?name=welcome&action=view`

query

URI schemes

ftp://ftp.is.co.za/rfc/rfc1808.txt

http://www.ietf.org/rfc/rfc2396.txt

ldap://[2001:db8::7]/c=GB?objectClass?one

mailto:John.Doe@example.com

news:comp.infosystems.www.servers.unix

tel:+1-816-555-1212

telnet://192.0.2.16:80/

urn:oasis:names:specification:docbook:dtd:xml:4.1.2

REST

REST

Representational State Transfer

Fact: HTTP is stateless

- State goes in the request
- Resources have names (URLs)
- use HTTP verbs as intended

REST

GET /files/README.txt

DELETE /files/README.txt

POST /files/README.txt?action=delete

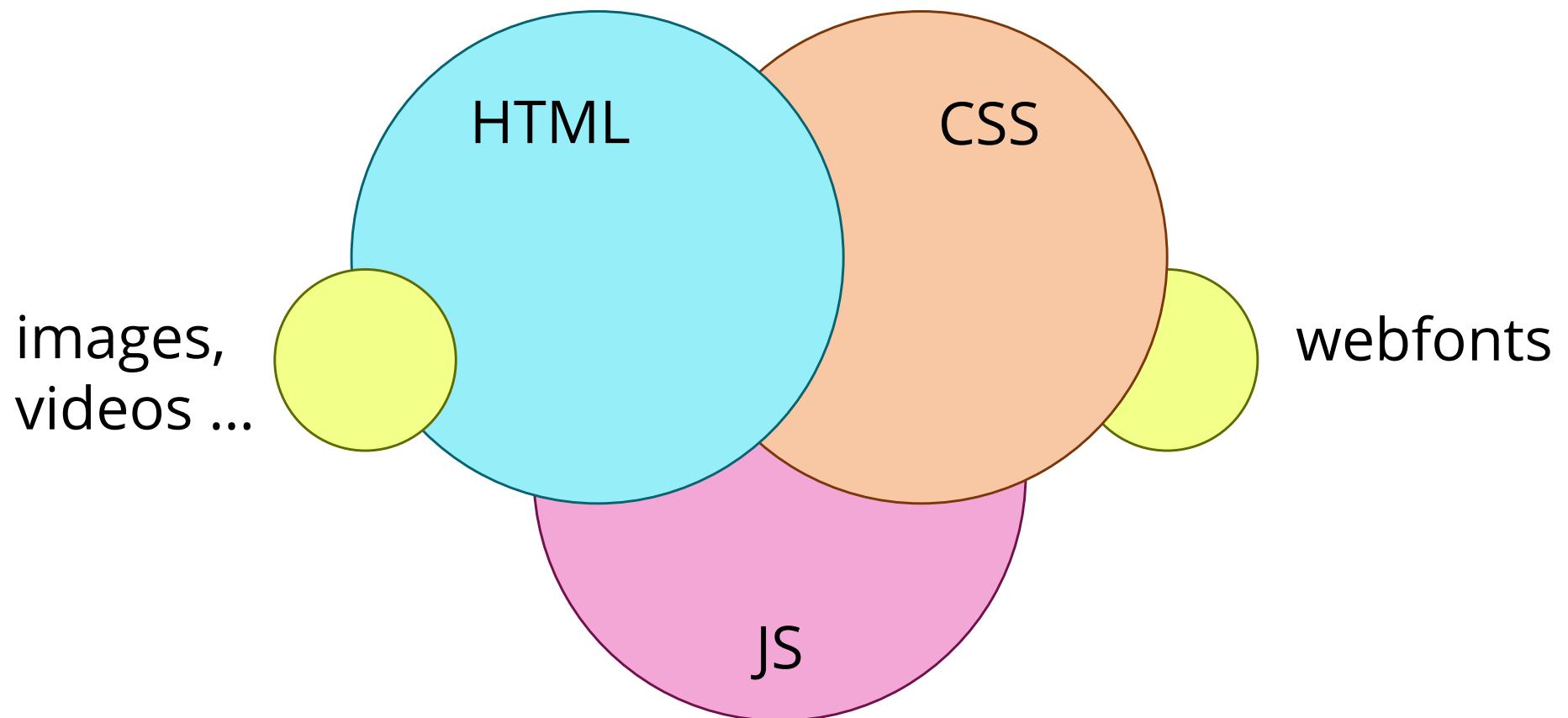
GET /files?name=README.txt

HTML5

COMS10012 / COMSM0085

Software Tools

In your browser



The Manual

<https://developer.mozilla.org/en-US/docs/Web>

Web technology references

Web APIs

Reference material for each of the individual APIs that comprise the Web's powerful scriptability, including the DOM and all of the related APIs and interfaces you can use to build Web content and apps.

HTML

HyperText Markup Language is the language used to describe and define the content of a Web page.

CSS

Cascading Style Sheets are used to describe the appearance of Web content.

JavaScript

JavaScript is a programming language used to add interactivity to a website.

HTML5

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8" />
    <title>A web page</title>
  </head>
  <body>
    <h1>An example webpage</h1>
    <h2>subsection 1</h2>
    <p>A paragraph of text. The browser deals
       with line breaking if the paragraph is
       longer than the windows is wide. The
       algorithm is not perfect, but usually
       good enough (especially if you don't force
       block text).</p>
    <p>Another paragraph. Empty lines in a
       HTML file do not create a new paragraph.
       You can however have line breaks
       exactly<br /> where you want them.</p>
    <h2>subsection 2</h2>
    <p>some text</p>
    <ul>
      <li>item 1</li>
      <li>item 2</li>
    </ul>
  </body>
</html>
```

An example webpage

subsection 1

A paragraph of text. The browser deals with line breaking if the paragraph is longer than the windows is wide. The algorithm is not perfect, but usually good enough (especially if you don't force block text).

Another paragraph. Empty lines in a HTML file do not create a new paragraph. You can however have line breaks exactly where you want them.

subsection 2

some text

- item 1
- item 2

HTML5 template

```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8" />
    <title>A web page</title>
  </head>
  <body>
    your content here
  </body>
</html>
```

Encoding



François Dupressoir



François Dupressoir

Tags

```
<body>
  <h1>An example webpage</h1> ←
  <h2>subsection 1</h2>
  <p>A paragraph of text. The browser deals
  with line breaking if the paragraph is
  longer than the windows is wide. The
  algorithm is not perfect, but usually
  good enough (especially if you don't force
  block text).</p>
  <p>Another paragraph. Empty lines in a
  HTML file do not create a new paragraph.
  You can however have line breaks
  exactly<br /> where you want them.</p>
  <h2>subsection 2</h2>
  <p>some text</p>
  <ul>
    <li>item 1</li>
    <li>item 2</li>
  </ul>
</body>
```

h1 ... h6
headings

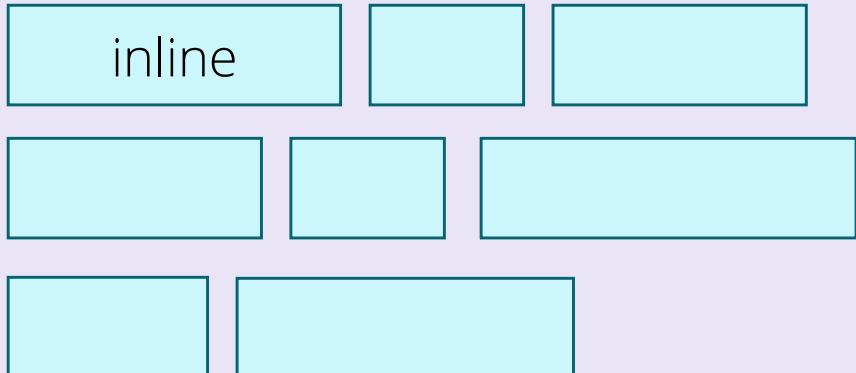
<p> paragraphs

 new line

 unordered list
 ordered list
 list item

Layout

block



```
<p>A paragraph  
of <em>example  
text</em>.</p>  
<p>And another.  
</p>
```

block



Semantic Tags

<https://developer.mozilla.org/en/docs/Web/HTML/Element>

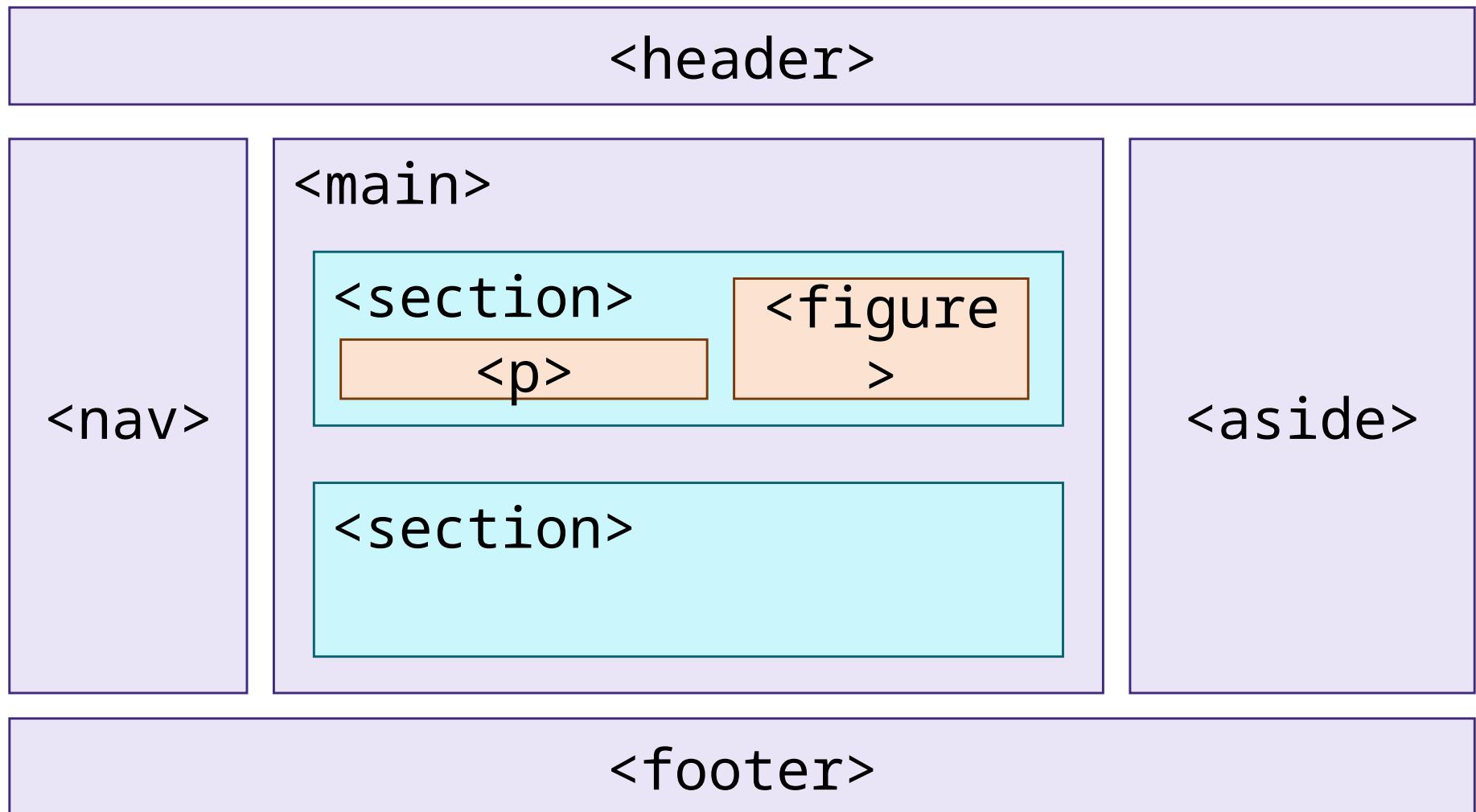
new

	emphasis
	important
<q>	quotation
<cite>	citation
<var>	variable
<code>	source code

old

	bold
<i>	<i>italics</i>
<u>	<u>underline</u>
<s>	strike out
<tt>	monospac e
<small>	small

Semantic Tags



Placeholder Tags

`<section>`

To structure your content.

``

Generic inline tag.

`<div>`

Generic block tag.

Attributes

```
<p id="today">28 September</p>
```

```
<p class="info">Lecture 2</p>
```

```
<p class="info">QB 0.18</p>
```

HTML elements

COMS10012 Software Tools

Links

Links

Our Courses

bristol.ac.uk/students/info.html :

"/courses" => bristol.ac.uk/courses

"courses" => bristol.ac.uk/students/courses

".../courses" => bristol.ac.uk/courses

Forms

Forms

We value your comments!

Name:

Age:

your comment here

Comment:

Forms

```
<form method="post" action="/comment">
  <p>
    <label for="name">Name:</label>
    <input id="name" name="name"/>
  </p>
  <p>
    <button type="submit">OK</button>
  </p>
</form>
```

Validation

A screenshot of a web form showing validation results. The form has four fields:

- Name:** A text input field containing "Jane Doe".
- Age:** A text input field containing "16". A tooltip message "Please fill in this field." is displayed above it.
- Comment:** A text area containing "your comment here".

The "Age" field is highlighted with a red border, indicating it is the current focus or has an error.

