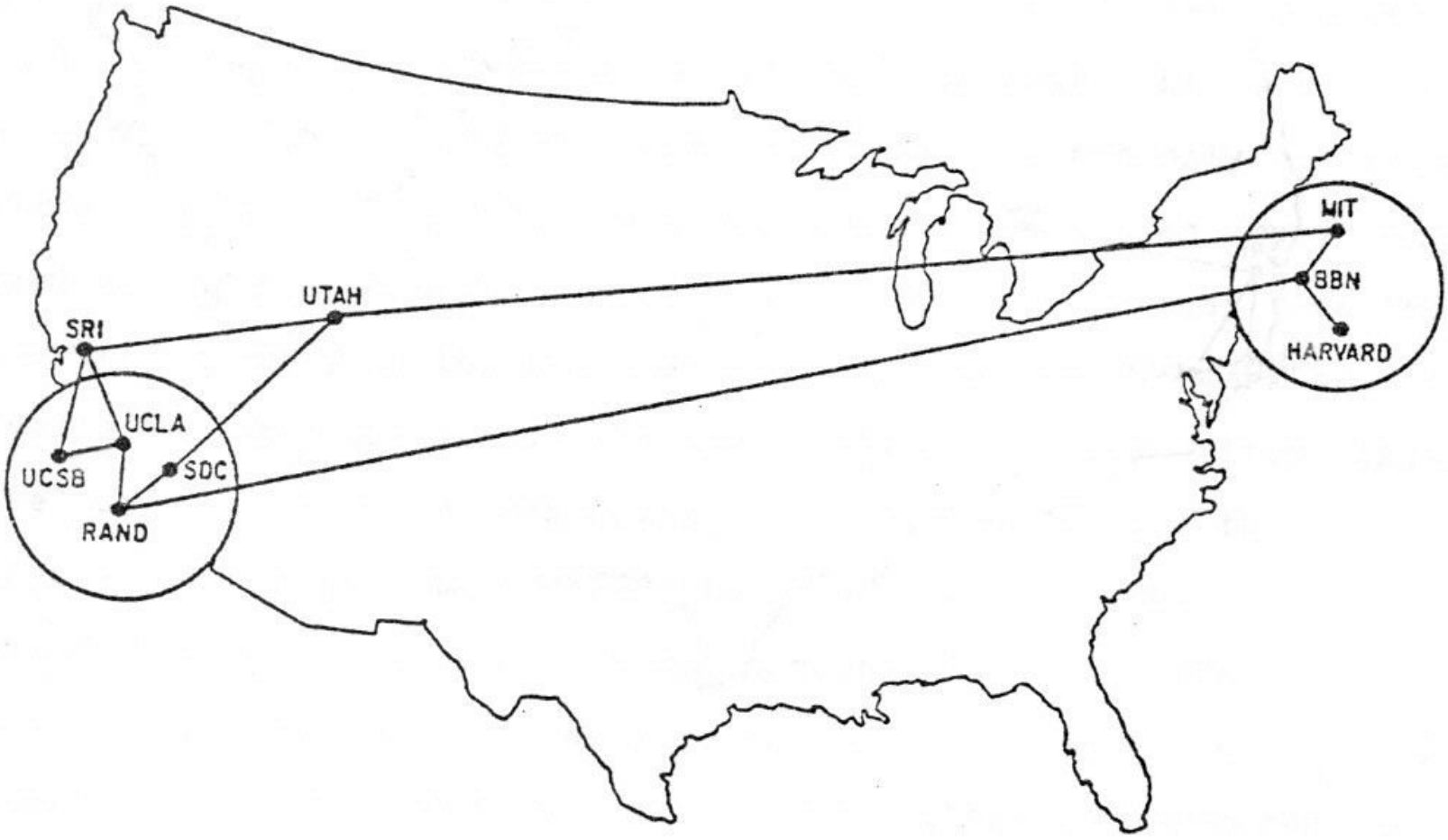
This is CS50

internet

The ARPANET in December 1969


MIT
BBN
HARVARD
UTAH
SRI
UCLA
UCSB
SDC
RAND

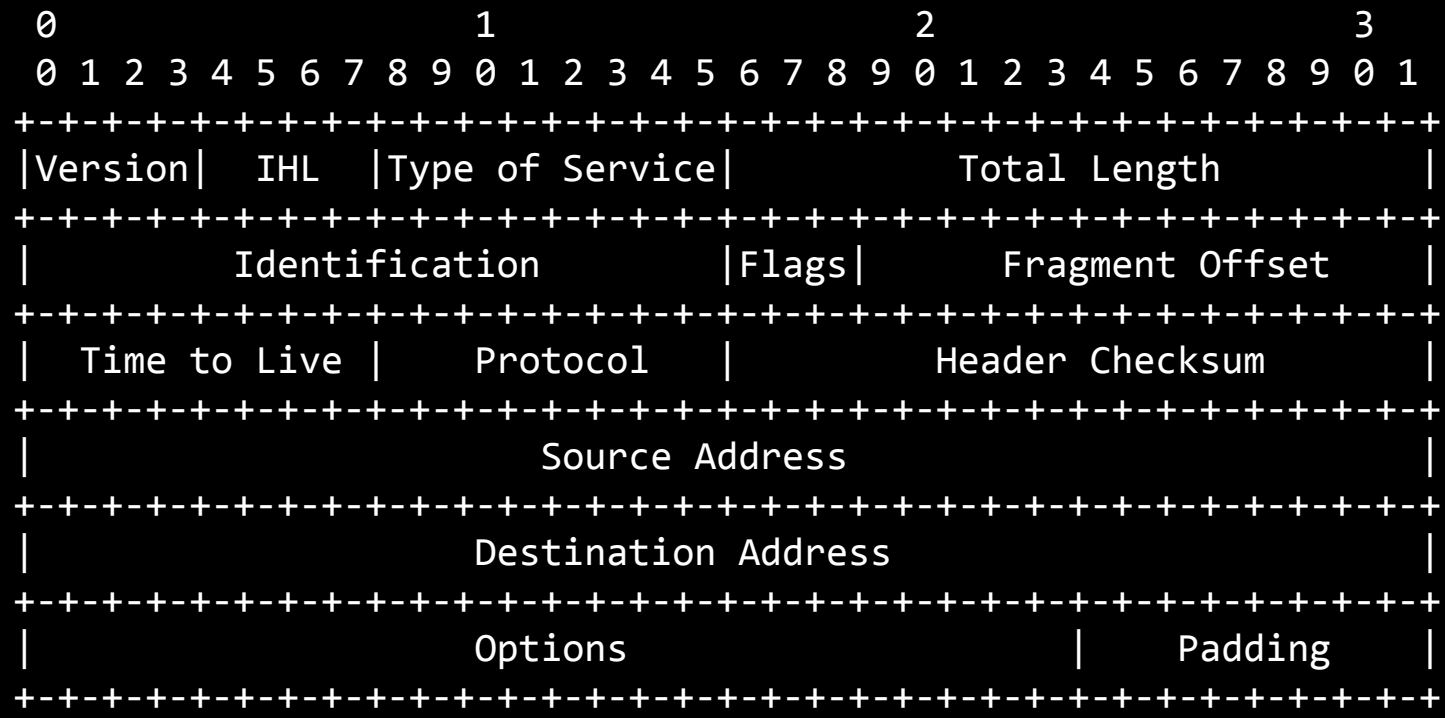
routers

Brian Yu
Guy E White
Dr Franko Betuafo N...
Alison Xin
Shreyas Iyer
Moshe Poliak
Yoel Hawa
Taylor Kruse
Helen Cho
Jonny Zhang
Josh Archibald
Ashley Zhuang
Caroline Abel
Sophie Edouard
Moni Radev
Jonathan Yuan
Albert Zhu
Helen Mehreteab
Joshua Ng
Montague Mawere
Matt Thomas Pauly
Seeam Noor
Maria Guramani
Patrick Song
Phyllis Zhang

