JavaScript & DOM

Using HTML Script Tag

```
<script>
Script code here
</script>
```

Use to tell the browser the beginning and ending point of scripting language in HTML Doc.

```
<script type="text/javascript">
JavaScript code here
</script>
```

```
<script type="text/javascript"
  src="yourfile.js">
</script>
```

<script> location

- Any number of <script> are allowed in the HTML document
- <script> can be placed in <head> or <body> or both
- Trick: placing scripts at the bottom of <body> improves speed of page rendering

ประโยชน์ คือ หลายหน้าใช้ร่วม ดัวยได้

External JavaScript

- In the external JavaScript file cannot contain <script>
- Advantages:
  - HTML and JavaScript are separated physically
  - Easier to maintain
  - Proxy server or browser caches can store frequently used JS file - speed up page loading

Variables

- Declaring variables: *var,let* keyword
- Variables are case sensitive
- Avoid using reserved as variables name
- The variable values (or type) can include number, string, Boolean and null
- JavaScripte allows virtually any value to be assigned to any variable
- Special characters can be used in string type variables (ex. \t, \n, \\, \", \')

Variables

- Examples

```
var web;
var str="web technology";
var str1='web technology';
let x=120;
var code=true;
var t=null;

y=200.5;
```

" , ' ใช้ได้ทั้งคู่

ในกรณี No keyword ข้างหน้า
= var y = 200.5;

var VS let

	var	let
Declaring variable ใช้ประกาศตัวแปร	Y	Y
Declare many var in 1 statement (separate by comma) ใช้ประกาศหลายตัวแปรได้	Y	Y
Re-declare var. var แก้ค่าได้ let ประกาศตัวแปรใน scope เดียวกันซ้ำได้	Y	N
Block scope var คือ scope ทั้ง function (f. main) let คือ scope อยู่ใน if ใน loop อย่างเดียวได้ (block scope)	N	Y
Use var. before it is declared ใช้งานตัวแปรก่อนที่มีการประกาศได้	Y	ต้องประกาศก่อนถึงใช้งานได้ N

ประกาศ

(ลอย)

Hoisting Behavior

ตัวแปร ที่ถูกประกาศ ไว้ ที่ไหนก็ได้ ปก. หลังใช้งานได้ ดูไปก็เหมือนเดิม

- Hoisting is the behavior of moving all declarations to the top of the current scope
  - All variables in the scope can be used right from the start of the scope (before the declaration of variables)
  - Only variables declared with var keyword
- Keyword 'let' also has this behavior ลอยเพื่องั้น — จับสังเกตว่ามีตัวแปร แต่ใช้ไม่ได้ เมื่อ ต้องอ่าน code ที่ประกาศ let ทีหลัง
  - But that variable cannot be used before its declaring point
  - ReferenceError is the result if 'let variable' is used before it is declared
  - Temporal dead zone

ถ้าใช้ก่อน อ่านถึง let จะ Error

Functions

- Declaring function

```
function functionname()
{
   code
}
```

- Function names are case sensitive
- The function name must begin with a letter or underscore and cannot contain any space

Functions

ไม่มี, มี, มีกี่ตัวก็ได้

- Functions can have one or more parameters

```
function func1(var1, var2)
{ document.write(“var1=”+var1+“, var2=”+var2); }
```

Nameless function

- Sometimes called anonymous function
- Function without name
  - Ex: `(function() { ... });`
- Usage:
  - Immediately invoked function
    - `<button onclick="(function() { alert('Hello World'); }) ();">Click</button>`
  - Using anonymous functions as arguments
  - Assign the function to var. for calling later
    - `let test = function() { alert('Hello World'); };`
      `test();`
- Arrow function is a shorthand for declaring anonymous function
  - `let test = () => alert('Hello World');`

Operators

- Mathematical Operators
  - +, -, *, /, %, ++, --
- Assignment Operators
  - =, +=, -=, *=, /=, %=
- Comparison Operators
  - ==, !=, >, <, >=, <=, ===, !==
- Logical Operators
  - &&, ||, !, &, |, ^, >>, >>>, <<
  - >> preserved the sign bit while >>> doesn't