```
<input required type="number">
```

Autocomplete

```
<input type="text"  
autocomplete="name">
```

name, email, address-line1, country, tel, ...

cc-name, cc-number, ...

input types

button

checkbox

color

date

datetime-local

email

file

hidden

image

month

number

password

radio

range

reset

search

submit

tel

text

time

url

week

<textarea>

(source: MDN)

select

```
<select name="animal">  
  <option value="dog">Dog</option>  
  <option value="cat">Cat</option>  
</select>
```

Cat ▼

Tables

Table

```
<table>
  <thead>
    <tr><th>Name</th><th>ID</th></tr>
  </thead>
  <tbody>
    <tr><td>Sarah</td><td>100</td></tr>
    <tr><td>Jon</td><td>101</td></tr>
  </tbody>
</table>
```

Datatable

datatables.net

| Show <select>10</select> entries | | Search: <input type="text"/> | | | |
|----------------------------------|-------------------------------|------------------------------|-----|------------|------|
| Name | Position | Office | Age | Start date | |
| Airi Satou | Accountant | Tokyo | 33 | 2008/11/28 | |
| Angelica Ramos | Chief Executive Officer (CEO) | London | 47 | 2009/10/09 | |
| Ashton Cox | Junior Technical Author | San Francisco | 66 | 2009/01/12 | |
| Bradley Greer | Software Engineer | London | 41 | 2012/10/13 | |
| Brenden Wagner | Software Engineer | San Francisco | 28 | 2011/06/07 | |
| Brielle Williamson | Integration Specialist | New York | 61 | 2012/12/02 | |
| Bruno Nash | Software Engineer | London | 38 | 2011/05/03 | |
| Caesar Vance | Pre-Sales Support | New York | 21 | 2011/12/12 | |
| Cara Stevens | Sales Assistant | New York | 46 | 2011/12/06 | |
| Cedric Kelly | Senior Javascript Developer | Edinburgh | 22 | 2012/03/29 | |
| Name | Position | Office | Age | Start date | |
| Showing 1 to 10 of 57 entries | | Previous | 1 | 2 | 3 |
| | | | 4 | 5 | 6 |
| | | | | | Next |

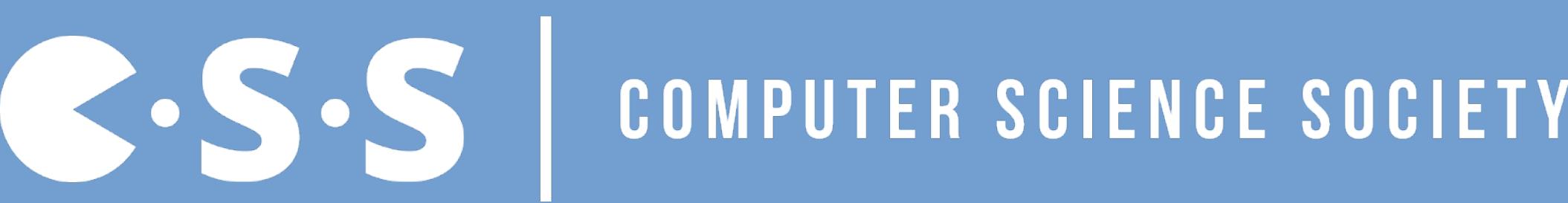
CSS 1

COMS10012 / COMSM0085

Software Tools

CSS

CSS



cssbristol.co.uk

CSS

<p>Some Text</p>

+

p { color: red }

=

Some Text

syntax

```
SELECTOR {  
    KEY: VALUE;  
    ...  
}
```

selectors

p <p>

.important <div class="important">

#title <div id="title">

p.important <p class="important">

h1#title <h1 id="title">

selectors

.container p

.container > p

.container ~ p

.container + p

p, div

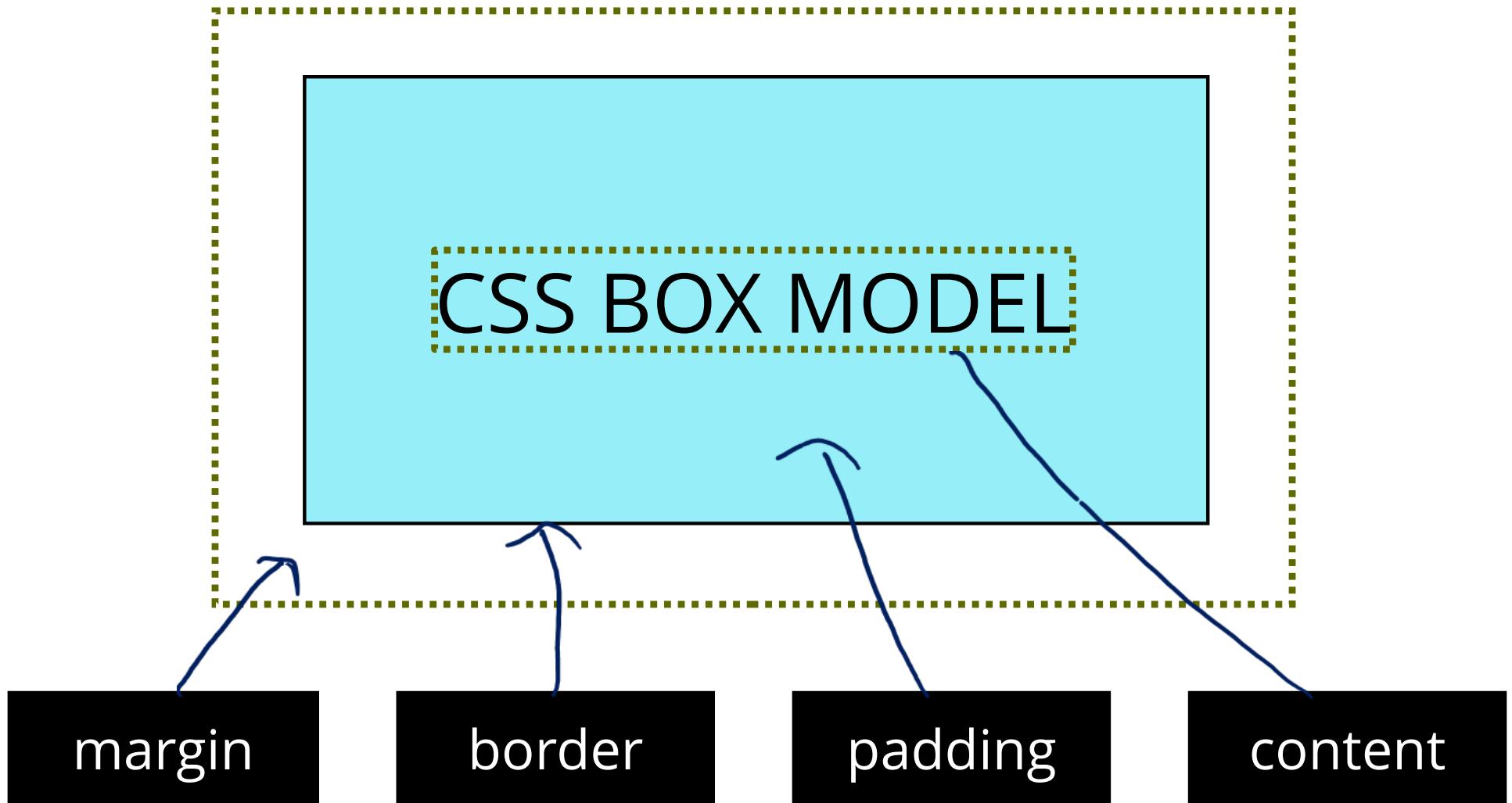
```
<div class="container">  
  <p>direct child</p>  
  
  <div>  
    <p>descendant</p>  
  </div>  
  
</div>  
  
<p>para one</p>  
<p>para two</p>
```

Values

```
color: red;  
background-color: #ff0000;  
border-color: rgba(255, 0, 0, 1.0);
```

Box Model

Box model



margin

border

padding

content

Box model

Admissions

If you are a prospective student or have an admissions query:

Undergraduate

Email: choosebristol-ug@bristol.ac.uk Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (taught)

Email: choosebristol-pg@bristol.ac.uk Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (research)

Email: sceem-pgr-admissions@bristol.ac.uk Tel: [+44 \(0\)117 331 4753](tel:+44(0)1173314753) or [+44 \(0\)117 331 5232](tel:+44(0)1173315232)

Current students

Contact the faculty for letters ([banks](#), [student status](#), [council tax](#)), [transcripts and other documents](#). Please also see the faculty's [current student pages](#) for further information and the [taught programme handbook](#).

F12



<https://www.bristol.ac.uk/engineering/departments/computerscience/contact/>

Box model

Admissions

If you are a prospective student or have an admissions query:

Undergraduate

Email: choosebristol-ug@bristol.ac.uk Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (taught)

Email: choosebristol-pg@bristol.ac.uk Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (research)

Email: sceem-pgr-admissions@bristol.ac.uk Tel: [+44 \(0\)117 331 4753](tel:+44(0)1173314753) or
[+44 \(0\)117 331 5232](tel:+44(0)1173315232)

Current students

Contact the faculty for letters ([banks](#), [student status](#), [council tax](#)),
[transcripts and other documents](#). Please also see the faculty's [current student pages](#) for further information and the [taught programme handbook](#).

Elements

```
><div class="module bg-stone main-col-child ">...</div>
<div class="module bg-stone main-col-child ">
  <h2 class="module-heading">
    <span class="mh-text">Current students</span>
  </h2>
  <p>
    "Contact the faculty&nbsp;"<br/>
    <a href="/engineering/current-students/transcripts-and-documents/">...</a>
    ". Please also see the faculty's&nbsp;"<br/>
    <a href="/engineering/current-students/">current student pages</a>
    "&nbsp;for further information and the&nbsp;"<br/>
    <a href="/engineering/current-students/taught-programme-handbook/">taught
    programme handbook</a>
    "&nbsp;"<br/>
  </p>
</div>
```

Box model

Admissions

If you are a prospective student or have an admissions query:

Undergraduate
Email: choosebristol-ug@bristol.ac.uk Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (taught)
Email: [choosebrristol-pg@bristol.ac.uk](mailto:choosebristol-pg@bristol.ac.uk) Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

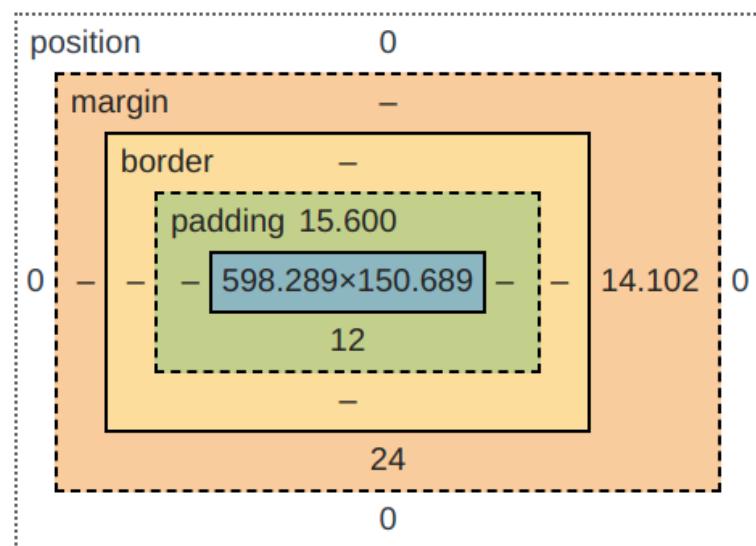
Postgraduate (research)
Email: sceem-pgr-admissions@bristol.ac.uk Tel: [+44 \(0\)117 331 4753](tel:+44(0)1173314753) or [+44 \(0\)117 331 5232](tel:+44(0)1173315232)

div.module.bg-stone.main-content.l-child 598.29 × 178.29

Current students

Contact the faculty [for letters \(banks, student status, council tax\)](#), [transcripts and other documents](#). Please also see the faculty's [current student pages](#) for further information and the [taught programme handbook](#).

Computed



Box model

Admissions

If you are a prospective student or have an admissions query:

Undergraduate

Email: choosebristol-ug@bristol.ac.uk

Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

Postgraduate (taught)

Email: choosebristol-pg@bristol.ac.uk

Tel: [+44 \(0\)117 394 1649](tel:+44(0)1173941649)

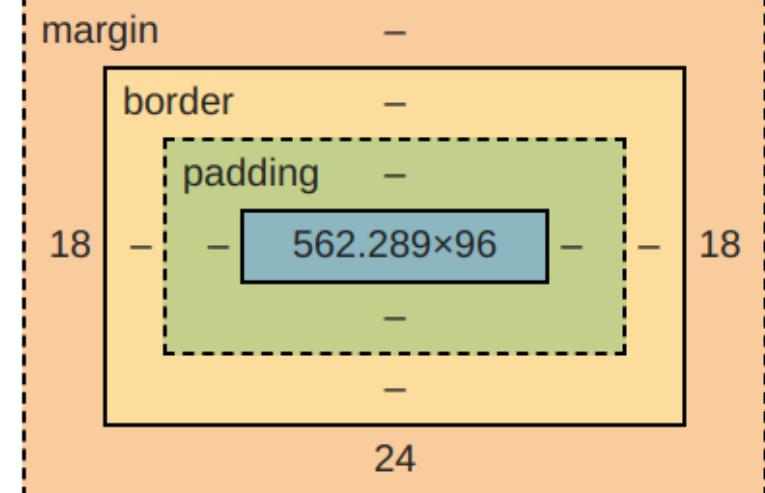
Postgraduate (research)

Email: sceem-pgr-admissions@bristol.ac.uk Tel: [+44 \(0\)117 331 4753](tel:+44(0)1173314753) or
[+44 \(0\)117 331 5232](tel:+44(0)1173315232)

 562.29 × 96 students

Contact the faculty for [letters \(banks, student status, council tax\)](#), [transcripts and other documents](#). Please also see the faculty's [current student pages](#) for further information and the [taught programme handbook](#).

Computed



Box model

```
margin-top: 10px;  
padding-left: 20px;
```

```
margin: 10px 5px 15px 20px;
```

```
border: 1px solid black;
```

CSS 2

COMS10012 / COMSM0085

Software Tools

Units of measurement

dpi (ppi)

dots (points) per inch

PC screen: 72 / 96 (Mac / Win defaults)
can be 120+ nowadays

mobile: 200+ (iPhone 12 Pro: 460)

Units

px pixel

pt point

cm, in, ...

em width of letter m

ex height of letter x

lh line height (+ space)

More units

vw, vh 1% of viewport width/height

rem root em (html)

% parent width/height

example

```
html { font-size: 12pt; }
p   { font-size: 1rem; }
h1 {
    font-size: 1.8rem;
    margin-top: 2ex;
    margin-bottom: 1ex;
}
h2   { font-size: 1.4rem; }
```

example