TCP/IP

IP

#.#.#.#

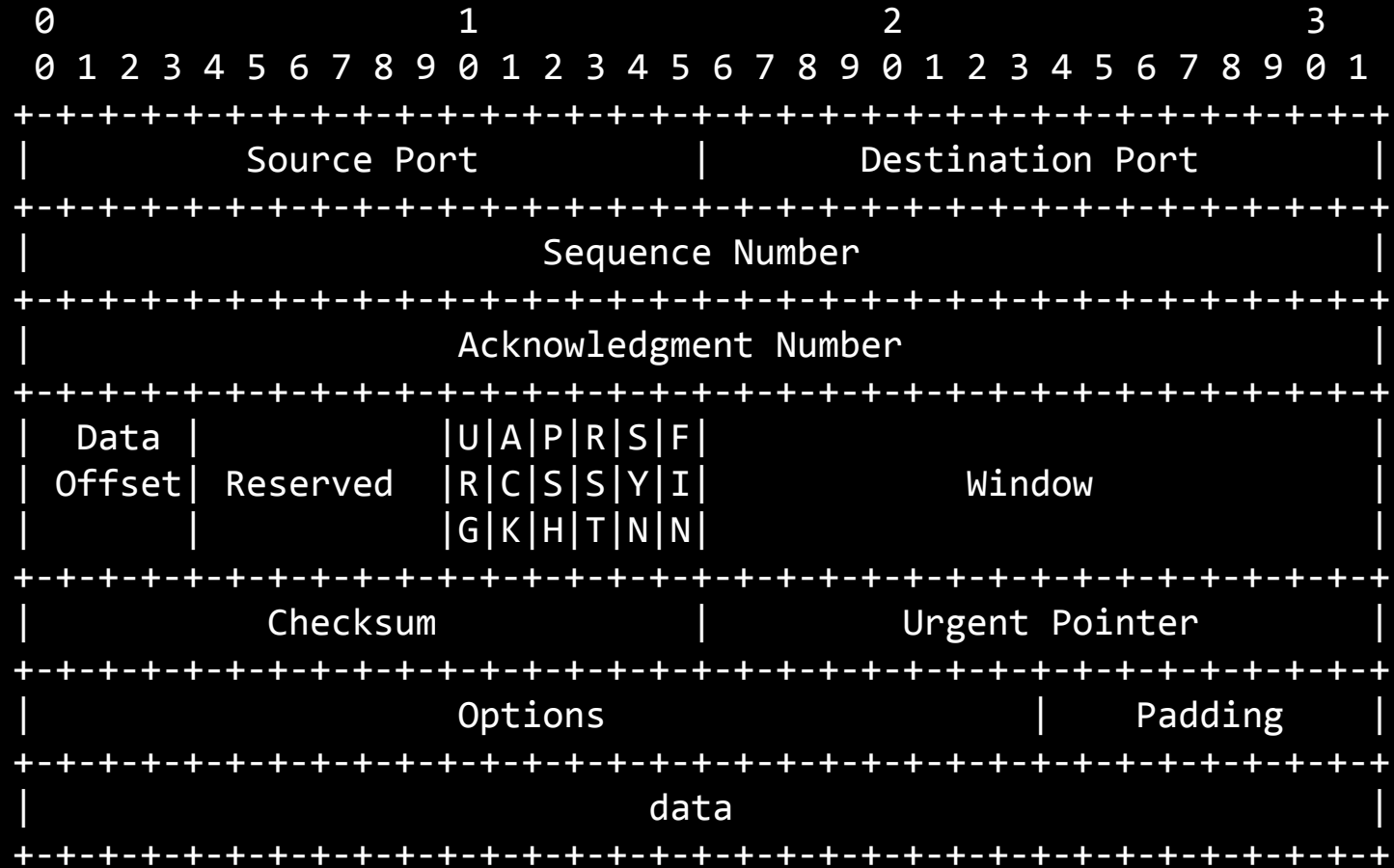


Example Internet Datagram Header

TCP

ports

80	HTTP
443	HTTPS
...	



TCP Header Format

DNS

Domain Name	IP Address

Fully Qualified Domain Name	IP Address

DHCP

HTTP

HTTPS

https://www.example.com

https://www.example.com/

https://www.example.com/path

https://www.example.com/file.html

https://www.example.com/folder/

https://www.example.com/folder/file.html

https://www.example.com/folder/file.html

https://www.example.com/folder/file.html

https://www.example.com/folder/file.html

https://www.example.com/folder/file.html

https://www.example.com/folder/file.html

GET
POST
...

```
GET / HTTP/2
Host: www.harvard.edu
...
```

```
HTTP/2 200
Content-Type: text/html
...
```

