



Web Programming

Spring 2021



#10

Chi-Jen Wu

Topics

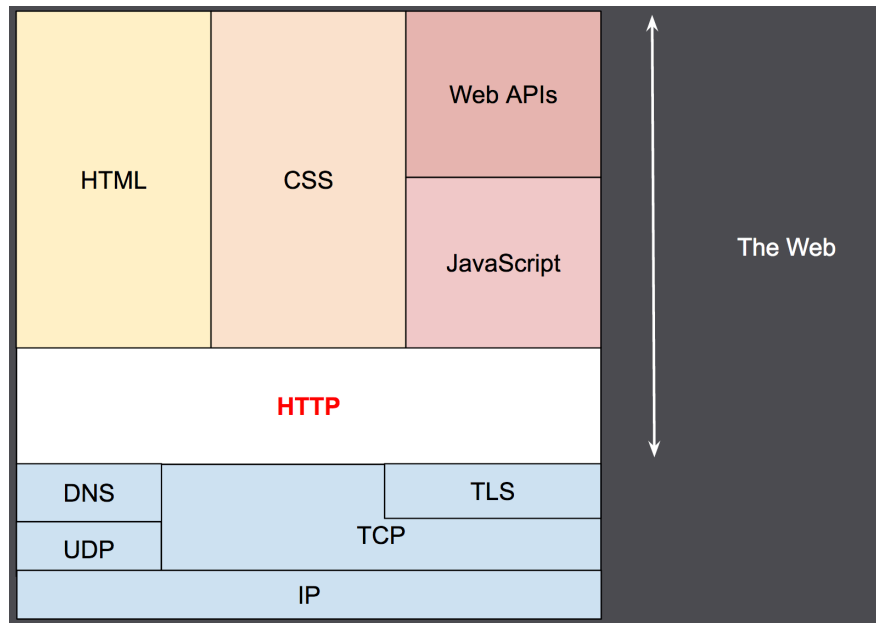
- The concepts of Web Services
- Web data protocols
 - HTTP, WebSocket, WebRTC
 - HTML, CSS
- **Web JavaScript programming**
- Cookies and sessions
- Web Frontend frameworks
- Web Backend frameworks
- RESTful API design



Google Analytics

Web data protocols

- HTTP, HTTPS
- Web APIs
- HTML, HTML5
- CSS, CSS3
- JavaScript
- Conclusion



JavaScript

- Introduction
- Basics
- Document Object Model
- Browser Object Model
- jQuery & AJAX
- JavaScript ES6





jQuery callback function

- 事件被觸發 Event fired -> 處理事件 Event Handler

```
<script>
$(document).ready(function(){
    $("button").click(function(){
        $("p").slideToggle("slow", function(){
            // Code to be executed once effect is complete
            alert("The slide toggle effect has completed.");
        });
    });
});
</script>
```

callback

A blue arrow originates from the word 'callback' and points to the 'function()' argument within the 'slideToggle' method call in the code block above.



jQuery callback function

- 事件被觸發 Event fired -> 處理事件 Event Handler

```
<script>
```

```
$(document).ready(
```

```
function(){
```

```
    $("button").click(function(){
```

```
        $("p").slideToggle("slow", function(){
```

```
            // Code to be executed once effect is complete
```

```
            alert("The slide toggle effect has completed.");
```

```
        });
```

```
    });
```

```
}
```

```
);
```

```
</script>
```

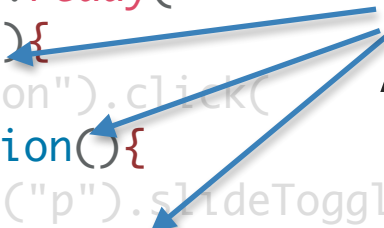
匿名函式

Anonymous Function

匿名函式

Anonymous Function

```
<script>
$(document).ready(
  function(){
    $("button").click(
      function(){
        $("p").slideToggle("slow",
          function(){
            // Code to be executed once effect is complete
            alert("The slide toggle effect has completed.");
          }
        );
      }
    );
  }
);
</script>
```

Three blue arrows originate from the title 'Anonymous Function' and point to the three 'function()' definitions in the code: the first in the .ready() call, the second in the .click() call, and the third in the .slideToggle() call.

```
<script>
$(document).ready(
  function(){
    $("button").click(
      function(){
        $("p").slideToggle("slow",
          my_alert();
        );
      }
    );
  }
);
```

```
var my_alert = function(){
  // Code to be executed once effect is complete
  alert("The slide toggle effect has completed.");
}

</script>
```