```
html, body {  
    margin: 0;  
    padding: 0;  
}  
  
h1 {  
    background-color: yellow;  
    width: 100%;  
}
```

Web Design

COMS10012 / COMSM0085

Software Tools

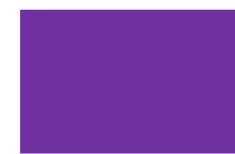
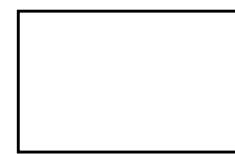
Design - the hard part

Design

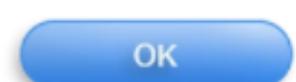
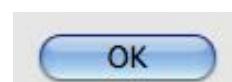
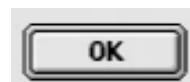
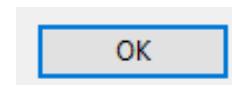
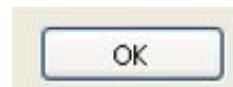
“Thinking about design is hard, but not thinking about it can be disastrous.”

- *Ralph Caplan*

Design and Cultures

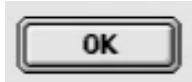


Design and fashion



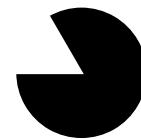
Design principle 1:

test with your intended audience!

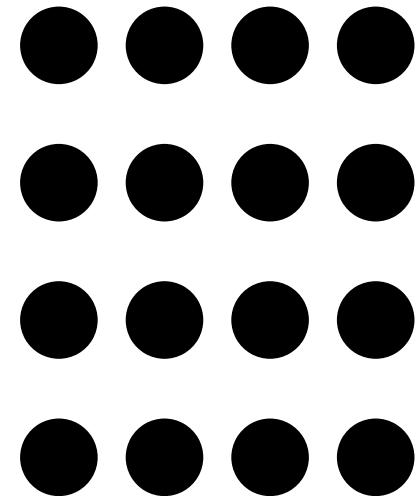
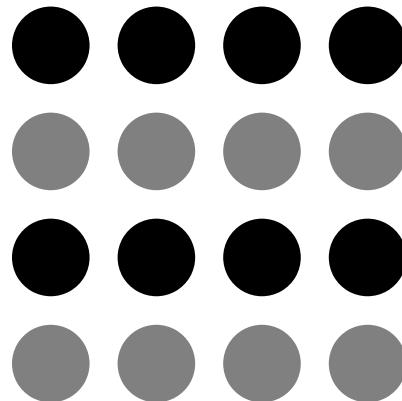
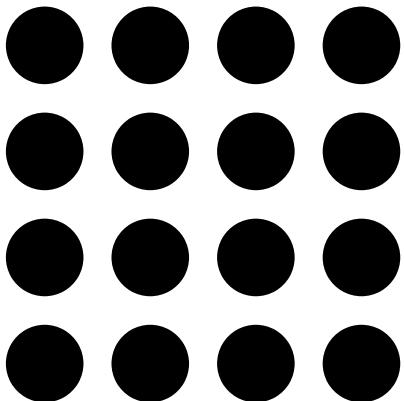


Some More Design Principles

Gestalt (1)



Gestalt (2)



Whitespace

| | | |
|-----------|---------|---------|
| gnats | gram | \$13.65 |
| | each | .01 |
| gnu | stuffed | 92.50 |
| emu | | 33.33 |
| armadillo | frozen | 8.99 |

| Item | | |
|-----------|-------------|------------|
| Animal | Description | Price (\$) |
| Gnat | per gram | 13.65 |
| | each | 0.01 |
| Gnu | stuffed | 92.50 |
| Emu | stuffed | 33.33 |
| Armadillo | frozen | 8.99 |

| Item | | |
|-----------|-------------|------------|
| Animal | Description | Price (\$) |
| Gnat | per gram | 13.65 |
| | each | 0.01 |
| Gnu | stuffed | 92.50 |
| Emu | stuffed | 33.33 |
| Armadillo | frozen | 8.99 |

TeX manual

booktabs

Text width

Guidelines you may see:

- 50–60 characters
- two full alphabets
- 12 words
- 30 em

Publication quality tables in L^AT_EX*

Simon Fear
300A route de Meyrin
Meyrin
Switzerland

Printed January 14, 2020

Abstract

This article describes some additional commands to enhance the quality of tables in L^AT_EX. Guidelines are given as to what constitutes a good table in this sense. The 2000 release (Version 1.61) of the `booktabs` package, described herein, adds some enhancements to the 1995 release (Version 1.00), most notably `longtable` compatibility.

Releases (Versions 1.618, 1.6180, 1.61803 and 1.618033) are only bug patches, support for the `colortbl` package and better compatibility with `longtable`.¹

1 Introduction

The routines described below are to enable the easy production of tables such as should appear in published scientific books and journals. What distinguishes these from plain L^AT_EX tables is the default use of additional space above and below rules, and rules of varying ‘thickness’. What further distinguishes them from the tables many people *do* produce using L^AT_EX is the absence of vertical rules and double rules.

I must draw a clear distinction between what I call here a *formal table*, which is a set of values in labelled columns, as distinct from what I will call a *tableau*. The latter is the kind of thing illustrated in the L^AT_EX manual, and increasingly common as the output of many database management systems; it will probably have icons in abundance, and no doubt use colour too. The layout of such a *tableau* is determined (hopefully) as a one-off, given a jumble of material the designer is trying to combine into a meaningful configuration. But the layout of a *table*

¹This file has version number v1.61803398, (converging to phi, the golden ratio), last revised 2020/01/12.

By Danie Els (dnejels@sun.ac.za) in the absence of the author.

1



Text width



MANCHESTER GUARDIAN

No. 33,653

MONDAY SEPTEMBER 29, 1952

Price 2d



STATE BUSES HELD “ABOVE THE LAW”

Ministry Refuses Equal Terms
to Private Services

PROBLEM FOR CABINET

FROM THE INDUSTRIAL STAFF

The British Transport Commission has been given authority by the Minister of Transport to set up a state transport service between Liverpool and London as it likes; all previous arrangements on its Liverpool-London buses have been scrapped. But the Minister has said that State service buses must remain subject to severe restrictions because there may well be no place to board them. This is likely to lead to other difficulties when traffic resumes.

The Liverpool-London buses were formerly run by a private company, Cunard-White Star. Between 1945 and 1950 a number of railway companies which had been nationalised were required to contribute £15 million towards the cost of a state transport system. These contributions were offset by the Minister of Transport's contribution of £15 million towards the cost of the state service. The amount to be paid by the state will be increased by £2 million each year until 1962. The Minister has also agreed to pay a grant of £1 million to the state service every year.

At present the state service is not running on all routes between Liverpool and London, and the B.T.C. applied for a licence to run unauthorised journeys with them. No application was made by the R.T.C. or the K.T.C., but the B.T.C. was granted permission to run the Liverpool-London route.

Change of Policy

It appears that a severe change of policy is to come into effect next month. The North Western Rail Car Company, Ltd., Manchester and London, by road, are allowed to run on and off the roads of the two cities. They will have to travel together if it is not convenient to do so. They will not be able to run on the roads of the other cities. The reason for this arrangement is that the two cities are separated by a number of local authorities, and the two cities are separated by a number of local authorities.

Thematics Turned Away

The changes on which a court will not interfere have been largely unaffected on their roads of a local nature. The new roads will be used to run on and off the roads of the two cities. The two cities are separated by a number of local authorities.

GEN. NAURAT AT JEWISH CEREMONY

NAHAS TO FACE CHARGES

Minister's Attack on
Wald Leader

COUN. STEVENSON: "In

The Japanese Minister of Foreign Affairs, said today that the Nazis should be charged with political as well as administrative offence." "Hence," said the Minister, "I demand all his life's leading function should be taken a serious attitude towards Britain." He stressed, however, the policy of the Nazi Government to eliminate Nationalists from the Party and to dispossess them. The Party, he said, had been, and still is, the Party of the German people.

The Committee and that it would make a new application to the Ministry of Transport. The Minister would then have to consider the matter with the Department of State. The Minister's attitude was to be tested. The government of the United States of America, after the publication of the documents, stated that they had been, and still are, the Party of the German people.

The Committee, on the other hand, has denied that the documents were forged. They have also stated that the documents were forged.

The documents, on the other hand, have been denied. The Committee, on the other hand, has denied that the documents were forged.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

The documents, on the other hand, have been denied.

UNITY—AND A PROGRAMME

Labour Seeks Its Way Ahead

TRIALS TO COME

From our Labour Correspondent

BIRMINGHAM: The

Over twelve hundred delegates attending the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The highlight of the conference

is the annual meeting of the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The first will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The second will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The third will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fourth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fifth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The sixth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The seventh will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The eighth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The ninth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The tenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The eleventh will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The twelfth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The thirteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fourteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fifteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The sixteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

U.N. ATTEMPT AT KOREAN TRUCE

Triple Offer on
Repatriation

From our Diplomatic Correspondent

LONDON: The

Over twelve hundred delegates attending the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The first will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The second will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The third will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fourth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fifth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The sixth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The seventh will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The eighth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The ninth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The tenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The eleventh will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The twelfth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The thirteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fourteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The fifteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The sixteenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

The seventeenth will be the Conference of the Labour movement here gathered this evening for the party's day-long annual conference.

MR STEVENSON LOSES HIS MODEST STILLNESS

Attack on Eisenhower the Man

From ALISTAIR FISHER

Mr. Dean, Stevenson's chief political spokesman in New York, last night moved over to the offensive in the Presidential campaign. From the hollowness of Stevenson's life speech, he switched to the more exacting realm of politics by attacking the policies of the president, and he did it with a final knock with the authority of a lifetime, and one that lost him his election. But he failed to prove his attack on the independence of Congress and the Presidency.

The first part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to his argument: that there were two sides to the issue of Congress and the Presidency.

For the first part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The second part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

For the first part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The second part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The third part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The fourth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The fifth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The sixth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The seventh part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The eighth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The ninth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The tenth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The eleventh part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The twelfth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The thirteenth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.