developer tools

```
HTTP/2 301
Location: https://www.harvard.edu/
…
```

```
GET / HTTP/2
Host: harvard.edu
...
```

```
HTTP/2 404
Content-Type: text/html
...
```

```
200 OK
301 Moved Permanently
302 Found
304 Not Modified
307 Temporary Redirect
401 Unauthorized
403 Forbidden
404 Not Found
418 I'm a Teapot
500 Internal Server Error
503 Service Unavailable
...
```

```
GET / HTTP/1.1
Host: safetyschool.org
...
```

HTML

tags

attributes

```
<!DOCTYPE html>

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

```
http-server
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <title>
            hello, title
        </title>
    </head>
    <body>
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    </body>
</html>
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    </body>
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<html lang="en">
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        </title>
    </head>
    <body>
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    </body>
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    </body>
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<!DOCTYPE html>

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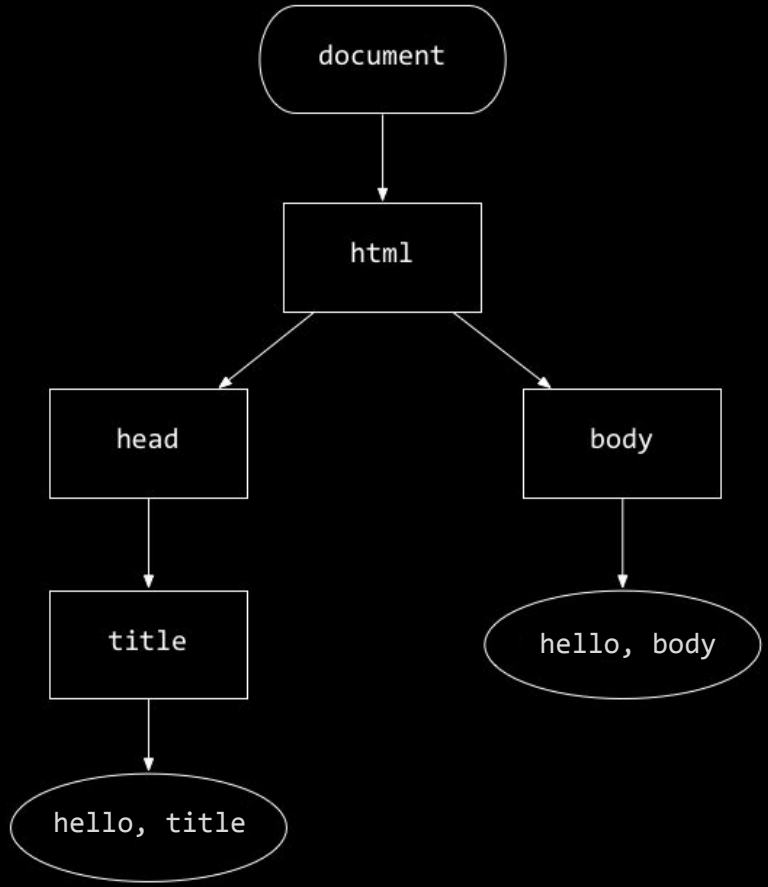



https://www.example.com

https://www.example.com/path?key=value

https://www.example.com/path?key=value&key=value

regular expressions

regexes

developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Regular_expressions

`.`	any single character (except line terminators)
`*`	zero or more times
`+`	one or more times
`?`	0 or 1 time
`{n}`	n occurrences
`{n,m}`	at least n occurrences, at most m occurrences

…

`[0123456789]`	any one of the enclosed characters
`[0-9]`	any one of the range of characters
`\d`	any digit
`\D`	any character that is not a digit

…

```
^[a-zA-Z0-9.!#$%&'*+\/=?^_`{|}~-]+@[a-zA-Z0-9](?:[a-zA-Z0-9-]{0,61}[a-zA-Z0-9])?(?:\.[a-zA-Z0-9](?:[a-zA-Z0-9-]{0,61}[a-zA-Z0-9])?)*$
```

developer tools

validator.w3.org

CSS

properties

type selector

class selector

ID selector

attribute selector

...

```
<!DOCTYPE html>

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

```
<!DOCTYPE html>

<html lang="en">
    <head>



        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
    </body>
</html>
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <style>

