

jQuery & AJAX

What is jQuery₁

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- jQuery is a lightweight, "write less, do more", JavaScript library.
- jQuery takes a lot of common tasks and wraps them into methods that you can call **with a single line of code**.
- The purpose of jQuery is to make it much easier to use JavaScript on your website.

https://w3techs.com/technologies/overview/javascript_library/all

What is jQuery₂

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- The jQuery library contains the following features:
 - ▣ HTML/DOM manipulation
 - ▣ CSS manipulation
 - ▣ HTML event methods
 - ▣ AJAX (Asynchronous JavaScript and XML)
 - ▣ Effects and animations
 - ▣ Utilities

History of jQuery

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- jQuery was originally released in January 2006 at BarCamp NYC by John Resig and was influenced by Dean Edwards' earlier cssQuery library.
- It is currently maintained by a team of developers led by Timmy Willison (with the jQuery selector engine, Sizzle, being led by Richard Gibson).
- Marketshare of jquery:
 - ▣ <https://w3techs.com/technologies/details/js-jquery>

jQuery in Modern Web Development

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- jQuery usage has declined but still remains relevant for the following cases:
 - Existing system maintenance
 - WordPress and other CMS platforms where jQuery is still widely used
 - Simple websites without complex state management
 - Rapid prototyping

Modern Alternatives for jQuery

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- React: Component-based UI development
 - ▣ 將使用者介面拆分為獨立、可重用的元件，每個元件負責自己的狀態與呈現邏輯。
- Vue: Progressive JavaScript framework
 - ▣ 與其他技術相容性高，易與現有系統結合，逐步改善應用程式。
- Angular: Full-featured framework for enterprise applications
- Svelte: Compile-time framework with minimal runtime

Adding jQuery to Your Web Pages

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- There are several ways to start using jQuery on your web site.
 - ▣ Download the jQuery library from [jQuery.com](https://jquery.com)
 - `<script src="jquery-3.7.1.min.js" type="text/javascript"></script>`
 - ▣ Include jQuery from a CDN (Content Delivery Network), like Google
 - `<script
src="https://ajax.googleapis.com/ajax/libs/jquery/3.7.1/jquery.min.js"
type="text/javascript"></script>`

Download from jQuery.com

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- There are two versions of jQuery available for downloading:
 - ▣ **Production version** - this is for your live website because it has been minified and compressed
 - <https://code.jquery.com/jquery-3.7.1.min.js>
 - ▣ Development version - this is for testing and development (uncompressed and readable code)
 - <https://code.jquery.com/jquery-3.7.1.js>
 - ▣ Slim build - it excludes the ajax and effects modules
 - <https://code.jquery.com/jquery-3.7.1.slim.js>
 - <https://code.jquery.com/jquery-3.7.1.slim.min.js>

How to Test Your jQuery Code Quickly?

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- JSFiddle: <https://jsfiddle.net/>
 - ▣ Frameworks & Extensions → jQuery

Include jQuery from a CDN₁

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- If you don't want to download and host jQuery yourself, you can include it from a CDN (Content Delivery Network).

```
<head>  
<script  
src="https://ajax.googleapis.com/ajax/libs/jquery/3.7.1/jquery.min.js"></script>  
</head>
```

```
<head>  
<script src="http://ajax.aspnetcdn.com/ajax/jQuery/jquery-3.7.1.min.js"></script>  
</head>
```

Include jQuery from a CDN₂

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- Advantage of using the hosted jQuery from Google or Microsoft
 - ▣ Many users already have downloaded jQuery from Google or Microsoft when visiting another site.
 - ▣ As a result, it will be loaded from cache when they visit your site, which leads to faster loading time.
 - ▣ Also, most CDN's will make sure that once a user requests a file from it, it will be served from the server closest to them, which also leads to faster loading time.

jQuery Syntax

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- The jQuery syntax is tailor made **for selecting HTML elements** and **performing some action** on the element(s).
 - ▣ 先選網頁元素、再對網頁元素做一些效果
- jQuery uses **CSS syntax** to select elements.
 - ▣ 如果CSS規則很熟，寫jQuery就成功一半
- Basic syntax is: ***\$(selector).action()***
 - ▣ A \$ sign to define/access jQuery
 - ▣ A (selector) to "query (or find)" HTML elements
 - ▣ A jQuery action() to be performed on the element(s)

jQuery Features₁

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□ DOM Traversal and Manipulation

```
$( "button.continue" ).html( "Next Step..." )
```

- Get the <button> element with the class 'continue' and change its HTML to 'Next Step...'