Ex. 10 == "10" T
10 === "10" F

!== ไม่เท่ากันค่า + Type ต่าง

=== เท่ากันทั้ง + Type เหมือนกัน

^ XOR

>>, >>> ไม่ยืน bit ซ้ายสุด

>> ยืน ขวาทิ้งหมด

Conditional Statements

- if/else

```
if (condition) {
  javascript statement
}
else {
  javascript statement
}
```

Conditional Statements

- switch

```
switch(varname) {
  case "X":
       javascript statement;
       break;
  case "Y":
       javascript statement;
       break;
  default:
       javascript statement; }
```

Loops

- for
- while
- do ... while

Event Handlers

- Event is something that happens when viewer of the page perform some actions such as clicking a mouse button
- Event Handlers can be used to identify the occurring event and then perform a task or a set of task
- With Event Handler, the page can react to the action of the viewer

Event Handlers

- Each event handler responds to or applies to different objects (html elements)
- For example:

Event handler	Applies to:	Triggered when:
onAbort	Image	The loading of the image is cancelled.
onBlur	Button, Checkbox, FileUpload, Layer, Password, Radio, Reset, Select, Submit, Text, TextArea, Window	The object in question loses focus (e.g. by clicking outside it or pressing the TAB key).
onChange	FileUpload, Select, Text, TextArea	The data in the form element is changed by the user.

→Ref: https://www.elated.com/events-and-event-handlers/

Event Handler

- Using event handler in an HTML element

```
<input type="button" value="Click Me!"
  onclick="JavaScript code here" />
```

ถ้าจับคู่ไม่ตรง เช่น blur ดันกับ onabort ไม่ได้ = ไม่ Error แต่ไม่มี event

Example

```
<body>
<form>
<input type="button" value="Click Me!"
onclick="window.alert('Hi!');window.ale
rt('Bye!');" />
</form>
</body>
```

Js_event_01.js

ฟ. อยู่แยกไฟล์

```
function hi_and_bye() {
window.alert('Hi!');
window.alert('Bye!');
}
```

สั่ง ฟ. มาใช้

```
<body>
<form>
<input type="button" value="Click Me!"
onclick="hi_and_bye();" />
</form>
<script type="text/javascript"
src="js_event_01.js"></script>
</body>
```

Event Handlers

- The blur event: onblur

Example

```
<form>
<input type="text" onblur="window.alert('Hey!
Come back!');" /><br />
<input type="text" />
</form>
```

Event Handlers

- The click event: onclick

Example

```
<body>
<form>
<input type="button" value="Do not Click Here"
onclick="window.alert('I told you not to click me!');">
</form>
</body>
```

Event Handlers

- The click event: onclick

Example

```
<body>
<a href="http://www.kmitl.ac.th"
onclick="return false;">Click me</a>
</body>
```

ไม่ทำงาน

Event Handlers

- The focus event: onfocus

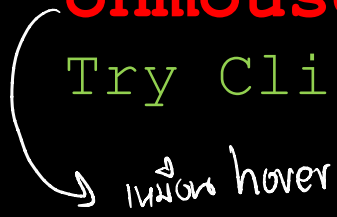
```
<form>
Enter Your Name:
<input type="text"
onfocus="window.alert('Don\'t forget
to capitalize!');" />
</form>
```

Event Handlers

- The mouse over event: onmouseover

Example

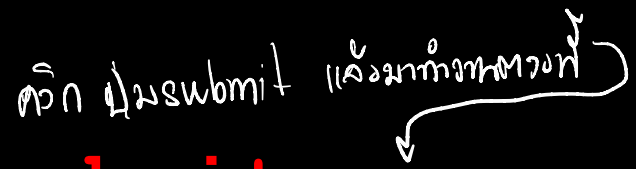
```
<a href="http://www.kmitl.ac.th"
onmouseover="window.alert('mouse over');">
Try Clicking Me!</a>
```



Event Handlers

- The submit event: onsubmit

Example




```
<form onsubmit="window.alert('Thank
You');">
What's your name?<br />
<input type="text" id="thename" /><br />
<input type="submit" value="Submit Form">
</form>
```