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

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <style>

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

```
<!DOCTYPE html>

<html lang="en">
    <head>

        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
    </body>
</html>
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <link href="styles.css" rel="stylesheet">
        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
    </body>
</html>
```

frameworks

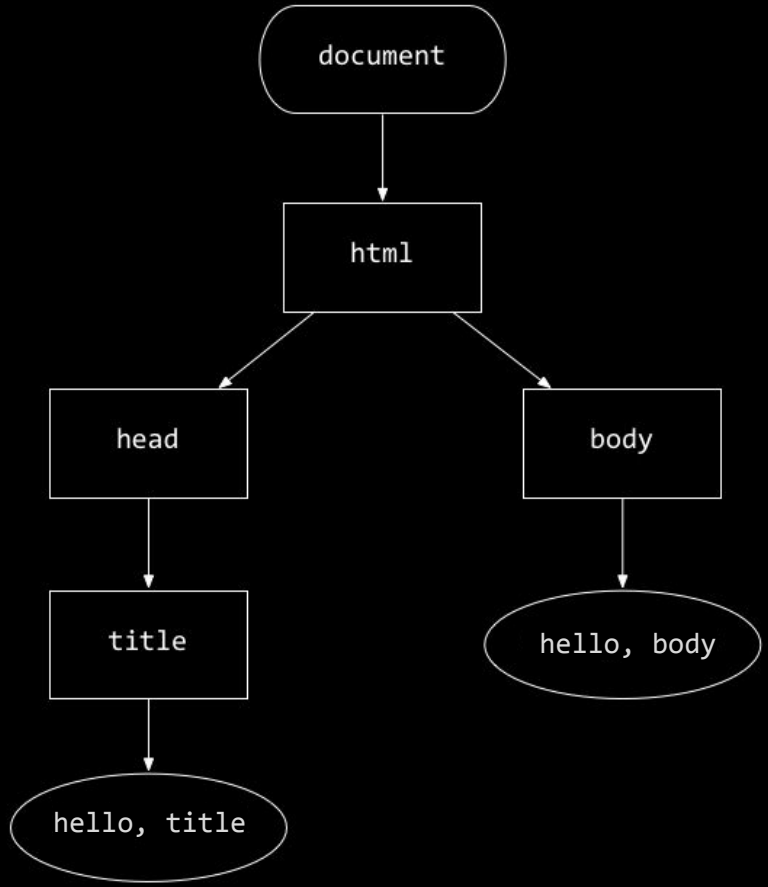
Bootstrap