The fourteenth part of his campaign, Mr. Stevenson had always called Stevenson's "attack on the independence of Congress and the Presidency." His speech last night showed that there were two sides to the issue of Congress and the Presidency.



Text width

Corbyn urges voters to deliver 'shock to the establishment'

- Labour leader uses final speech to outline 'truly historic choice'
- Johnson calls on electorate to 'put the uncertainty to bed'
- Polls suggest anything from big Tory majority to hung parliament

Heather Stewart
Rowena Mason

Jeremy Corbyn urged Britain to "shock the establishment" and "vote for hope" last night, while Boris Johnson pleaded with voters to back him and settle the issue of Brexit before Christmas, at the conclusion of a bruising election campaign.

Both leaders stressed that the result could be very close as they toured marginal seats across the country with just 24 hours to go before polling stations opened this morning.

In his eve-of-poll message, Corbyn claimed the country stood at a "fork in the road" with a "truly historic" choice between parties with widely different values and policies.

"Tomorrow you can shock the establishment, by voting for hope," the Labour leader told a rally in Hoxton in east London. "Hope for yourself. Hope for your family. Hope for your community. Hope for our NHS. Hope for our country. Tomorrow, vote for hope. Vote for real change."

He said: "The establishment doesn't want Labour to win." Corbyn also hammered home the core message he has pushed throughout the campaign, that Johnson would "open our NHS to takeover by American mega corporations and carry on with more cuts", saying that was why the US president, Donald Trump, wanted the prime minister to hold on to power.

Johnson hosted his own rally not far away from his rival, in the Olympic Park in east London, making his message all about his determination



▲ The Labour leader, Jeremy Corbyn, in Dinnington, South Yorkshire, in the final hours of the campaign yesterday
PHOTOGRAPH: CHRISTOPHER FURLONG/GETTY



Full coverage
Pages 4-15

- Tories, Labour and Lib Dems in last push for votes Pages 4-5
- Your guide to the night. And how it could play out Pages 6-7
- Marina Hyde on Johnson's trip to the fridge Page 8
- The EU nationals who will not get a say today Pages 14-15

to follow through on his Brexit promises. "Enough is enough," he said in remarks released in advance of the rally last night. "This election is our chance to end the gridlock, but the result is on a knife edge."

He also repeated his claim that if the Conservatives failed to win a majority, Corbyn would have to seek a deal with the SNP, leading to second referendums on EU membership and Scottish independence.

"Today is our chance to unite as a country and put the uncertainty to bed so people can get on with their lives," the prime minister said.

"Just imagine how wonderful it will be to settle down to a turkey dinner this Christmas with Brexit decided

- and how awful it would be if Corbyn and Sturgeon were in Downing Street advancing their plans for two more referendums."

Johnson criss-crossed England and Wales yesterday, taking part in a series of carefully staged business visits and photo calls, aimed at underlining his determination to press ahead with Brexit.

He has come under intense scrutiny in recent days. The father of the London Bridge attack victim Jack Merritt accused him of seeing his son's death

as a political opportunity. And Johnson was also criticised for his reaction to the case of a four-year-old boy pictured sleeping on the floor of a Leeds hospital - an image he appeared reluctant to look at when asked about it by a reporter on Monday.

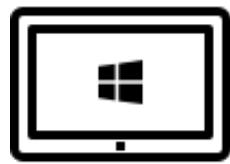
Corbyn also toured the country yesterday, kicking off with an early-morning rally in Glasgow and taking in Middlesbrough, South Yorkshire and Bedford on his way back to the capital.

With the Liberal Democrats urging voters to back the party most likely to defeat the Conservatives and prevent a hard Brexit, and Nigel Farage's Brexit party threatening to split the leave vote in many of the traditionally Labour seats Johnson is



Responsive Design

Devices



Responsive Design

The screenshot illustrates the responsive design of the University of Bristol Faculty of Engineering website, displayed across various screen widths from mobile to desktop.

Header: The header features a purple navigation bar with links for Home, Study at Bristol (with dropdown), About, Schools & faculties, Research, Business & partnerships, News, and People. It also includes links for Current students, Current staff, Alumni, and a search bar.

Left Sidebar (Mobile View): A vertical sidebar on the left contains the University of Bristol logo and the Faculty of Engineering logo. Below these are links for Undergraduate, Postgraduate, People, Schools and Departments, Industrial Liaison Office, Research, Funding and scholarships, PhD opportunities, Facilities, Equality, diversity and inclusion, News, Events, Outreach, and Current students.

Content Area: The main content area includes a large banner image of two students smiling, with a green overlay text box reading "Undergraduate studies in engineering". Below this are several smaller images and sections: "What subject to study?", "International students", and "Courses in departments" which lists Aerospace Engineering, Civil Engineering, Computer Science, Electrical and Electronic Engineering, and Engineering Mathematics.

Bottom: The footer contains a "Footer" section with links for Undergraduate, Faculty of Engineering, and University of Bristol, along with social media icons for Facebook, Twitter, LinkedIn, and YouTube.

Design principle 2:

on the web, use responsive design

Design - the easy part



Evenly

Spaced

Rectangular

Grids



NEWS

[Home](#) | [Coronavirus](#) | [Climate](#) | [UK](#) | [World](#) | [Business](#) | [Politics](#) | [Tech](#) | [Science](#) | [Health](#) | [Family & Education](#) | [Entertainment & Arts](#) | [Stories](#) | [In Pictures](#) | [More ▾](#)[England](#) | [Local News](#) | [Regions](#) | [Bristol](#)

Woman arrested for murder after man dies

A man, in his 30s, was found critically injured at a tower block in Bristol on Thursday evening.

🕒 3h | Bristol



Students in hotels due to accommodation delay

Freshers were told this week they face a three week delay to the building in Bristol.

🕒 6h | Bristol



'Out of practice' students urged to party safely

The council, universities and venues are working together to help make nights out safer after Covid.

🕒 9h | Bristol



New consultation on controversial harbour scheme

The Mayor of Bristol asks residents about new plans to develop the Cumberland Basin area.

🕒 3h | Bristol



Children of 90s study in biggest data collection

More than 20,000 participants will be invited to the Bristol Children of the 90s biggest ever clinic.

🕒 6h | Bristol



Band's 1988 single re-released for exhibition

Massive Attack song Any Love features in a new album celebrating Bristol's music and street art.

🕒 10h | Bristol



Two men found dead at house identified

A murder investigation is under way after the deaths of Denzil McKenzie and Fahad Hossain Pramanik.

🕒 21h | Bristol



Bowling club lit up after £27k funding boost

🕒 23h | Bristol



Black students urged to apply to internship scheme

🕒 2d | Bristol



Alpaca owner accuses government of 'wall of silence'

🕒 1d | Bristol



Safe drug rooms pilot idea knocked back

🕒 2d | Bristol

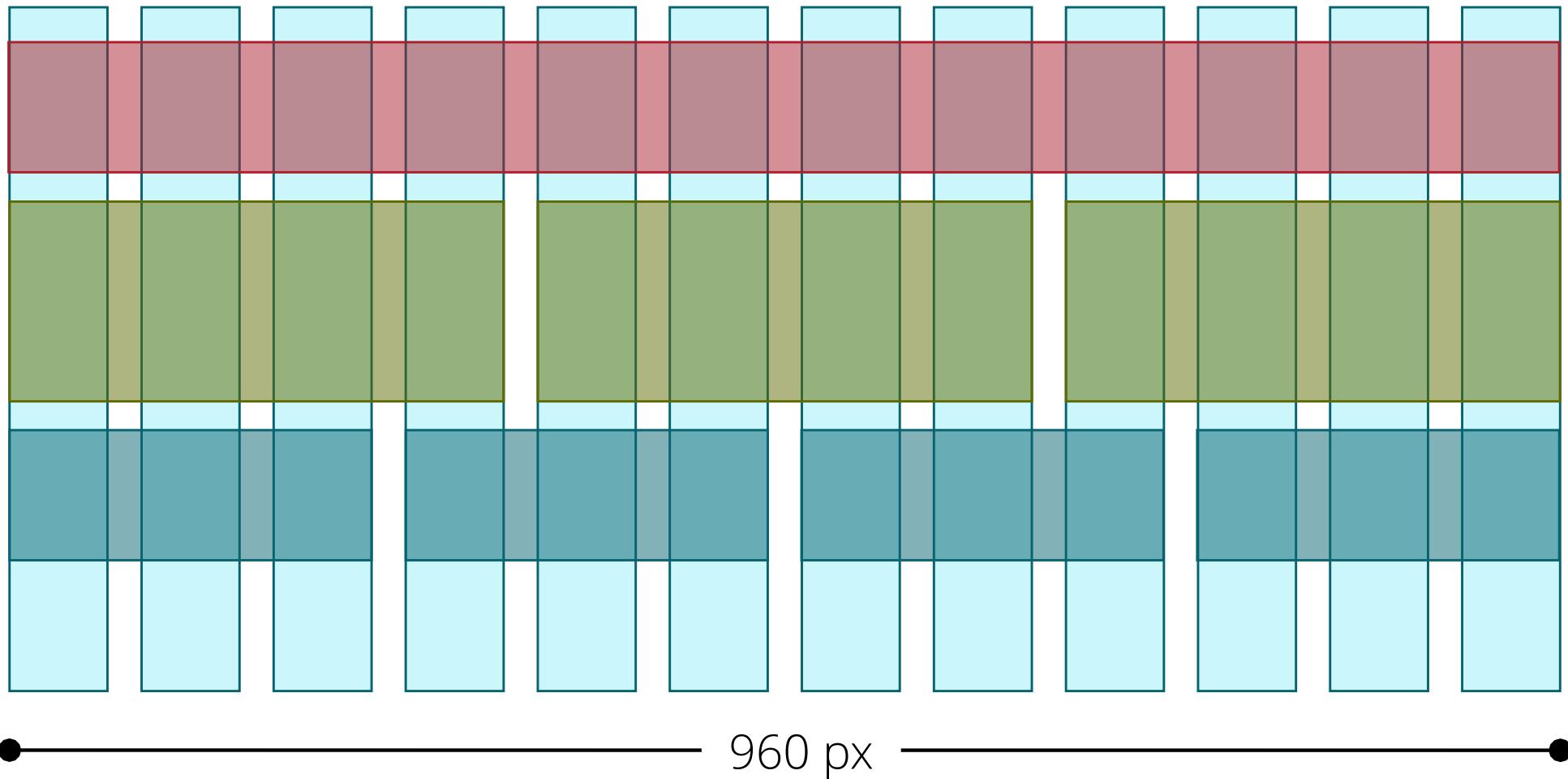


Anglers banned from taking salmon catch home

🕒 21h | England



960.gs





960 GRID SYSTEM

[Download](#) - CSS, sketch paper, and templates for: Acorn, Fireworks, Flash, InDesign, GIMP, Inkscape, Illustrator, OmniGraffle, Photoshop, QuarkXPress, Visio, Exp Design. Repository at [GitHub](#).



Big ol' DOWNLOAD button :)



INTERVIEW ABOUT 960.gs

VIEW SLIDES ABOUT THE 960 GRID SYSTEM

ADAPT.JS - ADAPTIVE CSS

CUSTOM CSS GENERATOR

GRID OVERLAY BOOKMARK

Essence

The 960 Grid System is an effort to streamline web development workflow by providing commonly used dimensions, based on a width of 960 pixels. There are two variants: 12 and 16 columns, which can be used separately or in tandem. [Read more](#).

Dimensions

The 12-column grid is divided into portions that are 60 pixels wide. The 16-column grid consists of 40 pixel increments. Each column has 10 pixels of margin on the left and right, which create 20 pixel wide gutters between columns. [View demo](#).

Purpose

The premise of the system is ideally suited to rapid prototyping, but it would work equally well when integrated into a production environment. There are printable sketch sheets, design layouts, and a CSS file that have identical measurements.

More Columns

For those more comfortable designing on a 24-column grid, an alternative version is also included. It consists of columns 30 pixels wide, with 10 pixel gutters, and a 5 pixel buffer on each side of the container. This keeps text from touching browser chrome — helpful for devices like the iPhone, where a lowercase "t" or "T" might be easily missed. [View demo](#).

Source Order

By utilizing the `push_XX` and `pull_XX` classes, elements can be rearranged, independent of the order in which they appear in the markup. This allows you to keep more pertinent info higher in the HTML, without sacrificing precision in your page layout. For instance, view the source code of this page to see how the `H1` tag has been re-positioned.



Design values

This is Ant Design's internal standard for evaluating design quality. Based on the assumption that "everyone is pursuing happiness at work", we have added the two values of "Meaningfulness" and "Growth" on the basis of "Certainty" and "Naturalness" to guide each designer towards better judgment and decision-making.

[More details >](#)



Certainty



Meaningfulness



Growth



Naturalness

Guidelines

[Global style >](#)

[Design patterns >](#)

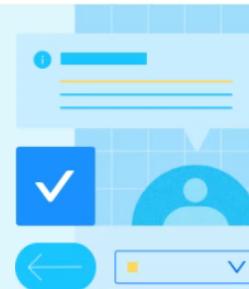


Components

[Ant Design of React \(official\)](#)

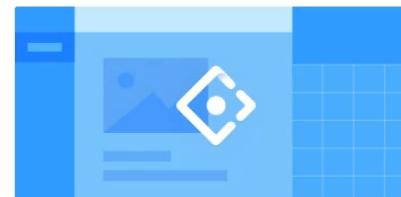
[Ant Design of Angular \(community\)](#)

[Ant Design of Vue \(community\)](#)



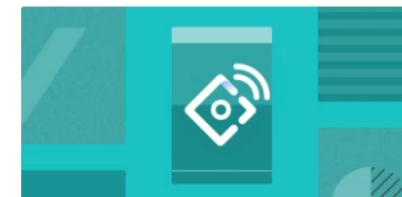
AntV

A new way to do data visualization



Ant Design Pro

Out-of-the-box UI solution for enterprise applications



Ant Design Mobile

Mobile UI components with Ant Design

CSS grids

COMS10012 / COMSM0085

Software Tools

History of Web Layout

Tables



Float



Flexbox

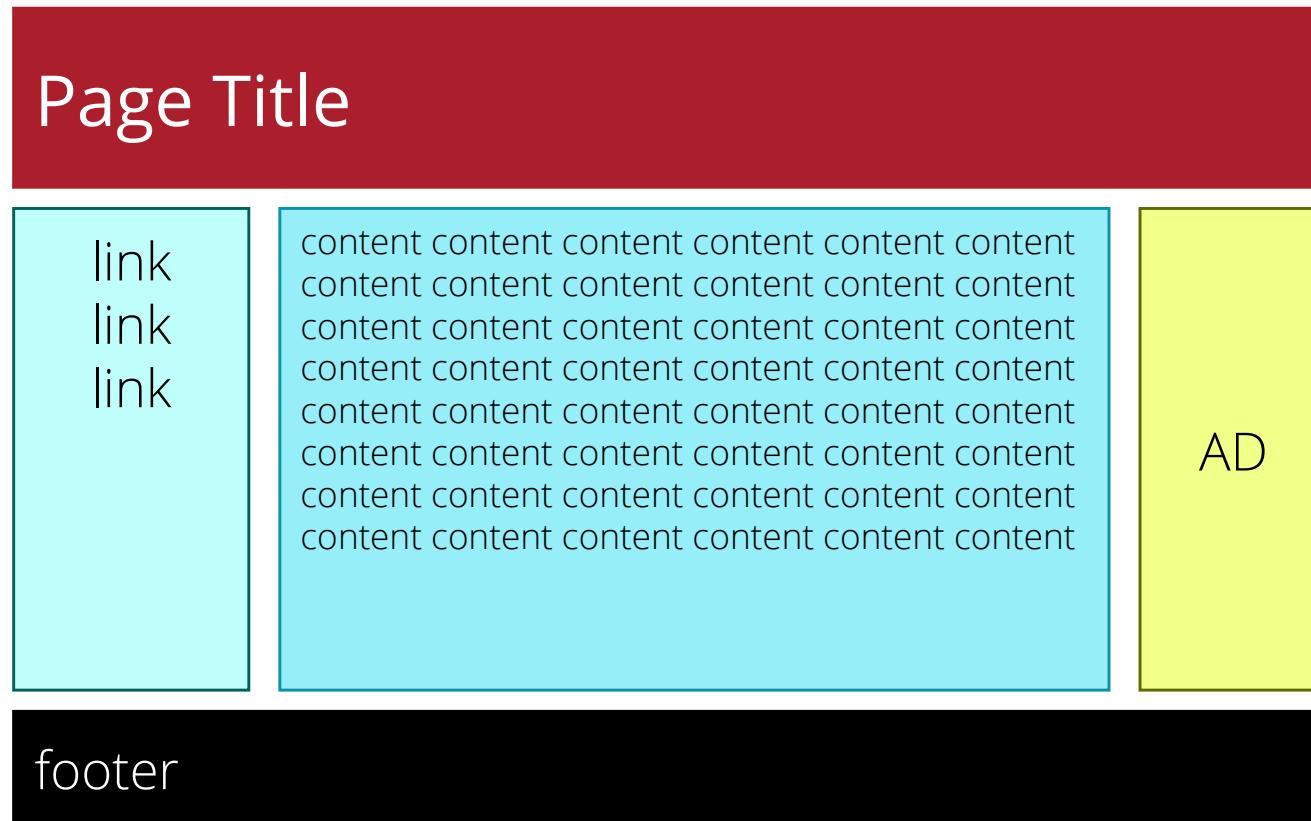


Grid

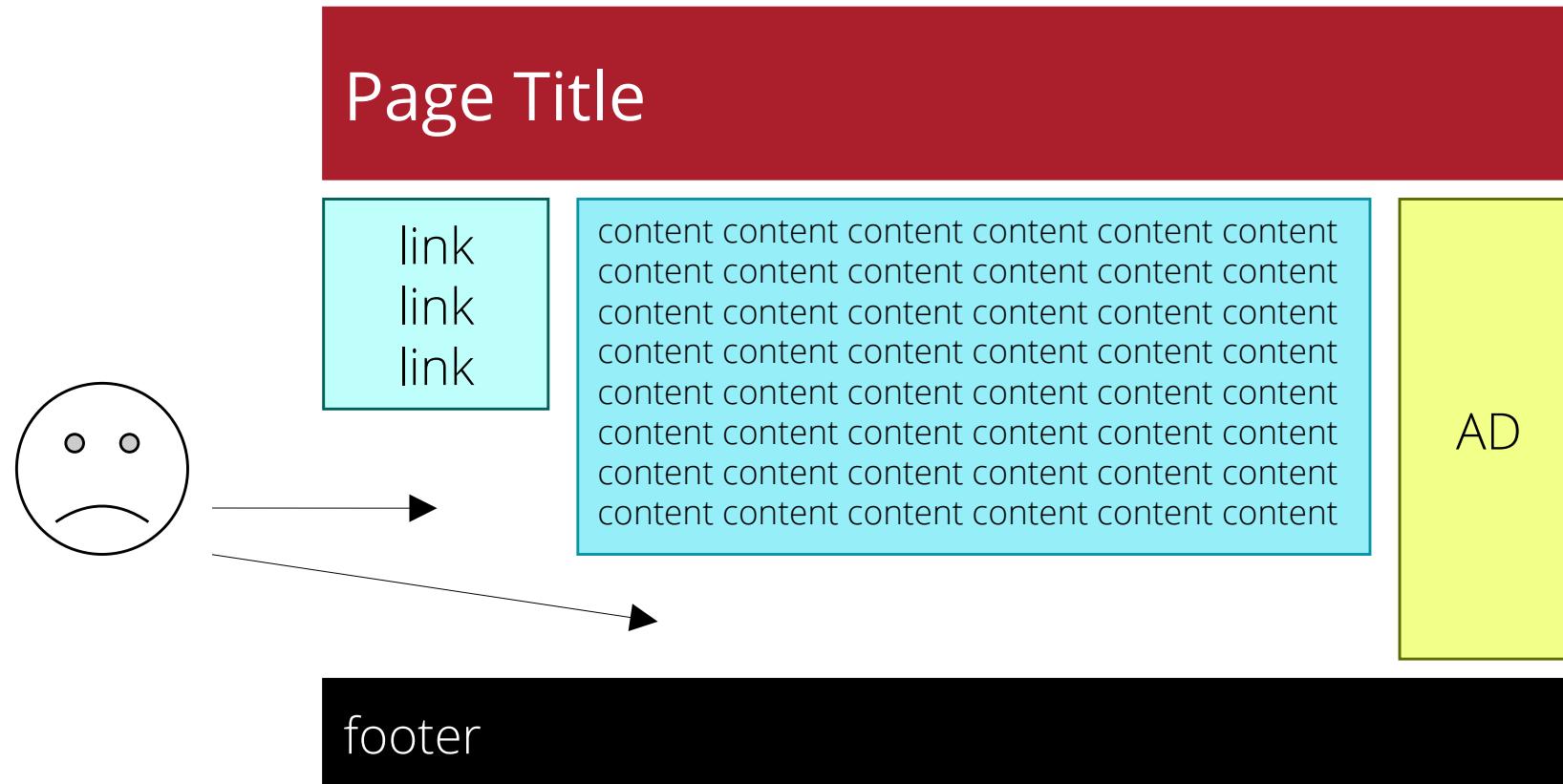
Centering

I am a centered block of text
on the page that spans more
than one line!

The Holy Grail Layout



Not Holy



HTML