Js_event_01.js

```
function test(v) {
window.alert(v.getAttribute("type"));
}
```

```
<body>
<form>
<input type="button" value="Click Me!"
onclick="test(this);" />
</form>
<script type="text/javascript"
src="js_event_01.js"></script>
</body>
```

The Event object

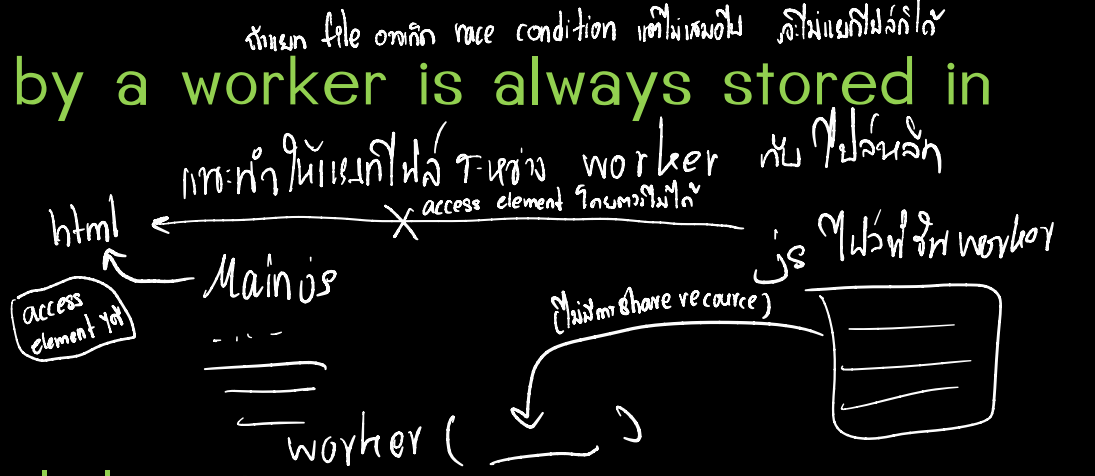
- Automatically created when an event occurs
- A number of properties
  - Provide additional info about the event
  - For example:
    - Event.data
    - Event.height
    - Event.pageX/Event.pageY ตำแหน่ง เมาส์
    - Event.screen/Event.screen
    - Etc.

Ref: https://www.elated.com/events-and-event-handlers/

Web Workers (มันคือ thread)

JS กับ html 5 จับไปเลี้ยงเชียงใหม่

- A way to execute JavaScript in the background without affecting the performance
- Normally web workers are used for the CPU intensive script
- The script that run by a worker is always stored in a separated file
  - To avoid
    - Using global var
    - Directly access html element



