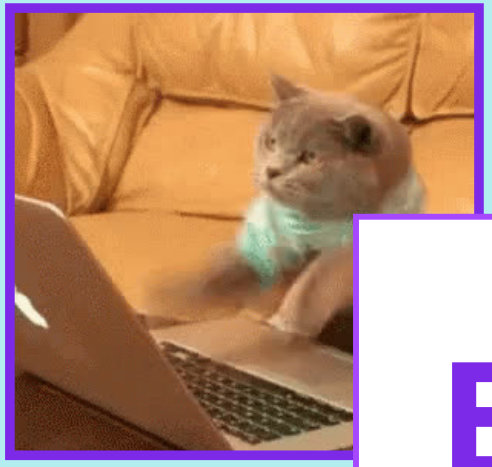
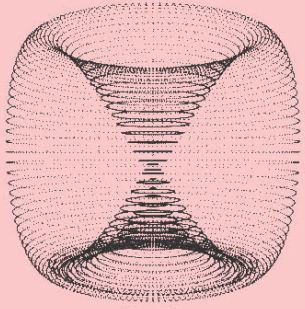


Events



Presented by
Anna Azzam

Canva

What is an Event?

An *event* is a signal that a "thing" has happened to a DOM element

This "thing" can be the element *loading*, a *click*, or a *key press*

We can use events to run JavaScript code in response to user actions

What are some examples of events?

Mouse events

```
click
dblclick
mouseup
mouseenter
mousedown
mouseleave
```

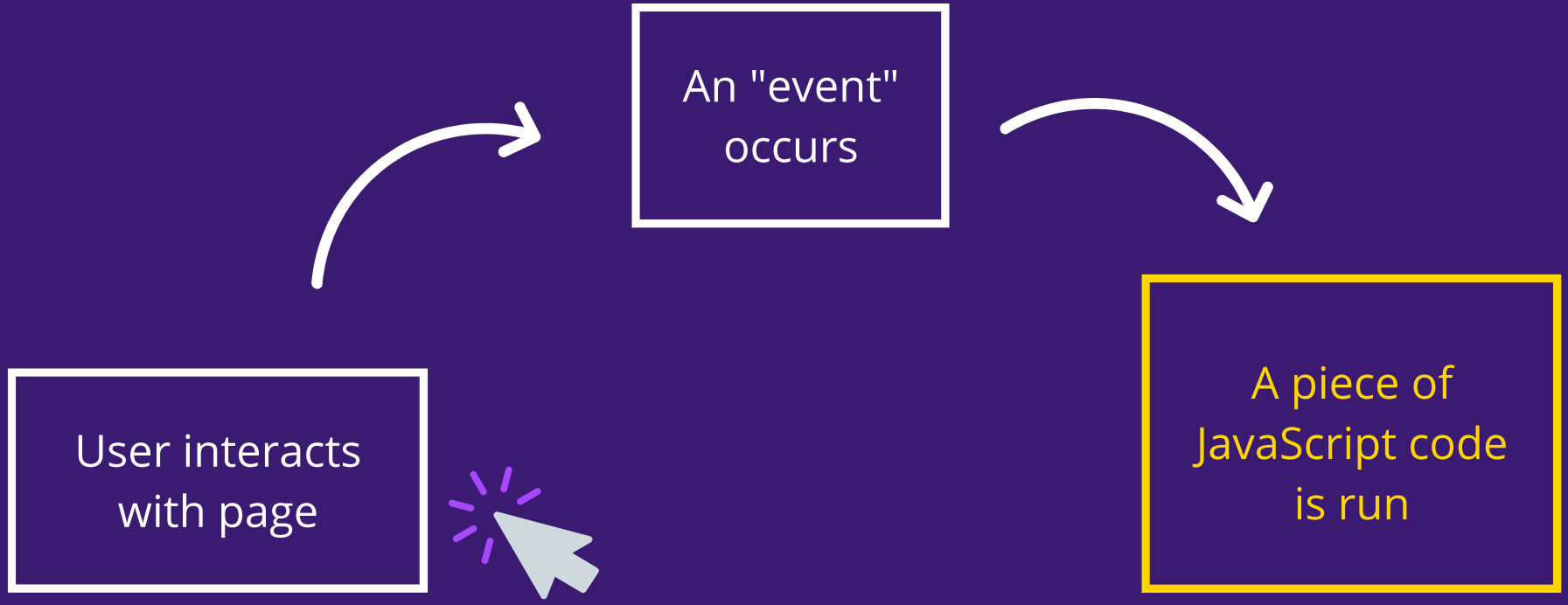
Keyboard events

```
keydown
keypress
keyup
```

...and more!

```
error
load
fullscreenchange
submit
canplay
canplaythrough
animationstart
```

Event Handlers



Adding Event Handlers

1) In HTML
2) DOM Property
3) addEventListener

```
<input
  value="Click me"
  onclick="alert('Clicked!')"
  type="button"
>
```

Adding Event Handlers

1) In HTML
2) DOM Property
3) addEventListener

```
let element = document.getElementById('btn');

element.onclick = () => {
  alert('Button was clicked!');
};
```

```
function doSomething() {
  alert('hello');
}

element.onclick = doSomething();
```

What's wrong with this code?