□ Event Handling

```
let hiddenBox = $( "#banner-message" );  
$( "#button-container button" ).on( "click", function( event ) {  
    hiddenBox.show();  
});
```

- Show the #banner-message element that is hidden with display:none in its CSS when any button in #button-container is clicked.

jQuery Features₂

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□ Ajax

```
$.ajax({  
  url: "/api/getWeather",  
  data: {  
    zipcode: 97201  
  },  
  success: function( result ) {  
    $( "#weather-temp" ).html( "<strong>" + result + "</strong> degrees" );  
  }  
});
```

- Call a local script on the server /api/getWeather with the query parameter zipcode=97201 and replace the element #weather-temp's html with the returned text.

jQuery Syntax: \$()

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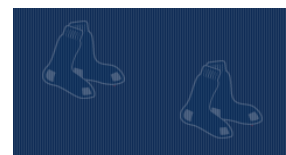
- Developers sometimes use the shorthand `$()` for `$(document).ready()`.

```
$(function() {  
    window.alert( "ready!" );  
});
```

- ▣ If you are writing code that people who aren't experienced with jQuery may see, it's best to use the long form.



jQuery Selectors



jQuery Selector

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- jQuery selectors allow you to select and manipulate HTML element(s).
- jQuery selectors are used to "find" (or select) HTML elements **based on their id, classes, types, attributes, values of attributes** and much more.
- All selectors in jQuery start with the dollar sign and parentheses: **\$()**.

https://www.w3schools.com/jquery/jquery_selectors.asp

The Element (Tag) Selector

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- Selects elements based on the element name.
- You can select all <p> elements on a page like this:

```
$(document).ready(function() {  
    $("button").click(function() {  
        $("p").hide();  
    });  
});
```

The #id Selector

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- Uses the id attribute of an HTML tag to find the specific element.
- An id should be unique within a page, so you should use the #id selector when you want to find a single, unique element.
- To find an element with a specific id, write a hash (#) character, followed by the id of the HTML element:

The .class Selector

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- Finds elements with a specific class.
- To find elements with a specific class, write a period (.) character, followed by the name of the class.

Basic Selectors

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By Tag:

```
$ ("div")  
// <div>Hello jQuery</div>
```

By ID:

```
$ ("#usr")  
// <span id="usr">John</span>
```

By Class:

```
$ (".menu")  
// <ul class="menu">Home</ul>
```

More Precise Selectors

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```
$ ("div.main")    // tag and class  
$ ("table#data") // tag and id
```

Visibility Filters

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```
$ ("div:visible")      // if visible  
$ ("div:hidden")      // if not
```

More jQuery Selectors

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More Examples of jQuery Selectors

Syntax	Description
<code>\$("*")</code>	Selects all elements
<code>\$(this)</code>	Selects the current HTML element
<code>\$(".p.intro")</code>	Selects all <code><p></code> elements with <code>class="intro"</code>
<code>\$("p:first")</code>	Selects the first <code><p></code> element
<code>\$("ul li:first")</code>	Selects the first <code></code> element of the first <code></code>
<code>\$("ul li:first-child")</code>	Selects the first <code></code> element of every <code></code>
<code>\$("[href]")</code>	Selects all elements with an href attribute
<code>\$("a[target='_blank']")</code>	Selects all <code><a></code> elements with a target attribute value equal to <code>"_blank"</code>
<code>\$("a[target!='_blank']")</code>	Selects all <code><a></code> elements with a target attribute value NOT equal to <code>"_blank"</code>
<code>\$(":button")</code>	Selects all <code><button></code> elements and <code><input></code> elements of <code>type="button"</code>
<code>\$("tr:even")</code>	Selects all even <code><tr></code> elements
<code>\$("tr:odd")</code>	Selects all odd <code><tr></code> elements

https://www.w3schools.com/cssref/css_selectors.asp

https://www.w3schools.com/jquery/jquery_ref_selectors.asp

If Using Pure JavaScript (Not jQuery)