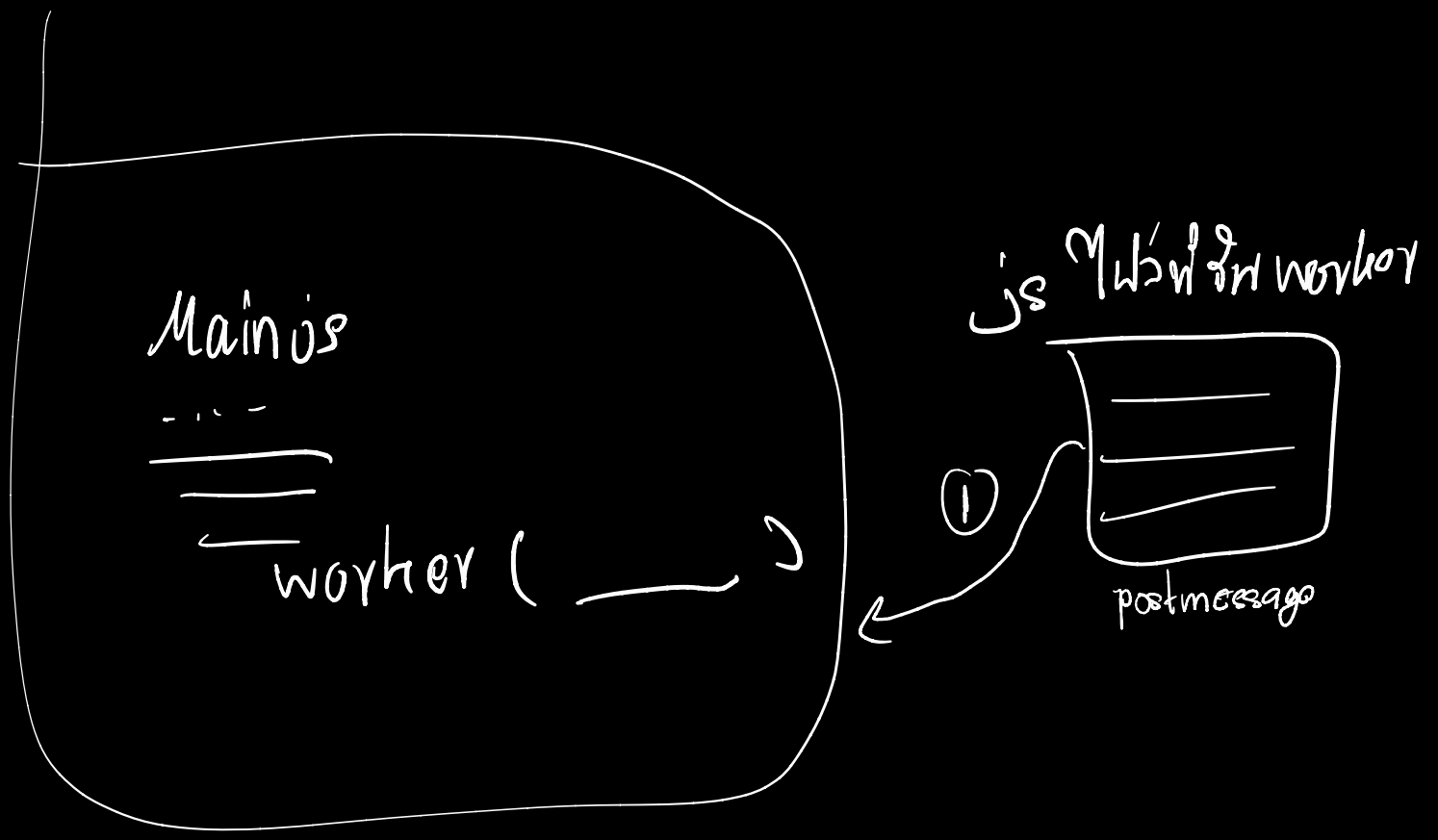
To create web worker

```
if (typeof(w) == "undefined")
{
  w = new Worker("workers1.js");
}
```

To send msg. out of the worker

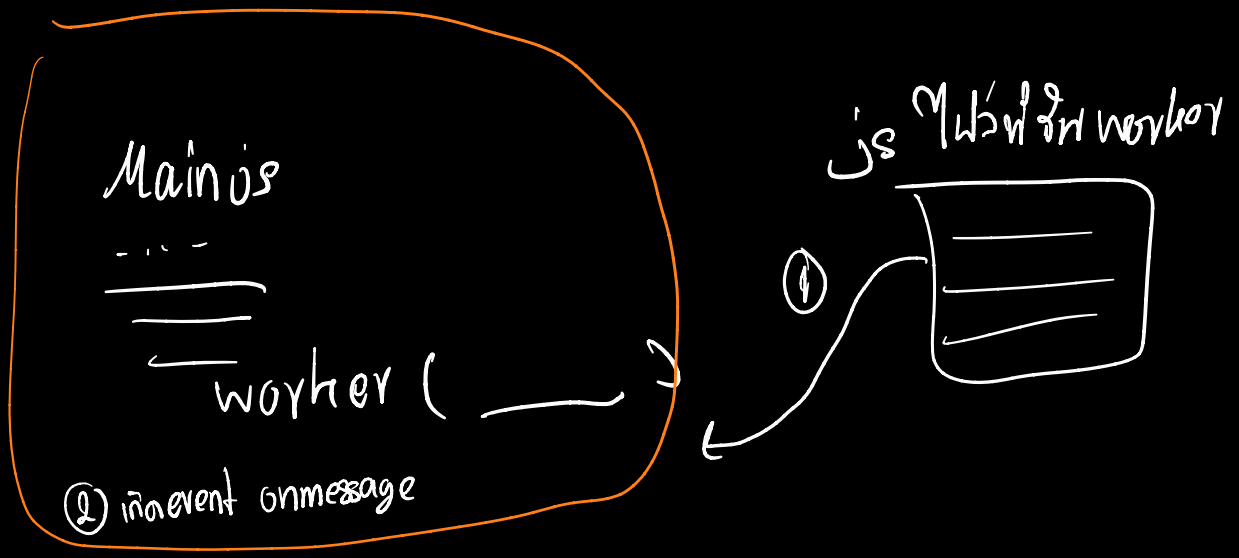
ถ้าต้องการส่ง Data ไปหา เรียกนอก ใช้

```
postMessage(message);
```



