Open Source Software Project Development

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Week 14

One-Hour Tour on selected topics in HTML5

- a gallery of trendy implementations.

Outline

- HTML5 newly-introduced storage.
- HTML5 VS SOP.
- Miscellaneous:
  - Multimedia;
  - WebSocket;
  - WebWorker;

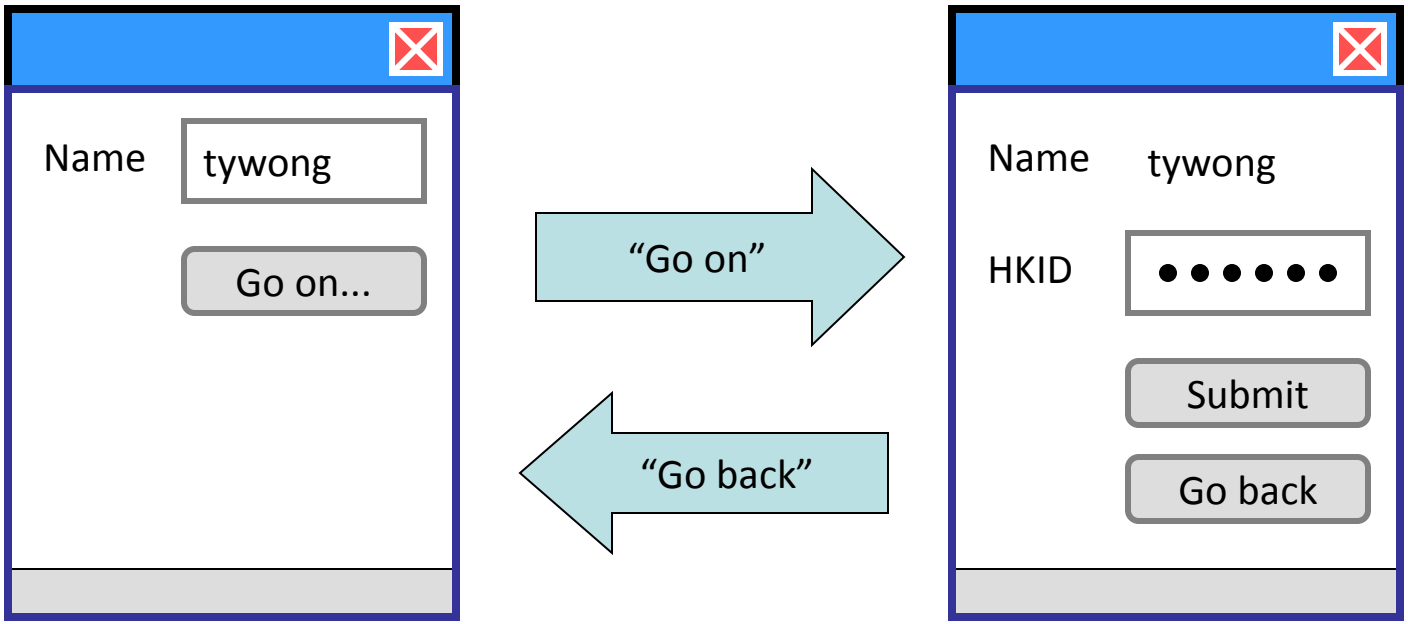
HTML5-related storage

- HTML5 standard opens up lots of functions related storage....

sessionStorage	One-time storage **for each tab**. Object: "**`window.sessionStorage`**".
localStorage	Permanent storage for a browser. Object: "**`window.localStorage`**".
WebDB	Permanent database for a browser. Method: "**`window.openDatabase()`**".
Offline Application Cache	Permanent offline storage (cache) for a browser. Object: "**`window.applicationCache`**".

WebStorage: Session Storage

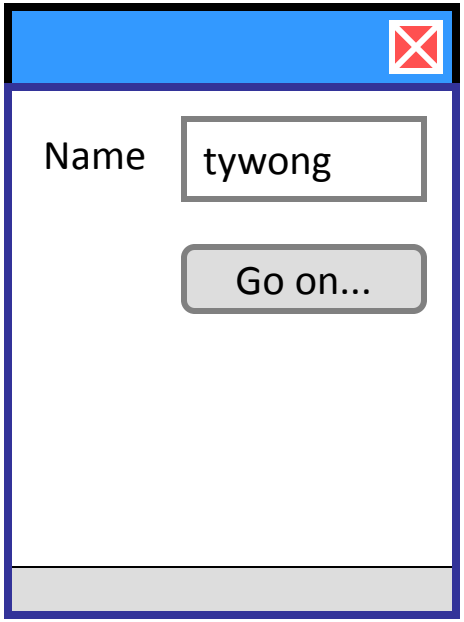
- One common use for session storage is...