A

```
function doSomething() {
  alert('hello');
}

element.onclick = doSomething();
```

By adding parentheses, we are executing doSomething rather than assigning a function to onclick.

A

```
function doSomething() {
  alert('hello');
}

element.onclick = doSomething;
```

By adding parentheses, we are executing doSomething rather than assigning a function to onclick.

Adding Event Handlers

1) In HTML
2) DOM Property
3) addEventListener

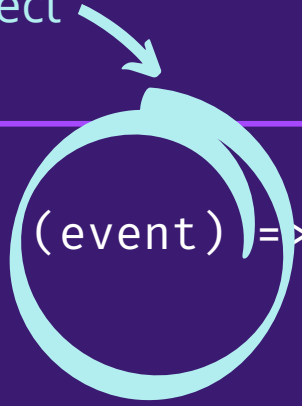
```
// Definition:
target.addEventListener(
  type, // e.g. 'click', 'mousemove'
  listener, // the callback
  [options]
);

// Example:
let element = document.getElementById('btn');
let handler = () => {
  alert('button was clicked');
})

element.addEventListener('click', handler);
element.removeEventListener('click', handler);
```

Event Interface

The parameter to an event handler is an event object



```
document.addEventListener('mousemove', (event) => {
  console.log(event.clientX);
  console.log(event.clientY);
});
```

The event object represents the event that has taken place, and has properties describing details of the event

Event Interface Properties

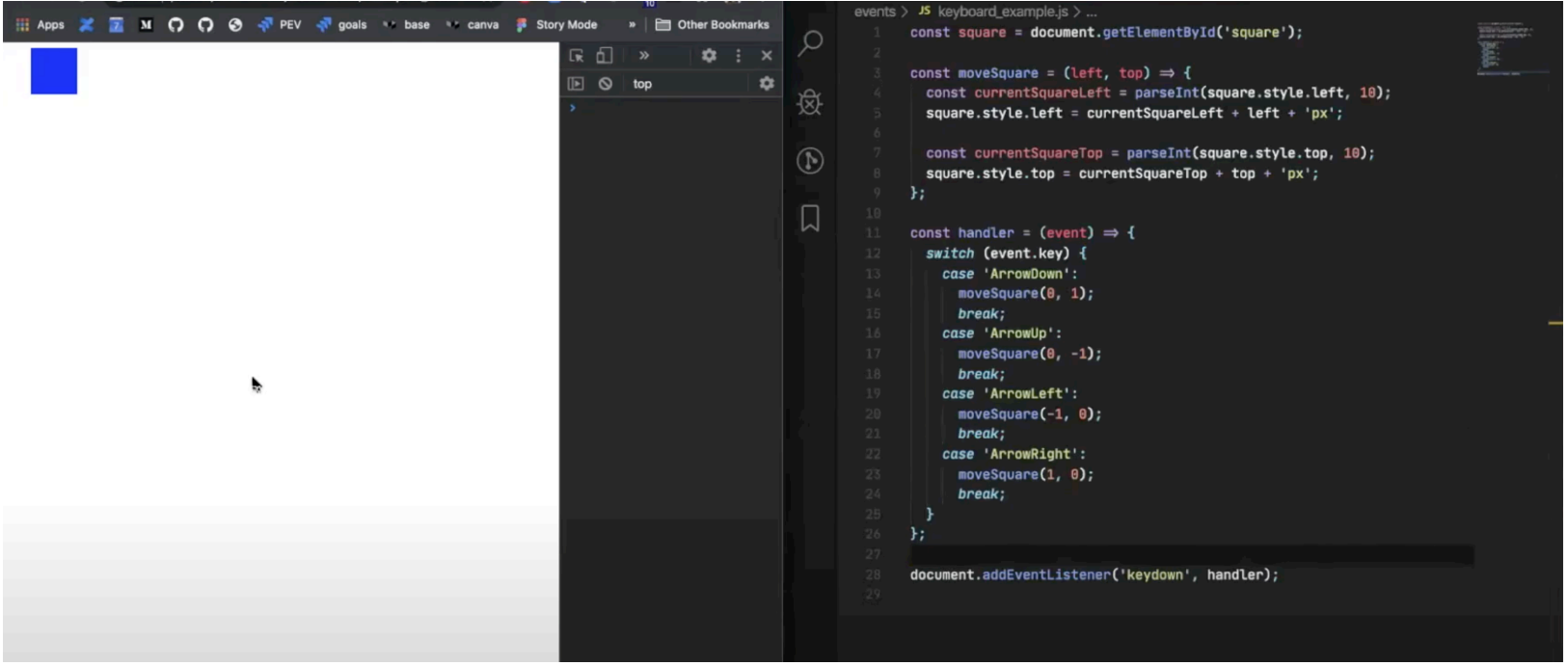
Some of the properties on the event interface include:

```
event.currentTarget // current element handler is running on
event.timeStamp // time the event was created (in ms)
event.type // name of the event, e.g. 'click'
```

