

Event Loop

Event LoopNodejsjavascript

Event Loopnodejsevent loop

- Event LoopHTML5
- NodejsEvent Looplibuv
- libuvEvent LoopHTML5Event Loop

javascript(macrotask)task(microtask)jobs

:

- script
- setTimeout
- setInterval
- setImmediate (NodejsIE10)
- requestAnimationFrame ()
- I/O
- UI rendering ()

:

- process.nextTick (Nodejs)
- Promise
- Object.observe ()
- MutationObserver

Event Loop

Javascript main thread () call-stack

JS

Javascript

Task Queue,



知乎 @mr.z

Event Loop:

1. Javascript(setTimeoutPromise.then)
2. Javascript call-stack
3. microtask queue call-stack **microtask**
4. microtask queue **microtask** **queue** **microtask**
5. microtask queue **microtask** **queue**
6. UI rendering
7. macrotask queue
- 8.
9. 3 - 8
- ...

Event Loop3:

1. macrotask queue
- 2.
3. UI rendering

Node.js Event Loop

libuv



NodeJs

NodeJsEvent Loop6



NodeEvent Loop6:

- timers: setTimeout setInterval clearInterval callback
- I/O callbacks: close callback timers setImmediate()
- idle, prepare:
- poll: I/O
- check: setImmediate callback (setImmediate() setImmediate)
- close callbacks: close callback socket.on('close', fn) http.createServer().on('close', fn)

NodeJs4:

1. Timers Queue
2. I/O Callbacks Queue
3. Check Queue
4. Close Callbacks Queue

NodeJs4

NodeJs2:

1. Next Tick Queue: process.nextTick(callback)
2. Other Micro Queue: microtaskPromise

NodeJs2



NodeJsEvent Loop:

1. Javascript(setTimeoutPromise.then)
2. Next Tick QueueOther Micro Queue
3. 61 **Event LoopNodeJsEvent Loop2**
4. Timers Queue -> 2 -> I/O Callbacks Queue -> 2 -> Check Queue -> 2 -> Close Callback Queue -> 2 -> Timers Queue ->

:

- NodeJs 11NodeJsEvent Loop
- NodeJS 11 **timersetTimeout, setInterval...checksetImmediatenode11**

NodeJsEvent Loopmicrotask queue macrotask queue

Microtask





setTimeout(fn, 0) setImmediate(fn)

1. : timer setImmediate Check Queue Timers Queue Timer Queue Check
Queue setImmediate timer setTimeout Timers Queue Timers Queue Timers
Queue setTimeout timer
setImmediate(fn) setTimeout(fn, 0)
2. : timer setTimeout Timers Queue setImmediate Check Queue Timers
Queue Timers Queue timer Check Queue setImmediate
0) setImmediate(fn)
3. setTimeout(fn, 0) setImmediate I/O readFile('xx', function () { // }) IO/I/O Callbacks
Queue setTimeout Timers Queue setImmediate Check Queue I/O Callbacks Queue
Check Queue Timers Queue setImmediate setTimeout(fn, 0)

```

setImmediate(function A() {
  console.log(1);
  setImmediate(function B(){console.log(2);});
});

setTimeout(function timeout() {
  console.log('TIMEOUT FIRED');
}, 0);

// :
// :
// 1
// TIMEOUT FIRED
// 2

// :
// TIMEOUT FIRED
// 1
// 2

```

:

- setImmediate setImmediate setImmediate check check

poll :

poll :

1. timer timer (Executing scripts for timers whose threshold has elapsed, then)
2. poll (Processing events in the poll queue)

poll timers:

- pollEvent Loop poll queue poll queue callback
- poll:
 - setImmediateEvent Loop poll check Check Queue setImmediate
 - setImmediate poll callback

poll timers:

- poll queueEvent Loop Timers QueueEvent Loop timer Timers Queue timers
check I/O callbacks?

setTimeout setImmediate

- setTimeout(fn, 0) timer poll timer
- setImmediate(fn) check

- (main module)
- I/O Circles setImmediate check

setImmediate process.nextTick

- setImmediate(fn)Check Queue
- process.nextTick(fn)Next Tick Queue
- process.nextTick(fn)1000setImmediate

Fetch API

XMLHttpRequestwebfetchXHR

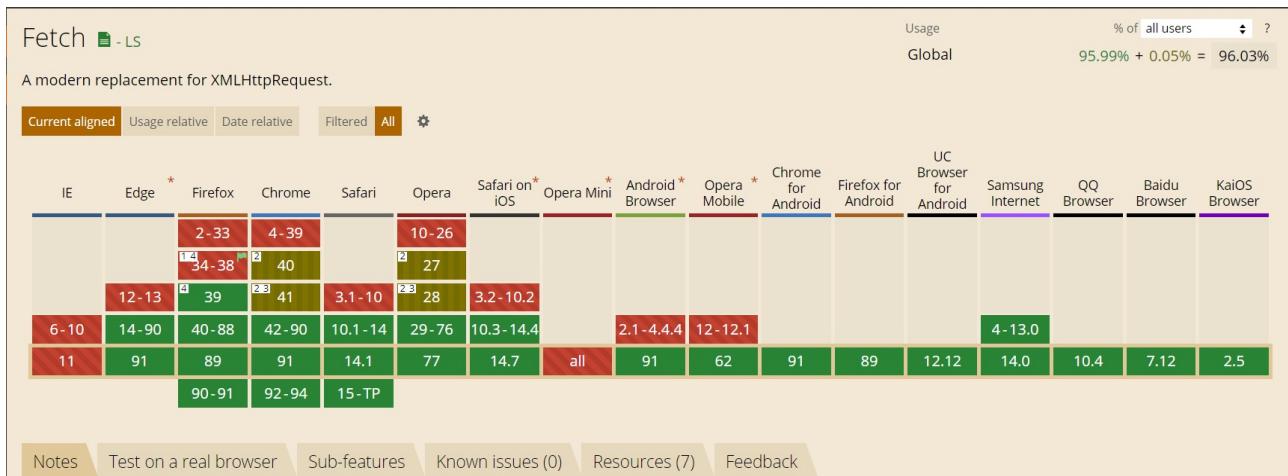
fetchPromiseFetchAPI:

- Promiseasync/await
- isomorphic-fetch

fetchfetch

Fetch

fetchfetch



fetch

fetchfetchpolyfill

fetchPromisePromisePromisepolyfillfetchpolyfill

- promisepolyfilles6-promisebabel-polyfillpromise
- fetchpolyfillisomorphic-fetchwhatwg-fetch

IE8/9IE8ES3IE9ES5ES5polyfill es5-shim

promisepolyfill

babel-runtimePromisepolyfillIE8/9fetchPromisebabel-runtimepolyfillfetchPromise

fetchpolyfill:

fetchPromiseXMLHttpRequestwhatwg-fetchisomorphic-fetchfetchrequire("whatwg-fetch")

fetchcookie

fetchcookie

credentials3

- omit: cookie
- same-origin: cookie
- include: cookie

credentialsXHR2withCredentialscookie

fetchcookiecredentialsfetch(url, {credentials: 'include'});

fetchSet-Cookiecookiecookiecredentials

fetchhttpreject

fetchpromisefetchpromisehttp400500rejectresovlefetch rejectfetch

```
function checkStatus(response) {
  if (response.status >= 200 && response.status < 300) {
    return response;
  }
  const error = new Error(response.statusText);
  error.response = response;
  throw error;
}

function parseJSON(response) {
  return response.json();
}

export default function request(url, options = {}) {
  return fetch(url, { credentials: 'include', ...options })
    .then(checkStatus)
    .then(parseJSON)
    .then((data) => data)
    .catch((err) => err);
}
```

fetchtimeout

fetchajaxtimeoutfetchpolyfill

abort() timeouttimeout+abort

fetchfetchpromisePromiseabortpromisepromise

fetchtimeoutpromisepromiseresolverejecttimeout

github[timeout handling \(https://github.com/github/fetch/issues/175\)](https://github.com/github/fetch/issues/175)

: setTimeout

```
var fetchOrigin = fetch;
window.fetch = function(url, options) {
  return new Promise(function(resolve, reject) {
    var timerId;
    if (options.timeout) {
      timerId = setTimeout(function() {
        reject(new Error('fetch timeout'));
      }, options.timeout);
    }

    fetchOrigin(url, option).then(function(response) {
      timerId && clearTimeout(timerId);
      resolve(response);
    }, function(error) {
      timerId && clearTimeout(timerId);
      reject(error);
    });
  });
}
```

XHRabort

```
var fetchOrigin = fetch;
window.fetch = function(url, options) {
  return new Promise(function(resolve, reject) {
    var abort = function() {
      reject(new Error('fetch abort'));
    };
    const p = fetchOrigin(url, option).then(resolve, reject);
    p.abort = abort;

    return p;
  });
}
```

: Promise.race

Promise.racepromisepromisepromisepromise

```

var fetchOrigin = fetch;
window.fetch = function(url, options) {
  var abortFn = null;
  var timeoutFn = null;

  var timeoutPromise = new Promise(function(resolve, reject) {
    timeoutFn = function () {
      reject(new Error('fetch timeout'));
    }
  });

  var abortPromise = new Promise(function(resolve, reject) {
    abortFn = function () {
      reject(new Error('fetch abort'));
    }
  });

  const fetchPromise = fetchOrigin(url, option);

  if (option.timeout) {
    setTimeout(timeoutFn, option.timeout);
  }

  const promise = Promise.race(
    timeoutPromise,
    abortPromise,
    fetchPromise,
  );

  promise.abort = abortFn;

  return promise;
}

```

fetchtimeout

- timeout
- fetchtimeoutabort

fetchJSONP

fetchJSONP
javascriptJSON““ajaxfetchJSONPJSONP

JSONPfetchfetchajaxfetchJSONPJSONPJSONPfetchPromiseJSONPfetchJSONP

JSONP[fetch-jsonp](https://github.com/camsong/fetch-jsonp) (<https://github.com/camsong/fetch-jsonp>)JSONPJSONP

npmfetch-jsonp

```
npm install fetch-jsonp --save-dev
```

fetch-jsonp:

```
const defaultOptions = {
```

```
    timeout: 5000,
    jsonpCallback: 'callback',
    jsonpCallbackFunction: null,
};

function generateCallbackFunction() {
    return `jsonp_${Date.now()}_${Math.ceil(Math.random() * 100000)}`;
}

function clearFunction(functionName) {
    // IE8 throws an exception when you try to delete a property on window
    // http://stackoverflow.com/a/1824228/751089
    try {
        delete window[functionName];
    } catch (e) {
        window[functionName] = undefined;
    }
}

function removeScript(scriptId) {
    const script = document.getElementById(scriptId);
    if (script) {
        document.getElementsByTagName('head')[0].removeChild(script);
    }
}

function fetchJsonp(_url, options = {}) {
    // to avoid param reassign
    let url = _url;
    const timeout = options.timeout || defaultOptions.timeout;
    const jsonpCallback = options.jsonpCallback || defaultOptions.jsonpCallback;

    let timeoutId;

    return new Promise((resolve, reject) => {
        const callbackFunction = options.jsonpCallbackFunction || generateCallbackFunction();
        const scriptId = `${jsonpCallback}_${callbackFunction}`;

        window[callbackFunction] = (response) => {
            resolve({
                ok: true,
                // keep consistent with fetch API
                json: () => Promise.resolve(response),
            });
        };

        if (timeoutId) clearTimeout(timeoutId);

        removeScript(scriptId);

        clearFunction(callbackFunction);
    });
}
```

```

    // Check if the user set their own params, and if not add a ? to start a
    list of params
    url += (url.indexOf('?') === -1) ? '?' : '&';

    const jsonpScript = document.createElement('script');
    jsonpScript.setAttribute('src',
` ${url}${jsonpCallback}=${callbackFunction}`);
    if (options.charset) {
        jsonpScript.setAttribute('charset', options.charset);
    }
    jsonpScript.id = scriptId;
    document.getElementsByTagName('head')[0].appendChild(jsonpScript);

    timeoutId = setTimeout(() => {
        reject(new Error(`JSONP request to ${_url} timed out`));

        removeScript(scriptId);

        clearFunction(callbackFunction);

        //
        window[callbackFunction] = () => {
            clearFunction(callbackFunction);
        };
    }, timeout);

    // Caught if got 404/500
    jsonpScript.onerror = () => {
        reject(new Error(`JSONP request to ${_url} failed`));

        clearFunction(callbackFunction);
        removeScript(scriptId);
        if (timeoutId) clearTimeout(timeoutId);
    };
});

export default fetchJsonp;

```

```

:
fetchJsonp('/users.jsonp', {
    timeout: 3000,
    jsonpCallback: 'custom_callback'
})
.then(function(response) {
    return response.json()
}).catch(function(ex) {
    console.log('parsing failed', ex)
});

```

fetchprogress

XHRprogress

```
var xhr = new XMLHttpRequest();
xhr.open('POST', '/uploads');
xhr.onload = function() {}
xhr.onerror = function() {}
var uploadProgress = function(event) {
  if (event.lengthComputable) {
    var percent = Math.round((event.loaded / event.total) * 100);
    console.log(percent);
  }
};

// progress
xhr.upload.onprogress = uploadProgress;
// progress
xhr.onprogress = uploadProgress;
```

fetchprogressfetchRequestResponseResponseResponseresponse.json()
response.body

response.bodygetRender()

getRender()body

fetchprogress

:

```
// fetch() returns a promise that resolves once headers have been received
fetch(url).then(response => {
  // response.body is a readable stream.
  // Calling getReader() gives us exclusive access to the stream's content
  var reader = response.body.getReader();
  var bytesReceived = 0;

  // read() returns a promise that resolves when a value has been received
  reader.read().then(function processResult(result) {
    // Result objects contain two properties:
    // done - true if the stream has already given you all its data.
    // value - some data. Always undefined when done is true.
    if (result.done) {
      console.log("Fetch complete");
      return;
    }

    // result.value for fetch streams is a Uint8Array
    bytesReceived += result.value.length;
    console.log('Received', bytesReceived, 'bytes of data so far');

    // Read some more, and call this function again
    return reader.read().then(processResult);
  });
});
```

githubPromise+XHRfetchprogress(fetch
<https://github.com/github/fetch/issues/89#issuecomment-256610849>)

```

function fetchProgress(url, opts={}, onProgress) {
  return new Promise((resolve, reject)=>{
    var xhr = new XMLHttpRequest();
    xhr.open(opts.method || 'get', url);

    for (var key in opts.headers||{}) {
      xhr.setRequestHeader(key, opts.headers[key]);
    }

    xhr.onload = function(event) {
      resolve(e.target.responseText)
    };

    xhr.onerror = reject;

    if (xhr.upload && onProgress) {
      xhr.upload.onprogress = onProgress; // event.loaded / event.total * 100 ;
//event.lengthComputable
    }

    xhr.send(opts.body);
  });
}

fetchProgress('/').then(console.log)

```

fetch

ajaxXHR2CORSAccess-Control-Allow-Origin

XHR2fetchXHR2fetchmode

fetchmode3

- same-originerrorresponse typebasic
- cors: CORSCORSresponse typecors
- no-cors: CORSCORSfetchresponse typeopaque

corsfetchno-cors

response typeopaque

APIsServiceWorkerresponseCache APIsscriptcssCDNCORS

fetchCORS

JavaScriptJSnullundefinedArray/Function/Date/RegExpObjectBoolean/Number/String
classJSarguments.lengthES6class

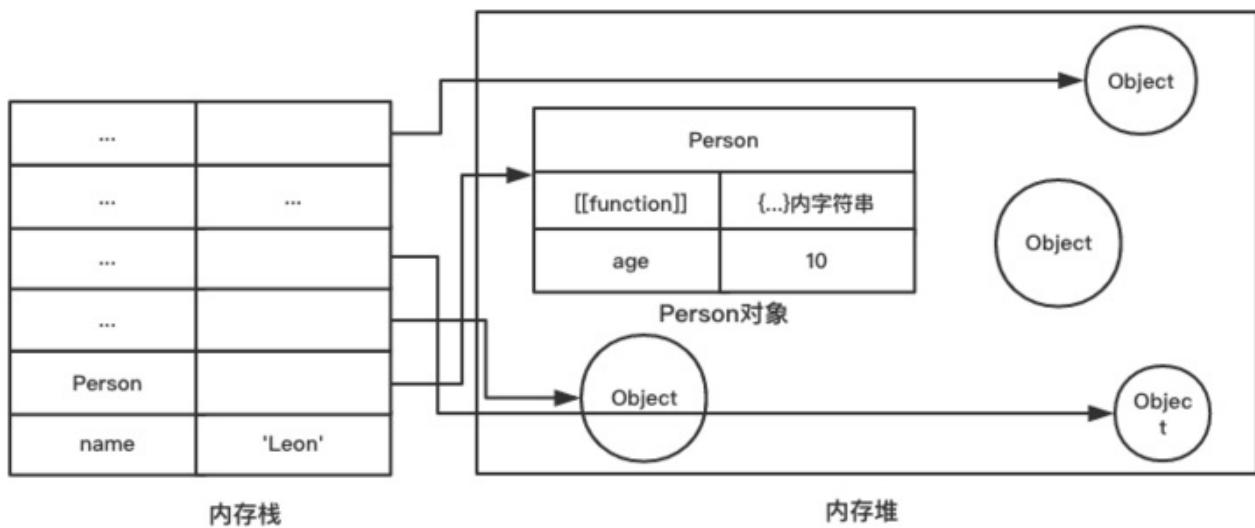
```

var name = 'Hank';
function Person(name) {
    this.name = name;
    this.sayName = function() {
        alert(this.name);
    }
}
Person.age = 10;
console.log(Person.age);      // 10
console.log(Person);
/*
f Person(name) {
    this.name = name;
}
*/