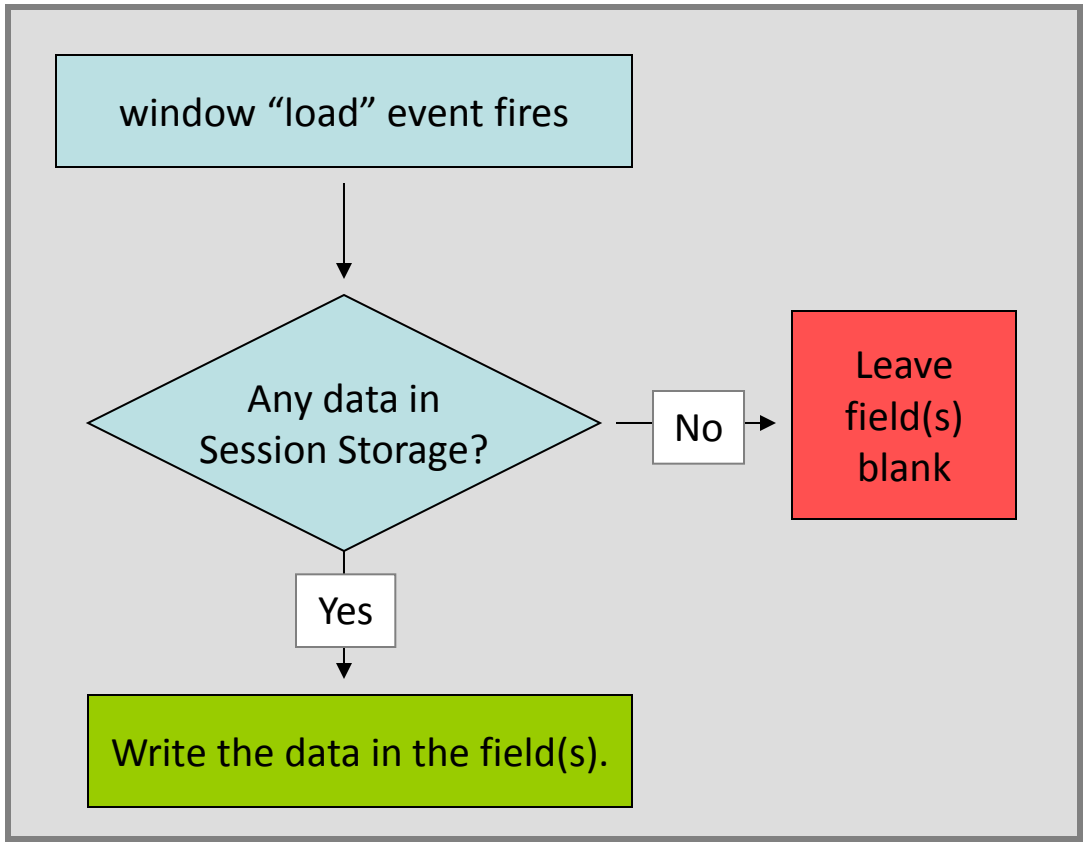
So, how can you fill the "Name" field to "tywong" automatically when the "Go back" button is clicked?

WebStorage: Session Storage

- One common use for session storage is...



Session storage is a temporary storage. So, the data is only valid for the current session.



[Example] “session_page{1,2}.html”

WebStorage: Session Storage

- One common use for session storage is...

Method	Descriptions
sessionStorage.getItem(key)	returns a string representing the value mapped by the input key.
sessionStorage.setItem(key, value)	Set a string mapped to the input key.

Making great use of JSON

```
var obj = JSON.parse( sessionStorage.getItem(key) );
```

read an object out!

```
sessionStorage.setItem( key, JSON.stringify(obj) );
```

save an object!

[Example] “session_page{1,2}.html”