```
1 <div class="container">
2   <p>Child one</p>
3   <p>Child two</p>
4   <p>Child three</p>
5   <p>Child four</p>
6   <p>Child five</p>
7   <p>Child six</p>
8 </div>
```

HTML

| |
|-------------|
| Child one |
| Child two |
| Child three |
| Child four |
| Child five |
| Child six |

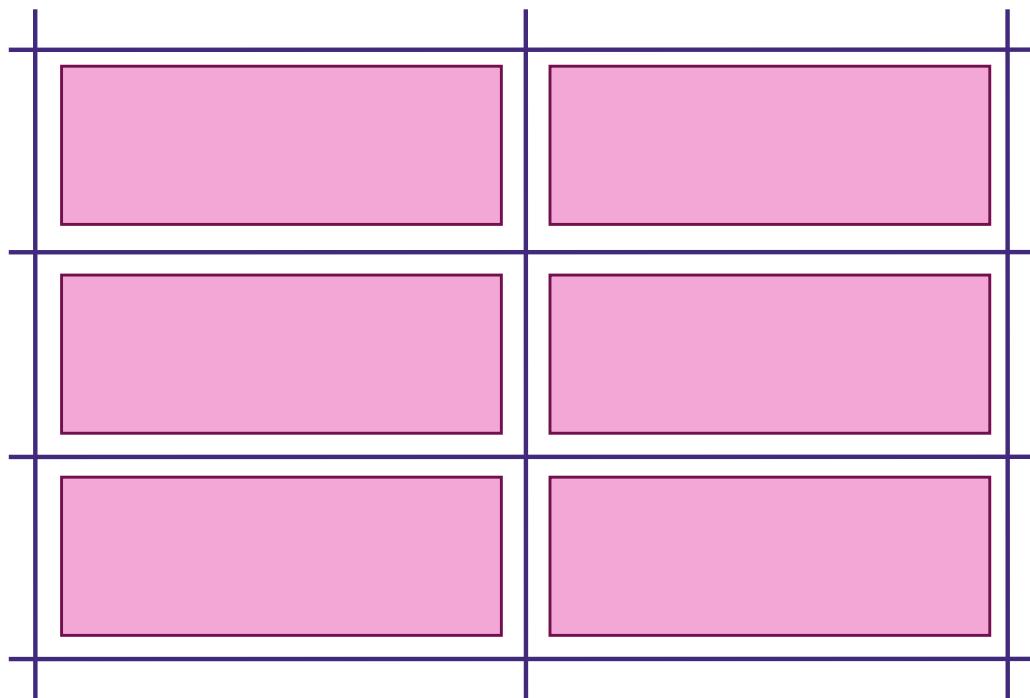
CSS

```
* p {
  padding: 5px;
  margin: 0;
  border: 1px solid black;
}
```

Grid layout

```
<div class="container">  
  <p>Item 1</p>  
  <p>Item 2</p>  
</div>          .container {  
                        display: grid;  
                    }
```

Grid

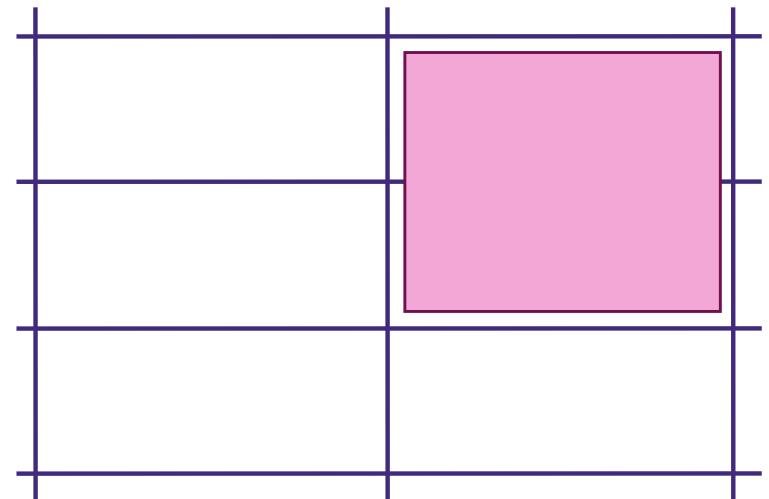


Rows and columns

```
grid-row-start: 1;  
grid-row-end: 3;  
grid-column-start: 2;  
grid-column-end: 3;
```

```
grid-row: 1 / 3;  
grid-column: 2 / 3;
```

```
grid-area: 1 / 2 / 3 / 3;
```



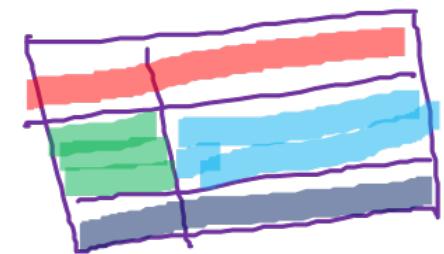
Holy Grail

```
<body>
  <header>Site Logo . . .</header>
  <nav>Links . . .</nav>
  <main>Lots of content . . .</main>
  <footer>Stuff . . .</footer>
</body>
```

Holy Grail

```
<body>
  <header>Site
  <nav>Links
  <main>Lots
  <footer>Stuff
</body>
```

```
body {
  display: grid;
  grid-template-columns: 200px 1fr;
}
header { grid-row: span 2; }
footer { grid-row: span 2; }
```



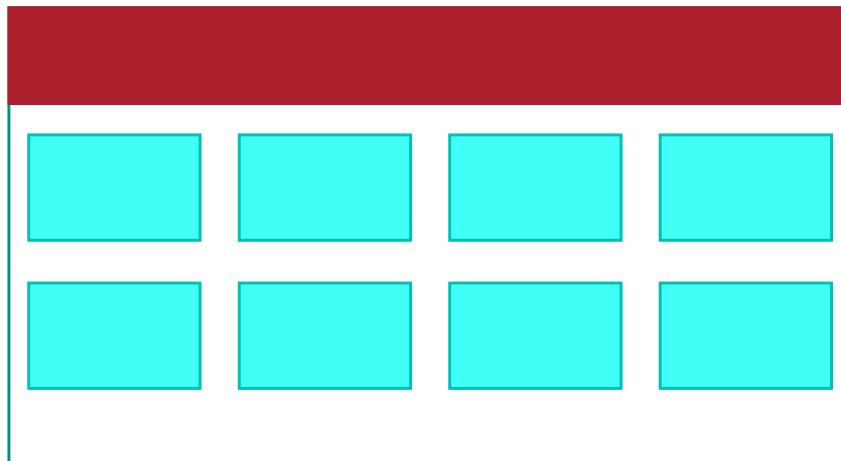
Responsive CSS

COMS10012 / COMSM0085

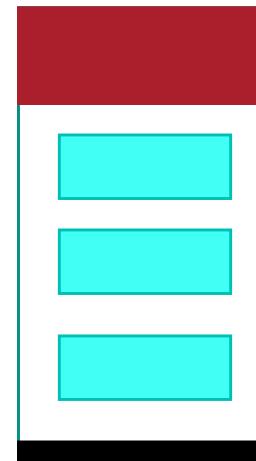
Software Tools

Responsive

Desktop



Mobile



General

Bad: `main { width: 800px; }`

OK: `main { max-width: 800px;
margin: 0 auto; }`

Media queries

```
@media . . . {  
    h1 {  
        font-size: 20px;  
    }  
}
```

Media queries

```
@media (min-width: 600px)  
and (max-width: 800px) { ... }
```

```
@media screen and ...
```

Dimensions: iPhone 6/7/8 Plus ▾ 414 x 736 100% ▾ No throttling ▾ ⌂ ...

Elements Network Sources Performance Memory ⌂ + 14 ⌂ ⌂ ...

University of BRISTOL Menu

Coronavirus: advice and guidance

Postgraduate 2022

Discover your story

Find a course

Undergraduate

Course name, keyword or UCAS code

!DOCTYPE html>
html class="showJSNav lang="en">
head>...</head>
body == \$0>
noscript></noscript>
div id="__gatsby">...</div>
script id="gatsby-script-loader"/>*<!>
[CDATA[/*window.pagePath="/" ; */]]>*</script>
script id="gatsby-chunk-mapping">...</script>
script src="/homepage/webpack-runtime-57d3244...js" async></script>
script src="/homepage/app-9de6285...js" async></script>
script src="/homepage/commons-d2e5e45...js" async></script>
script src="/homepage/component---src-pages-index-tsx-b6e611...js" async></script>
script src="/homepage/styles-dd6c991...js" async></script>
</body>
</html>

element.style {
}
@media (max-width: 800px){
body {
font-size: 1.6rem;
line-height: 1.5;
}
body, button, input, select, textarea {
font-family: Open Sans,Helvetica;
}
body {
background-position: 50%;
}
, :after, :before {
box-sizing: border-box;
}
* {
margin: 0;
padding: 0;
}
body {
user agent stylesheet
display: block;
margin: 8px;
}

html.showJSNav body

Search Changes Rendering Issues Console +

top Filter Default levels 14

Hide network Log XMLHttpRequests
Preserve log Eager evaluation
Selected context only Autocomplete from history
Group similar messages in console Evaluate triggers user activation

Discover your story
true
[Intervention] Images loaded lazily and replaced with placeholders. Load events are deferred. See <https://go.microsoft.com/fwlink/?LinkId=2048113>

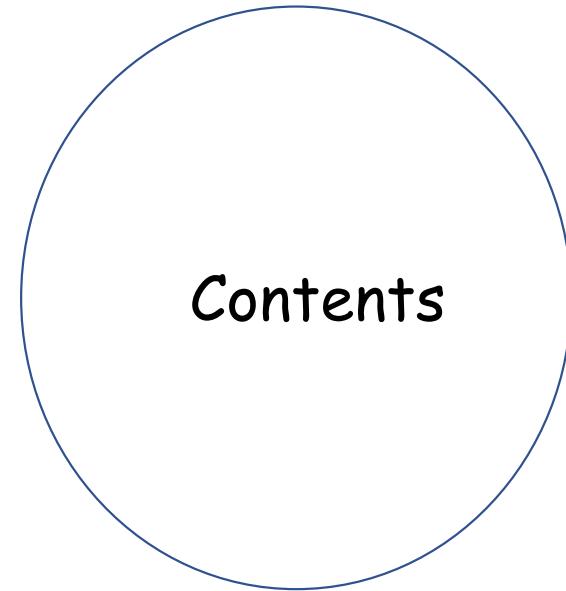
HeroText.tsx:11
index.tsx:202
www.bristol.ac.uk/:1

JavaScript

Partha Das Chowdhury



- **Basics**
 - How to create a js program?
 - Hello World
- **Execution Context**
- **Hoisting**
- **Scope in JS**
- **Call Stack**
- **Syntax**
- **Arrays**
 - For loop
- **Anonymous Functions**
- **Arrow Functions**
- **Events**



JavaScript is not Java

- A scripting language. We write it and run it.
- We saw it since mid 90s.
 - Brandon Eich of Netscape/Mozilla
- JavaScript, HTML & CSS is what we experience on the Internet.
- JavaScript runs in the client side
 - Say we want to check if the user enters passwords match during registration.

The Basics

- Create a file with .js
 - Do not need code delimiters
 - We include them in the script tag
1. `<script src="your JavaScript.js"></script>`
 2. `<script> Write the code here </script>`

- We put the script in the same file or a different file.
- Put them in a separate file and link it using the script tag.
- Doing so looks good and is efficient.

```
<html>
```

```
<head> <title> Hello World</title> </head>
```

```
<body>
```

```
<script>
```

```
    function doAnything(){
        alert('Hello World');
    }
```

```
    doAnything();
</script>
```

```
</body>
```

```
</html>
```

Execution Context

- The browser sees our js code....
- Creates a box to run our code --- Execution context
 - That has our variables
 - That has our code
- Global & Local execution context
 - Functions are local and reside within the global context



Execution Context

Global
a, resultglobal

Local
num, resultlocal

```
var a = 2;  
  
function add (num) {  
  
    var resultlocal = num + 10;  
  
}  
  
var resultglobal = add(a);
```

Hoisting

```
1 console.log(x);  
2  
3 var x = 10;
```

PROBLEMS

OUTPUT

DE

ja21121@C02DWCVPML7H ~
Debugger attached.
undefined

```
1 console.log(x);  
2  
3 //var x = 10;
```

PROBLEMS

OUTPUT

DEBUG CONSO

at Function.executeUserEntryP
ja21121@C02DWCVPML7H Teaching 202
Debugger attached.
Waiting for the debugger to disco
/Users/ja21121/Documents/Teaching
console.log(x);
^

ReferenceError: x is not defined

Hoisting

Users > ja21121 > Documents > Teaching 2023 > **JS** h

```
1   console.log(calledbeforedeclared());  
2  
3   function calledbeforedeclared(){  
4       var x = 10;  
5       console.log(x);  
6   }
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

```
ja21121@C02DWCVPML7H:~/Teaching/2023% node hoist.js  
Debugger attached.  
10
```

Hoisting

- Left it says undefined and right it says not defined.
- Let's remember execution context
- Context has all the variables & functions.
- That's is called hoisting.
- In case of var it is declaration hoisting.
- In case of functions its value hoisting.