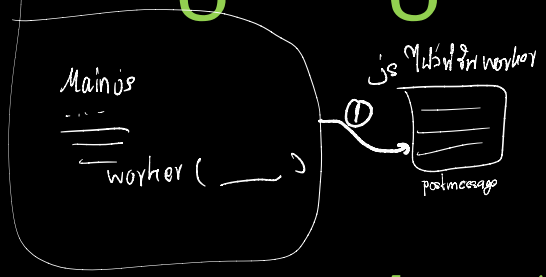
To receive message from worker

```
w.onmessage = function(event){
    window.alert(event.data);
};
```



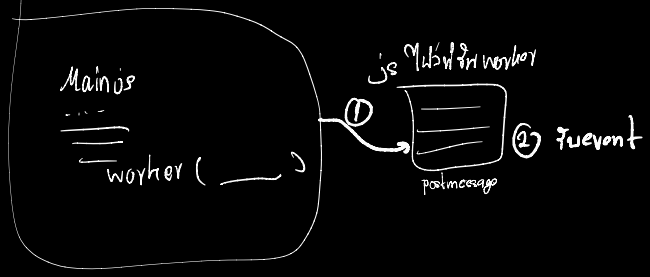
Sending msg. into worker

- Main




```
...
const w = new Worker("Worker1.js" );
w.postMessage("Message");
...
```

- Worker




```
...
self.onmessage = function(msg) {
console.log("received: ", msg);
}
...
```

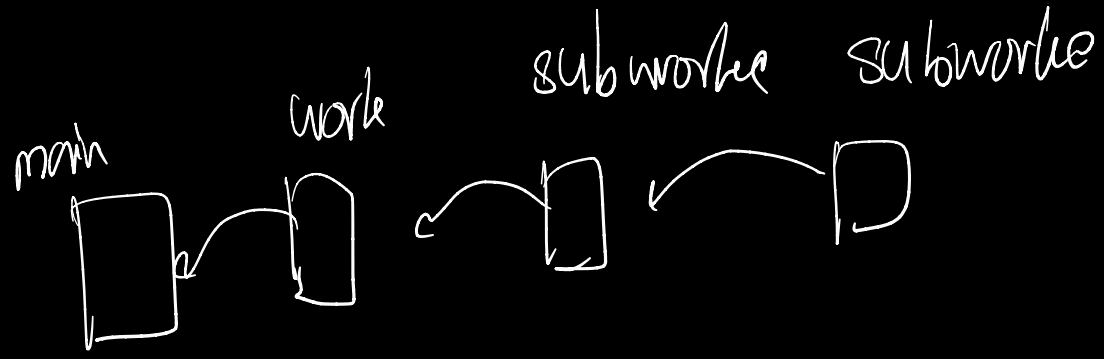
To terminate the worker

```
w.terminate();
w = undefined;
```

ทำให้ worker

Conclusion

- Data exchanges between main and workers done by onmessage event
- A worker can create sub-worker