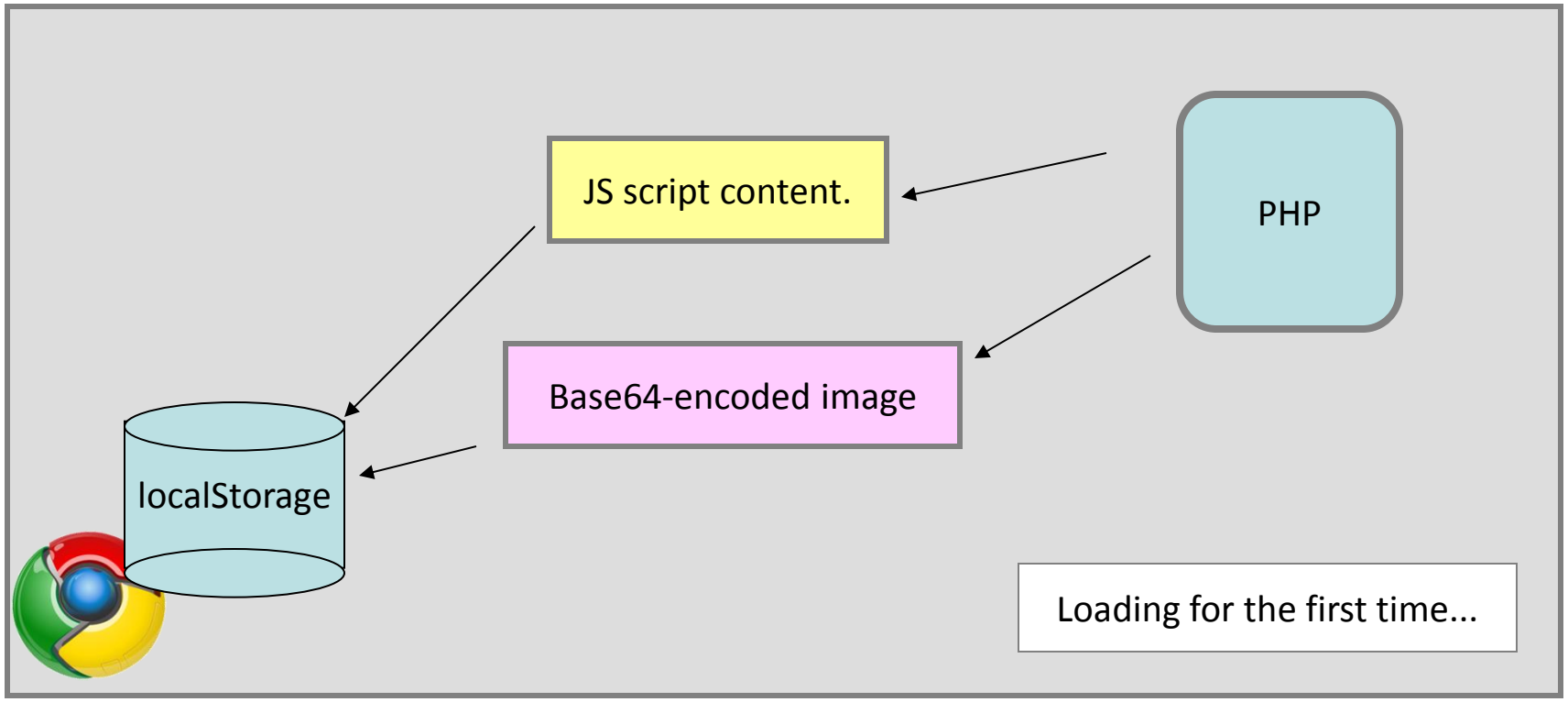
WebStorage: local storage

- “localStorage” and “sessionStorage” only differ by their lifetime.

- “localStorage” is a good replacement of HTTP cookie.
  - In terms of design:
    - “localStorage”: the web application has the control;
      - it decides when to read from or write to the local storage space of the client, using JavaScript.
    - “cookie”: the path, the domain, etc. take the control...

localStorage: realistic deployment

- It has as a cache for...
  - JS files, small icons, etc.



[Reference] http://www.stevesouders.com/blog/2011/03/28/storager-case-study-bing-google/

localStorage: realistic deployment

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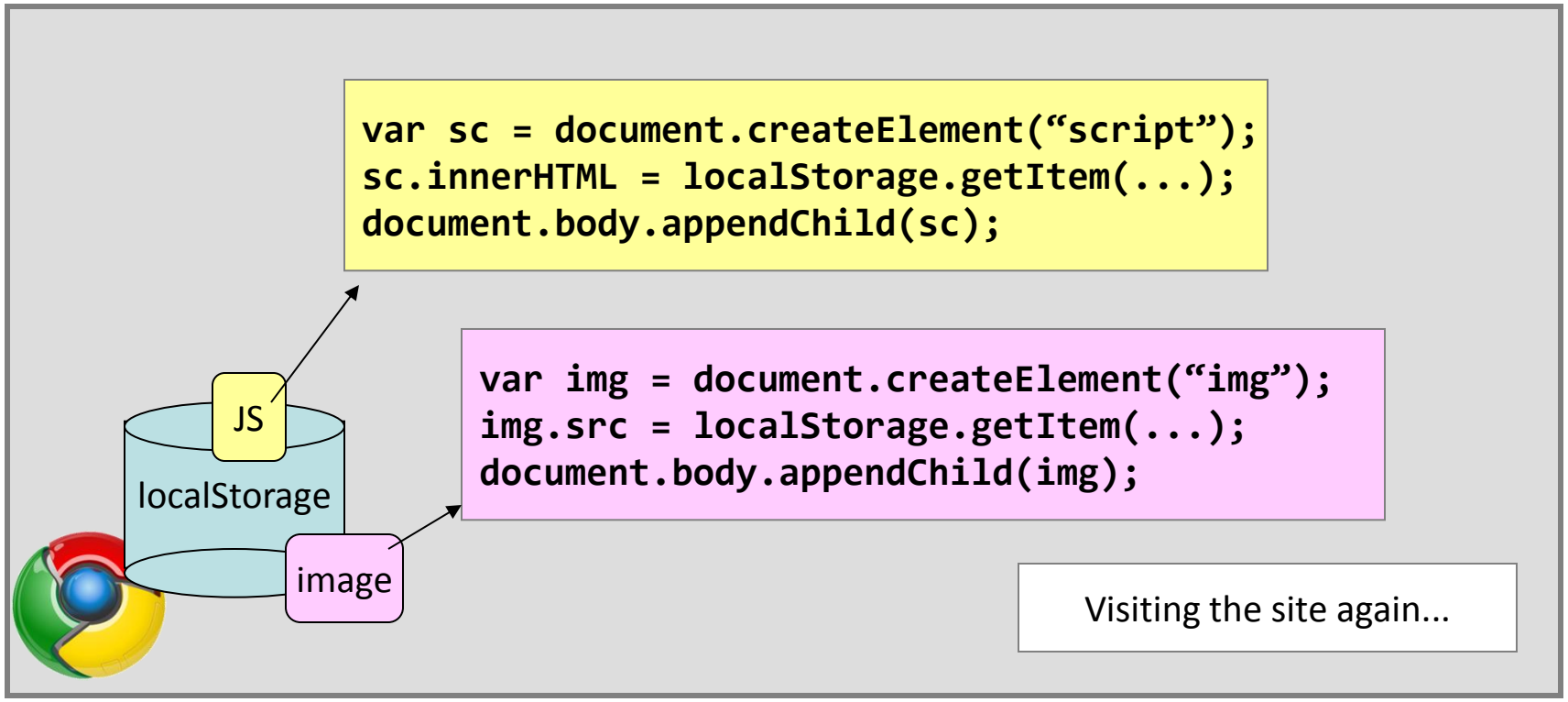


[Example] "localStorage_display_png.html", "localStorage.js"

Base64-decoded image?

- The format:

```
[string representing base64-encoded image]
```

Can also be image/gif, image/jpeg, etc...