具名函式寫法



jQuery callback XD

匿名函式

```
<script>  
doSomething1(function(result) {  
    doSomething2(result, function(newResult) {  
        doSomething3(newResult, function(finalResult) {  
            console.log('Got the final result: ' + finalResult);  
        }, failureCallback);  
    }, failureCallback);  
}, failureCallback);  
</script>
```

具名函式

Callback function 當參數



```
<script>
```

```
function api_test(callback_fun){
```

```
    var x=5, y=6, z =7;
```

```
    callback_fun(x, y, z);
```

```
}
```

```
function print_log(x2, y2, z2){
```

```
    console.log("x:",x2,";y2:",y2,";z2:",z2);
```

```
}
```

```
api_test(print_log);
```

```
</script>
```



另一個例子有參數

```
<script>
var allUserData = [];

function logStuff (userData){
  for(var item in userData){
    console.log(item + ": " + userData[item]);
  }
}

function getInput (options, callback){
  allUserData.push(options);
  callback(options);
}

getInput({name:"Rich",speciality:"Javascript"}, logStuff);
</script>
```

javascript object



addEventListener 的 Callback

```
<script>  
btn = document.querySelector('.btn_alert')  
btn.addEventListener('click', handleClick)  
  
function handleClick(event) {  
    alert('click!')  
}  
</script>
```

```
▼ MouseEvent {isTrusted: true, screenX: 1334, screenY: 213, clientX: 39, clientY: 22, ...} ⓘ
  altKey: false
  bubbles: true
  button: 0
  buttons: 0
  cancelBubble: false
  cancelable: true
  clientX: 39
  clientY: 22
  composed: true
  ctrlKey: false
  currentTarget: null
  defaultPrevented: false
  detail: 1
  eventPhase: 0
  fromElement: null
  isTrusted: true
  layerX: 39
  layerY: 22
  metaKey: false
  movementX: 0
  movementY: 0
  offsetX: 30
  offsetY: 10
  pageX: 39
  pageY: 22
  ▶ path: (5) [button#btn, body, html, document, Window]
    relatedTarget: null
    returnValue: true
    screenX: 1334
    screenY: 213
    shiftKey: false
  ▶ sourceCapabilities: InputDeviceCapabilities {firesTouchEvents: false}
  ▶ srcElement: button#btn
  ▶ target: button#btn
    timeStamp: 9545.53
  ▶ toElement: button#btn
    type: "click"
  ▶ view: Window {postMessage: f, blur: f, focus: f, close: f, frames: Window, ...}
    which: 1
    x: 39
    y: 22
  ▶ __proto__: MouseEvent
```



addEventListener 的 event handleClick(event)

多個elements 要加addEventListener



```
<html>
<ul id="myList">
  <li>Item 01</li>
  <li>Item 02</li>
  <li>Item 03</li>
</ul>
</html>
```

多個elements 要加addEventListener



```
var myList = document.getElementById('myList');

if( myList.childNodes() ) {

    for (var i = 0; i < myList.childNodes.length; i++) {

        if( myList.childNodes[i].nodeType === 1 ){
            myList.childNodes[i].addEventListener('click', function(){
                console.log(this.textContent);
            }, false);
        }
    }
}

var newList = document.createElement('li');
var textNode = document.createTextNode("hello cgu!");
newList.appendChild(textNode);
myList.appendChild(newList);
```



HTML

```
1 <ul id="myList">
2   <li>Item 01</li>
3   <li>Item 02</li>
4   <li>Item 03</li>
5 </ul>
```

CSS

JS

20 unsaved changes x

```
3 if( myList.hasChildNodes() ) {
4
5   for (var i = 0; i < myList.childNodes.length; i++) {
6
7     if( myList.childNodes[i].nodeType === 1 ){
8       myList.childNodes[i].addEventListener('click', function(){
9         console.log(this.textContent);
10      }, false);
11    }
12  }
13 }
14 var newList = document.createElement('li');
15 var textNode = document.createTextNode("hello cgu!");
16 newList.appendChild(textNode);
17 myList.appendChild(newList);
```

- Item 01
- Item 02
- Item 03
- hello cgu!