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- `querySelectorAll()`
 - ▣ <https://developer.mozilla.org/en-US/docs/Web/API/Document/querySelectorAll>
- `querySelector()`
 - ▣ <https://developer.mozilla.org/en-US/docs/Web/API/Document/querySelector>
- Return DOM objects
 - ▣ jQuery的\$函式回傳的則是再包裝過的DOM物件



jQuery Events



jQuery Events

Here are some common DOM events:

Mouse Events	Keyboard Events	Form Events	Document/Window Events
click	keypress	submit	load
dblclick	keydown	change	resize
mouseenter	keyup	focus	scroll
mouseleave		blur	unload

jQuery Syntax for Event Method

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- In jQuery, most DOM events have an equivalent jQuery method.
- To assign a click event to all paragraphs on a page, you can do this:

```
$ ("p") .click (...);
```

- The next step is to define what should happen when the event fires. You must pass a function to the

```
$ ("p") .click (function () {  
    // action goes here!!  
});
```

Commonly Used jQuery Event Methods

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- `$(document).ready()`
- `click()`
- `dblclick()`
- `mouseenter()`
- `mouseleave()`
- `mousedown()`
- `mouseup()`
- `hover()`
- `focus()`
- `blur()`

http://www.w3schools.com/jquery/jquery_events.asp

http://www.w3schools.com/jquery/jquery_ref_events.asp

When the DOM is ready...

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```
$(document).ready(function() {  
    // ...  
});
```

- Fires when the document is ready for programming.
 - ▣ 比onload的作法快一些，無需等待文字外的resource之loading時間。
- Uses advanced listeners for detecting.

Attach Event

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```
// execute always  
$("div").on("click", fn);  
  
// execute only once  
$("div").one("click", fn);
```

- Possible event values:

blur, focus, load, resize, scroll, unload, beforeunload, click, dblclick, mousedown, mouseup, mousemove, mouseover, mouseout, mouseenter, mouseleave, change, select, submit, keydown, keypress, keyup, error

- ▣ (or any custom event)

Detaching Events

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```
$ ("div").off ("click", fn);
```

https://www.w3schools.com/jquery/event_one.asp

Events Triggering

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```
$ ("div").trigger ("click");
```

- Triggers browser's event action as well.
- Can trigger custom events.
- Triggered events bubble up.

https://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_event_trigger



Effects



jQuery Effect: Hide and Show

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- jQuery hide() and show()
 - ▣ With jQuery, you can hide and show HTML elements with the hide() and show() methods:

```
$("#hide").click(function() {  
    $("p").hide();  
});
```

```
$("#show").click(function() {  
    $("p").show();  
});
```

```
$("#hide").click(function() {  
    $("p").hide(100);  
});
```

http://www.w3schools.com/jquery/jquery_hide_show.asp

jQuery Effect: Toggle

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□ jQuery toggle()

- ▣ With jQuery, you can toggle between the hide() and show() methods with the toggle() method.

```
$("#hide").click(function() {  
    $("p").toggle();  
});
```

https://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_toggle

jQuery Effect: Fade

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- jQuery fadeIn() Method (淡入)
 - The jQuery fadeIn() method is used to fade in a hidden element.
- jQuery fadeOut() Method (淡出)
 - The jQuery fadeOut() method is used to fade out a visible element.
- jQuery fadeToggle() Method
 - The jQuery fadeToggle() method toggles between the fadeIn() and fadeOut() methods.
- jQuery fadeTo() Method
 - The jQuery fadeTo() method allows fading to a given opacity (value between 0 and 1). (特別的淡出功能)

http://www.w3schools.com/jquery/jquery_fade.asp

jQuery Effect: Sliding

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- jQuery slideDown() Method
 - ▣ The jQuery slideDown() method is used to slide down an element.
- jQuery slideUp() Method
 - ▣ The jQuery slideUp() method is used to slide up an element.
- jQuery slideToggle() Method
 - ▣ The jQuery slideToggle() method toggles between the slideDown() and slideUp() methods.

http://www.w3schools.com/jquery/jquery_slide.asp

jQuery Effect: Animation₁

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- The animate() Method
 - ▣ The jQuery animate() method is used to create custom animations.