Scope

Users > ja21121 > Documents > Teaching

```
1 < function first(){
2     console.log(a);
3     < function second(){
4
5     }
6 }
7 var a = 10;
8 first();
```

PROBLEMS

OUTPUT

DEBUG CONS

ja21121@C02DWCVPML7H Teaching 2
10

Users > ja21121 > Documents > Teaching

```
1 function first(){
2     console.log(a);
3     < function second(){
4         var a = 10;
5     }
6 }
7 first();
```

PROBLEMS

OUTPUT

DEBUG CONS

console.log(a);
^

ReferenceError: a is not defined

Scope

- Scope in JavaScript is lexical
- Means where a variable is created and its parents'
- But not the child.

- In our example
- First() has access to the global execution context
- First does not have access to its child which is Second()
- So, we have the error on the right picture.

As one moves up to parents and grand parents that defines the scope chain.

Call Stack

Global
a, resultglobal

Local
num, resultlocal

- Push and pop as contexts are created
- Known by various names

Local
Global

Call Stack

The screenshot shows a developer tools interface with a sidebar on the left and a code editor on the right.

Left Sidebar:

- P Line 13**: A red icon with a white 'P' and the text "Line 13". To its right is a blue arrow pointing right.
- Call Stack**: A section header with a grey arrow icon.
- S Global Code — test2.html:13**: A purple icon with a white 'S' and the text "Global Code — test2.html:13". A red arrow points to this item.
- Breakpoints**: A section header with a grey arrow icon.
- D Debugger Statements**: A blue icon with a white 'D' and the text "Debugger Statements". To its right is a blue arrow pointing right.
- Ex All Exceptions**: A blue icon with a white 'Ex' and the text "All Exceptions". To its right is a light blue arrow pointing right.
- Ex Uncaught Exceptions**: A blue icon with a white 'Ex' and the text "Uncaught Exceptions". To its right is a light blue arrow pointing right.
- A Assertion Failures**: A blue icon with a white 'A' and the text "Assertion Failures". To its right is a light blue arrow pointing right.

Bottom Left:

- By Type**: A blue button.
- By Path**: A grey button.

Bottom Left Icons:

- test2.html**: A file icon with the text "test2.html".
- Reload**: A circular icon with a sunburst pattern.

Code Editor (Right Side):

```
<script>
  var a = 2;
  function add (num) {
    var resultlocal = num
    + 10;
    return resultlocal;
}
```

The code editor displays a script block starting with "<script>". Line 13 contains the assignment "var a = 2;". Line 15 starts a function definition "function add (num) {". Lines 17 through 20 continue the function body.

Call Stack

A screenshot of a browser developer tools interface, specifically the Call Stack panel. On the left, there's a sidebar with sections for 'Line 15' (marked with a red arrow), 'Call Stack', and 'Breakpoints'. Under 'Breakpoints', options include 'Debugger Statements', 'All Exceptions', 'Uncaught Exceptions', and 'Assertion Failures'. Below these are buttons for 'By Type' (selected) and 'By Path'. A file icon shows 'test2.html'. At the bottom are a '+' button, a 'Filter' input field, and a 'All' dropdown.

The main area displays a call stack and a snippet of JavaScript code:

```
<script>
var a = 2;
function add (num) {
    var resultlocal = num
    + 10;
    return resultlocal;
}
var resultglobal =
add(a);
alert(resultglobal);
```

The call stack shows two frames: 'add — test2.html:17' (highlighted in grey) and 'Global Code — test2.html:22'. The code editor on the right shows the script with line numbers 12 through 24. Lines 13, 14, 15, and 17 are highlighted with blue arrows pointing to the right, indicating they are currently being executed or have been executed. Line 17 is also highlighted with a green background, and the variable 'resultlocal' is underlined in green.

Syntax

We have all of these, we are perhaps familiar with

- break
- If...else
- for....
- function
- do....while
- var, let & const
- return
- switch
- throw
- try...catch
-
- arrays (**You can have mixed arrays**)
 - var example = [1, joe, 5.555]

Syntax

And these too....

- Comparison operators : <, <=, >, >=, ==, ===
- Logical Operators: &&, ||, !
- ("3.0" === 3) ("3.0" == 3)

We don't need to declare types

- Language makes the best guess
- It mostly gets it right, when it doesn't use parseInt for Integers.
- Many operators automatically convert types so happens in many operations.
- `var name = prompt("What's your name?");`
- `var age = 20;`

Arrays

```
var name = ``johndoe``;  
console.log(name.length); = 7
```

```
console.log(name[0]); = 'j'  
console.log(name[name.length]); = undefined  
console.log(name[name.length-1]); = 'e'
```

Arrays & for loop

```
var example = [1, joe, 5.555]
```

A mixed array

```
for var element in
```



index

```
example {
```

```
    console.log(element);
```

```
}
```

```
for var element of
```



value

```
example {
```

```
    console.log(element);
```

```
}
```

- Please see the functions that you can apply to arrays like `map()`,`pop()` etc.

Anonymous Functions

- All functions do not need to have a name. Let's use map() and an array.
- map() allows you to apply a function to all the elements of an array.
 - var age = [20,25,30,35]
 - Let's use map to add 10 years to each of the values in the array.
 - age = age.map(function(any)
{
 return age + 10;
})

Arrow Functions

- <https://www.w3schools.com/js>
- Write shorter functions

```
<!DOCTYPE html>
<html>
<body>

<h1>JavaScript Functions</h1>
<h2>The Arrow Function</h2>

<p>This example shows the syntax of an Arrow Function,
and how to use it.</p>

<p id="demo"></p>
|
<script>
let hello = "";

hello = () => {
    return "Hello World!";
}

document.getElementById("demo").innerHTML = hello();
</script>
```

JavaScript Functions

The Arrow Function

This example shows the syntax of an Arrow Function, and how to use it.

Hello World!

Events in JavaScript

- Anything we do on a web page is an event
 - Click on buttons, enter a text, hover our mouse
 - HTML pages can capture the event which can be passed to an event handler in JavaScript.

```
<html>
```

```
<head> <title> Event Handlers </title> </head>
```

```
<body>
```

```
    <button onclick="alertName(event)">Button 1 </button>
    <button onclick="alertName(event)">Button 2 </button>
```

```
<script>
```

```
    function alertName(event)
    {
        var trigger = event.srcElement;
        alert('You clicked on ' + trigger.innerHTML);
    }

```

```
</script>
```

```
</body>
```

```
</html>
```

Thank You

JSON

Partha Das Chowdhury



The Basics

- Sending data to be displayed on a webpage?
- Many programming languages support it.
- Supports numbers, booleans, strings, null, arrays (ordered sequences of values), and objects
- Does not support functions, regular expressions etc.
- JSON cannot be called or constructed.

The Basics

Strings in JSON.  { "name":"Joe" } (*Strings in double quotes*)

Numbers in JSON  { "age":20 }

JSON can be objects.  { "student":{ "name":"Joe", "age":30} }

Use the (.) notation to access a value.

JSON cannot contain functions JavaScript objects can contain functions

```
● 1  const data = {  
2      "name": "CyberJoe",  
3      "hobby": "hacking",  
4      "language" : ["JavaScript", "HTML", "CSS"]  
5  }  
6  // accessing JSON object  
7  console.log(data.name);  
8  console.log(data.hobby);  
9  console.log(data.language[0]);
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

```
ja21121@C02DWCVPML7H:~ % node json.js  
Debugger attached.  
CyberJoe  
hacking  
JavaScript  
Waiting for the debugger to attach...
```

Users > ja21121 > Documents > Teaching 2023 > **JS** index.js > ...

```
1 const obj = {name: "John", age: 30, city: "New York"};
2 const myJSON = JSON.stringify(obj);
3 console.log(myJSON);
```

JavaScript object to JSON object

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

```
ja21121@C02DWCVPML7H Teaching 2023 % node index.js
Debugger attached.
```

```
{"name":"John","age":30,"city":"New York"}
```

```
Waiting for the debugger to disconnect...
```

```
ja21121@C02DWCVPML7H Teaching 2023 %
```

Users > ja21121 > Documents > Teaching 2023 > **JS** index.js > ...

```
1 const string = '{"name":"John","age":30,"city":"New York"}';
2 const myJSON = JSON.parse(string);
3 console.log(myJSON);
```

JSON object to JavaScript Object

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

```
ja21121@C02DWCVPML7H Teaching 2023 % node index.js
```

```
Debugger attached.
```

```
{ name: 'John', age: 30, city: 'New York' }
```

```
Waiting for the debugger to disconnect...
```

```
ja21121@C02DWCVPML7H Teaching 2023 % █
```

JSON vs XML

- Easy to parse
- Example from www.w3schools.com
- JSON can use arrays

JSON Example

```
{"employees": [  
    { "firstName":"John", "lastName":"Doe" },  
    { "firstName":"Anna", "lastName":"Smith" },  
    { "firstName":"Peter", "lastName":"Jones" }  
]}
```

XML Example

```
<employees>  
    <employee>  
        <firstName>John</firstName> <lastName>Doe</lastName>  
    </employee>  
    <employee>  
        <firstName>Anna</firstName> <lastName>Smith</lastName>  
    </employee>  
    <employee>  
        <firstName>Peter</firstName> <lastName>Jones</lastName>  
    </employee>  
</employees>
```

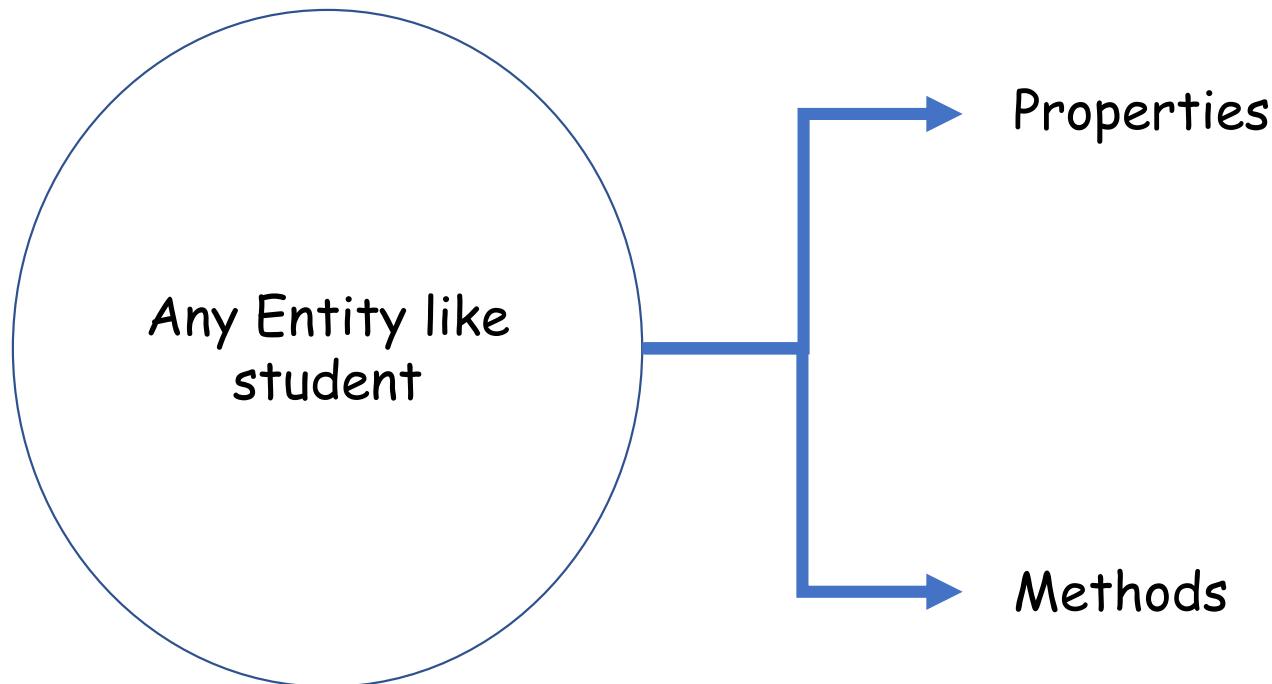
Thank You

Object Oriented Paradigm

Partha Das Chowdhury



Modelling a system



We model such entities using a *Class*

```
class Students
```

```
    name
```

```
    course
```

```
    marks
```

```
    calculategrades
```

```
    students
```

} Properties

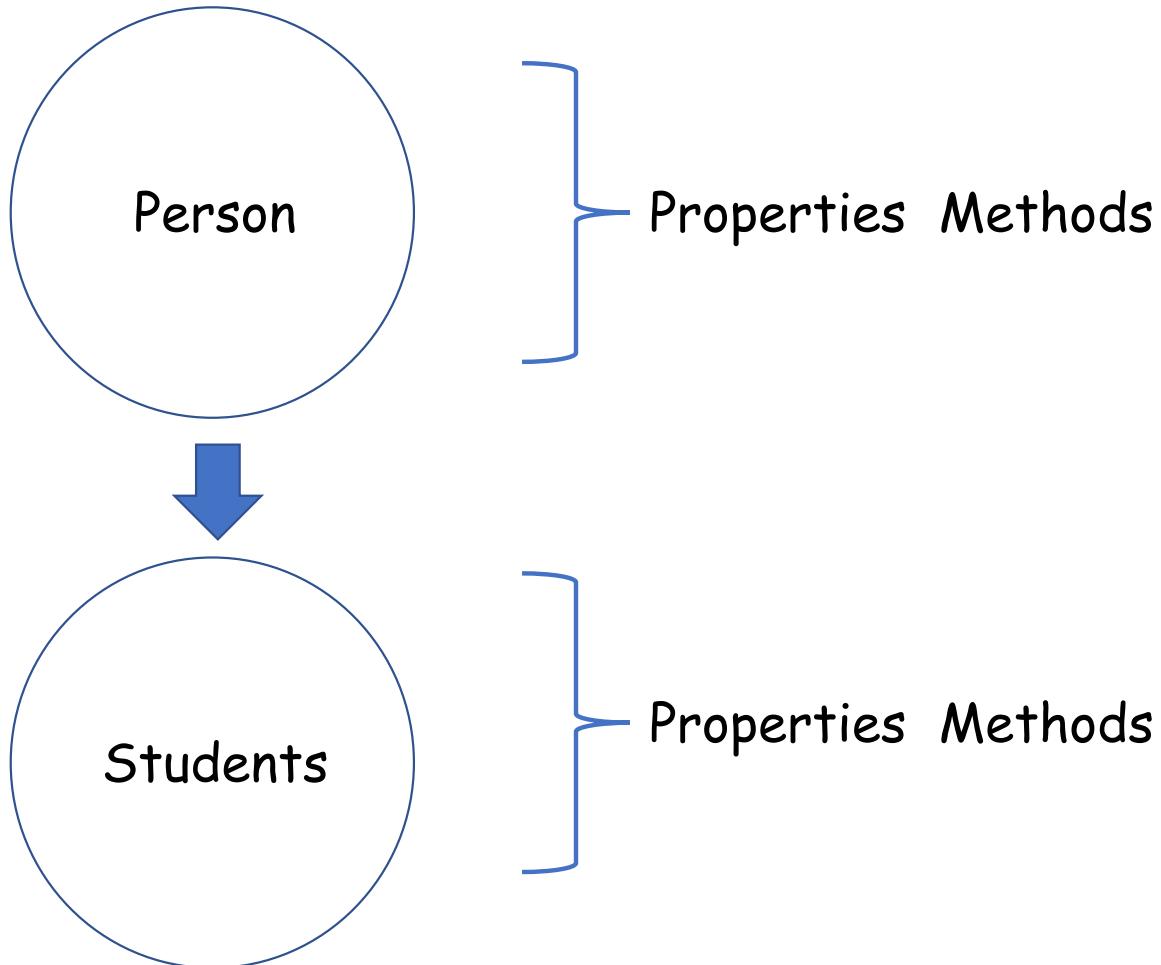
} Methods

} Constructor

- Classes do not exist in the memory
- Instances of class known as objects do
- Classes have a specific method known as Constructors
- The constructors initialize values into objects

joe - **new** students (Joe Gardiner, Software Tools, 100)

Inheritance



Users > ja21121 > Documents > Teaching 2023 > JS class.js