Different types of events have specific properties:

```
event.clientX // A MouseEvent has the X and Y coordinate
event.key // A KeyboardEvent has the keycode of the key that was pressed
```

Keyboard Events Example


Apps
PEV
goals
base
canva
Story Mode
Other Bookmarks
top
events > JS keyboard_example.js > ...
const square = document.getElementById('square');
const moveSquare = (left, top) => {
const currentSquareLeft = parseInt(square.style.left, 10);
square.style.left = currentSquareLeft + left + 'px';
const currentSquareTop = parseInt(square.style.top, 10);
square.style.top = currentSquareTop + top + 'px';
};
const handler = (event) => {
switch (event.key) {
case 'ArrowDown':
moveSquare(0, 1);
break;
case 'ArrowUp':
moveSquare(0, -1);
break;
case 'ArrowLeft':
moveSquare(-1, 0);
break;
case 'ArrowRight':
moveSquare(1, 0);
break;
}
};
document.addEventListener('keydown', handler);

The Event Loop

- The event loop is a single-threaded loop which runs in the browser, and manages all events.
- When an event is triggered, the event is added to the queue.

```
while (queue.waitForMessage()) {
  queue.processNextMessage();
}
```

The Event Loop

JavaScript uses a run-to-completion model, meaning it will not handle a new event until the current event has completed.