I may be ignorant; I can't find examples not using "base64"

```
<?php
    $fp = fopen($filename, "r");
    $n = filesize($filename);
    $buf = fread($fp, $n);
    fclose($fp);

    echo "" . base64_encode(buf);
?>
```

[Example] "localStorage_display_png.html", "localStorage.js", "base64_png.php"

Short Summary

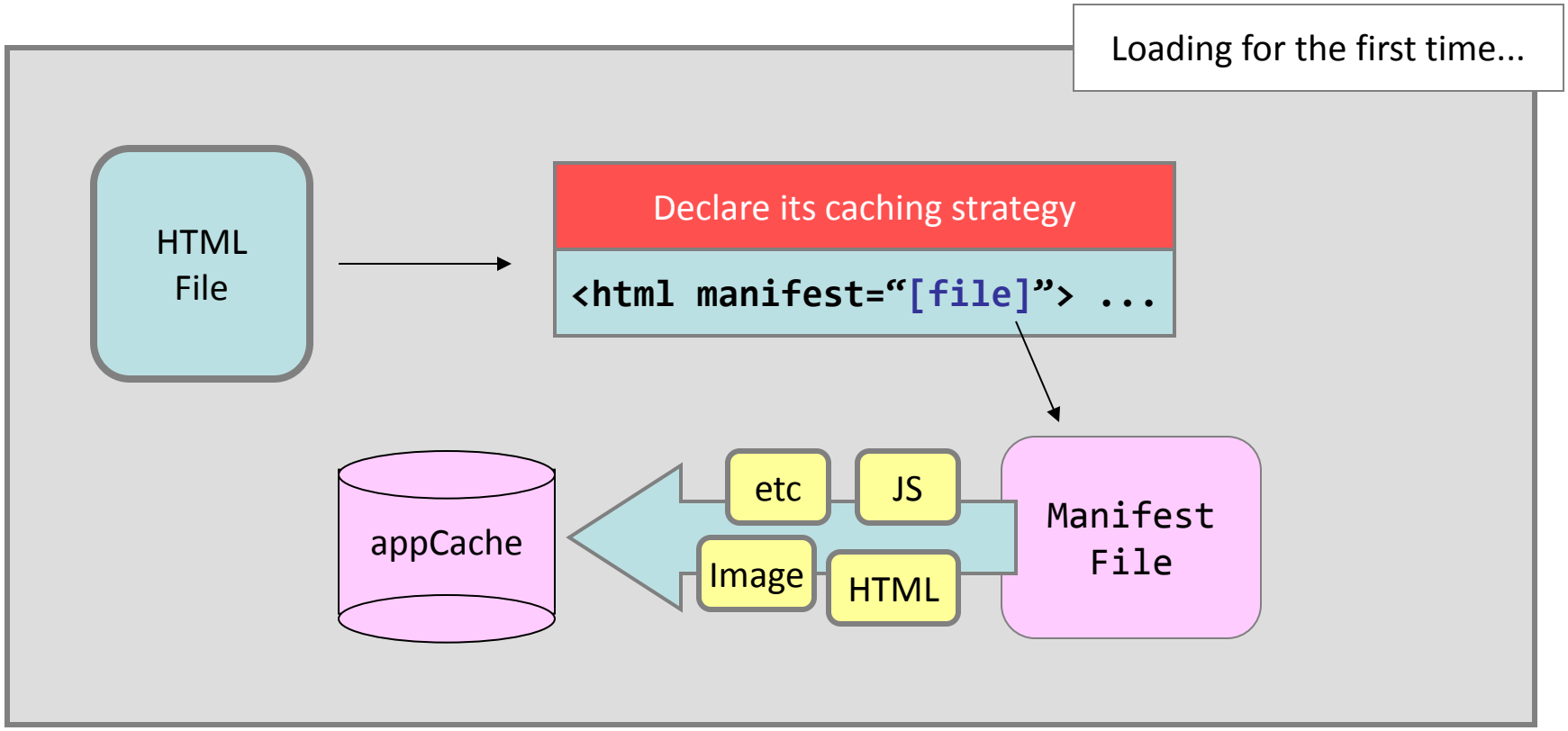
- Both “localStorage” and “sessionStorage” are for small pieces of data:
  - 16x16 icons;
  - small text files such as script files.

- Someone has reported that there is a limit on the storage size, too.
  - http://ejohn.org/blog/dom-storage/
  - note: for an entire domain!

[Example] “*_display_png.html”