無法點擊

Console

"Item 01"

"Item 02"

"Item 03"



試一下！



Problem?



```
var newList = document.createElement('li');  
var textNode = document.createTextNode("hello cgu!");  
newList.appendChild(textNode);  
myList.appendChild(newList);
```

**新增一個 node 就要重新
addEventListener
memory leak problem !!**



Event Delegation

```
var myList = document.getElementById('myList');
```

```
myList.addEventListener('click', function(e){  
    if( e.target.tagName.toLowerCase() === 'li' ){  
        console.log(e.target.textContent);  
    }  
}, false);
```

```
var newList = document.createElement('li');  
var textNode = document.createTextNode("hello cgu!");  
newList.appendChild(textNode);  
myList.appendChild(newList);
```



HTML 21 unsaved changes x

```
1 <ul id="myList">
2   <li>Item 01</li>
3   <li>Item 02</li>
4   <li>Item 03</li>
5 </ul>
```

JS

```
1 var myList = document.getElementById('myList');
2
3 myList.addEventListener('click', function(e){
4   if( e.target.tagName.toLowerCase() === 'li' ){
5     console.log(e.target.textContent);
6   }
7 }, false);
8
9 var newList = document.createElement('li');
10 var textNode = document.createTextNode("hello cgu!");
11 newList.appendChild(textNode);
12 myList.appendChild(newList);
```

- Item 01
- Item 02
- Item 03
- hello cgu!

可以點擊!!

Console

"Item 01"

"Item 02"

"Item 03"

"hello cgu!"



打開 <https://codepen.io/pen>

練習一下喔

等等課堂練習會加上ajax

function pointer in C/C++



```
int func(int a) {  
    return a + a;  
}
```

```
int add_func(int b, int (*func_ptr)(int)) {  
    return b + func_ptr(b);  
}
```

```
int main(int argc, char* argv[])  
{  
    // make function pointer to point func  
    int (*func_ptr)(int) = func;  
    printf("%d\n", add_func(10, func_ptr)); // print 30  
    return 0;  
}
```

Callback function 當參數

jQuery Selecting Elements by ID



```
<script>
$(document).ready(function(){
    // Highlight element with id mark
    $("#mark").css("background", "yellow");
});
</script>
```

select and highlight an element having the ID attribute `id="mark"`



jQuery source code

```
// HANDLE: $(#id)
} else {
  elem = document.getElementById( match[ 2 ] );

  if ( elem ) {

    // Inject the element directly into the jQuery object
    this[ 0 ] = elem;
    this.length = 1;
  }
  return this;
}
```

<https://code.jquery.com/jquery-3.6.0.js>

打字機練習



HTML

```
1 <div id="container">
2   </div>
3
```

CSS

JS

48 unsaved changes x

```
1 var container = document.getElementById('container');
2 window.addEventListener('keyup', function (e) {
3   console.log(e.key);
4   container.textContent += e.key;
5   if (e.key == 'Enter') {
6     container.textContent = '';
7   }
8 }, false);
9
10
```

hello cgu



打字機

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

```
var container = document.getElementById('container');  
window.addEventListener('keyup', function (e) {  
  console.log(e.key);  
  container.textContent += e.key;  
  if (e.key == 'Enter') {  
    container.textContent = '';  
  }  
}, false);
```



複製貼上試一下!

打字機 jquery版本



HTML 40 unsaved changes x

```
1 <div id="container">
2 </div>
3 <script type="text/javascript"
  src="https://cdnjs.cloudflare.co
  m/ajax/libs/jquery/3.1.0/jquery.
  min.js">
```

JS

```
1 $(document).keypress(function( e ) {
2   console.log(e.key);
3   $("#container").text( $("#container").text() + e.key);
4   if (e.key == "Enter") {
5     $("#container").text("");
6   }
7 });
```

hello cgu!



打字機

```
<div id="container">
```

```
</div>
```

```
<script type="text/javascript" src="https://  
cdnjs.cloudflare.com/ajax/libs/jquery/3.1.0/jquery.min.js">
```

```
$(document).keypress(function( e ) {  
    console.log(e.key);  
    $("#container").text( $("#container").text() + e.key);  
    if (e.key == "Enter") {  
        $("#container").text("");  
    }  
});
```



複製貼上試一下!



Thanks!

Open for any questions

CJ Wu

cjwu@mail.cgu.edu.tw