- Syntax

```
$(selector).animate({params}, speed, callback);
```

- Example

```
$("button").click(function() {  
    $("div").animate({left: '250px'});  
});
```

http://www.w3schools.com/jquery/jquery_animate.asp

jQuery Effect: Animation₂

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- Only numeric values can be animated (like "margin:30px").
- String values cannot be animated (like "background-color:red"), except for the strings "show", "hide" and "toggle".
 - ▣ These values allow hiding and showing the animated element.

jQuery Effect: Stop

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□ jQuery stop() Method

- The jQuery stop() method is used to stop an animation or effect before it is finished.
- The stop() method works for all jQuery effect functions, including sliding, fading and custom animations.

□ Syntax

```
$ (selector) .stop (stopAll, goToEnd) ;
```

- The optional stopAll parameter specifies whether also the animation queue should be cleared or not. Default is false.
- The optional goToEnd parameter specifies whether or not to complete the current animation immediately. Default is false.

jQuery Method Chaining

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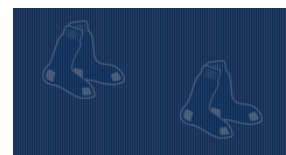
- With jQuery, you can chain together actions/methods.
- Chaining allows us to run multiple jQuery methods (on the same element) within a single statement.
- Example

```
$("#p1").css("color","red").slideUp(2000).slideDown(2000);
```

http://www.w3schools.com/jquery/jquery_chaining.asp

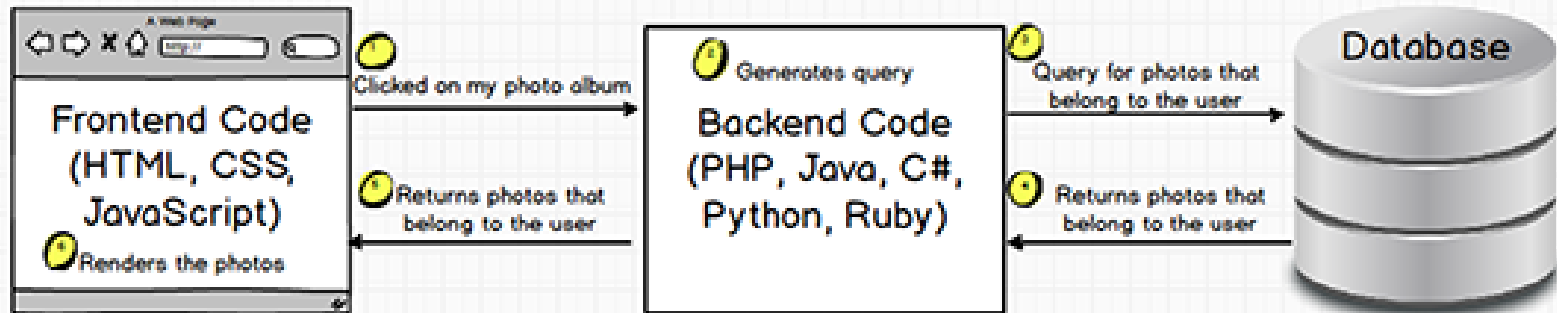


JSON and Ajax



Frontend and Backend

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HTTP GET Example

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The “?” separates the path and the parameters.

The amount of data you can send along with the GET is limited.

It’s exposed up here in the browser bar for everyone to see.

Please try:
Chrome: [F12] → Network

HTTP POST Example

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<https://mail.ntou.edu.tw>



帳號account :

albert

@mail.ntou.edu.tw



密碼password :

.....