```

JS

`[[function]]()` `eval()`



JSJSPersonPerson[[function]]arguments>this/nameage

JSprototype

constructor

PersonPersonPerson.prototypePerson.prototype.constructorPersonnamesayName()
prototype



```
Person.age; // 10
Person.prototype.age; // 24
```

`new`

```
var person1 = new Person('Lee');
var person2 = new Person('Lucy');
```

person1
person2
[[Prototype]]
Object.setPrototypeOf()

protoES6
Object.getPrototypeOf()
protoAPI
Object.create()

`prototype` **proto**

```
Object.getPrototypeOf({}) === Object.prototype; // true
```

JavaScript
[[Prototype]]
[[Prototype]]
[[Prototype]]
JavaScript
obj.
Object.create()
[[Prototype]]

(function)



```
newPerson()namesayName
```

```
person1.__proto__ === Person.prototype // true
Person.prototype.isPrototypeOf(person1); // true
Object.getPrototypeOf(person2) === Person.prototype; // true
person1 instanceof Person; // true
```

```
person1
```

```
person1.name; // Lee
person1.age; // 24
person1.toString(); // [object Object]
```

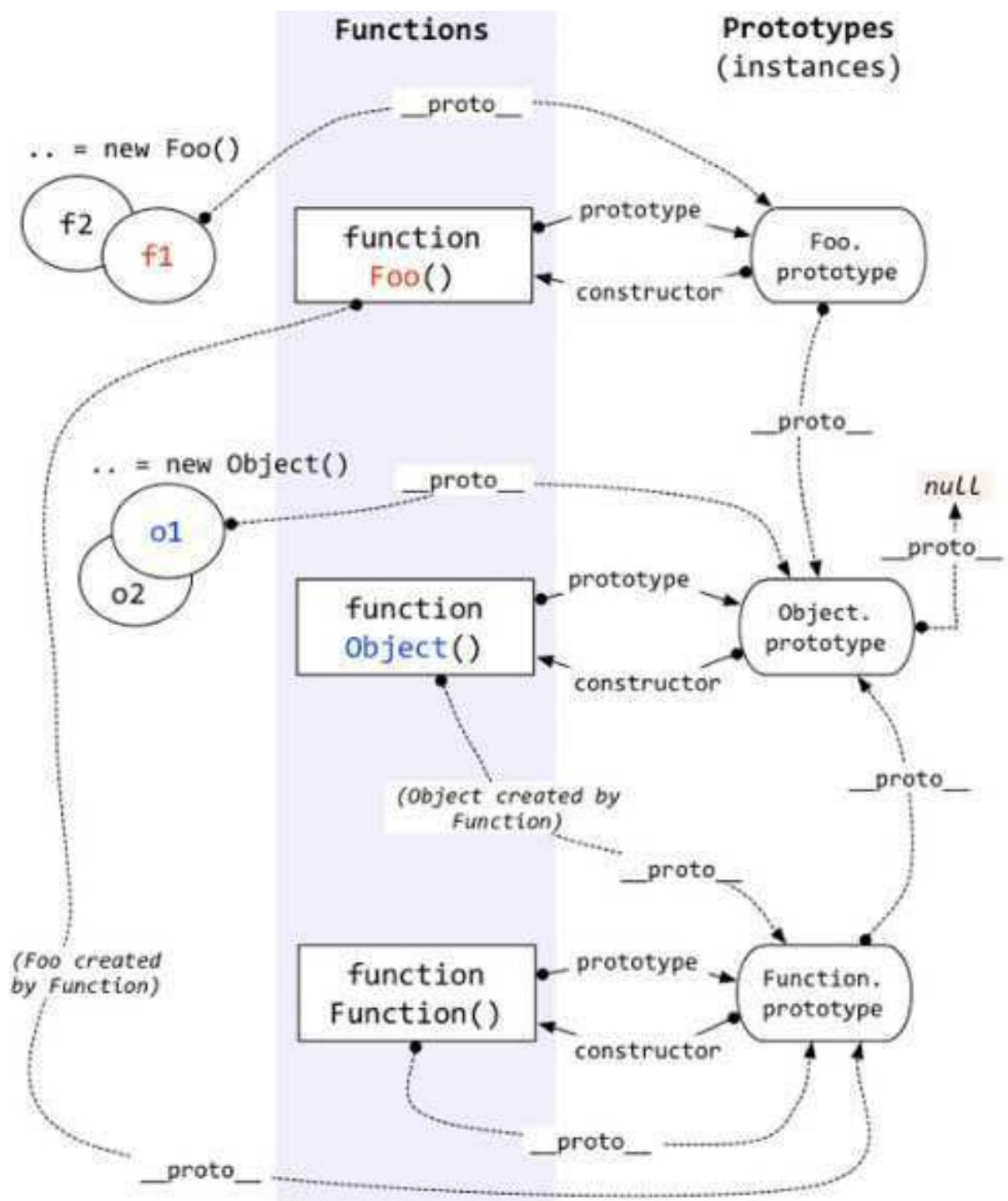
```
nameperson1agetoString( )
```

```
nameagetoString( )PersonObject
```

```
Person.prototype.__proto__ === Object.prototype // true
```

```
Person.__proto__ === Function.prototype // true
Function.prototype.__proto__ === Object.prototype // true
```

```
PersonFunctionFunctionObjectPersonObjectJavaScriptJSnullundefined
```



prototype/constructor/**proto**

- 1.
 2. nullObject.prototype. **proto** = nullObject.prototypeJS

```
function Super(){
  this.name = 'web' ;
  this.type = ['JS','HTML','CSS'];
}
Super.prototype.sayName=function(){
  return this.name;
}
function Sub(){}
Sub.prototype = new Super();
Sub.prototype.constructor = Sub;
var sub1 = new Sub();
sub1.sayName();
```

•

:

•

```
var sub1 = new Son();
var sub2 = new Son();
sub1.type.push('VUE');
console.log(sub1.type); // ['JS','HTML','CSS','VUE']
console.log(sub2.type); // ['JS','HTML','CSS','VUE']
```

•

:

call

```
function Super(){
  this.name = 'web' ;
  this.type = ['JS','HTML','CSS'];

  this.sayName = function() {
    return this.name;
  }
}
function Sub(){
  Super.call(this);
}
var sub1 = new Sub();
sub1.type.push('VUE');
console.log(sub1.type); // ['JS','HTML','CSS','VUE']
var sub2 = new Sub();
console.log(sub2.type); // ['JS','HTML','CSS']
```

:

•

-
- :
-
- call

```
function Super(name){  
    this.name = name;  
    this.type = ['JS', 'HTML', 'CSS'];  
}  
  
Super.prototype.sayName=function(){  
    return this.name;  
}  
  
function Sub(name){  
    Super.call(this, name);  
}  
  
Sub.prototype = new Super();  
sub1 = new Sub('');  
sub2 = new Sub('');  
sub1.type.push('VUE');  
sub2.type.push('PHP');  
console.log(sub1.type); // ['JS', 'HTML', 'CSS', 'VUE']  
console.log(sub2.type); // ['JS', 'HTML', 'CSS', 'PHP']  
sub1.sayName(); //  
sub2.sayName(); //
```

- :
- -
 - :
 - (call)

```
function create(obj) {
  function Sub(){};
  Sub.prototype = obj;
  Sub.prototype.constructor = Sub;
  return new Sub();
}

var parent = {
  name: '',
  type: ['JS', 'HTML', 'CSS'],
};

var sub1 = create(parent);
var sub2 = create(parent);

console.log(sub1.name); //
console.log(sub2.name); //
```

ES5Object.create()Object.defineProperties()

```
Object.create(null, {name: {value: 'Greg', enumerable: true}});

// 
var parent = {
  name: '',
  type: ['JS', 'HTML', 'CSS'],
};

var sub1 = Object.create(parent);
var sub2 = Object.create(parent);

console.log(sub1.name); //
console.log(sub2.name); //
```

•

:

```

function create(obj) {
  function Sub() {};
  Sub.prototype = obj;
  Sub.prototype.constructor = Sub;

  return new Sub();
}

function Parasitic(obj) {
  var clone = create(obj);
  clone.sayHi = function() {
    console.log('hi');
  };
  return clone;
}

var parent = {
  name: '',
  type: ['JS', 'HTML', 'CSS'],
};

var sub1 = Parasitic(parent);
var sub2 = Parasitic(parent);

console.log(sub1.name); //
console.log(sub2.name); //

```

ES5Object.createcreate:

```

function Parasitic(obj) {
  var clone = Object.create(obj);
  clone.sayHi = function() {
    console.log('hi');
  };
  return clone;
}

var parent = {
  name: '',
  type: ['JS', 'HTML', 'CSS'],
};

var son1 = Parasitic(parent);
var son2 = Parasitic(parent);

console.log(son1.name); //
console.log(son2.name); //
son1.sayHi();
son2.sayHi();

```

:

```

•
:
 

function Super(name) {
  this.name = name;
  this.type = ['JS', 'HTML', 'CSS'];
};

Super.prototype.sayName = function () {
  return this.name;
};

function Sub(name, age) {
  Super.call(this, name);
  this.age = age;
}

// 
function inheritPrototype(Sub, Super) {
  //
  var prototype = Object.create(Super.prototype);
  prototype.constructor = Sub;
  Sub.prototype = prototype;
}

inheritPrototype(Sub, Super);

// inheritPrototype
Sub.prototype.sayAge = function () {
  return this.age;
}

var instance = new Sub(' ', 40);
instance.sayName(); // 
instance.sayAge(); // 40

```

instanceofisPrototypeOf()

: ES6 Class extends

ES6 class **ES5** ES5 ES6

```

//  

class Point {  

    constructor(x, y) {  

        this.x = x;  

        this.y = y;  

    }  

    toString() {  

        return '(' + this.x + ', ' + this.y + ')';  

    }  

}  

var point = new Point(10, 10);

```

constructor this to String() new function this
new ES6 new new.target new new.new.target undefined
static

```

class Foo {  

    static classMethod() {  

        return 'hello';  

    }  

}  

Foo.classMethod() // 'hello'  

var foo = new Foo();  

foo.classMethod()  

// TypeError: foo.classMethod is not a function

```

extends super super super super

```

class ColorPoint extends Point {  

    constructor(x, y, color) {  

        super(x, y); // constructor(x, y)  

        this.color = color;  

    }  

    toString() {  

        return this.color + ' ' + super.toString(); // toString()  

    }  

}

```

24:

1. HTTP

HTTP DNS TCP HTTP

HTTP

Queued at 153.20 ms

Started at 160.96 ms



[Explanation](#)

https://blog.csdn.net/q4120416_ms/

HTTP 28.4KB

- Queueing:
- Stalled: TCP
- Proxy negotiation:
- DNS Lookup: DNSDNS
- Initial Connection / Connecting: TCPSSL
- SSL: SSL
- Request sent:
- Waiting(TFFB): TFFB
- Content Download:

$13.05 / 204.16 = 6.39\% \text{ HTTP}$

2. HTTP2

HTTP2 HTTP1.1

HTTP1.1 CRLF HTTP2 HTTP2

HTTP1.1 TCP TCP HTTP1.1

HTTP2 TCP ID TCP ID

HTTP2

```
// 1
:authority: unpkg.zhimg.com
:method: GET
:path: /za-js-sdk@2.16.0/dist/zap.js
:scheme: https
accept: /*
accept-encoding: gzip, deflate, br
accept-language: zh-CN,zh;q=0.9
cache-control: no-cache
pragma: no-cache
referer: https://www.zhihu.com/
sec-fetch-dest: script
sec-fetch-mode: no-cors
sec-fetch-site: cross-site
user-agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.122 Safari/537.36

// 2
:authority: zz.bdstatic.com
:method: GET
:path: /linksubmit/push.js
:scheme: https
accept: /*
accept-encoding: gzip, deflate, br
accept-language: zh-CN,zh;q=0.9
cache-control: no-cache
pragma: no-cache
referer: https://www.zhihu.com/
sec-fetch-dest: script
sec-fetch-mode: no-cors
sec-fetch-site: cross-site
user-agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/80.0.3987.122 Safari/537.36
```

HTTP/2 ""

```
Header1:foo  
Header2:bar  
Header3:bat
```

62 Header1 foo
63 Header2 bar
64 Header3 bar

```
62 63 64
```

HTTP2

TCP

HTTP2

HTML HTML URL

HTTP2

Name	Status	Protocol	Type	Initiator	Size	T
main.topstory-routes.96...	200	h2	script	<u>hot</u>	(disk ...	3.
hm.js?98beeee57fd2ef70...	200	http/1.1	script	<u>hot</u>	208 B	6.
push.js	200	h2	script	<u>hot</u>	(disk ...	6.
init.js	200	h2	script	<u>init.js</u>	(disk ...	1.
analytics.js	200	http/2+quic...	script	<u>js?id=UA-1...</u>	(disk ...	2.
zap.js	200	h2	script	<u>main.app.7f...</u>	(disk ...	3.
hm.gif?cc=1&ck=1&cl=...	200	http/1.1	gif	<u>hm.js?98be...</u>	299 B	1.
hm.gif?cc=1&ck=1&cl=...	200	http/1.1	gif	<u>hm.js?98be...</u>	299 B	1.
s.gif?r=https%3A%2F%...	200	http/1.1	text/...	<u>push.js:1</u>	116 B	1.
home up	200	h2	fetch	init.js:1	2.1 KB	4.

h2 HTTP2 http/1.1 HTTP1.1

- [HTTP HTTPS HTTP2](https://github.com/woai3c/Front-end-articles/blob/master/http-https-http2.md) (<https://github.com/woai3c/Front-end-articles/blob/master/http-https-http2.md>)

3.

: HTML JavaScript DOM

HTML HTML

- SEO
-

Vue SSR SSR

- 1.
2. <div id="app"></div> HTML
3. HTTP new Vue()

- 1.
2. HTML ajax HTML HTML
3. HTML new Vue()

HTML HTML

(time-to-content)

abcd 1 M

4 HTML 4M HTML HTML HTML KSSR HTML 400K

- [vue-ssr-demo](https://github.com/woai3c/vue-ssr-demo) (<https://github.com/woai3c/vue-ssr-demo>)
- [Vue.js](https://ssr.vuejs.org/zh/) (<https://ssr.vuejs.org/zh/>)

4. CDN

CDN Web CDN

CDN

CDN

1. IP DNS
2. DNS IP
3. DNS IP IP



CDN

1. IP DNS
2. DNS GSLB IP
3. DNS GSLB GSLB DNS IP SLB SLB IP DNS
4. DNS SLB IP SLB
5. SLB
6. SLB
- 7.



- [CDNCDN](https://www.zhihu.com/question/36514327/answer/193768864) (<https://www.zhihu.com/question/36514327/answer/193768864>)
- [CDN](https://juejin.cn/post/6844903873518239752) (<https://juejin.cn/post/6844903873518239752>)

5. CSS JavaScript

head CSS JS CSS JS JS HTML JS

CSS

HTML CSS"" CSS

JS script defer

6. iconfont

font-sizecolor

[fontmin-webpack \(<https://github.com/patrickhulce/fontmin-webpack>\)](https://github.com/patrickhulce/fontmin-webpack)

Save Bytes

Before

```
674f50d287a8c48dc19ba404d20fe713.eot      166 kB      [emitted]
912ec66d7572ff821749319396470bde.svg     444 kB      [emitted]  [big]
b06871f281fee6b241d60582ae9369b9.ttf      166 kB      [emitted]
af7ae505a9eed503f8b8e6982036873e.woff2    77.2 kB      [emitted]
fee66e712a8a08eef5805a46892932ad.woff     98 kB      [emitted]
```

After

```
674f50d287a8c48dc19ba404d20fe713.eot      2.82 kB      [emitted]
912ec66d7572ff821749319396470bde.svg     2.88 kB      [emitted]
b06871f281fee6b241d60582ae9369b9.ttf      2.64 kB      [emitted]
af7ae505a9eed503f8b8e6982036873e.woff2    1.01 kB      [emitted]
fee66e712a8a08eef5805a46892932ad.woff     2.72 kB      [emitted]
```

由吕金技术社区

- [fontmin-webpack \(<https://github.com/patrickhulce/fontmin-webpack>\)](https://github.com/patrickhulce/fontmin-webpack)
- [Iconfont- \(<https://www.iconfont.cn/>\)](https://www.iconfont.cn/)

7.