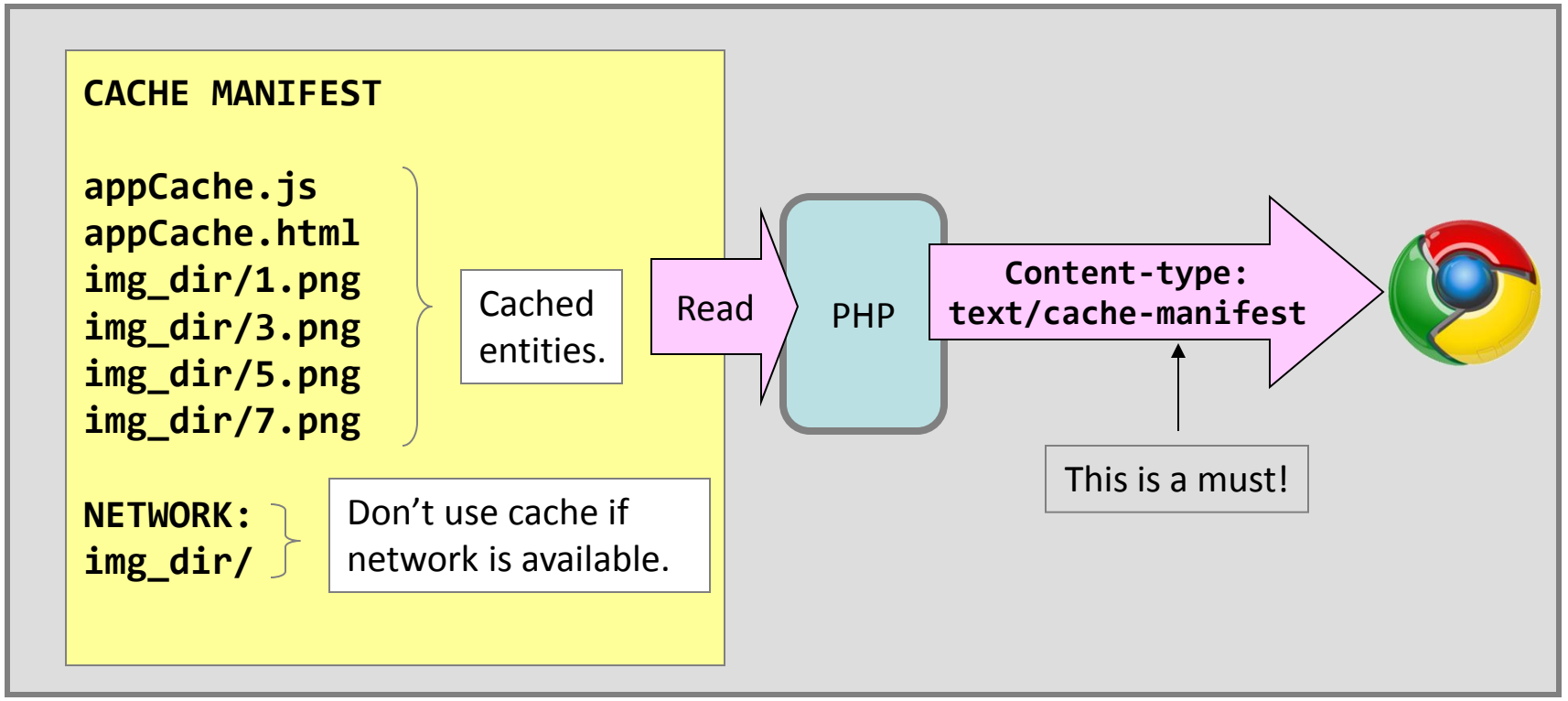
Offline Application Cache

- This cache targets a bunch of different entities.



Offline Application Cache – manifest file

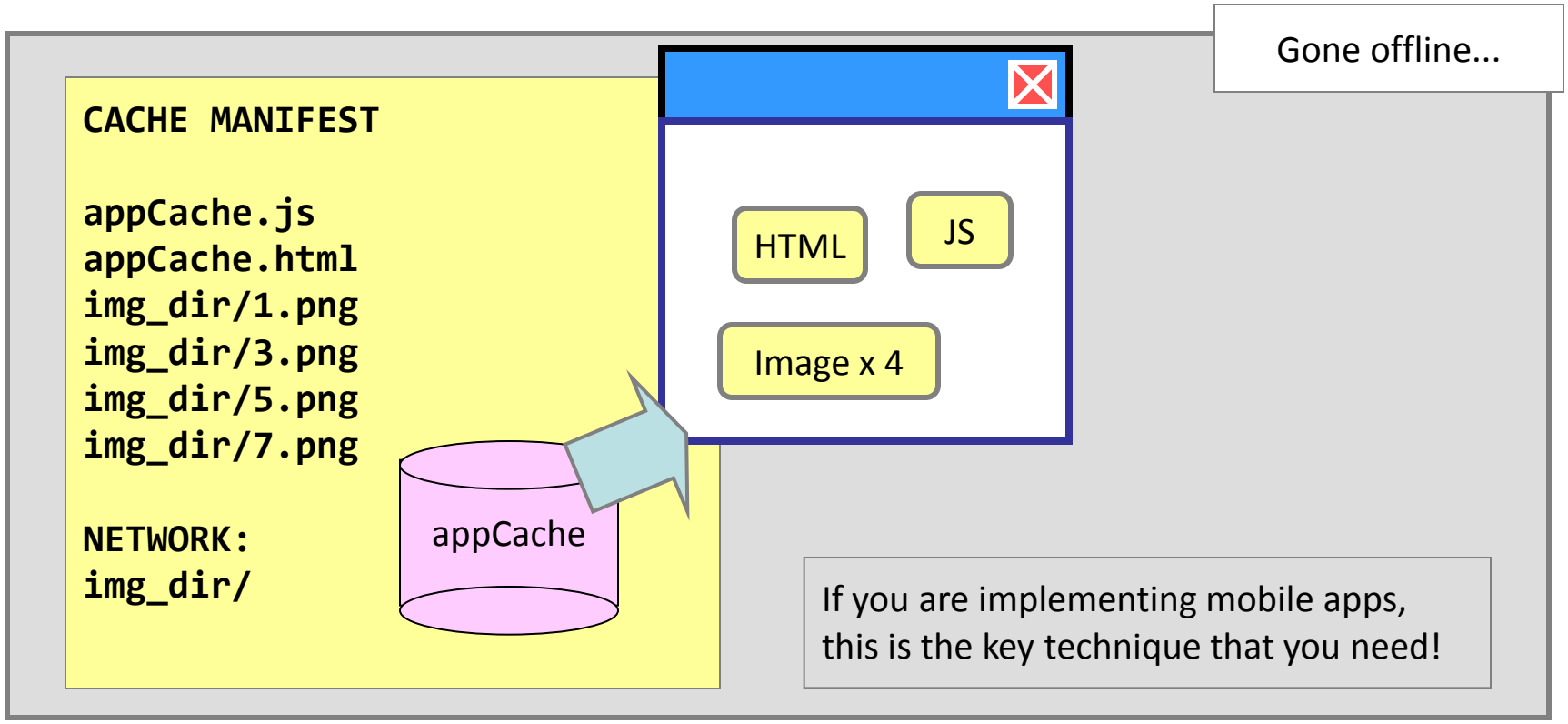
- It defines how the caching should be performed.