getbootstrap.com

developer tools

JavaScript

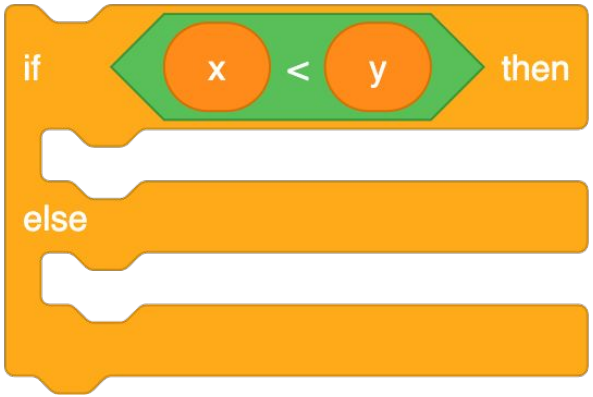
```
<!DOCTYPE html>

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

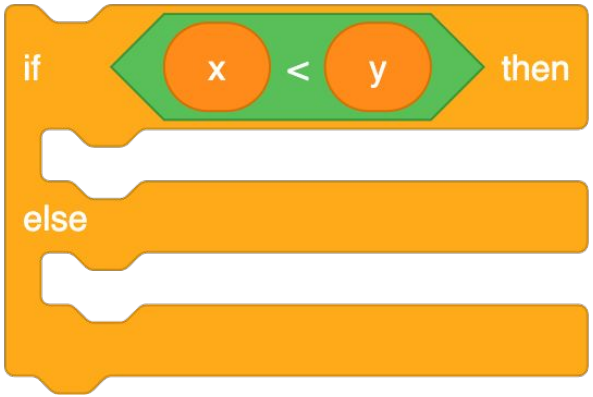


conditionals

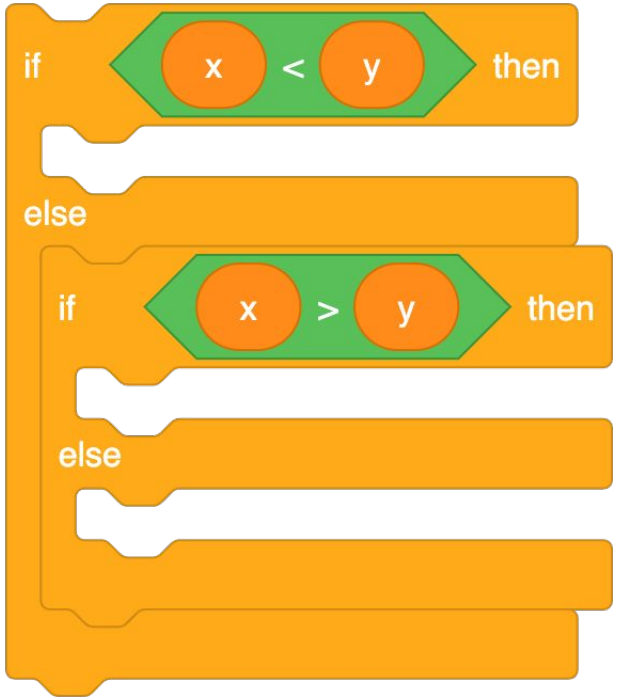
if
x
<
y
then

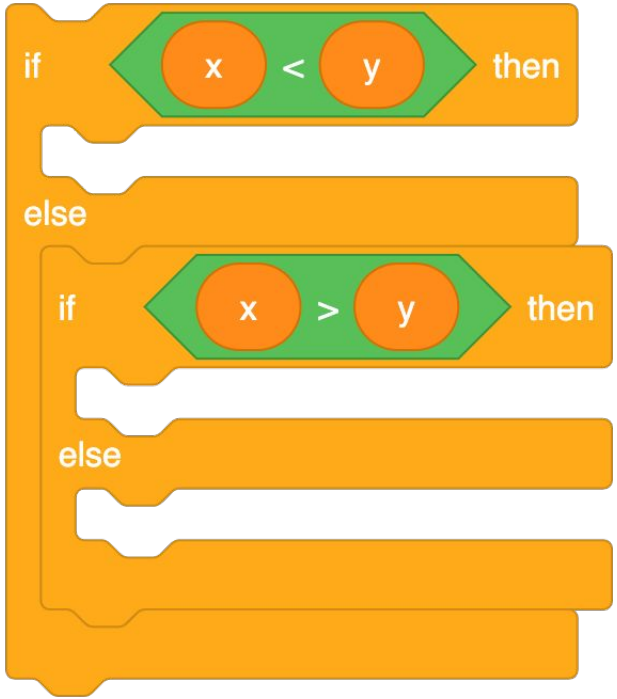
```
if (x < y)
{

}
```


if
x
<
y
then
else



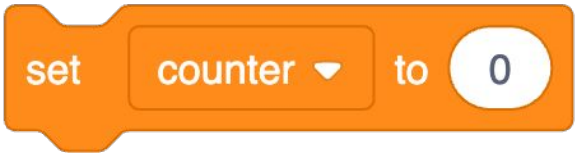

```
if (x < y)
{

}
else
{

}
```

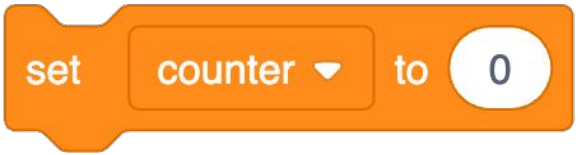

if
x
<
y
then
else
if
x
>
y
then
else



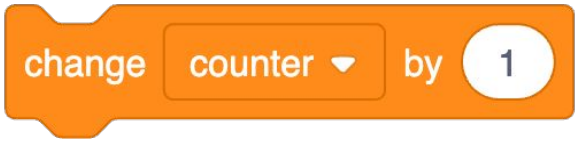