Expires max-age Expires max-age max-age Expires

URL URL [\(<https://cloud.tencent.com/developer/article/1584742>\)](https://cloud.tencent.com/developer/article/1584742)

- [webpack + express \(<https://github.com/woai3c/node-blog/blob/master/doc/node-blog7.md>\)](https://github.com/woai3c/node-blog/blob/master/doc/node-blog7.md)
- [webpack- \(<https://www webpackjs com/guides/caching/>\)](https://www webpackjs com/guides/caching/)
- [-- \(<https://www.zhihu.com/question/20790576/answer/32602154>\)](https://www.zhihu.com/question/20790576/answer/32602154)

8.

webpack node

webpack

- JavaScriptUglifyPlugin
- CSS MiniCssExtractPlugin
- HTMLHtmlWebpackPlugin

gzip HTTP Accept-Encoding gzip

gzip Vue app.js 1.4MB gzip 573KB 60%

webpack node gzip

```
npm install compression-webpack-plugin --save-dev
npm install compression
```

webpack

```
const CompressionPlugin = require('compression-webpack-plugin');

module.exports = {
  plugins: [new CompressionPlugin()],
}
```

node

```
const compression = require('compression')
// app.use(compression())
```

9.

(1).

```

```

JS

```
const img = document.querySelector('img')
img.src = img.dataset.src
```

- [web \(https://juejin.cn/post/6844903482164510734\)](https://juejin.cn/post/6844903482164510734)

(2).

picture

```
<picture>
  <source srcset="banner_w1000.jpg" media="(min-width: 801px)">
  <source srcset="banner_w800.jpg" media="(max-width: 800px)">
  
</picture>
```

@media

```
@media (min-width: 769px) {
  .bg {
    background-image: url(bg1080.jpg);
  }
}
@media (max-width: 768px) {
  .bg {
    background-image: url(bg768.jpg);
  }
}
```

(3).

1920 * 1080

src

(4).

JPG 100% 90% PS JPG 60%

webpack image-webpack-loader

webpack image-webpack-loader

```
npm install --save-dev image-webpack-loader
```

webpack

```
{
  test: /\.(\png|jpe?g|gif|svg)(\?.*)?$/,
  use:[
    {
      loader: 'url-loader',
      options: {
        limit: 10000, /* 1000 base64 */
        name: utils.assetsPath('img/[name].[hash:7].[ext]')
      }
    },
    /**
    {
      loader: 'image-webpack-loader',
      options: {
        bypassOnDebug: true,
      }
    }
  ]
}
```

- [imgwebpack \(<https://juejin.cn/post/6844903816081457159>\)](https://juejin.cn/post/6844903816081457159)

(5). CSS3

CSS CSS3

(6). webp

WebP Alpha JPEG PNG

- [WebP PNGJPEG \(<https://www.zhihu.com/question/27201061>\)](https://www.zhihu.com/question/27201061)

10. webpack ES6 ES5

import

output filename filename [contenthash] hash[contenthash]

```
{
  output: {
    filename: '[name].[contenthash].js',
    chunkFilename: '[name].[contenthash].js',
    path: path.resolve(__dirname, '../dist'),
  },
}
```

webpack4 splitChunk cacheGroups

```
optimization: {
  runtimeChunk: {
    name: 'manifest' // webpack runtime chunk
  },
  splitChunks: {
    cacheGroups: {
      vendor: {
        name: 'chunk-vendors',
        test: /[\\/]node_modules[\\/]/,
        priority: -10,
        chunks: 'initial'
      },
      common: {
        name: 'chunk-common',
        minChunks: 2,
        priority: -20,
        chunks: 'initial',
        reuseExistingChunk: true
      }
    },
  }
},
```

- **test**: modules modules chunk chunk chunk module RegExpStringFunction
- **priority**: module cacheGroups module
- **reuseExistingChunk**: chunktrue chunk chunk module
- **minChunks(1)**:
- **chunks**(async): initialasynccallchunksall(initial)(async)
- **name(chunks)**: ()

ES6 ES5

Babel

```
class Person {}
```

```
"use strict";

function _classCallCheck(instance, Constructor) {
  if (!(instance instanceof Constructor)) {
    throw new TypeError("Cannot call a class as a function");
  }
}

var Person = function Person() {
  _classCallCheck(this, Person);
};
```

```

_classCallCheck helper      helper
@babel/runtime    @babel/plugin-transform-runtime helper    @babel/runtime

"use strict";

var _classCallCheck2 = require("@babel/runtime/helpers/classCallCheck");
var _classCallCheck3 = _interopRequireDefault(_classCallCheck2);

function _interopRequireDefault(obj) {
  return obj && obj.__esModule ? obj : { default: obj };
}

var Person = function Person() {
  (0, _classCallCheck3.default)(this, Person);
};

```

helper classCallCheck @babel/runtime helpers/classCallCheck

```
npm install --save-dev @babel/plugin-transform-runtime @babel/runtime
```

.babelrc

```
{
  "plugins": [
    "@babel/plugin-transform-runtime"
  ]
}
```

- [Babel 7.1 transform-runtime polyfill env](https://www.jianshu.com/p/d078b5f3036a) (<https://www.jianshu.com/p/d078b5f3036a>)
- [webpack](https://webpack.docschina.org/guides/lazy-loading/) (<https://webpack.docschina.org/guides/lazy-loading/>)
- [Vue](https://router.vuejs.org/zh/guide/advanced/lazy-loading.html#%E8%B7%AF%E7%94%B1%E6%87%92%E5%8A%A0%E8%BD%BD) (<https://router.vuejs.org/zh/guide/advanced/lazy-loading.html#%E8%B7%AF%E7%94%B1%E6%87%92%E5%8A%A0%E8%BD%BD>)
- [webpack](https://webpack.docschina.org/guides/caching/) (<https://webpack.docschina.org/guides/caching/>)
- [webpack4splitChunk](https://juejin.cn/post/6844903614759043079) (<https://juejin.cn/post/6844903614759043079>)

11.

1. HTMLDOM
2. CSSCSSOM
3. DOMCSSOM
- 4.
- 5.



DOM

JavaScript GUI

- DOM
-
-
-
-

- **JavaScript class**
- **DOM DOM display:none documentFragment**

12.

```

<ul>
  <li> </li>
  <li> </li>
  <li> </li>
</ul>
  
```

```

// good
document.querySelector('ul').onclick = (event) => {
  const target = event.target;
  if (target.nodeName === 'LI') {
    console.log(target.innerHTML);
  }
}

// bad
document.querySelectorAll('li').forEach((e) => {
  e.onclick = function() {
    console.log(this.innerHTML);
  }
})

```

13.

- :
- :

```

function sum(arry) {
  let i, sum = 0;
  let len = arry.length;

  for (i = 0; i < len; i++) {
    sum += arry[i];
  }

  return sum;
}

```

sumsum

```
//  
function sum1(arry, rows, cols) {  
    let i, j, sum = 0;  
  
    for (i = 0; i < rows; i++) {  
        for (j = 0; j < cols; j++) {  
            sum += arry[i][j];  
        }  
    }  
  
    return sum;  
}
```

```
//  
function sum2(arry, rows, cols) {  
    let i, j, sum = 0;  
  
    for (j = 0; j < cols; j++) {  
        for (i = 0; i < rows; i++) {  
            sum += arry[i][j];  
        }  
    }  
  
    return sum;  
}
```

1 kk

1 rows

- cpu: i7-10510U
- : 83.0.4103.61

9000900010

```

function sum2(arry, rows, cols) {
  let i, j, sum = 0;

  for (j = 0; j < cols; j++) {
    for (i = 0; i < rows; i++) {
      sum += arry[i][j];
    }
  }

  return sum;
}

// 
function sum1(arry, rows, cols) {
  let i, j, sum = 0;

  for (i = 0; i < rows; i++) {
    for (j = 0; j < cols; j++) {
      sum += arry[i][j];
    }
  }

  return sum;
}

var arry = new Array(9000).fill(new Array(9000).fill(1));

let ts = 0;
for (let i = 0; i < 10; i++) {
  const startTime = new Date().valueOf();
  sum1(arry, 9000, 9000);
  ts += (new Date().valueOf() - startTime);
}

console.log('sum1: ' + (ts / 10)); // 81.5ms

let ts2 = 0;
for (let i = 0; i < 10; i++) {
  const startTime = new Date().valueOf();
  sum2(arry, 9000, 9000);
  ts2 += (new Date().valueOf() - startTime);
}

console.log('sum2: ' + (ts2 / 10)); // 167.3ms

```

1(sum1) 9000(sum2)

81.5ms 167.3ms

1 9000

-
- k

- [\(https://book.douban.com/subject/26912767/\)](https://book.douban.com/subject/26912767/)

14. if-else switch

switch if-else

```
if (color == 'blue') {  
  
} else if (color == 'yellow') {  
  
} else if (color == 'white') {  
  
} else if (color == 'black') {  
  
} else if (color == 'green') {  
  
} else if (color == 'orange') {  
  
} else if (color == 'pink') {  
  
}  
  
switch (color) {  
    case 'blue':  
  
        break;  
    case 'yellow':  
  
        break;  
    case 'white':  
  
        break;  
    case 'black':  
  
        break;  
    case 'green':  
  
        break;  
    case 'orange':  
  
        break;  
    case 'pink':  
  
        break;  
}
```

```
switch color pink if-else 7 switch switch
```

```
switch if-else switch switch
```

15.

```
switch if-else
```

```
switch (index) {  
    case '0':  
        return result0;  
    case '1':  
        return result1;  
    case '2':  
        return result2;  
    case '3':  
        return result3;  
    case '4':  
        return result4;  
    case '5':  
        return result5;  
    case '6':  
        return result6;  
    case '7':  
        return result7;  
    case '8':  
        return result8;  
    case '9':  
        return result9;  
    case '10':  
        return result10;  
    case '11':  
        return result11;  
}
```

```
switch
```

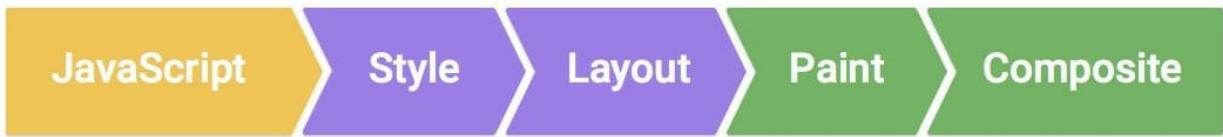
```
const results =  
[result0,result1,result2,result3,result4,result5,result6,result7,result8,result  
9,result10,result11];  
  
return results[index];
```

```
const map = {  
    red: result0,  
    green: result1,  
};  
  
return map[color];
```

16.

60fps

$$60 / 16 \ (1 / 60 = 16.66) \ 10$$



JavaScript DOM 50 ms 1s / 50ms = 20fps

JavaScript

```
for (let i = 0, len = arry.length; i < len; i++) {  
    process(arry[i]);  
}
```

process()

```
const todo = arry.concat();  
setTimeout(function(){  
    process(todo.shift());  
    if (todo.length) {  
        setTimeout(arguments.callee, 25);  
    } else {  
        callback(arry);  
    }  
}, 25);
```

JavaScript 6 [Web](https://book.douban.com/subject/30170670/) (<https://book.douban.com/subject/30170670/>) 3

17. requestAnimationFrame

16 60 / 16.66 JavaScript JavaScript

requestAnimationFrame

```
/**  
 * If run as a requestAnimationFrame callback, this  
 * will be run at the start of the frame.  
 */  
function updateScreen(time) {  
    // Make visual updates here.  
}  
  
requestAnimationFrame(updateScreen);
```

setTimeout setInterval

setTimeout fires



18. Web Workers

Web Worker worker JavaScript ,

Web Worker UI

worker URI worker main.js

```
var myWorker = new Worker('worker.js');
// postMessage() onmessageevent
first.onchange = function() {
  myWorker.postMessage([first.value,second.value]);
  console.log('Message posted to worker');
}

second.onchange = function() {
  myWorker.postMessage([first.value,second.value]);
  console.log('Message posted to worker');
}
```

worker worker.js

```
onmessage = function(e) {
  console.log('Message received from main script');
  var workerResult = 'Result: ' + (e.data[0] * e.data[1]);
  console.log('Posting message back to main script');
  postMessage(workerResult);
}
```

onmessagedata2postMessage()

onmessageworker

```
myWorker.onmessage = function(e) {
  result.textContent = e.data;
  console.log('Message received from worker');
}
```

dataresulttextContent

workerDOMwindowwindowWebSocketsIndexedDBFireFox OSData Store API

- [Web Workers \(\[https://developer.mozilla.org/zh-CN/docs/Web/API/Web_Workers_API/Using_web_workers\]\(https://developer.mozilla.org/zh-CN/docs/Web/API/Web_Workers_API/Using_web_workers\)\)](https://developer.mozilla.org/zh-CN/docs/Web/API/Web_Workers_API/Using_web_workers)

19.

JavaScript IEEE-754 64 32

0 1

```
if (value % 2) {  
    //  
} else {  
    //  
}  
//  
if (value & 1) {  
    //  
} else {  
    //  
}
```

```
~~10.12 // 10  
~~10 // 10  
~~'1.5' // 1  
~~undefined // 0  
~~null // 0
```

```
const a = 1  
const b = 2  
const c = 4  
const options = a | b | c
```

a/b/c options

```
// b  
if (b & options) {  
    // ...  
}
```

20.

21. CSS

(1).

```
#block .text p {  
    color: red;  
}
```

1. P
2. 1 text
3. 2 id block

(2). CSS

```
> ID > >
```

- 1.
2. ID
3. *

CSS

22. flexbox

CSS [flexbox \(https://developer.mozilla.org/zh-CN/docs/Web/CSS/CSS_Flexible_Box_Layout/Basic_Concepts_of_Flexbox\)](https://developer.mozilla.org/zh-CN/docs/Web/CSS/CSS_Flexible_Box_Layout/Basic_Concepts_of_Flexbox)

1300



flexbox



3.5 14

flexbox

- Chrome 29+
- Firefox 28+
- Internet Explorer 11
- Opera 17+
- Safari 6.1+ (prefixed with -webkit-)
- Android 4.4+
- iOS 7.1+ (prefixed with -webkit-)

Flexbox

23. transform opacity

CSS transforms opacity composite



24.

- 1.
- 2.