[Example] "appCache.manifest" & "appCache.php"

Offline Application Cache – go offline?

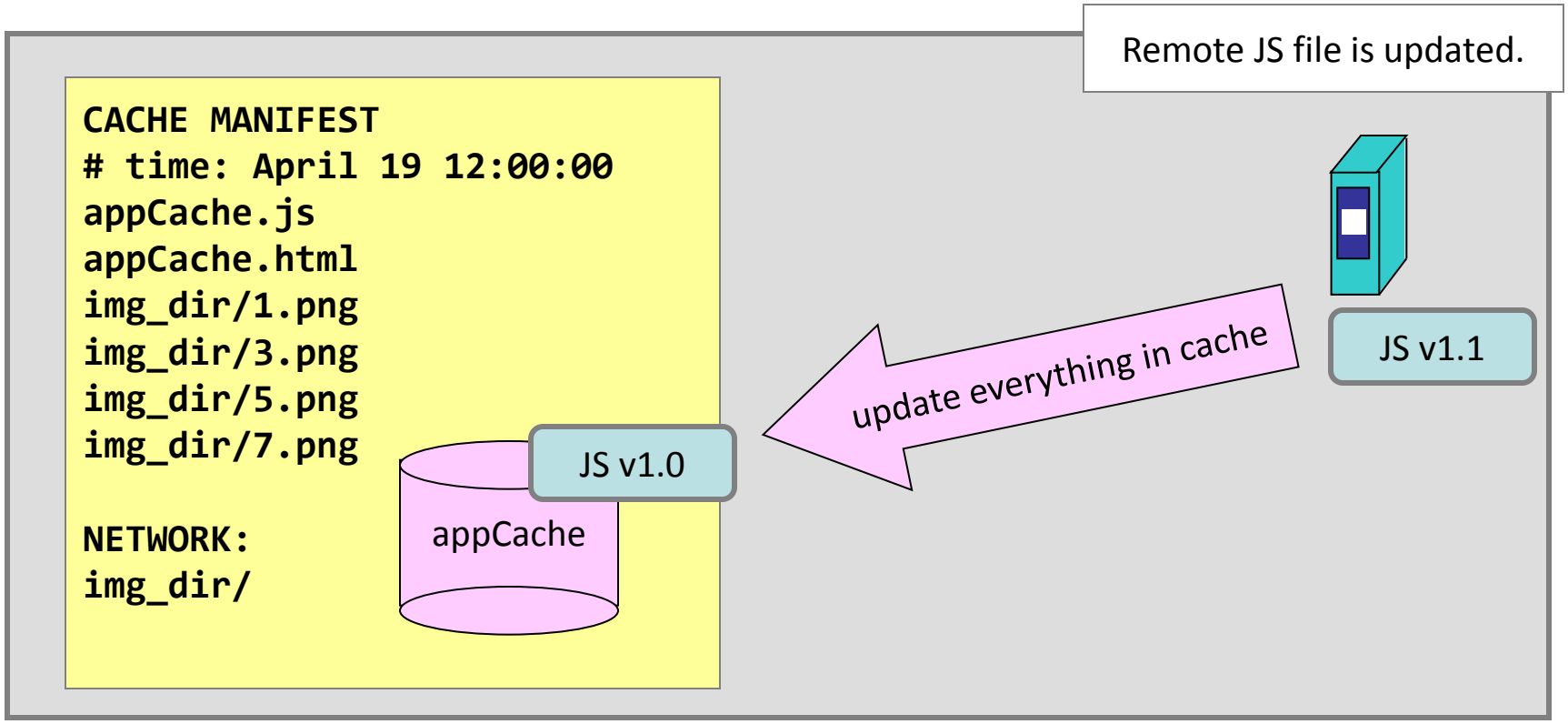
- What if the machine goes offline?
  - The browser reads data from the offline **appCache**!



[YouTube] http://www.youtube.com/watch?v=b8tnSdlJZI0

Offline Application Cache – cache update?

- What if one of the cached item is updated?
  - The browser will only check the manifest file...so...



Offline Application Cache – programming

- A new object: "**`window.applicationCache`**".
  - E.g., **`window.applicationCache.update()`**
    - update the cached items only if the manifest file is updated.

- New events for the new object: **`noupdate`**, **`cached`**, **`updateready`**, etc.
  - See the example for details.

[Example] "appCache.js"

[Reference] http://www.html5rocks.com/tutorials/appcache/beginner/

Last type of storage: WebDB

- Just a SQL database on the client side.
  - That's all!
  - Nothing special!

- In the example, I've implemented one of the requirements of Assignment 2 using WebDB.
  - See the reference and the example for details.