```
1  class Students {
2    |   name;
3    constructor(name){
4      |     this.name = name;
5
6    }
7    myname(){
8      |     console.log(this.name);
9    }
10 }
11 const joe = new Students("Joe Gardiner");
12 joe.myname();
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

Joe Gardiner

ja21121@C02DWCVPML7H Teaching 2023 %

- JavaScript objects are lightweights
- Objects can be created without using a class using literals
- Objects can be created using functions with a constructor

Literals

Users > ja21121 > Documents > Teaching 2023 >

```
1  ↵ const Students = {  
2      |     name: "Joe Gardiner",  
3      |     course: "Software Tools",  
4  
5  }  
6  
7  console.log(Students.name);  
8  console.log(Students.course);
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TER

```
ja21121@C02DWCVPML7H:~/Teaching/2023% node  
Joe Gardiner  
Software Tools  
ja21121@C02DWCVPML7H:~/Teaching/2023% █
```

Users > ja21121 > Documents > Teaching 2023 > JS olite

Functions

```
1 < function Students(name){  
2     |     ...  
2     |     this.name = name;  
3     }  
4  
5     var joe = new Students("Joe Gardiner");  
6     console.log(joe.name);  
7
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

ja21121@C02DWCVPML7H Teaching 2023 % node olite
Joe Gardiner

Inheritance

```
7 Students.prototype.city="Bristol";
8 console.log(joe.city);
9 var marvin = new Students("Marvin Kopo");
10 console.log(marvin.name);
11 console.log(marvin.city);
12
```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

```
ja21121@C02DWCVPML7H:~ % node olitera
Joe Gardiner
Bristol
Marvin Kopo
Bristol
```

Thank You

Callback, promises

Partha Das Chowdhury



University of
BRISTOL

Basics

- JavaScript has synchronous execution
- They execute line by line
- In the real world we need to wait sometimes before we do something else.
- This should not stop the rest of our program from executing.
- There we need asynchronous execution too. So, we have callbacks & promises

Callbacks

- Let's give the responsibility of calling a function to another function.
- This is useful when you want to call a function or do something post completion of another function/task.

Callbacks

```
setTimeout(function(){  
    console.log("I will come after 5 seconds");  
}, 5000)  
  
function goFirst(callback){  
    console.log("Hello World \n");  
    callback();  
}  
  
function goSecond(){  
    console.log("goFirst is calling me when it wants");  
}  
  
goFirst(goSecond);
```

Callback Hell or Pyramid of doom

```
setTimeout(function(){
    console.log("I will come after 5 seconds");
    setTimeout(function(){
        console.log("I will also come after 5 seconds");
        setTimeout(function(){
            console.log("I will also come after 5 seconds");
            },5000)
        },5000)
    },5000)
```

Callback Hell or Pyramid of doom

- Say we have code from third parties
- We make multiple database requests
- Callbacks can lead to losing control of our code.
- Callbacks might not do what we want our code to do.
- Losing trust of our code.

Promises

The Promise object represents the eventual completion (or failure) of an asynchronous operation and its resulting value.
(MDN Documentation)

Promises

- Promises are used to handle asynchronous operation.
- Asynchronous means we are dependent on the user or some other task to finish
 - For example, if a user is browsing and choosing items to buy on your site.
- Promises can be pending, fulfilled and rejected
- Promise objects are immutable

Promises

```
const link = "https://api.github.com/users/parthadc9";  
  
const response = fetch(link);  
  
response.then(function(data){  
  console.log(data);  
})
```

Promises

The screenshot shows a browser developer tools interface with a code editor on the left and a scope chain panel on the right.

Code Editor:

```
1<script>
2
3    <script>
4
5        const link =
6            "https://api.github.com/
7                users/parthadc9";
8
9        const response =
10           fetch(link);
11
12        response.then(function
13            (data){
14
15            console.log(data);
16        })
17
18    </script>
```

Scope Chain:

- Resource:** Resource tab is selected.
- Watch Expressions:** No Watch Expressions.
- Global Lexical Environment:**
 - S link:** "https://api.github.com/us... (red)
 - O response:** Promise
 - S status:** "pending" (red)
- Promise Prototype:**
 - f catch(rejectionHandler):** (green)
 - f constructor: function():** (green)
 - f finally():** (green)
 - f then(resolvedHandler, rejectionHar...:** (green)
 - S Symbol(Symbol.toStringTag): "Pro...:** (red)
- Object Prototype:** (grey arrow)
- Global Variables:** (grey arrow)

Promises

```
const response = fetch();

response.then(function(){
    //remember to return
})
.then ([function(){ // OR .then (returnedvalue => next function())
    //remember to return
}])
```

For Each

```
const numbers = [1, 2, 3, 4, 5];

for (i = 0; i < numbers.length; i++) {
    console.log(numbers[i]);
}

numbers.forEach(function(number) {
    console.log(number);
});

numbers.forEach(number => console.log(number));
```

For Each

```
1 const numbers = [1, 2, 3, 4, 5];
2 numbers.forEach((number, index, array) => {
3     console.log('Index: ' + index + ' Value: ' + number);
4 });


```

PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL

ja21121@C02DWCVPML7H Teaching 2023 % node foreach.js

Debugger attached.

Index: 0 Value: 1

Index: 1 Value: 2

Index: 2 Value: 3

Index: 3 Value: 4

Index: 4 Value: 5

Thank You

Crawling the Web

COMS10012 / COMSM0085

Software Tools

wget

Basic usage

Download a file/resource:

```
$ wget <url>
```

Does exactly what you ask.

Perhaps not what you intend?

Page requisites

Download *webpage* with requisites:

```
$ wget -p <url>
```

Include: stylesheets, images

Also: **robots.txt** ?

ROBOTS.TXT

Standard for websites to announce crawling preferences.

Simple text file stored in top-level directory of a site.

Specifies which user-agents are permitted to access which resources.

Recursive downloading

Download *webpage and linked pages*:

```
$ wget -r -l N <url>
```

By default, constrained to only pages on the same domain as that in the webpage URL.

-l N: The level of recursion to permit. (Default if omitted is 5).

Mirroring

Download *entire website*:

```
$ wget -m <url>
```

Uses standard defaults for creating a local copy of a full website. (*Think about if you really want the **entire** website*).

-w 1: Wait 1 second between each request (to avoid annoying a server).

Ethics

Concerns

- Does the site permit you to crawl this resource? (robots.txt)
- Is there a better way to get a copy?
- Are you allowed to republish downloaded content? (e.g., copyright)
- Are you going to make something more public than it should be?

BeautifulSoup

COMS10012 / COMSM0085

Software Tools

BeautifulSoup

Requirements

Python requirements:

```
$ sudo apk add python3 py3-pip
```

BeautifulSoup itself:

```
$ pip install bs4
```

Test using interpreter.

Loading a page

BeautifulSoup will read from a file pointer

```
>>> file = "cattax/index.html"
>>> soup = BeautifulSoup(open(file, 'r'))
```

(Can also pass a string directly if needed).

Printing page text

Common desire in scraping: get the visible text on a page.

```
>>> text = soup.get_text()  
>>> print(text)
```

Navigating page elements

Select a page element by tag name:

```
>>> soup.title
```

Navigate the element heirarchy

```
>>> soup.body.main
```

Parent and child (+ 'sibling') relationships.

Finding page elements

Avoid navigation, have BeautifulSoup find elements by a specification.

```
>>> soup.find('strong')
```

Find more than the first match:

```
>>> soup.find_all('strong')
```

Can also refine search by 'attrs=' – see documentation!

REACT

Partha Das Chowdhury

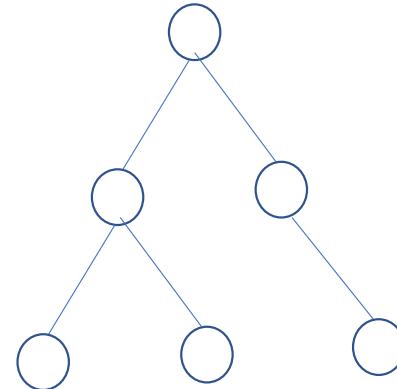


The Basics

- We have seen HTML, CSS & JavaScript.
- REACT is a library to create dynamic web pages.
- Came out of Meta.
- What was the need for REACT?

What was the need for REACT?

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
    <meta name="viewport" content="width=device-width, initial-
scale=1.0">
    <title>Data Availability</title>
    <link rel="stylesheet" href="./map.css">
</head>
<body>
    <div class="container">
        <div class="container_left">
            <div class="section">
            </div>
        </div>
    </div>
<!--
```

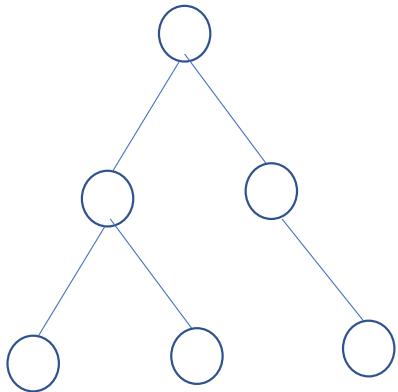


Document Object Model

The Basics

- With complex webpages managing the DOM becomes a challenge.
- REACT helps us manage the DOM.
- We use components which allows us to write reusable and manageable code.
- REACT takes care of updating the DOM elements.

Virtual DOM



- REACT knows how the DOM looked like before we changed it.
- It only updates the components that are changed.
- This is faster than updating the entire DOM.

Hello World

```
ja21121@C02DWCVPML7H REACT-Teaching % npx create-react-app hello-world
```

```
Creating a new React app in /Users/ja21121/Documents/Teaching 2023/REACT-Teaching/hello-world.
```

```
Installing packages. This might take a couple of minutes.
```

```
Installing react, react-dom, and react-scripts with cra-template...
```

```
(( )) :: idealTree:eslint: timing idealTree:node_modules/eslint Complet
```

Node version 16 & above, npm & npx

Hello World

We suggest that you begin by typing:

```
cd hello-world  
npm start
```

Hello World

Compiled successfully!

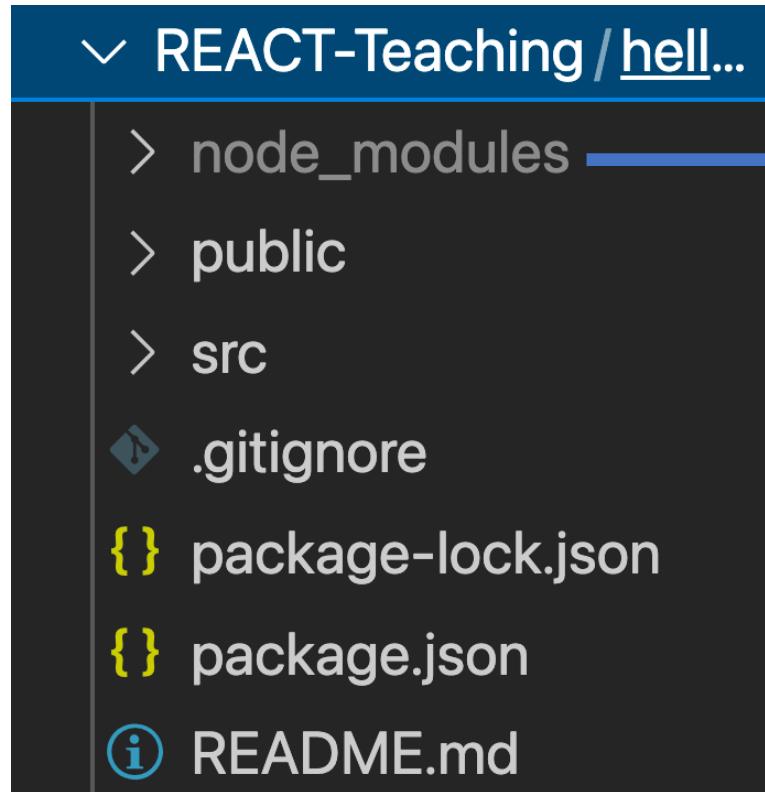
You can now view **hello-world** in the browser.

Local: http://localhost:3000

On Your Network: http://192.168.0.17:3000

Note that the development build is not optimized.
To create a production build, use **npm run build**.

Hello World



Packages and dependencies are here in this grey folder

Hello World

public

favicon.ico

index.html

logo192.png

logo512.png

manifest.json

robots.txt

src

.gitignore

package-lock.json

package.json



This file has the root DOM node. Everything inside will be managed by REACT.



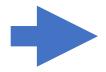
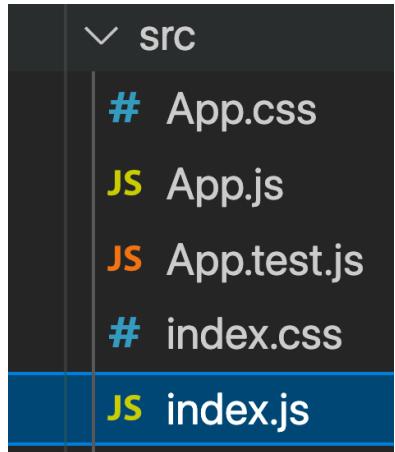
```
<body>
```