23 10 13 23

-
-

</head>

```
<script>
  new Date() - performance.timing.navigationStart
</script>
```

```
window.onload = new Date() - performance.timing.navigationStart
```

chrome

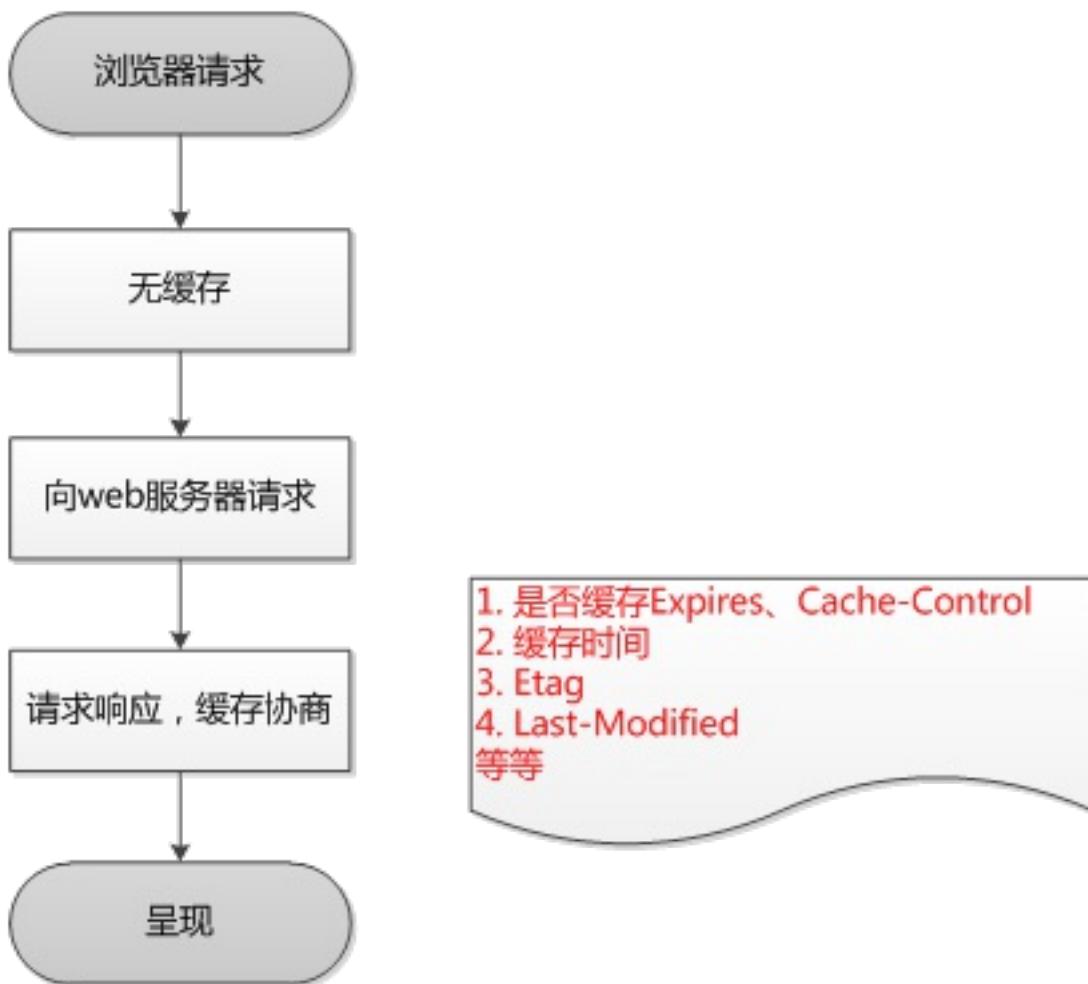
F12 performance stop FPS performance

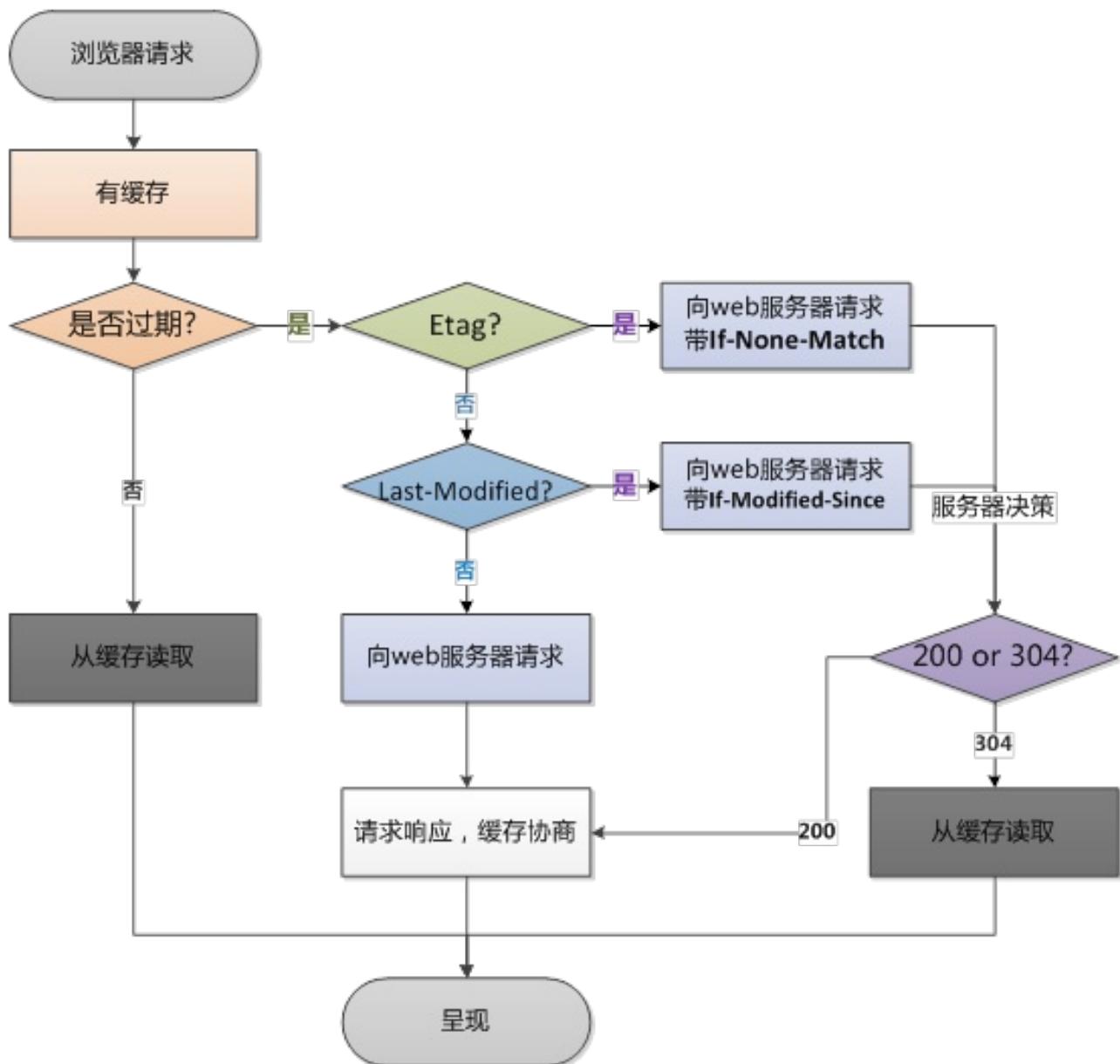
- [performance.timing.navigationStart](https://developer.mozilla.org/zh-CN/docs/Web/API/PerformanceTiming/navigationStart) (<https://developer.mozilla.org/zh-CN/docs/Web/API/PerformanceTiming/navigationStart>)

-
- Web
- JavaScript
- [Web](https://book.douban.com/subject/30170670/) (<https://book.douban.com/subject/30170670/>)

response header

- 1.
- 2.
- 3.





,,(),,

- header cache-control expires header

```

Accept: xxx
Accept-Encoding: gzip,deflate
Accept-Language: zh-cn
Connection: keep-alive
Host: xxx
Referer: xxx
User-Agent: xxx

```

```
Accept-Ranges: bytes
Cache-Control: max-age= xxxx
Content-Encoding: gzip
Content-length: 3333
Content-Type: application/javascript
Date: xxx
Expires: xxx
Last-Modified: xxx
Server:
```

- header Last-Modified/If-Modified-SinceEtag/If-None-Matchheader
headerheader

200from cache

304not modified

header

header

1. **expires**: http1.0GMT **Mon, 10 Jun 2015 21:31:12 GMT**expires
2. **cache-controlmax-age=number** : http1.1headermax-ageCache-Control
cache-control
 - **no-cache**: ETag
 - **no-store**:
 - **public**: CDN
 - **private**: CDN

cache-controlexpirescache-controlexpires

header

header Last-ModifiedEtag If-Modified-SinceIf-None-Match Last-Modified
Etag

1. Last-Modified/If-Modified-Since

GMT

- responseheader Last-Modifiedheaderheader
- requestheader If-Modified-SinceheaderheaderLast-Modified
- If-Modified-Since 304 Not Modified 304 Not Modifiedresponse
header Last-Modifiedheader Last-Modified304response header
- 304
- Last-ModifiedHeader If-Modified-SinceLast-Modified

2. Etag/If-None-Match

Last-Modified/If-Modified-Since Last-Modified 304 Not Modified ETag response
header ETag ETag

Last-Modified Etag

Last-Modified Etag HTTP 1.1 Etag Last-Modified

- () GET
- (1sN) If-Modified-Since (UNIX MTIME)
-

Etag Etag

: **Last-Modified Etag Etag Last-Modified 304**

Expires/Cache-Control Last-Modified/ETag

F5

Ctrl + F5

```
<link rel="stylesheet" href="a.css?a=1.0" />
...
<div class="app">app</div>
```

query query

HTTP

HTTP 3 HTTP 19893

HTTP 0.9 Get
 HTML

HTTP 1.0 POST DELETE PUT HEADER

HTTP 1.1 Connection , keep-alive

 cache-control etag

 Header

HTTP 2.0

 Header ,
 2005

1HTTP 0.9

HTTP 0.9 HTTP GET HTTP 0.9 HTML

HTTP 0.9 HTTP 0.9 HTTP 0.9 Web TCP Web

2HTTP 1.0

HTTP HTTP HTTP 0.9

-
-
-
- POST Web GET HEAD POST
- TCP2(head of line blocking)(head of line blocking)

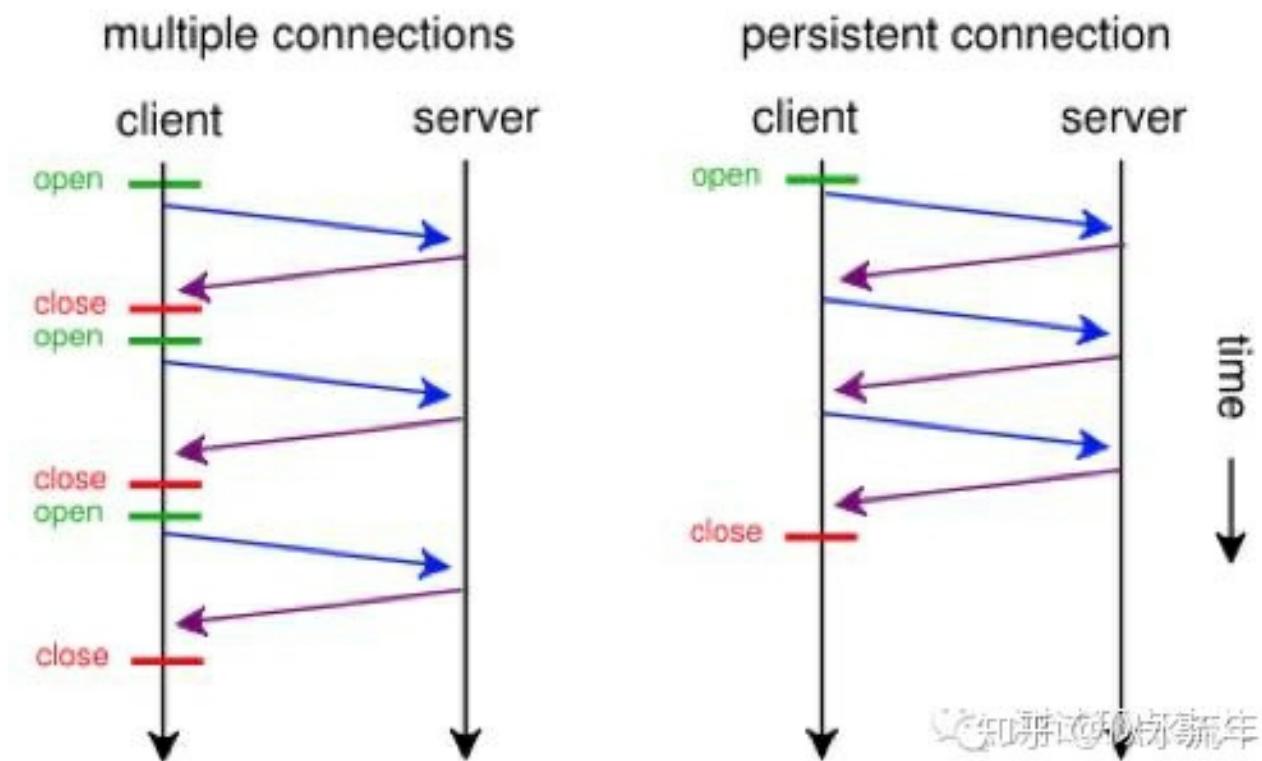
3HTTP 1.1

HTTP HTTP 1.1 HTTP 1.1 HTTP HTTP 1.1

HTTP 1.1 keepalive chunked

Persistent Connection keepalive

HTTP TCP HTTP HTTP 1.0 Connection: Keep-Alive HTTP 1.1 HTTP Connection:
close FIFO Request



chunked

0()

HTTP1.1 rangeContent-Range 206 Partial Content

Header

Accept-Ranges:

Etag: tag

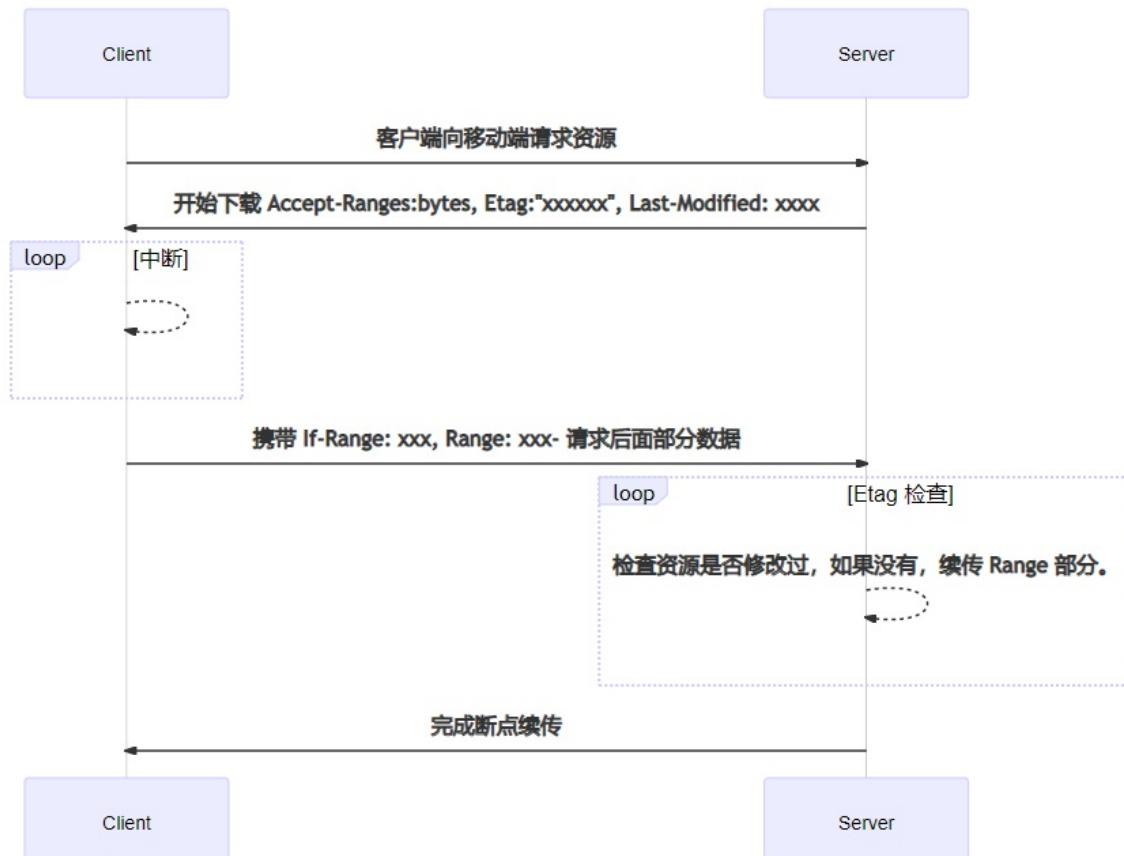
Last-Modified:

Content-Range:

If-Range: Etag

Range:

If-Modified-Since: Last-Modified 304



206

Pipelining

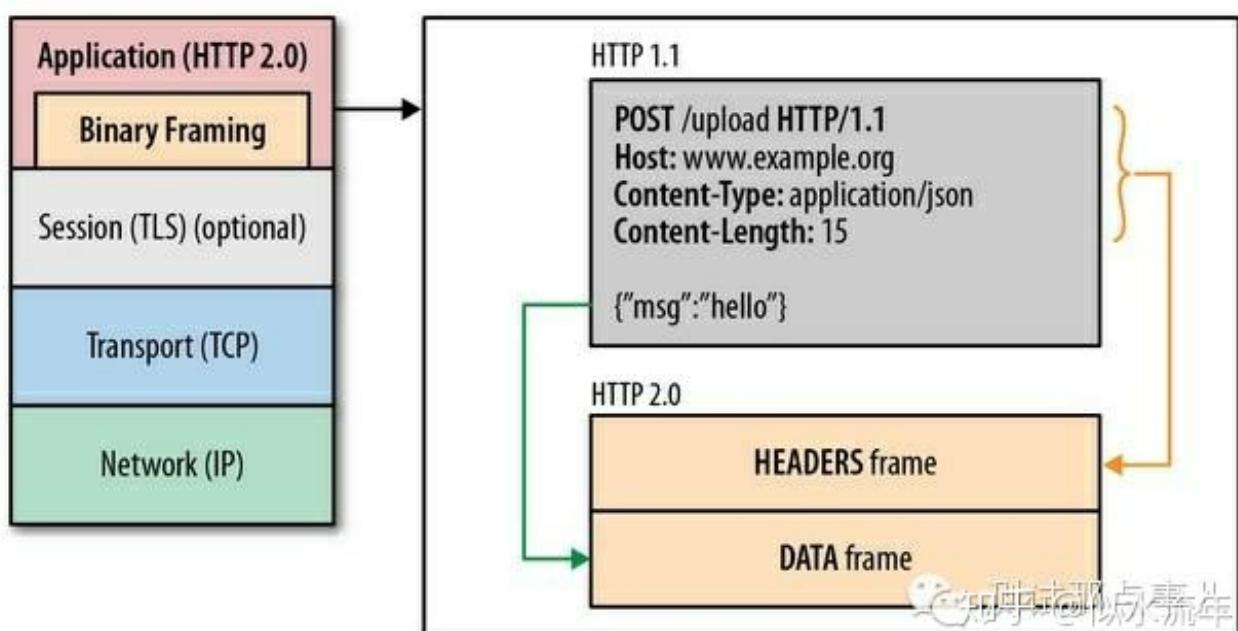
HTTP 1.1

- Host HTTP 1.0 IP URL hostname Multi-homed Web Servers IP Host
- Request method HTTP 1.1 OPTIONS, PUT, DELETE, TRACE, CONNECT
- HTTP/1.1.0 cache-control Cache-Control