語言language :

Personal Predefined Config.



記住帳號



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[\[使用說明\]](#)

HTTP Methods

(Important for RESTful Services)

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- GET: Asks to get the thing (resource / file) at the requested URL. (讀取)
- POST: Asks the server to accept the body info attached to the request, and give it to the thing at the requested URL. (新增)
- PUT: Says to put the enclosed info (the body) at the requested URL. (更新)
- DELETE: Says to delete the thing (resource / file) at the requested URL. (刪除)
- HEAD: Asks for only the header part of whatever a GET would return.
- TRACE: Asks for a loopback of the request message, so that the client can see what's being received on the other end. (測試用)
- OPTIONS: Asks for a list of the HTTP methods to which the thing at the requested URL can respond. (類似 /help)
- CONNECT: Says to connect for the purposes of tunneling.

The Difference between GET and POST

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POST /select/selectBeerTaste.jsp

HTTP/1.1

Host: www.wickedlysmart.com

User-Agent: Mozilla/5.0 (Macintosh; U; PPC Mac OS X Mach-O; en-US; rv:1.4) Gecko/20030624 Netscape/7.1

Accept: text/xml,application/xml,application/xhtml+xml,text/html;q=0.9,text/plain;q=0.8,video/x-mng,image/png,image/jpeg,image/gif;q=0.2,*/*;q=0.1

Accept-Language: en-us,en;q=0.5

Accept-Encoding: gzip,deflate

Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7

Keep-Alive: 300

Connection: keep-alive

color=dark&taste=malty

Difference between GET and POST

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- With GET, **the parameter data is limited** to what you can stuff into the Request line. (GET 參數資料量有限制)
- When you use GET, the parameter data shows up in the browser's input bar. (GET 參數內容會出現在網址列)
- GET requests **can be bookmarked**; POST requests cannot. (GET 可加入書籤)
- GET is meant to be used for getting things, whereas POST is meant to be used for sending data to be processed. (use the data from the POST body to change something on the server.)

jQuery: AJAX₁

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- AJAX is the art of exchanging data with a server, and update parts of a web page - without reloading the whole page.

Method	Description
\$.ajax()	Performs an async AJAX request
\$.ajaxPrefilter()	Handle custom Ajax options or modify existing options before each request is sent and before they are processed by \$.ajax()
\$.ajaxSetup()	Sets the default values for future AJAX requests
\$.ajaxTransport()	Creates an object that handles the actual transmission of Ajax data
\$.get()	Loads data from a server using an AJAX HTTP GET request
\$.getJSON()	Loads JSON-encoded data from a server using a HTTP GET request
\$.parseJSON()	Deprecated in version 3.0, use JSON.parse() instead. Takes a well-formed JSON string and returns the resulting JavaScript value
\$.getScript()	Loads (and executes) a JavaScript from a server using an AJAX HTTP GET request
\$.param()	Creates a serialized representation of an array or object (can be used as URL query string for AJAX requests)
\$.post()	Loads data from a server using an AJAX HTTP POST request

jQuery: AJAX₂

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- `$.get()`: Load data from the server using a HTTP GET request. (結果可能是JSON，也可能不是)

`$.getJSON(url [, data] [, func(data)] [, dataType])`

Parameter	Description
<code>url</code>	A string containing the URL to which the request is sent. (Web API路徑)
<code>data</code>	A plain object or string that is sent to the server with the request.
<code>func(data)</code>	A callback function that is executed if the request succeeds. The parameter “ <i>data</i> ” contains the data returned from the server. (更新畫面或其他處理之function)
<code>dataType</code>	The type of data expected from the server. Default: Intelligent Guess (xml, json, script, text, html).

jQuery: AJAX₃

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- What Is a Callback (回呼函数)?
 - ▣ A callback is any executable code that is passed as an argument to other code, which is expected to call back (execute) the argument at a given time.
 - ▣ The JavaScript code generates a request that is sent to a Web API (node.js, PHP, ASP, or Spring Boot).
 - ▣ When the server returns with the information, the callback function is invoked.