มีการแก้: cookie เข้า header

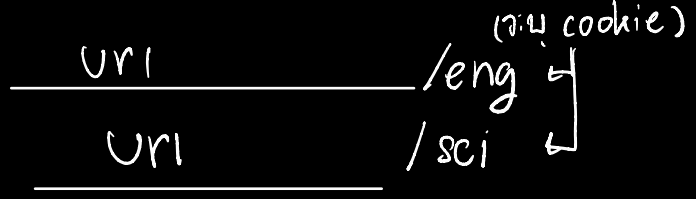
Cookie

ใหม่ๆการ login ครั้งไว้ แม้ปิดเบิ้ลอีกวัน

- Cookies are data stored in small text file
- Cookie were invented to help server remember info about the user
  - Ex: when user login, session info can be stored in a cookie
  - Cookies are saved in name-value pairs
  - When browser sends request to a server, cookies of that page of the server are added to request message

Cookie attributes

- There are many attributes
- Ex:
  - Expires: specifies expiry date of the cookie
  - Domain: specifies which host to be sent cookie to
  - Path: specifies which cookie to be sent to which URL
  - Etc.



Create cookie

- JavaScript can create a cookie
  - document.cookie
- Ex:

```
document.cookie = "user=Hello World";
document.cookie = "user=Hello World;
expires=Mon, 6 Feb 2023 12:00:00 UTC";
document.cookie = "username=John Doe;
expires=Mon, 18 Dec 2023 12:00:00 UTC;
path=/";
```

*assume that today is Sun, 5 Feb 2023

Read a Cookie

- Cookie can be read like this:

```
let i = document.cookie;
```

- The document.cookie will returen all cookie in one string ex:

```
cookie1=value1; cookie2=value2; cookie3=value3;
```

Change value of a Cookie

- Changing value of the cookie can be done in the same way as creating it

```
document.cookie = "user=Hello KMITL;
expires=Thu, 9 Feb 2023 12:00:00 UTC";
```

*assume that today is Sun, 5 Feb 2023

Delete a Cookie

- Cookie can be deleted by setting expires attribute to a past date

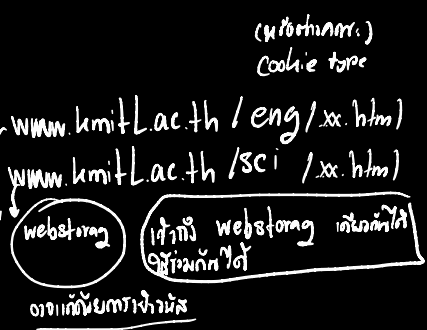
```
document.cookie = "user=Hello World;
expires=Fri, 14 Feb 2020 12:00:00 UTC";
```

Cookie มี ปัญหา - html ธ ส header ที่ขนาดใหญ่

Web Storage

- A way for web app. to store data locally
- Before HTML5, data are store in cookies
  - Cookies are included in every request
    - Less secure
    - Limited amount a data to be stored
- Web storage is per domain
  - All pages from the same domain can store and access the same data

disk ที่ browser เขียนไว้เท่านั้น เพจที่อยู่domain เดียวกัน ถึงใช้ web storage เดียวกัน เช่น



Web Storage Objects

- There are 2 web storage objects
  - window.localStorage: stores data with no expiration
  - window.sessionStorage: stores data for one session (data deleted after the browser is closed)
- To check browser support

```
if (typeof(Storage) !== "undefined")
```

Storing data in Web Storage

เก็บข้อมูล

- Data are stored in name/value pair
- To store
  - `localStorage.setItem("name", "John");`

  or

  ↕ ใช้ได้เหมือนกัน
  - `localStorage.name="John";`

Retrieving data from web storage

- Ex:

  ดึงข้อมูล

  - `var n = localStorage.getItem("name");`

  or

  - `var n = localStorage.name;`

Removing data from web storage

- Item in web storage can be removed by
  - `localStorage.removeItem("name");`

sessionStorage Object

ใช้เหมือนกันหมดทุกประการ แต่แค่เปลี่ยนชื่อจาก localStorage เป็น sessionStorage

- sessionStorage Object can be used the same way as localStorage
- As mentioned earlier, sessionStorage stores data for only limited of time