4 HTTP 2.0

HTTP 2.0 HTTP

HTTP 2.0 HTTP HTTP URI 2.0 HTTP 2.0 HTTP 1.x Headers
request body Data



HTTP 2.0

HTTP2.0-

HTTP HTTP

-
- 1 IP2

[HTTP2 \(<https://imququ.com/post/header-compression-in-http2.html>\)](https://imququ.com/post/header-compression-in-http2.html)

HTTP2

-
- Header
- Huffman Coding



HTTP1.1HTTPTCPHTTP2RST_STREAM

Server PushXZZ

TCPHTTP1.1TCP

TCP

head-of-line blockingTCP

TCP3Web3

TCP

HTTP

HTTPTCPHTTPHTTPpipelining

HTTP

HTTP1.1 keep-alive



HTTP

HTTP“-”

-
-
- HTTP1.0 HTTP1.0 Keep-Alive HTTP1.1 persistent HTTP
-
- HTTP1.1 pipelining TCP HTTP

HTTP

1. FIFO HTTP
- 2.
3. GET HEAD

HTTP

HTTP

HTTP

HTTP1.1/HTTP2 HTTP2//

HTTP2 HTTP2 TCP TCP

TCP

TCP TCP TCP TCP

google QUIC TCP TCP UDP UDP

SCTP TCP UDP SCTP

TCP HTTP

1. "" TCP HTTP TCP
2. TCP HTTP

quic TCP UDP SCTP

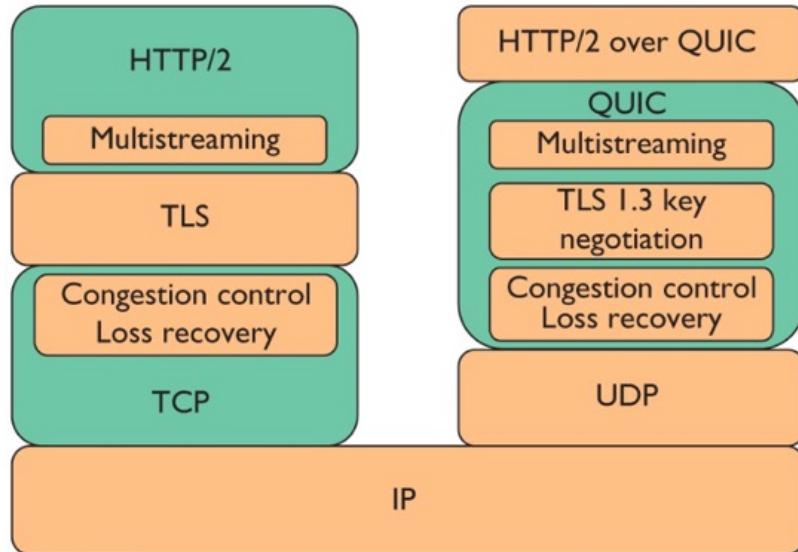
QUIC

QUIC Quick UDP Internet Connection UDP TCP TLS HTTP/2

QUIC UDP TCP

UDP TCP TCP TCP TCP CPU UDP TCP TCP

Web TCP TCP TCP TCP TCP UDP

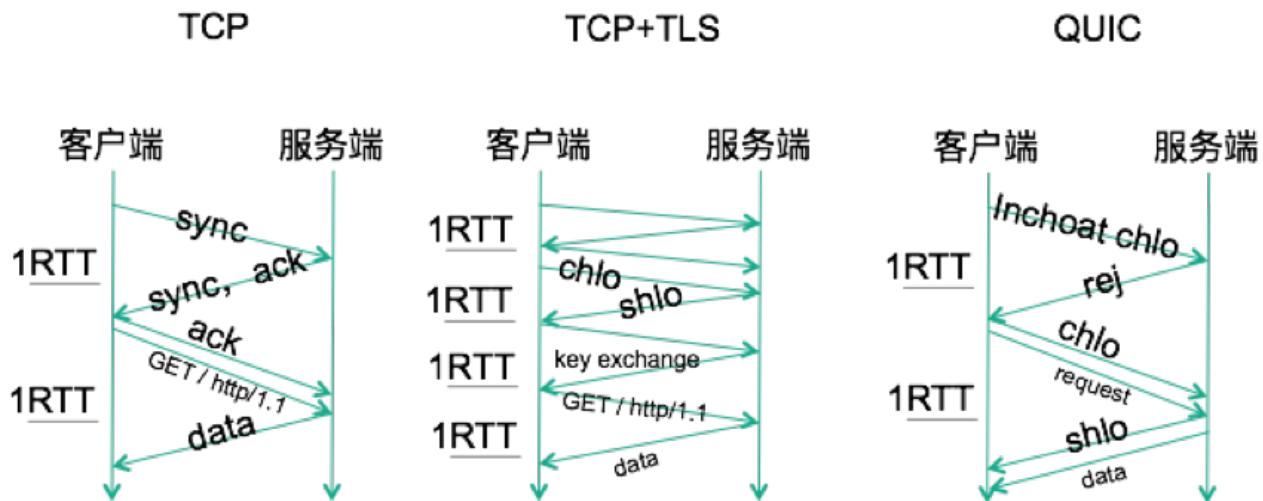


QUICClientServerUDPQUICTCP

QUIC

1.

TCP+TLS 1~2RTT + httpTCP HTTPS 2 ~3RTT QUIC UDP 1RTT 0RTT



2.

QUIC TCP TLS HTTPS/2 TLS

3.

QUIC TCP

4.

QUIC TCP Packet Number RTT

5.

HTTP2TCPHTTPTCPHTTP2TCPHTTP2QUICconnectionstreamstreamstream
stream



功能优势
快速建立连接 0-RTT的握手延迟，建立连接更加迅速
改进的多路复用 彻底解决TCP协议中队头阻塞的问题
更先进的拥塞控制算法 可插拔，RTT计算更加准确，拥塞控制更精准
超强的弱网性能 基于UDP协议的QUIC，在弱网环境下仍能保持业务可用

QUIC UDP TCP

CDN CDN QUIC CDN CDN QUIC QUIC IP

QUIC

- Chrome QUIC Q43 CDN QUIC Q39 CDN QUIC
- App App QUIC IIS quic-client cronet

QUIC

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

WebRTC

WebRTC Web Real-Time Communication API

WebRTC WebRTC

1. WebRTC WebRTC Google WebRTC HTML JavaScript API Web/
2. WebRTC codec Google
3. WebRTC STUN ICE TURN RTP-over-TCP NAT

- 1.

2. WebRTCP2P
3. WebRTC
- 4.
5. NativeWebRTCWebNativeAPI

EventSource

EventSource

EventSource EventSourceHTTPtext/event-stream ,

WebSockets,. IndexedDBWebEventSource

- EventSourceServer-sent eventsSSEhttp text/event-stream
EventSource.close()
- EvenSourceXHR-streamingAPI
- EventSource
- EventSource,event IDs,

EventSource:

```
// EventSource
var source = new EventSource('http://localhost:3000');

source.onopen = function (event) { //
  console.log('' );
}

// (event)
source.onmessage = function (event) { //
  console.log('' , event.data);
}

source.onerror = function (error) { //
  console.log('' );
}

//
source.addEventListener("ping", function (event) {
  console.log("ping" , event.data)
})
```

```

const http = require('http');

http.createServer((req, res) => {
  res.writeHead(200, {
    'Content-Type' : 'text/event-stream',
    'Access-Control-Allow-Origin': '*'
  });

  let i = 0;
  const timer = setInterval(()=>{
    const date = {date:new Date()}
    var content ='event: ping\n'+ "data:" +JSON.stringify(date)+"\n\n";
    res.write(content);
  },1000)

  res.connection.on("close", function(){
    res.end();
    clearInterval(timer);
    console.log("Client closed connection. Aborting.");
  });
});

}).listen(3000);
console.log('server is run http://localhost:3000');

```

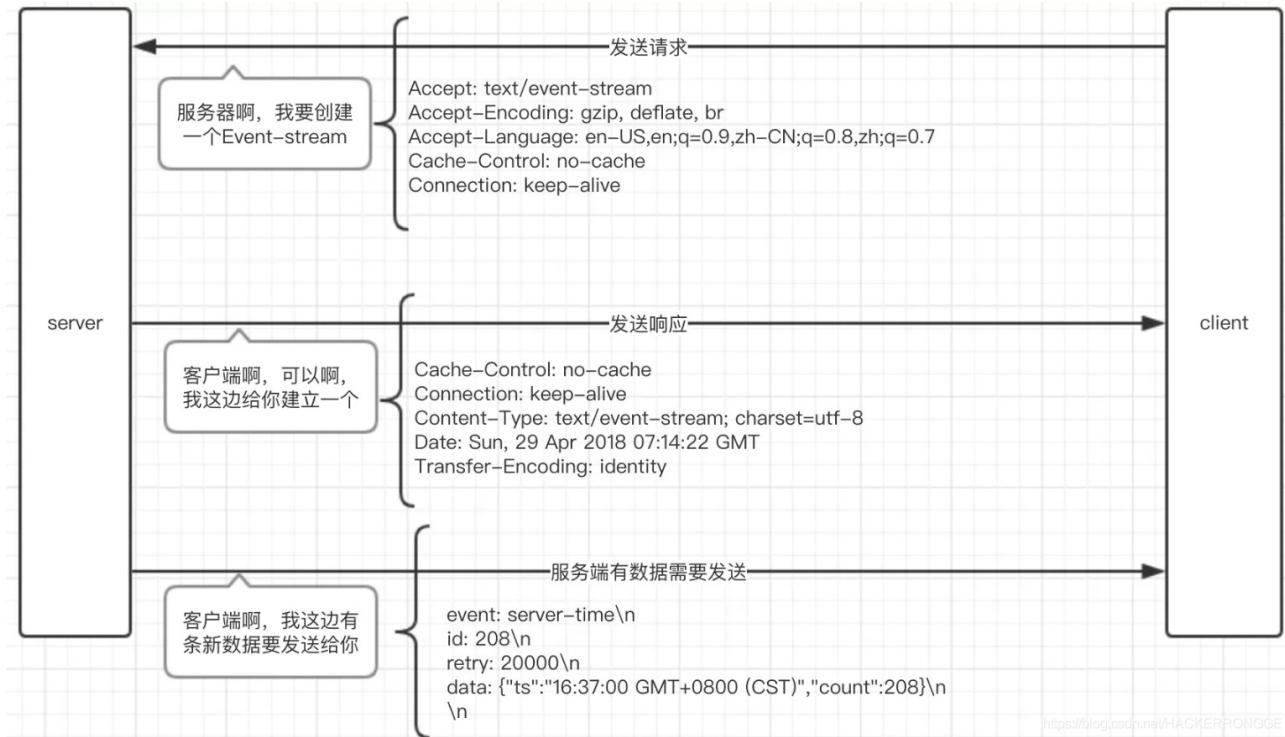
EventSource

- **event**: EventSource.addEventListener()EventSourceeventonmessage
- **data**: data
- **id**: IDEventSource“ID”
- **retry**:

EventSource

- **EventSource.onerror**: EventHandler error
- **EventSource.onmessage**: EventHandler message
- **EventSource.onopen**: EventHandler open
- **EventSource.readyState()**: unsigned short CONNECTING (0), OPEN (1), CLOSED (2)
- **EventSource.url()**: DOMStringURL

EventSource



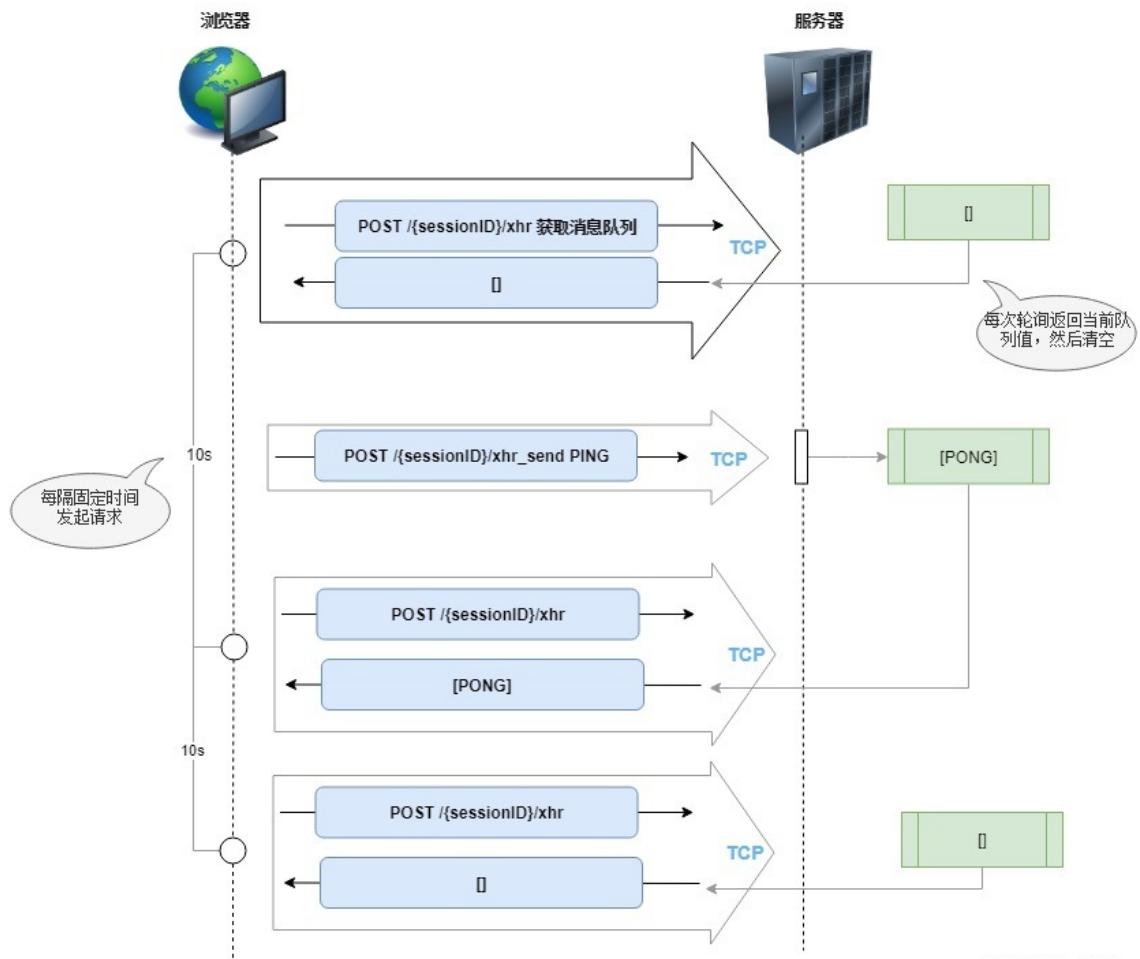
1. ->
2. UTF-8base64

(Polling)

""

```
function Polling() {
  fetch(url).then(data => {
    // something
  }).catch(err => {
    console.error(err);
  });
}

//5s
setInterval(polling, 5000);
```



知乎 @ivan
<https://blog.csdn.net/HACKERRONGGE>

- http
- : HTTPCPU
- :

(Long Polling)