Event Capturing and Bubbling

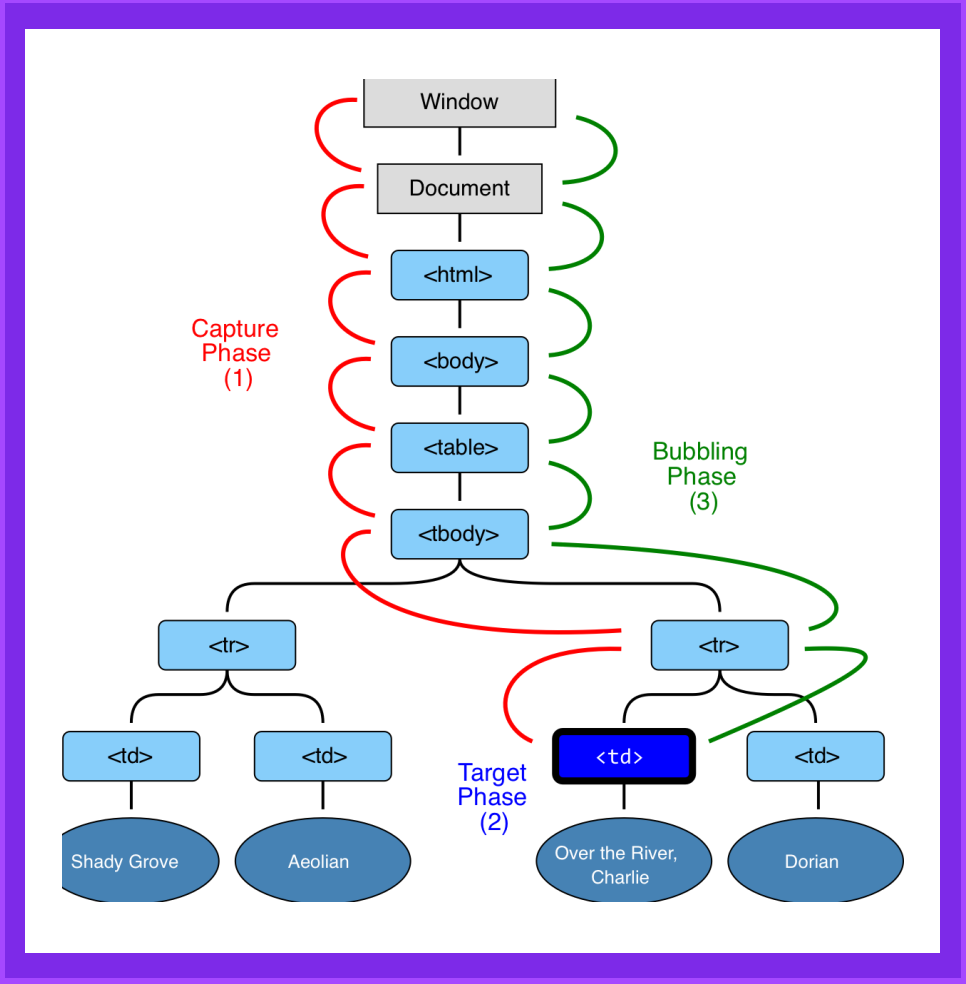
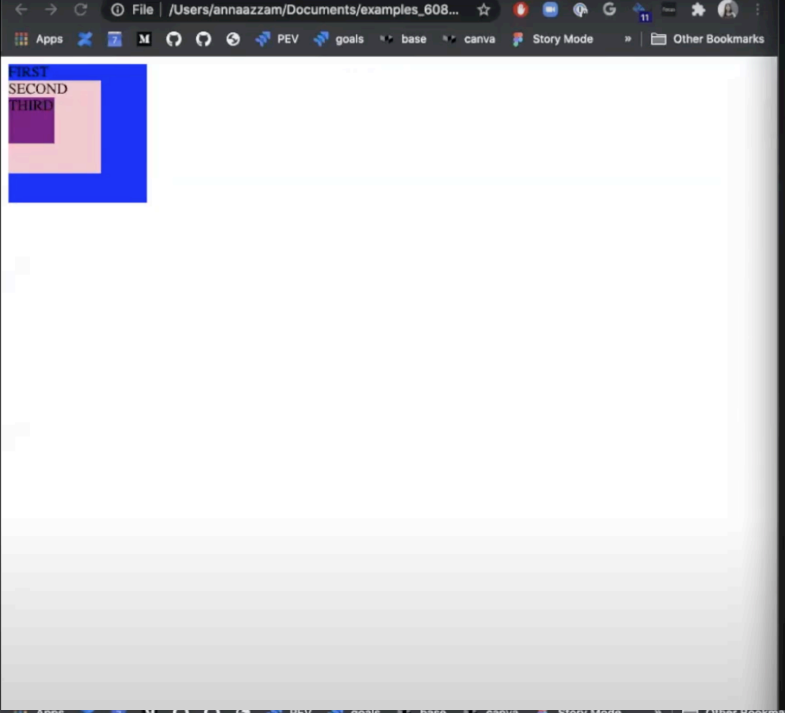


Image Source: https://javascript.info/bubbling-and-capturing

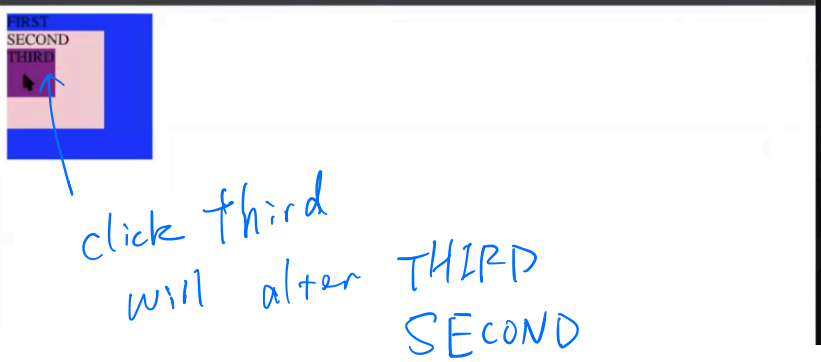
Event Capturing and Bubbling Example




```
events > bubbling_example.html > html > body > div#first
<!DOCTYPE html>
<html>
    <head>
        <style>
            #first {
                width: 150px;
                height: 150px;
                background-color: blue;
            }

            #second {
                width: 100px;
                height: 100px;
                background-color: pink;
            }

            #third {
                width: 50px;
                height: 50px;
                background-color: purple;
            }
        </style>
    </head>
    <body>
        <div id="first">
          FIRST
          <div id="second">
            SECOND
            <div id="third">THIRD</div>
          </div>
        </div>
        <script src="bubbling_example.js"></script>
    </body>
</html>
```