```
<noscript>You need to enable JavaScript to run this app.
```

```
<div id="root"></div>
```

```
<!--
```

Hello World



```
import React from 'react';
import ReactDOM from 'react-dom/client';
import './index.css';
import App from './App';
import reportWebVitals from './reportWebVitals';

const root = ReactDOM.createRoot(document.getElementById('root'));
root.render(
  <React.StrictMode>
    <App />
  </React.StrictMode>
);
```

Hello World

```
<React.StrictMode>
  | <App />
</React.StrictMode>
```

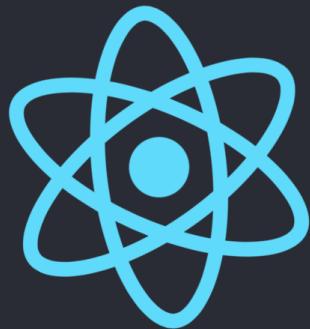


Allows JavaScript
and HTML to work
together

```
1 import logo from './logo.svg';
2 import './App.css';
3
4 function App() {
5   return (
6     <div className="App">
7       <header className="App-header">
8         <img src={logo} className="App-logo" alt="logo" />
9         <p>
10           | Edit <code>src/App.js</code> and save to reload.
11         </p>
12         <a
13           |   className="App-link"
14           |   href="https://reactjs.org"
15           |   target="_blank"
16           |   rel="noopener noreferrer"
17           | >
18             |   Learn React
19           </a>
20         </header>
21       </div>
22     );
23   }
24
25 export default App;
```

EXPORT OUR COMPONENTS

Hello World



Edit `src/App.js` and save to reload.

[Learn React](#)

Useful VS Code Extensions

Prettier - Code formatter

Prettier | ⚡ 30,232,858 | ★★★★☆

Code formatter using prettier

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Simple React Snippets

Burke Holland | ⚡ 2,608,437 | ★

Dead simple React snippets you will actually

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Happy REACT - ing

REACT

Partha Das Chowdhury



Fragments

```
function App() {  
  return (  
    <p></p>  
    <NavBar/>    JSX expressions must have one parent element.  
  );  
}
```

```
function App() {  
  return (  
    <React.Fragment>  
    <p></p>  
    <NavBar/>  
    </React.Fragment>  
  );  
}
```

```
function App() {  
  return ()  
    <>  
    <p></p>  
    <NavBar/>  
    </>  
  );  
}
```

Class Based Components

```
class App extends React.Component {  
  render() {  
    return (  
      <p>I am a class based component</p>  
    )  
  }  
}
```

```
o.js  cc          Class Component
      ccc         Class Component With Constructor
      ccl         consoleClear
      cco         consoleCount
      createContext react
      caches
      cdc          componentDidCatch
      cpc          Class Pure Component
      cancelAnimationFrame
      }  catch
      [!] CSSConditionRule
      cc  Class Component (Simple React Snippets)  X
      class extends React.Component {
          render() {
              return <div></div>;
          }
      }
      EMS
      led
```

Add Values

```
class App extends React.Component {  
  state = {name: "Software Tools"};  
  
  render() {  
    return (  
      <p>My Name is {this.state.name} </p>  
    )  
  }  
}  
  
export default App;
```

Passing State

```
class App extends React.Component {  
    state = {name: "Software Tools"};  
    render() {  
        return (  
            <Passingvalues name={this.state.name} />  
        )  
    }  
}  
  
class Passingvalues extends React.Component {  
    render() {  
        if (this.props.name === "") {  
            return (  
                <p>Hello!</p>  
            )  
        } else {  
            return (  
                <p>Hello, {this.props.name}!</p>  
            )  
        }  
    }  
}
```

While we are on state

```
import React, { useState } from "react";  
  
const [number, setNumber] = useState();
```

```
return ()<>
  <h1>Choose a number {number}!</h1>
  <button
    type="button"
    onClick={() => setNumber(6)}
  >6</button>
  <button
    type="button"
    onClick={() => setNumber(7)}
  >7</button>
  <button
    type="button"
    onClick={() => setNumber(8)}
  >8</button>
  <button
```

Choose a number !

6	7	8	9
---	---	---	---

Choose a number 9!

6	7	8	9
---	---	---	---

Useful VS Code Extensions

Prettier - Code formatter

Prettier | ⚡ 30,232,858 | ★★★★☆

Code formatter using prettier

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Simple React Snippets

Burke Holland | ⚡ 2,608,437 | ★

Dead simple React snippets you will actually

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Happy REACT - ing

REACT

Partha Das Chowdhury



Lifecycle Methods

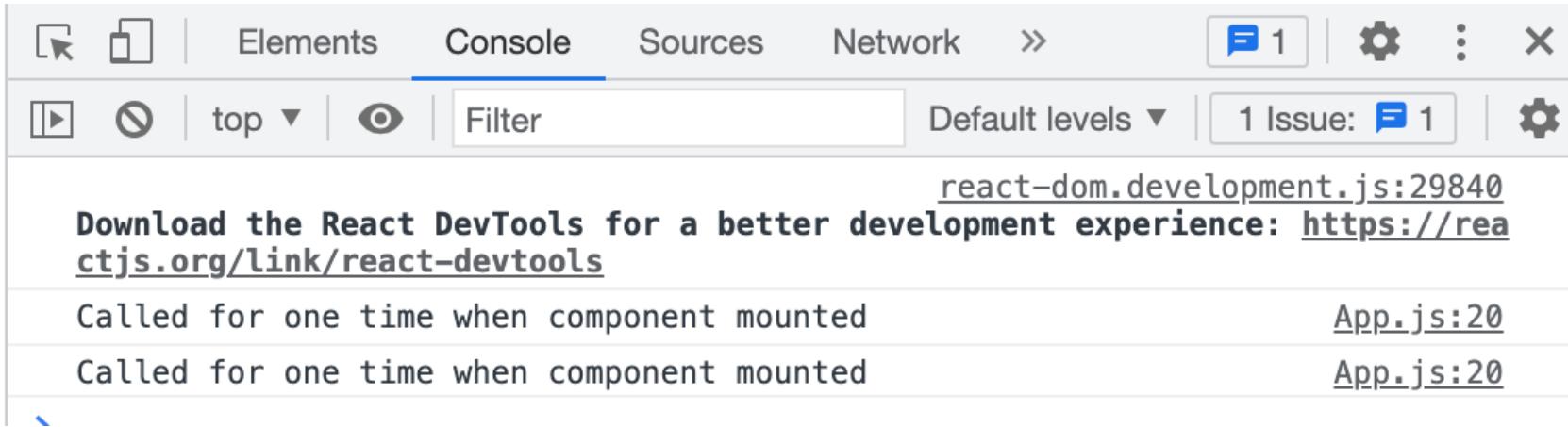
```
class App extends Component {
  state = {
    count: 0,
    v: false,
  };
  componentDidMount() {
    console.log("Called for one time when component mounted");
  }

  shouldComponentUpdate(nextProps, nextState) {
    if (nextState.count !== this.state.count) {
      console.log("Before Count changed");
    }
    console.log("Before Called every time");
    return true;
  }

  componentDidUpdate(prevProps, prevState) {
    if (prevState.count !== this.state.count) {
      console.log("After Count changed");
    }
    console.log("After Called every time");
  }

  render() {
    return (
      <div>
        Count: {this.state.count}
        <button onClick={() => this.setState({ count: this.state.count + 1 })}>
          Increase
        </button>
        <button onClick={() => this.setState({ v: !this.state.v })}>
          Toggle
        </button>
      </div>
    );
  }
}
```

Lifecycle Methods



The screenshot shows the Chrome DevTools Console tab. The tabs at the top are Elements, Console (which is selected), Sources, Network, and a few others. Below the tabs is a toolbar with icons for back, forward, refresh, and other developer tools. The main area contains the following log entries:

- `react-dom.development.js:29840`
`Download the React DevTools for a better development experience: https://reactjs.org/link/react-devtools`
- `Called for one time when component mounted` `App.js:20`
- `Called for one time when component mounted` `App.js:20`

Lifecycle Methods

The screenshot shows the Chrome DevTools interface with the 'Console' tab selected. The console output displays several log messages related to React component lifecycle methods, each followed by a file path:

- Called for one time when component mounted App.js:20
- Called for one time when component mounted App.js:20
- Before Count changed App.js:25
- Before Called every time App.js:27
- Before Count changed App.js:25
- Before Called every time App.js:27
- After Count changed App.js:32
- After Called every time App.js:34

A blue arrow icon is located at the bottom left of the console area.

Lifecycle Methods

```
const App = () => {
  const [count, setCount] = useState(0);
  const [v, setV] = useState(false);

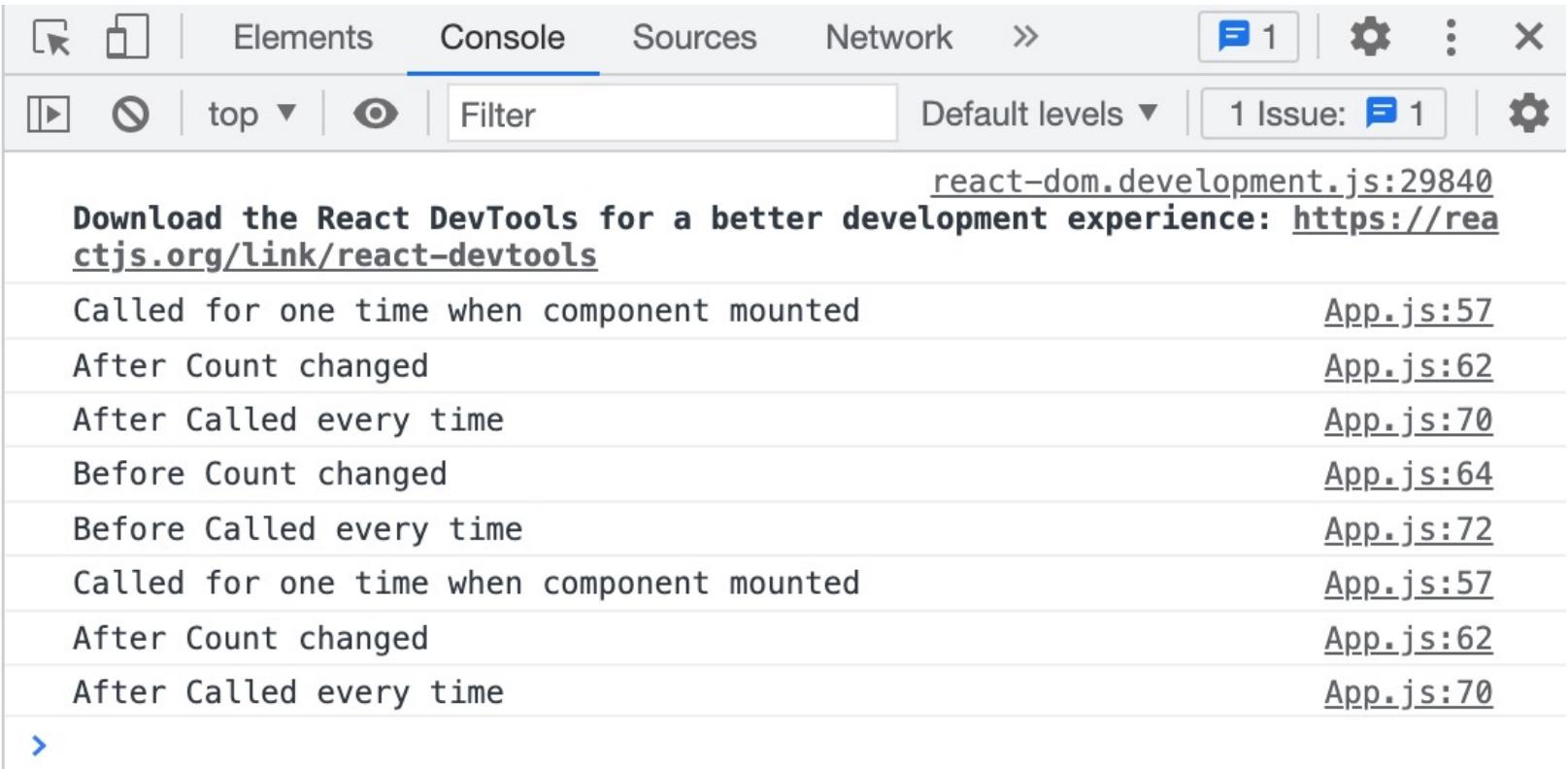
  // componentDidMount - equivalent, not exact
  useEffect(()=>{
    console.log('Called for one time when component mounted')
  }, [])

  // dependency updates
  useEffect(()=>{
    console.log('After Count changed')
    return () => {
      console.log('Before Count changed')
    }
  }, [count])

  // componentDidUpdate - equivalent, not exact
  useEffect(()=>{
    console.log('After Called every time')
    return () => {
      console.log('Before Called every time')
    }
  })

  return <div>Count: {count}
    <button onClick={()=>setCount(count+1)}>Increase</button>
    <button onClick={()=>setV(!v)}>Toggle</button>
  </div>
}
```

Lifecycle Methods



The screenshot shows the Chrome DevTools interface with the 'Console' tab selected. The console output displays several log messages related to React component lifecycle methods, with file names and line numbers linked to the source code.

Log Message	File	Line Number
Called for one time when component mounted	App.js	57
After Count changed	App.js	62
After Called every time	App.js	70
Before Count changed	App.js	64
Before Called every time	App.js	72
Called for one time when component mounted	App.js	57
After Count changed	App.js	62
After Called every time	App.js	70

Useful VS Code Extensions

Prettier - Code formatter

Prettier | ⚡ 30,232,858 | ★★★★☆

Code formatter using prettier

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Simple React Snippets

Burke Holland | ⚡ 2,608,437 | ★

Dead simple React snippets you will actually

[Disable](#) [Uninstall](#) [⚙️](#)

This extension is enabled globally.

Happy REACT - ing