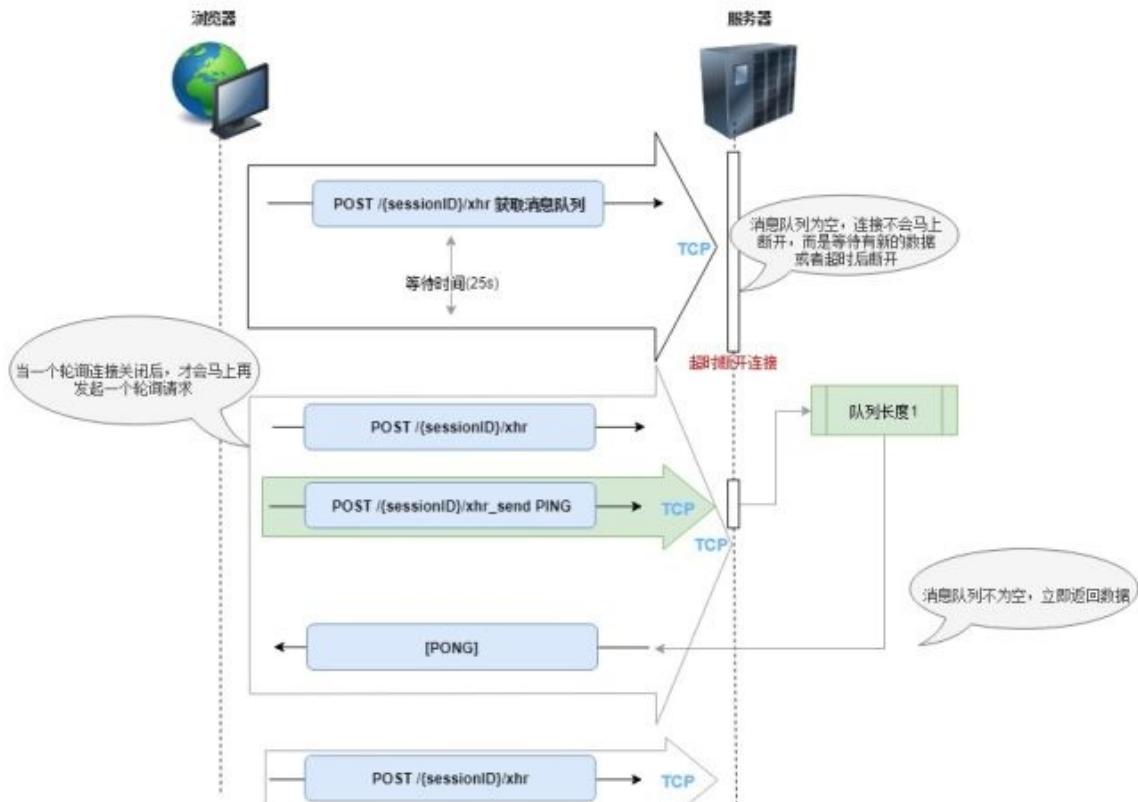
sockjs

:

```

function LongPolling() {
  fetch(url).then(data => {
    LongPolling();
  }).catch(err => {
    LongPolling();
    console.log(err);
  });
}
LongPolling();

```



知乎 @jyan

<https://blog.csdn.net/HACKERRONGGE>

PollingPolling

- http

•

EventSource VS

(Polling) (Long-Polling) EventSource

http	http	http
client()	client()	clientserver()

- : > > EventSource
- : EvenSource > >
- : EventSource >

WebSocket

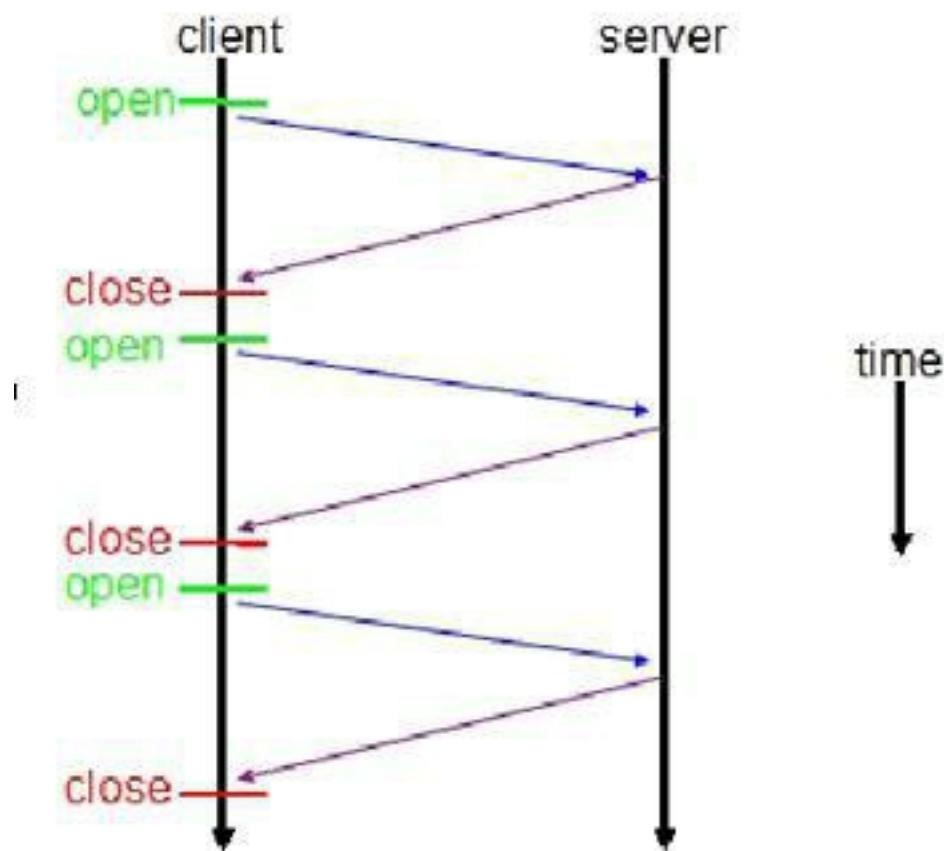
WebSocket

WebSocket

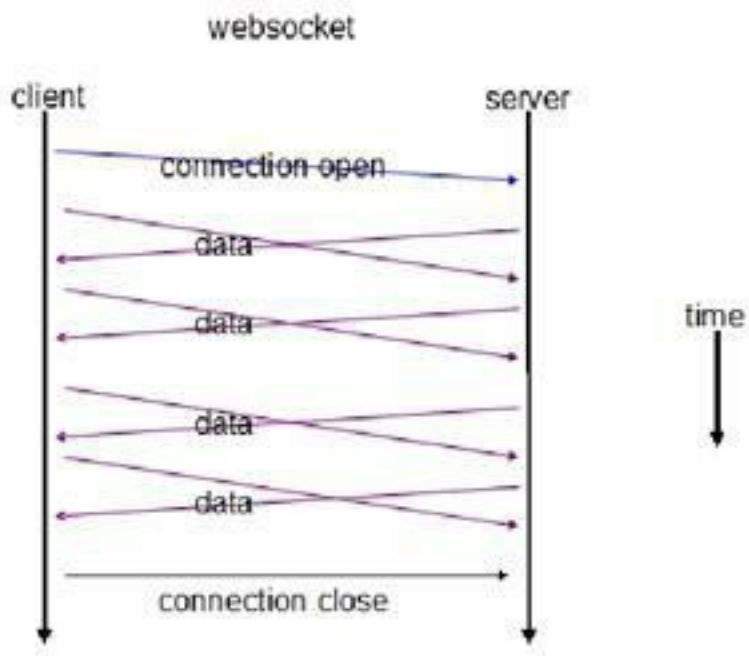
WebSocketHTML5HTTPTCPHTTP

- WebSocketWebSocketSocket
- WebSocketTCP

HTTP



WebSocket



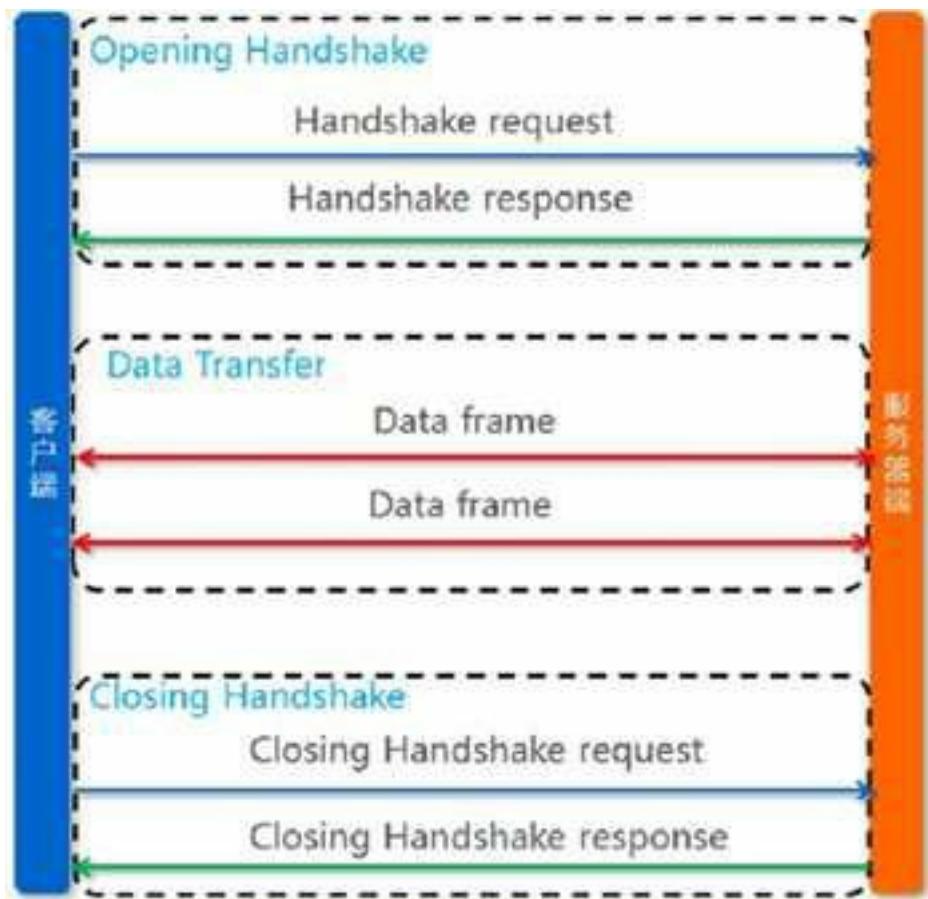
HTTP-WebSocketTCPWebSocketServer

HTTPWebSocket

- HTTPHTTP
- HTTPHTTP headerWebsocketrequestTCP HTTP headerHTTPHTML5
multiplexingURLWebSocketHTTP

WebSocket

httpWebSocketTCPhttpWebSocketWebSocketshttp



WebSocket

▼ General

Request URL: ws://127.0.0.1:8080//ws

Request Method: GET

Status Code: 101 Switching Protocols

▼ Response Headers view source

Connection: Upgrade

Sec-WebSocket-Accept: AYtwtwampsFjE0lu3kFQrmOCzLQ=

Upgrade: websocket

▼ Request Headers view source

Accept-Encoding: gzip, deflate, sdch, br

Accept-Language: zh-CN,zh;q=0.8

Cache-Control: no-cache

Connection: Upgrade

Host: 127.0.0.1:8080

Origin: http://127.0.0.1:8080

Pragma: no-cache

Sec-WebSocket-Extensions: permessage-deflate; client_max_window_bits

Sec-WebSocket-Key: mg8LvEqrB2vLpyCNnCJV3Q==

Sec-WebSocket-Version: 13

Upgrade: websocket

User-Agent: Mozilla/5.0 (Windows NT 10.0; WOW64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/55.0.2883.87 Safari/537.36

```
Connection:Upgrade  
Upgrade:websocket  
Sec-WebSocket-Extensions:permessage-deflate; client_max_window_bits  
Sec-WebSocket-Key:mg8LvEqrB2vLpyCNnCJV3Q==  
Sec-WebSocket-Version:13
```

1. ConnectionUpgradeWebSocket
2. Sec-WebSocket-Extensions
3. Sec-WebSocket-KeyBase64
4. Sec-WebSocket-Version

```
Connection:Upgrade  
Upgrade:websocket  
Sec-WebSocket-Accept:AYtwtwampsFjE0lu3kFQrm0CzLQ=
```

1. ConnectionUpgrade
2. Sec-WebSocket-Accept

```
Status Code:101 Switching Protocols
```

http101WebSockethttpTCPhttp

WebSocket

- WebSocket
-

•

WebSocket

-
-
- /
-
- /
-

WebSocket

- websocket/

- 7proxy_read_timeout60s
- 50sWebsocket

Sass

Sass (Syntactically Awesome Stylesheets) Hampton Catlin Natalie Weizenbaum

Sass CSS

Sass CSS CSS

Sass CSS

Sass CSS3

Sass CSS

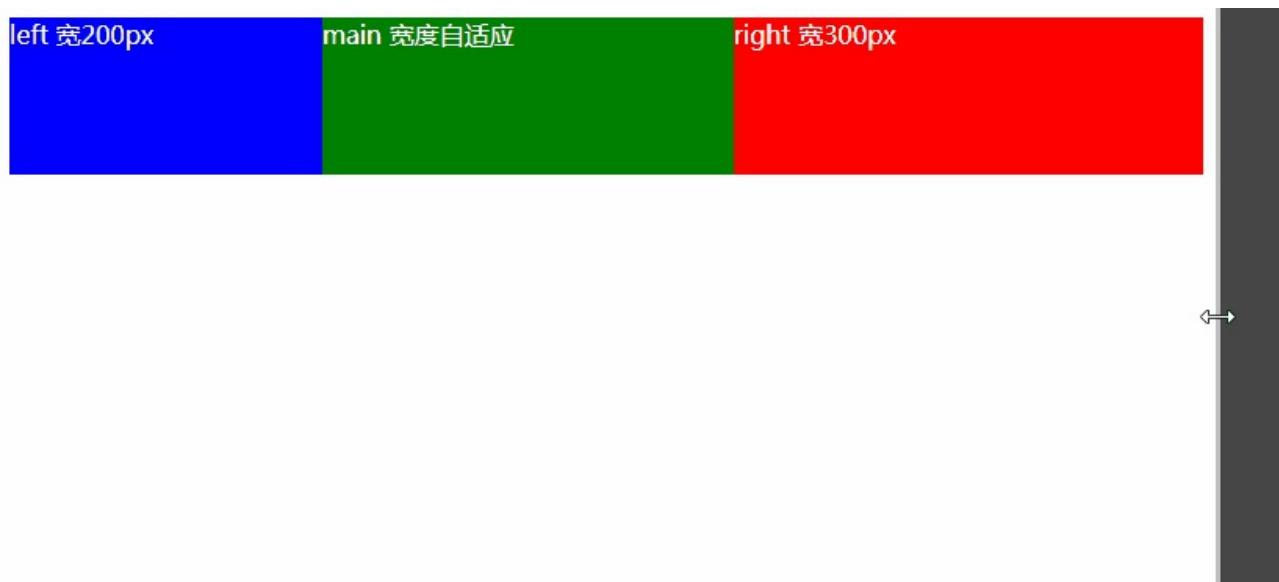
Sass .scss

Sass Sass Sass CSS

5(flexgrid)

csshtmlmainleft200pxright300pxmain

```
<div class="container">
  <div class="main">main      </div>
  <div class="left">left 200px </div>
  <div class="right">right 300px </div>
</div>
```



5

1.

- containerpaddingleftrightleft\rightmain
-
- leftrightcontainer

```

<!DOCTYPE html>
<head>
  <meta charset="UTF-8">
  <title>      </title>
</head>
<style>
  .container {
    color: #fff;
    position: relative;
    padding: 0 300px 0 200px;
  }

  .left,
  .main,
  .right {
    top: 0;
    min-height: 100px;
  }

  .left {
    position: absolute;
    width: 200px;
    background: blue;
    left: 0;
  }

  .right {
    position: absolute;
    width: 300px;
    background: red;
    right: 0;
  }

  .main {
    background: green;
  }
</style>
<body>
  <div class="container">
    <div class="main">main      </div>
    <div class="left">left 200px </div>
    <div class="right">right 300px </div>
  </div>
</body>
</html>

```

2.

- containerpaddingleftrightleft\right\main left\rightleftrightmargin-leftmain
100%
-
- left/right/main3

```
<!DOCTYPE html>
<head>
  <meta charset="UTF-8">
  <title>    </title>
</head>
<style>
  .container {
    color: #fff;
    overflow: hidden;
    padding: 0 300px 0 200px;
  }

  .left,
  .main,
  .right {
    float: left;
    position: relative;
    min-height: 100px;
  }

  .left {
    width: 200px;
    background: blue;
    margin-left: -100%;
    left: -200px;
  }

  .right {
    width: 300px;
    background: red;
    margin-left: -300px;
    right: -300px;
  }

  .main {
    width: 100%;
    background: green;
  }
</style>
<body>
  <div class="container">
    <div class="main">main      </div>
    <div class="left">left 200px </div>
    <div class="right">right 300px </div>
  </div>
</body>
</html>
```

3.