When designing Ajax applications, it means "don't stop anything, just notify me when the data comes back."

jQuery: AJAX₄

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- `$.getJSON()`: Load JSON-encoded data from the server using a GET HTTP request.

`$.getJSON(url [, data], func(data))`

Parameter	Description
url	A string containing the URL to which the request is sent. (Web API路徑)
data	A plain object or string that is sent to the server with the request.
func(data)	A callback function that is executed if the request succeeds. The parameter “ <i>data</i> ” contains the data returned from the server. (更新畫面或其他處理之function)

https://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_ajax_get

jQuery: AJAX₅

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An Example of \$.getJSON()

```
const jsonUrl =  
"https://raw.githubusercontent.com/evenchange4/mrt_opendata/master/mrt.json";  
  
$.getJSON(jsonUrl, function (data) {  
  for (let item of data) {  
    let content =  
      "<tr>" +  
      "<td>" + item.id + "</td>" +  
      "<td>" + item.name + "</td>" +  
      "<td>" + item.number + "</td>" +  
      "<td>" + item.address + "</td>" +  
      "<td><a href='https://www.google.com.tw/maps/place/捷運" +  
item.name + "站/@" + item.latitude + "," + item.longitude + ",17z'" +  
      "target='_blank'>GoogleMap連結</a></td>" +  
      "</tr>";  
    $("#menu").append(content);  
  }  
});
```

jQuery: AJAX₆

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□ CORS Problem

- Cross-origin resource sharing (CORS) is a mechanism that allows **restricted resources** (e.g. fonts) on a web page to be requested from another domain outside the domain from which the first resource was served.
- Chrome denied the access **to local files** using AJAX due to CORS
 - 但若正式發佈至web server則無此問題，只是無法以Chrome測試
- Solution: using JSON hosting service, such as GitHub or JSONBIN.io.

Ajax Using Pure JavaScript₁

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```
req.onload = function() {...};
```

- It tells the *req* object to call the **callback** function **whenever a state transition occurs**.

```
req.open("GET", url);
```

- **"Get"**: The first parameter tells JavaScript whether to submit the request to the server **using HTTP GET or HTTP POST**.
- **url**: The second parameter is the URL we're passing to the server. We created that URL earlier in the method.

Ajax Using Pure JavaScript₂

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```
req.send();
```

- It sends the request.
- 以POST/PUT傳送時,這裡可以輸入字串(query string)、資料串流、XML或JSON資料等。
 - ▣ 一般都只會用query string的方式送資料。
 - ▣ 複雜的request可使用XML或JSON格式。

https://www.w3schools.com/js/tryit.asp?filename=tryjs_ajax_suggest_php

Fetch₁

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- The Fetch API provides a JavaScript interface for accessing and manipulating parts of the **HTTP pipeline**, such as requests and responses. (From ES6)
- It provides a global **fetch()** method that provides an easy, logical way to fetch resources asynchronously across the network.
- This kind of functionality was previously achieved using XMLHttpRequest.

https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch

Fetch₂

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// 最簡單形式

```
fetch('https://api.sampleapis.com/coffee/hot');
```

// 處理回應

```
fetch('https://api.sampleapis.com/coffee/hot')  
  .then(response => response.json()) // 解析 JSON  
  .then(data => console.log(data))   // 使用資料  
  .catch(error => console.log('Error:', error)); // 錯誤處理
```

// async/await 語法

```
async function getData() {  
  try {  
    const response = await fetch('https://api.sampleapis.com/coffee/hot');  
    const data = await response.json();  
    return data;  
  } catch (error) {  
    console.error('Error:', error);  
  }  
}
```

Arrow function: https://www.w3schools.com/js/js_arrow_function.asp

<https://codepen.io/Shang-Pin-Ma/pen/emOOrwR>

Promise, async/await

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□ Promise

- ▣ 主要用途是處理非同步操作，它提供了比callback function更優雅的方式來處理結果和錯誤。
- ▣ 每個 Promise 都有三種可能的狀態：pending (進行中)、fulfilled (已完成)、rejected (已拒絕)。
- ▣ Fetch的結果即為一個Promise