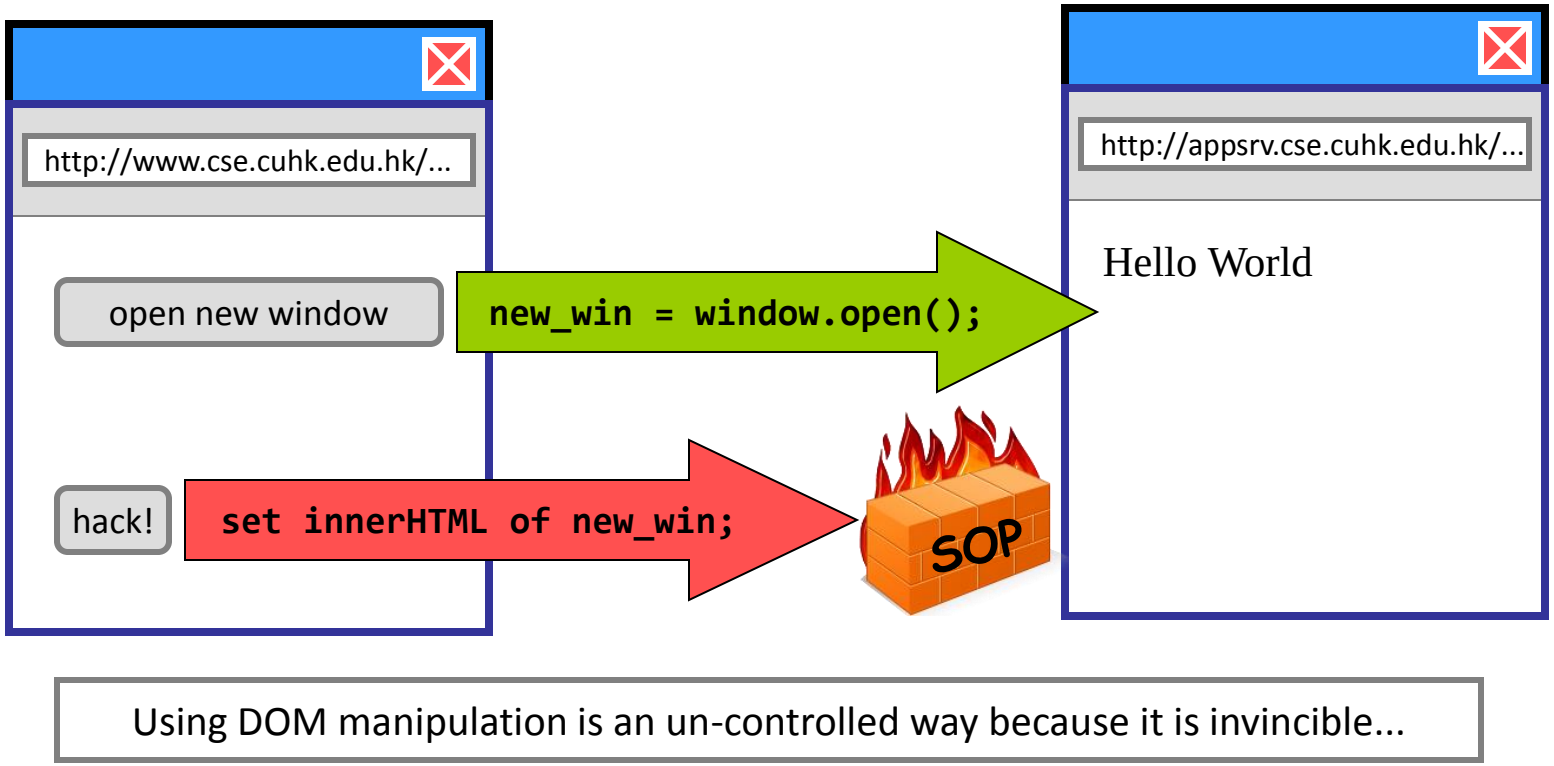
```
[Example] "webDB.html", "webDB.js"
[Reference] http://openbit.co.uk/?p=135
```

Outline

- HTML5 newly-introduced storage.
- HTML5 VS SOP.
- Miscellaneous:
  - Multimedia;
  - WebSocket;
  - WebWorker;