- left\right\main left\rightmargin-leftmain100%maincontentcontentleft\right
-
- left/right/main3

```
<!DOCTYPE html>
<head>
  <meta charset="UTF-8">
  <title>      </title>
</head>
<style>
  .container {
    color: #fff;
    overflow: hidden;
  }

  .left,
  .main,
  .right {
    float: left;
    min-height: 100px;
  }

  .left {
    width: 200px;
    background: blue;
    margin-left: -100%;
  }

  .right {
    width: 300px;
    background: red;
    margin-left: -300px;
  }

  .main {
    width: 100%;
    background: green;
  }

  .content {
    margin: 0 300px 0 200px;
  }
</style>
<body>
  <div class="container">
    <div class="main">
      <div class="content">
        main
      </div>
    </div>
    <div class="left">left 200px </div>
    <div class="right">right 300px </div>
  </div>
</body>
</html>
```

4. flex

css3

- container display:flexleftorder:-1main flex-grow:1
- left/right/main3
- ie10+chrome20+-webkit--ms-

```
<!DOCTYPE html>
<head>
  <meta charset="UTF-8">
  <title>flex  </title>
</head>
<style>
  .container {
    color: #fff;
    display: flex;
  }

  .left,
  .main,
  .right {
    min-height: 100px;
  }

  .left {
    order: -1;
    width: 200px;
    background: blue;
  }

  .right {
    width: 300px;
    background: red;
  }

  .main {
    flex-grow: 1;
    background: green;
  }
</style>
<body>
  <div class="container">
    <div class="main">main      </div>
    <div class="left">left 200px </div>
    <div class="right">right 300px </div>
  </div>
</body>
</html>
```

5. grid

css3

- container display:grid grid-template-columns:200px auto 300px left order: -1
- left/right/main3
- ie10+Chrome57+-webkit--ms-

```
<!DOCTYPE html>
<head>
    <meta charset="UTF-8">
    <title>grid </title>
</head>
<style>
    .container {
        color: #fff;
        display: grid;
        grid-template-columns: 200px auto 300px;
    }

    .left,
    .main,
    .right {
        min-height: 100px;
    }

    .left {
        order: -1;
        background: blue;
    }

    .right {
        background: red;
    }

    .main {
        background: green;
    }
</style>
<body>
    <div class="container">
        <div class="main">main      </div>
        <div class="left">left 200px </div>
        <div class="right">right 300px </div>
    </div>
</body>
</html>
```

CSSBFCIFC

BFC

Formatting Context(), W3C CSS2.1

- (FC)
- (FC)

Block Formatting Context (BFC) BFC

BFC

- 1.
2. BFC
3. BFC Box margin
4. BFC
- 5.
6. BFCfloat

BFC BFC

- body
- float none
- position (absolutefixed)
- display inline-blocktable-cellsflex
- overflow visible (hiddenautoscroll)

BFC

BFC

```
<!DOCTYPE html>
<head>
<style>
.p {
  width: 200px;
  height: 50px;
  margin: 50px 0;
  background-color: red;
}
</style>
</head>
<body>
  <div class="p"></div>
  <div class="p"></div>
</body>
</html>
```

:



BFC3

margin

BFC + Box + margin

body BFC

```
<!DOCTYPE html>
<head>
<style>
.wrap {
  overflow: hidden;
}

.p {
  width: 200px;
  height: 50px;
  margin: 50px 0;
  background-color: red;
}
</style>
</head>
<body>
  <div class="p"></div>
  <div class="wrap">
    <div class="p"></div>
  </div>
</body>
</html>
```

:



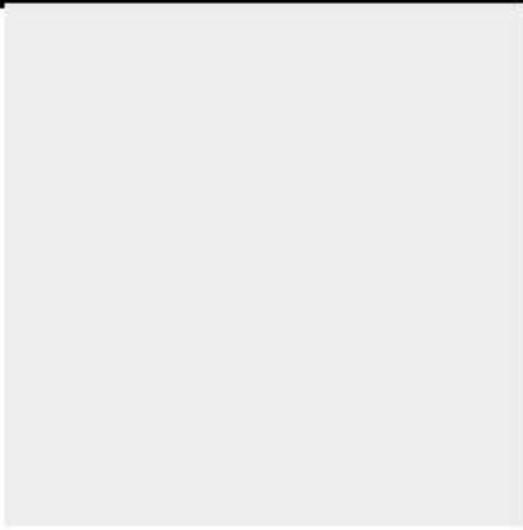
BFC()

```
<!DOCTYPE html>
<head>
<style>
.wrap {
    border: 1px solid #000;
}

.p {
    width: 200px;
    height: 50px;
    background-color: #eee;
    float: left;
}
</style>
</head>
<body>
    <div class="wrap">
        <div class="p"></div>
    </div>
</body>
</html>
```

div div

:

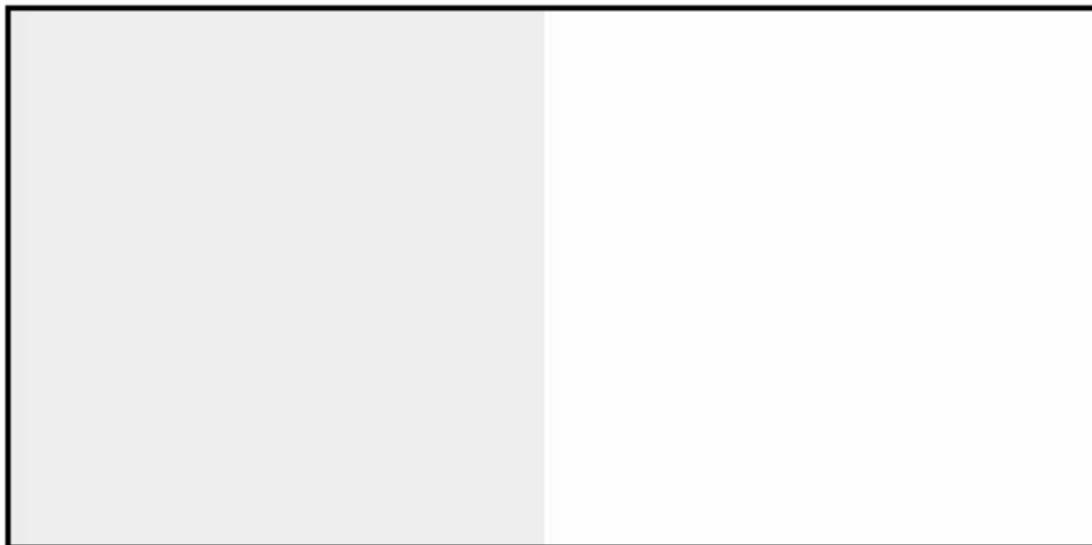


BFCBFC4BFCdiv

```
<!DOCTYPE html>
<head>
<style>
.wrap {
    border: 1px solid #000;
    overflow: hidden;
}

.p {
    width: 200px;
    height: 50px;
    background-color: #eee;
    float: left;
}
</style>
</head>
<body>
    <div class="wrap">
        <div class="p"></div>
    </div>
</body>
</html>
```

:

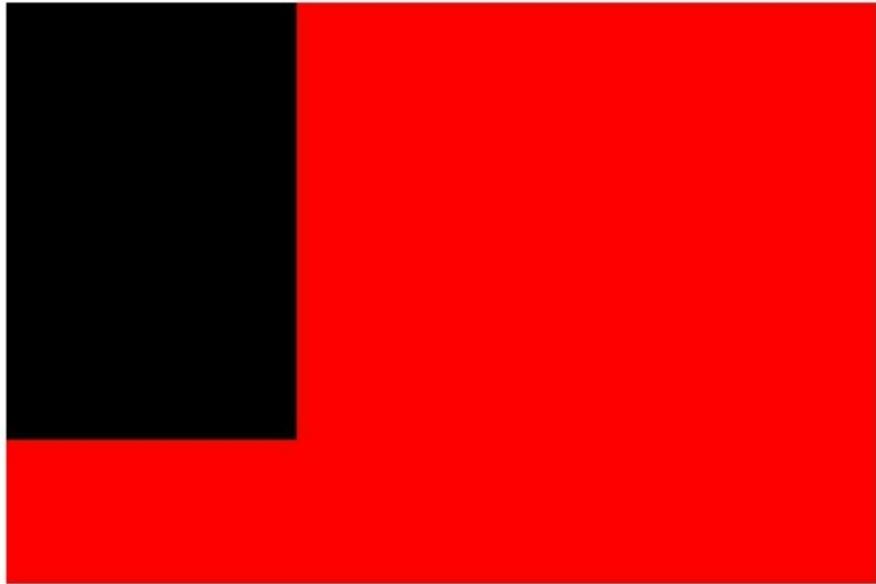


BFC

```
<!DOCTYPE html>
<head>
<style>
aside {
  width: 100px;
  height: 150px;
  float: left;
  background: black;
}

main {
  width: 300px;
  height: 200px;
  background-color: red;
}
</style>
</head>
<body>
  <div class="aside"></div>
  <div class="main"></div>
</body>
</html>
```

:



5

6 BFCfloat <div class="main"> BFC

:

```
<!DOCTYPE html>
<head>
<style>
aside {
  width: 100px;
  height: 150px;
  float: left;
  background: black;
}

.main {
  width: 300px;
  height: 200px;
  background-color: red;
  overflow: hidden;
}
</style>
</head>
<body>
  <div class="aside"></div>
  <div class="main"></div>
</body>
</html>
```



IFC

- 1.
2. +
marginpaddingborder
3. ;

CSStransformpositionGPUCSS

transformposition:absolute

1. position + top/left

left top css

```

<!DOCTYPE html>
<head>
<style>
  html,
  body {
    width: 100%;
    height: 100%;
  }

  .ball-running {
    animation: run-around 4s infinite;
    width: 100px;
    height: 100px;
    background-color: red;
    position: absolute;
  }

@keyframes run-around {
  0%: {
    top: 0;
    left: 0;
  }
  25% {
    top: 0;
    left: 200px;
  }
  50% {
    top: 200px;
    left: 200px;
  }
  75% {
    top: 200px;
    left: 0;
  }
}
</style>
</head>
<body>
  <div class="ball-running"></div>
</body>
</html>

```

60fps topleft reflow repaint

2. transform

transform translate() top left

```

<!DOCTYPE html>
<head>
<style>
  html,
  body {
    width: 100%;
    height: 100%;
  }

  .ball-running {
    animation: run-around 4s infinite;
    width: 100px;
    height: 100px;
    background-color: red;
  }

@keyframes run-around {
  0%: {
    transform: translate(0, 0);
  }
  25% {
    transform: translate(200px, 0);
  }
  50% {
    transform: translate(200px, 200px);
  }
  75% {
    transform: translate(0, 200px);
  }
}
</style>
</head>
<body>
  <div class="ball-running"></div>
</body>
</html>

```

repaintreflow

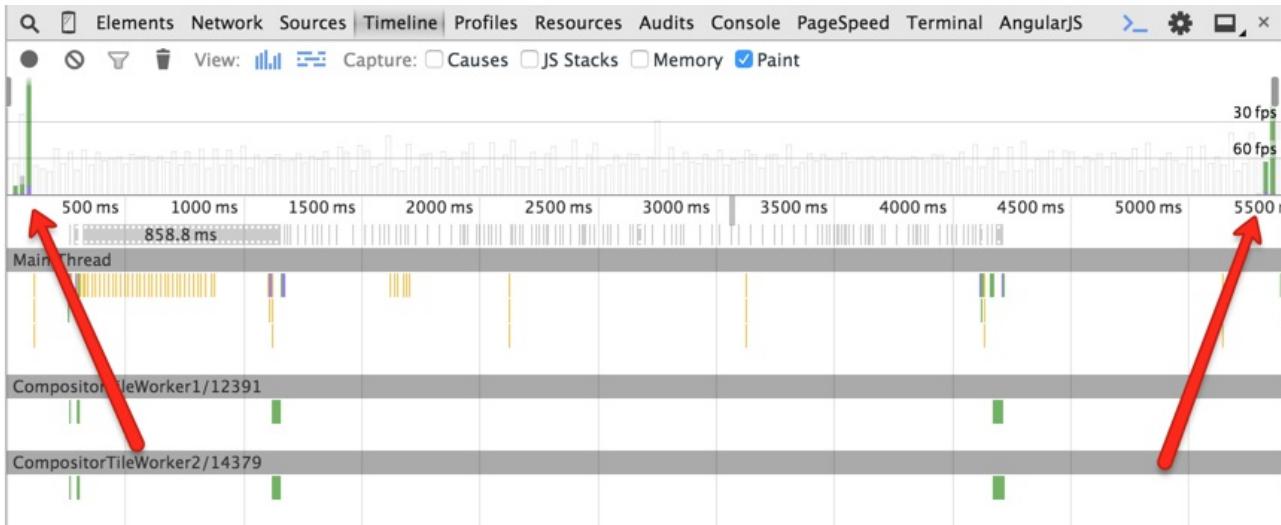
transform repaint transform GPU

DOMDOMCSSGPU transform repaint 3Dtransform

CSS transform GPU transform chrome “show layer borders”

1. 3D CSS transform
2. videocanvas
3. CSS filters
4. z-index

2D transform 3D transform timeline repaint



3D 2D transform 3D2D

GPU repaint GPU repaint

GPU

GPU

CSS GPU

1. transform
2. opacity
3. filter

GPU

2D transform repaint

```
.exam1 {  
  transform: translateZ(0);  
}  
  
.exam2 {  
  transform: rotateZ(360deg);  
}
```

3D transform GPU

1. GPU
2. GPUGPUCPU

will-change

will-change will-change

```
.exam3 {  
  will-change: transform;  
}
```

1. transform GPU position + top/left
- 2.
3. 3D 2D 2D2
4. GPU
5. transform GPU CSS

EventLoop

Event Loop

1. Event Loop
2. requestAnimationFrame microTask
3. requestIdleCallback microTask
4. resizescroll

requestAnimationFrame requestIdleCallback bug

HTML API

- 1.
- 2.
3. rendering opportunity event loop task
 - 60fps 16.66ms 30fps
 - 4fps
 -
 - 1.
 - 2. map of animation frame callbacks requestAnimationFrame

4. This step enables the user agent to prevent the steps below from running for other reasons, for example, to ensure certain tasks are executed immediately after each other, with only microtask checkpoints interleaved (and without, e.g., animation frame callbacks interleaved). Concretely, a user agent might wish to coalesce timer callbacks together, with no intermediate rendering updates. `microTask`
`requestAnimationFrame`
 5. `resize`
 6. `scroll`
 7. `requestAnimationFrame`
 8. `IntersectionObserver`
 - 9.
 10. `taskmicroTask` `Idle` `requestIdleCallback`
- ```
resize scroll CSSOM pending scroll event targets scroll
resize
```

task

An event loop has one or more task queues. For example, a user agent could have one task queue for mouse and key events (to which the user interaction task source is associated), and another to which all other task sources are associated. Then, using the freedom granted in the initial step of the event loop processing model, it could give keyboard and mouse events preference over other tasks three-quarters of the time, keeping the interface responsive but not starving other task queues. Note that in this setup, the processing model still enforces that the user agent would never process events from any one task source out of order.

- 1.
2. Task

Task""

```
Vue 2.0.0-rc.7 nextTick MutationObserver postMessage Issue
(https://github.com/vuejs/vue/issues/3771#issuecomment-249692588)
"" jsfiddle task nextTick nextTick
```

```
microTask nextTick promise.then Chrome queueMicroTask API
Promise
```

Issue Bug

### **requestAnimationFrame**

```
requestAnimationFrame
```

1.