```
if (x < y)
{

}
else if (x > y)
{

}
else
{

}
```

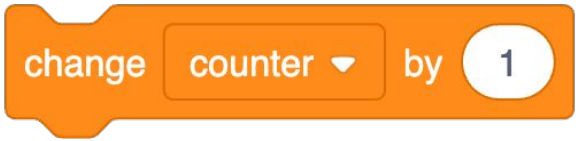
variables


set
counter
to
0

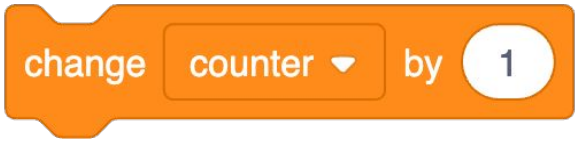



```
let counter = 0;
```

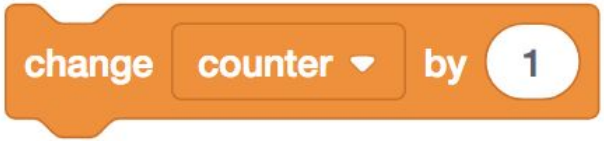

change
counter
by
1




```
counter = counter + 1;
```

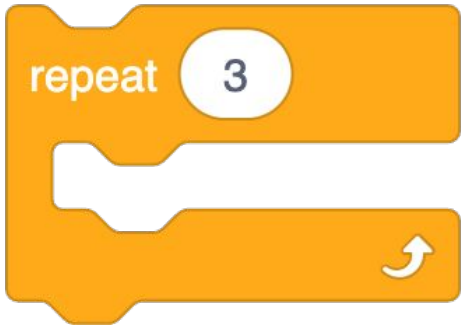


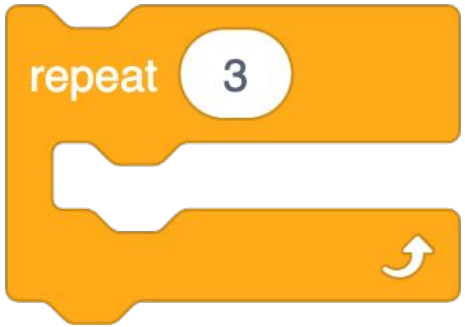

```
counter += 1;
```



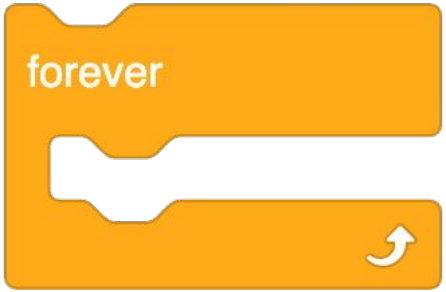

```
counter++;
```

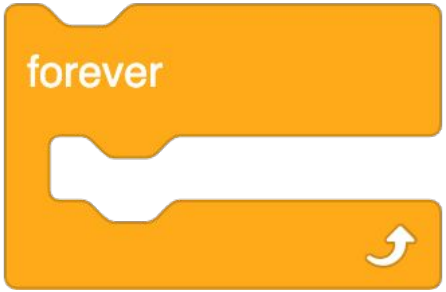
loops


repeat
3




```
for (let i = 0; i < 3; i++)
{

}
```


forever




```
while (true)
{

}
```

```
<!DOCTYPE html>

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

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <script>

        </script>
        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
    </body>
</html>
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <script src="scripts.js"></script>
        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
    </body>
</html>
```

```
<!DOCTYPE html>

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

        </script>
    </body>
</html>
```

```
<!DOCTYPE html>

<html lang="en">
    <head>
        <title>
            hello, title
        </title>
    </head>
    <body>
        hello, body
        <script src="scripts.js"></script>
    </body>
</html>
```

```
blur
change
click
drag
focus
keyup
load
mousedown
mouseover
mouseup
submit
touchmove
unload
...
```

This is CS50

ruse
Helen Cho
Jonny Zhang
Abel
Sophie Edouard
Moni Radev
ehreteab
Joshua Ng
Montague Mawere