HTML5 VS SOP

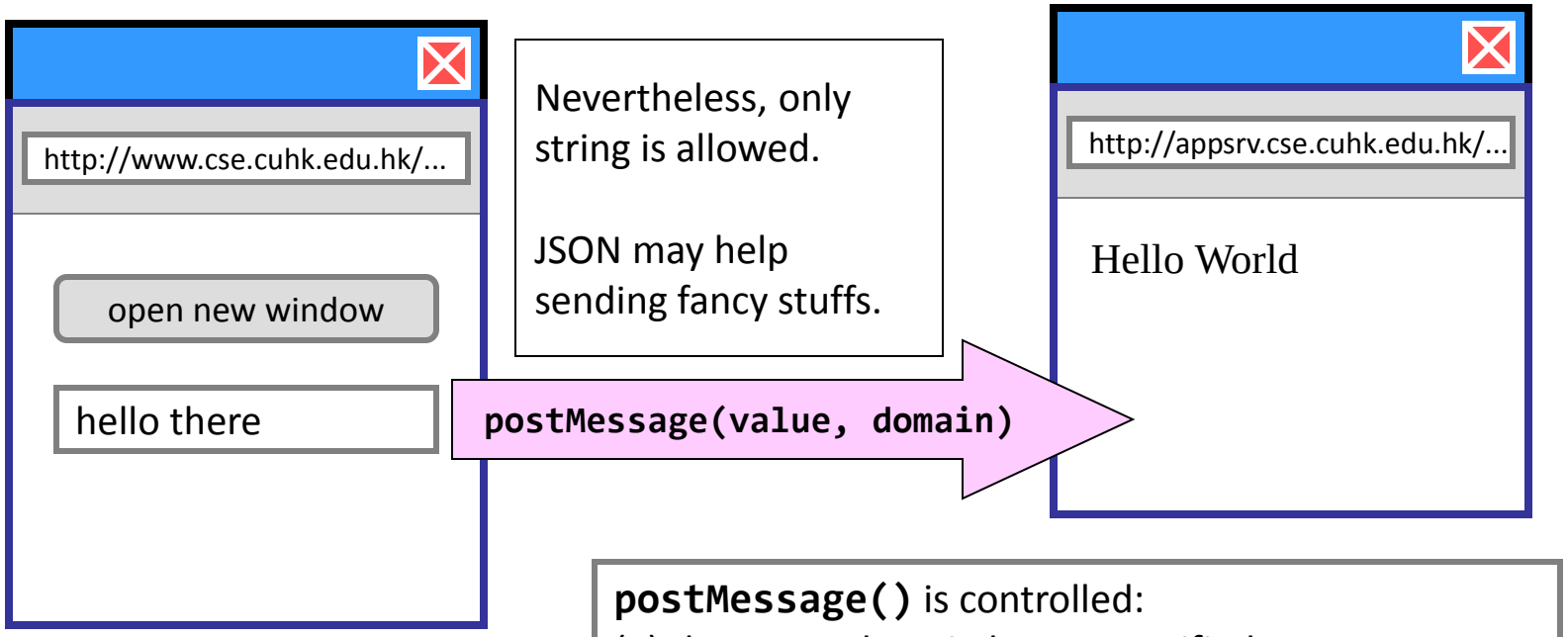
- Traditionally, browsers only allow **same-origin communication**.



Using DOM manipulation is an un-controlled way because it is invincible...

HTML5 VS SOP

- HTML5 implements a **controlled cross-domain communication** – using **`postMessage()`**.



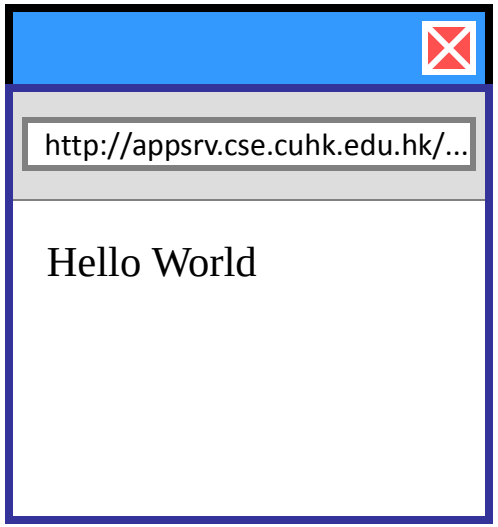
`postMessage()` is controlled:
(1) the target domain has to specified,
(2) the recipient can check the origin of the message.

[Example] "postMessage.html"

HTML5 VS SOP

- The recipient uses a new event type “message” to receive the a cross-domain message.

The “message” event object	
`event.origin`	A string representing the origin’s domain. E.g., “http://www.cse.cuhk.edu.hk”
`event.data`	Data received, and is a string.
`event.source`	The window which sent the message. This is another window object and is for **replying messages** using another **`postMessage()`** call.



[Example] “dummy.html”

[Reference] https://developer.mozilla.org/en/DOM/window.postMessage

Outline

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Video and Audio Tags

- Lecturer's point of view: this aims to kill flash!

```
<video id="video_obj" controls>
    <source src="appCache.ogv" type="video/ogg">
</video>
```

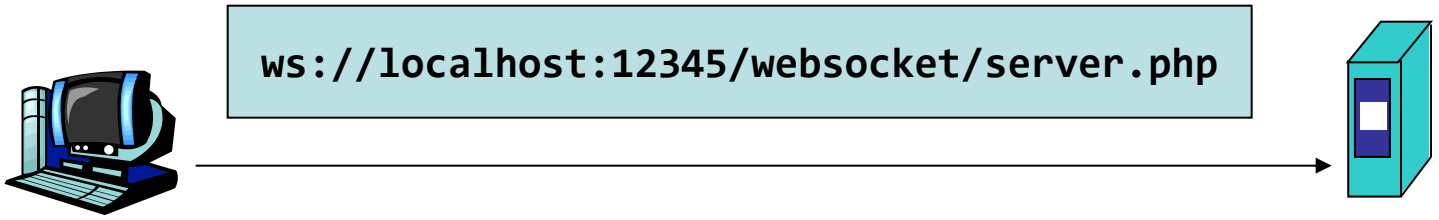
video object methods	
video.play()	Play the video.
video.pause()	Stop the video.

video object interesting event	
ended	Fires when the end of the video is reached.

[Example] "video.html"

WebSocket

- Current status:
  - Browsers can only act as clients.
  - No listening port is implemented although it is defined in the spec of HTML5.



A dedicated server is needed because: an application-level handshaking is there!

Other than that, websocket programming is the same as the ordinary socket programming.

[YouTube] http://www.youtube.com/watch?v=9zFWrgXUpKA

WebWorker

- Sorry, I don’t have any demos:
  - Because I can’t think of any good ones.

- What is WebWorker?
  - It is just multi-threading programming!
  - That’s all!

[Reference] http://ejohn.org/blog/web-workers/

[Demo] http://people.mozilla.com/~prouget/demos/worker_and_simulatedannealing/index.xhtml