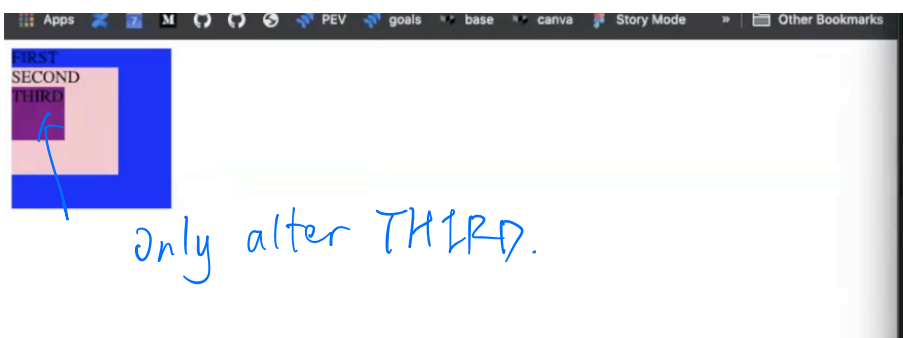

```
let first = document.getElementById('first');
let second = document.getElementById('second');
let third = document.getElementById('third');

first.onclick = () => {
  alert('FIRST');
}

second.onclick = () => {
  alert('SECOND');
}

third.onclick = () => {
  alert('THIRD');
}
```

click third
will alter THIRD
SECOND
FIRST




```
let first = document.getElementById('first');
let second = document.getElementById('second');
let third = document.getElementById('third');

first.onclick = () => {
  alert('FIRST');
}

second.onclick = () => {
  alert('SECOND');
}

third.onclick = (event) => {
  event.stopPropagation();
  alert('THIRD');
}
```

only alter THIRD.

Prevent Default

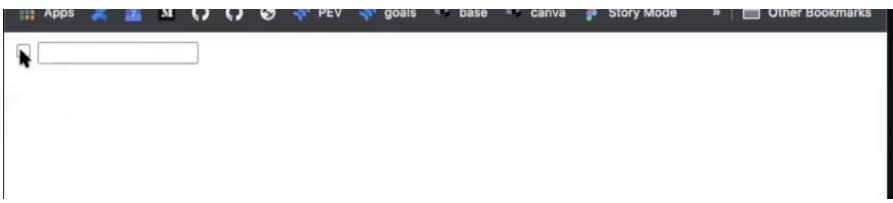
Some types of DOM elements have default behaviour, e.g.

1. Clicking an input checkbox toggles the checkbox
2. Images have a default drag and drop behaviour to allow you to drag them into another location
3. Key presses into a text input field has the default behaviour of entering that text into the input field

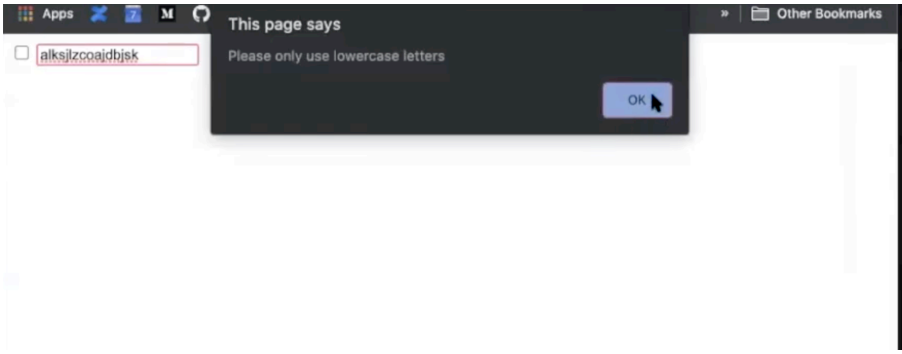
To stop the default behaviour of an event, use:

```
event.preventDefault()
```

Prevent Default Example




```html
<!DOCTYPE html>
<html>
    <body>
      <input type="checkbox" id="checkbox">
      <input type="text" id="textbox">
      <script src="prevent_default_example.js"></script>
    </body>
</html>
```




```js
const checkbox = document.getElementById('checkbox');

checkbox.addEventListener('click', (event) => {
  // event.preventDefault();
});

const textbox = document.getElementById('textbox');

textbox.addEventListener('keypress', (event) => {
  if (event.charCode < 97 || event.charCode > 122) {
    event.preventDefault();
    alert('Please only use lowercase letters');
  }
});
```

Basketball drag and drop game