□ async/await

- ▣ 是處理非同步操作的語法糖
- ▣ async 函數總是回傳 Promise
- ▣ await 暫停執行直到 Promise 解析完成
- ▣ 應使用 try/catch 處理錯誤

Supplementary:

Using Google Spreadsheet as a Backend

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□ 請參考js-12-google-sheet.html

	A	B	C	D	E	F	G
1	姓名	統率	武力	智力	政治	總和	生年
2	諸葛亮	98	38	100	95	331	181
3	司馬懿	97	63	98	91	349	179
4	賈詡	88	48	97	85	318	147
5	龐統	86	34	97	85	302	178
6	周瑜	95	71	96	86	348	175
7	郭嘉	84	15	96	84	279	170
8	陸遜	94	69	95	87	345	183
9	荀彧	62	14	95	99	270	163
10	法正	84	47	94	78	303	176
11	荀攸	73	26	94	88	281	157
12	徐庶	87	64	93	80	324	178
13	田豐	72	29	93	87	281	162
14	李儒	61	26	93	75	255	150
15	曹操	99	72	92	91	354	155

武將名	統率	武力	智力	政治	總和
諸葛亮	98	38	100	95	331
司馬懿	97	63	98	91	349
賈詡	88	48	97	85	318
龐統	86	34	97	85	302
周瑜	95	71	96	86	348
陸遜	94	69	95	87	345
法正	84	47	94	78	303
徐庶	87	64	93	80	324
曹操	99	72	92	91	354
魯肅	85	56	92	90	323
鐘會	83	50	91	78	302
姜維	92	89	90	66	337
鄧艾	93	87	89	81	350



Supplementary: Using Google Sheet to Upload/Display Images

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□ 請參考js-13-image-upload-display.html

圖片上傳測試

shangpin.ma@gmail.com [切換帳戶](#) 已儲存草稿

當你上傳檔案並提交這份表單時，系統會記錄與你 Google 帳戶相關聯的名稱和相片。表單回覆只會包含你輸入的電子郵件地址。

* 表示必填問題

電子郵件 *

照片描述

您的照片 *

可上傳 1 個支援的檔案 (image)，大小上限為 10 MB。

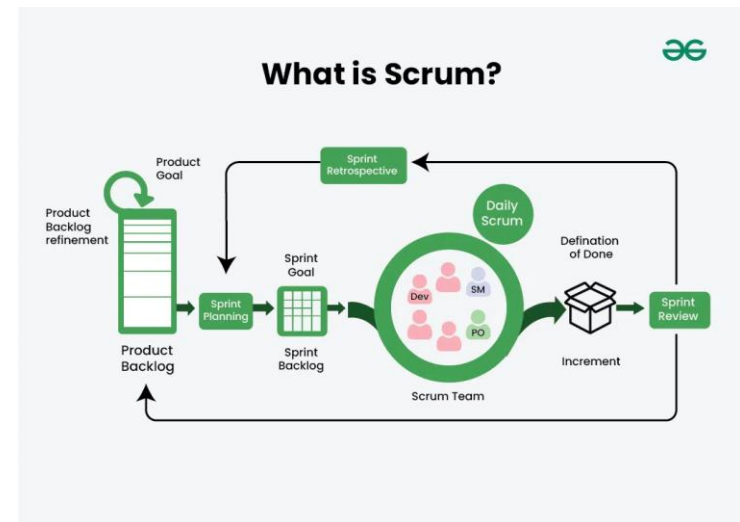
What-is-Scrum.w... ✕

提交

清除表單

請勿利用 Google 表單送出密碼。

使用者	照片
albert@ntou.edu.tw 2023/12/17 上午 12:29:28	笑臉 (圖片連結)
shangpin.ma@gmail.com 2024/11/26 上午 7:46:03	Scrum (圖片連結)



Resources

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- <http://api.jquery.com/>
- <https://learn.jquery.com/>
- <http://www.w3schools.com/jquery/>
- <https://www.pluralsight.com/courses/code-school-try-jquery>

Any Question?

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