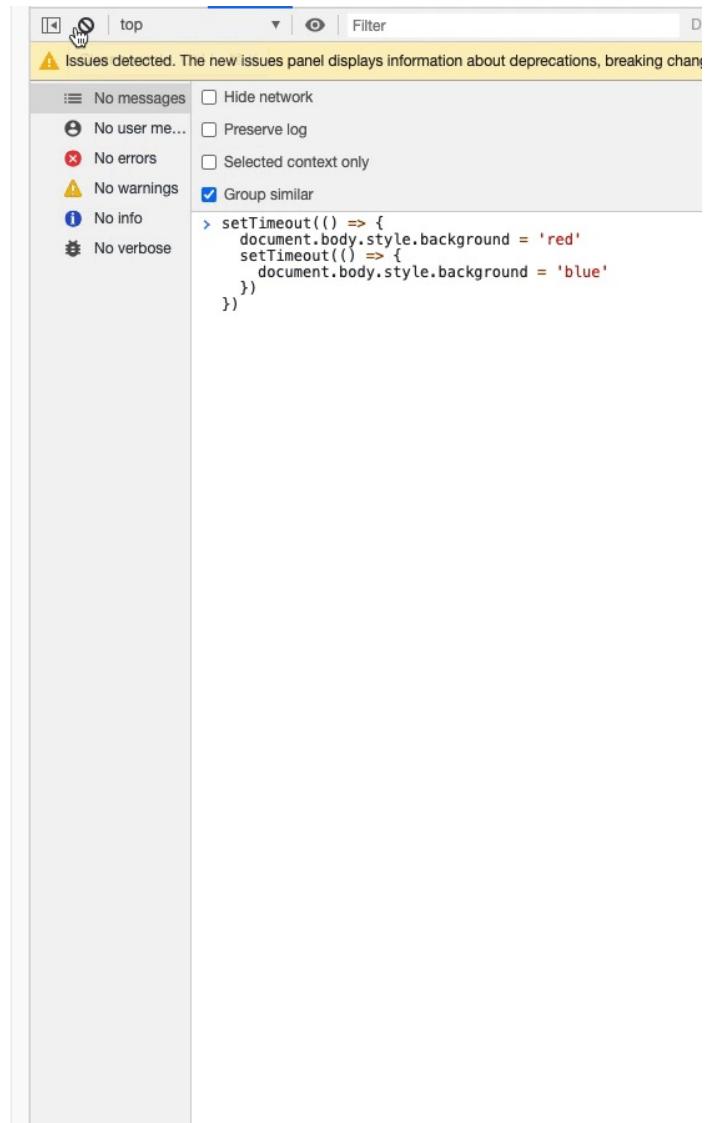
2.

rAF API DOM DOM

rAF DOM setTimeout

setTimeout

```
setTimeout(() => {
 document.body.style.background = "red";
 setTimeout(() => {
 document.body.style.background = "blue";
 });
});
```



Task

17ms 60fps

API

rAF 10

```
let i = 10;
let req = () => {
 i--;
 requestAnimationFrame(() => {
 document.body.style.background = "red";
 requestAnimationFrame(() => {
 document.body.style.background = "blue";
 if (i > 0) {
 req();
 }
 });
 });
};

req();
```

gif 10 20 performance



4

```
setTimeout(() => {
 console.log("sto1")
 requestAnimationFrame(() => console.log("rAF1"))
})
setTimeout(() => {
 console.log("sto2")
 requestAnimationFrame(() => console.log("rAF2"))
})

queueMicrotask(() => console.log("mic1"))
queueMicrotask(() => console.log("mic2"))
```

```
mic1
mic2
sto1
rAF1
sto2
rAF2
```

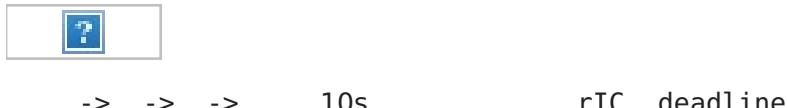
```
mic1
mic2
sto1
sto2
rAF1
rAF2
```

## requestIdleCallback

requestIdleCallback [MDN \(<https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestIdleCallback>\)](https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestIdleCallback)

React API postMessage

API



50ms deadline 50ms

MDN API ([https://developer.mozilla.org/zh-CN/docs/Web/API/Background\\_Tasks\\_API](https://developer.mozilla.org/zh-CN/docs/Web/API/Background_Tasks_API))

MDN [requestAnimationFrame \(<https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestAnimationFrame>\)](https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestAnimationFrame)

1. 10 EventLoop
2. rIC rIC timeout  
rIC
3. 50 100 50ms 50ms
4. timeRemaining() 0 deadline - now
5. timeRemaining()

rIC 49.xx ms

```
requestIdleCallback((deadline) => console.log(deadline.timeRemaining()))
```

## § 6. Processing

### § 6.1 Start an idle period algorithm

The [start an idle period algorithm](#), which is called by the [event loop processing model](#) when it determines that the [event loop](#) is otherwise idle:

1. Let `last_deadline` be the last idle period deadline associated with `window`
2. If `last_deadline` is greater than the current time, return from this algorithm.
3. Optionally, if the user agent determines the idle period should be delayed, return from this algorithm.

**NOTE**

This is intended to allow user agents to delay the start of idle periods as needed to optimise the power usage of the device. For example, if the [Document's hidden attribute \(\[page-visibility\]\)](#) is `true` then the user agent can throttle idle period generation, for example limiting the Document to one idle period every 10 seconds to optimize for power usage.

4. Let `now` be the current time.
5. Let `deadline` be a time in the future until which the browser expects to remain idle. The user agent [SHOULD](#) choose `deadline` to ensure that no time-critical tasks will be delayed even if a callback runs for the whole time period from `now` to `deadline`. As such, it should be set to the minimum of: the closest timeout in the list of active timers as set via [setTimeout](#) and [setInterval](#); the scheduled runtime for pending animation callbacks posted via [requestAnimationFrame](#); pending internal timeouts such as deadlines to start rendering the next frame, process audio or any other internal task the user agent deems important.
6. If `deadline - now` is greater than 50ms, then cap `deadline` by setting it to be `now + 50ms`.

**NOTE**

The cap of 50ms in the future is to ensure responsiveness to new user input within the threshold of human perception.

7. Let `pending_list` be `window`'s list of idle request callbacks.
8. Let `run_list` be `window`'s list of runnable idle callbacks.

```
> requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
})
< 373
49.875
> |
```

**NOTE**

The user agent is free to end an idle period early, even if `deadline` has not yet occurred, by deciding return from the algorithm in step 1. For example, the user agent may decide to do this if it determines that higher priority work has become runnable.

```
> requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
})
< 378
15.86
> requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
})
< 379
14.26500000000002
> |
```

### § 6.3 Invoke idle callback timeout algorithm

The [invoke idle callback timeout algorithm](#):

1. Let `callback` be the result of finding the entry in `window`'s list of idle request callbacks or the list of runnable idle callbacks that is associated with the value given by the `handle` argument passed to the algorithm.
2. If `callback` is not undefined:
  1. Remove `callback` from both `window`'s list of idle request callbacks and the list of runnable idle callbacks.
  2. Let `now` be the current time.
  3. Let `deadlineArg` be a new [IdleDeadline](#). Set the `time` associated with `deadlineArg` to `now` and set the `timeout` associated with `deadlineArg` to `true`.
  4. Call `callback` with `deadlineArg` as its argument. If an uncaught runtime script error occurs, then report the error.

**NOTE**

The user agent is free to end an idle period early, even if `deadline` has not yet occurred, by deciding return from the algorithm in step 1. For example, the user agent may decide to do this if it determines that higher priority work has become runnable.

## § 7. Privacy and Security

When an idle callback is scheduled the user agent provides an estimate of how long it expects to remain idle. This information can be used to estimate the time taken by other application tasks and related browser work within that frame. However, developers can already access this information via other means – e.g. mark beginning of the frame via [requestAnimationFrame](#), estimate the time of the next frame, and use that information to compute “remaining time” within any callback.

To mitigate cache and statistical fingerprinting attacks, the resolution of the time estimates returned by the [IdleDeadline](#) interface should be set to the same 5 microsecond minimum as the [Performance](#) interface defined in [\[HR-TIME\]](#).

## § A. Acknowledgments

```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="UTF-8" />
 <meta name="viewport" content="width=device-width, initial-scale=1.0" />
 <title>Document</title>
 <style>
 #SomeElementYouWantToAnimate {
 height: 200px;
 width: 200px;
 background: red;
 }
 </style>
 </head>
 <body>
 <div id="SomeElementYouWantToAnimate"></div>
 <script>
 var start = null;
 var element = document.getElementById("SomeElementYouWantToAnimate");
 element.style.position = "absolute";

 function step(timestamp) {
 if (!start) start = timestamp;
 var progress = timestamp - start;
 element.style.left = Math.min(progress / 10, 200) + "px";
 if (progress < 200) {
 window.requestAnimationFrame(step);
 }
 }
 //
 window.requestAnimationFrame(step);

 //
 window.requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
 alert("rIC");
 });
 </script>
 </body>
</html>
```

```
requestIdleCallback alert('rIC')
```

rID

确定



alert left rIC

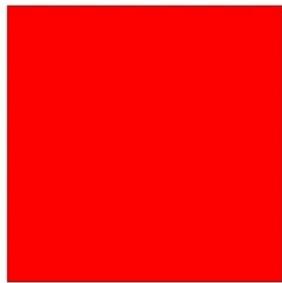
step 1000

```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="UTF-8" />
 <meta name="viewport" content="width=device-width, initial-scale=1.0" />
 <title>Document</title>
 <style>
 #SomeElementYouWantToAnimate {
 height: 200px;
 width: 200px;
 background: red;
 }
 </style>
 </head>
 <body>
 <div id="SomeElementYouWantToAnimate"></div>
 <script>
 var start = null;
 var element = document.getElementById("SomeElementYouWantToAnimate");
 element.style.position = "absolute";

 function step(timestamp) {
 if (!start) start = timestamp;
 var progress = timestamp - start;
 element.style.left = Math.min(progress / 10, 200) + "px";
 let i = 1000;
 while (i > 0) {
 console.log("i", i);
 i--;
 }
 if (progress < 2000) {
 window.requestAnimationFrame(step);
 }
 }

 //
 window.requestAnimationFrame(step);

 //
 window.requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
 alert("rIC");
 });
 </script>
 </body>
</html>
```



"" , rIC

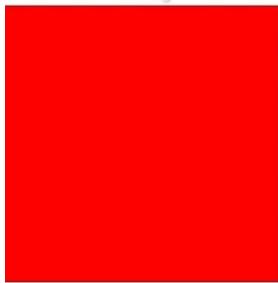
rIC timeout

```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="UTF-8" />
 <meta name="viewport" content="width=device-width, initial-scale=1.0" />
 <title>Document</title>
 <style>
 #SomeElementYouWantToAnimate {
 height: 200px;
 width: 200px;
 background: red;
 }
 </style>
 </head>
 <body>
 <div id="SomeElementYouWantToAnimate"></div>
 <script>
 var start = null;
 var element = document.getElementById("SomeElementYouWantToAnimate");
 element.style.position = "absolute";

 function step(timestamp) {
 if (!start) start = timestamp;
 var progress = timestamp - start;
 element.style.left = Math.min(progress / 10, 200) + "px";
 let i = 1000;
 while (i > 0) {
 console.log("i", i);
 i--;
 }
 if (progress < 2000) {
 window.requestAnimationFrame(step);
 }
 }

 //
 window.requestAnimationFrame(step);

 //
 window.requestIdleCallback((deadline) => {
 console.log(deadline.timeRemaining())
 alert("rIC");
 }, { timeout: 500 });
 </script>
 </body>
</html>
```



500ms      rIC ""

Event Loop rAFrIC

- 1.
- 2.
3. requestAnimationFrame
4. requestIdleCallback timeout
5. resizescroll Event Loop EventTarget

## React FiberrequestIdleCallback

### requestIdleCallback API

requestIdleCallback Web API React Fiber API

#### API

[requestIdleCallback \(<https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestIdleCallback>\)](https://developer.mozilla.org/zh-CN/docs/Web/API/Window/requestIdleCallback)

""

60

160160

2430

160 1000/60 ≈ 16ms

16 ms

(16ms

requestIdleCallback

requestIdleCallback UI

```
var handle = window.requestIdleCallback(callback[, options])
```

- callback
  - IdleDeadline
    - timeRemaining()
    - 
    - : 0
    - 
    - didTimeout(Boolean)
    - requestIdleCallback options.timeout
- options

- timeout

## DIV DIV

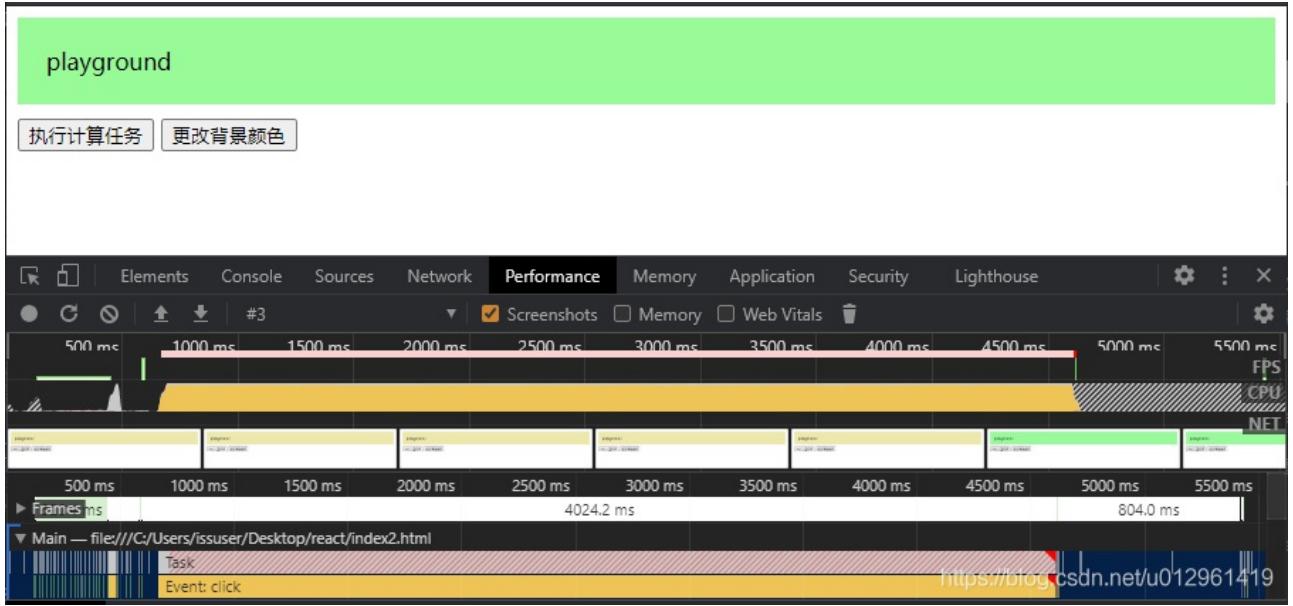
```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="UTF-8" />
 <title>requestIdleCallback</title>
 <style>
 #box {
 background: palegoldenrod;
 padding: 20px;
 margin-bottom: 10px;
 }
 </style>
 </head>
 <body>
 <div id="box">playground</div>
 <button id="btn1"></button>
 <button id="btn2"></button>

 <script>
 var box = document.querySelector('#box');
 var btn1 = document.querySelector('#btn1');
 var btn2 = document.querySelector('#btn2');
 var number = 100000000;
 var value = 0;

 function calc() {
 while (number > 0) {
 value = Math.random() < 0.5 ? Math.random() : Math.random();
 number--;
 }
 }

 btn1.onclick = function () {
 calc();
 }

 btn2.onclick = function () {
 console.log(number); // 0
 box.style.background = 'palegreen';
 }
 </script>
 </body>
</html>
```



requestIdleCallback

```
<!DOCTYPE html>
<html lang="en">
 <head>
 <meta charset="UTF-8" />
 <title>requestIdleCallback</title>
 <style>
 #box {
 background: palegoldenrod;
 padding: 20px;
 margin-bottom: 10px;
 }
 </style>
 </head>
 <body>
 <div id="box">playground</div>
 <button id="btn1"> </button>
 <button id="btn2"> </button>

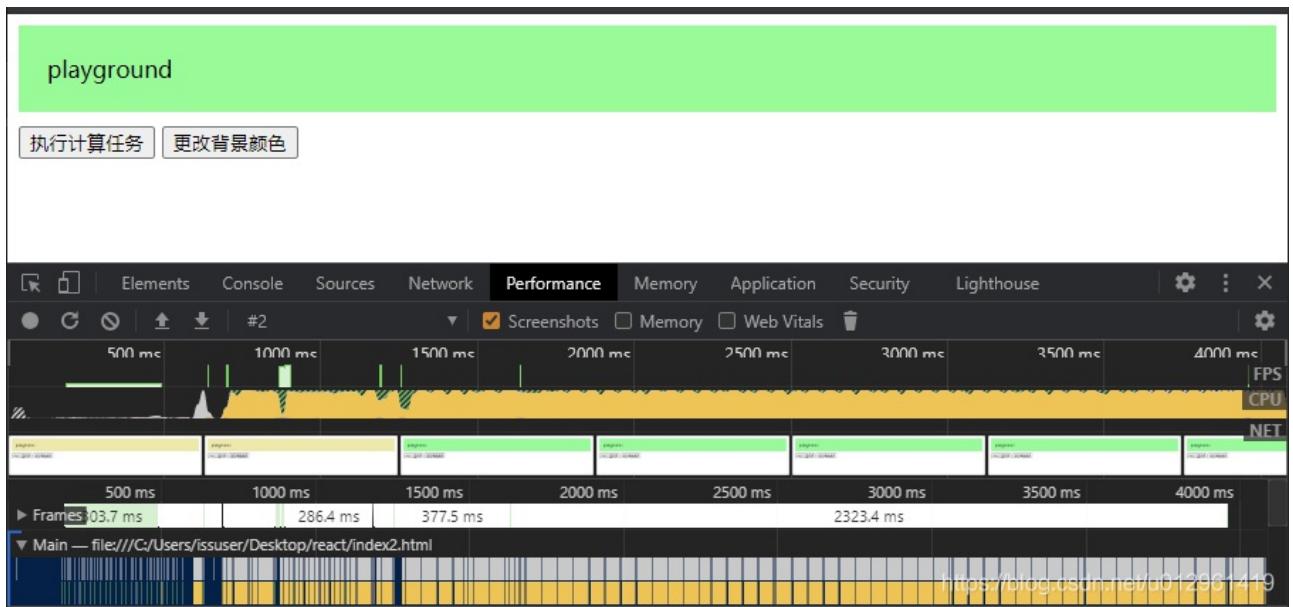
 <script>
 var box = document.querySelector('#box');
 var btn1 = document.querySelector('#btn1');
 var btn2 = document.querySelector('#btn2');
 var number = 100000000;
 var value = 0;

 function calc(IdleDeadline) {
 while (number > 0 && IdleDeadline.timeRemaining() > 1) {
 value = Math.random() < 0.5 ? Math.random() : Math.random();
 number--;
 }

 if (number > 0) {
 requestIdleCallback(calc);
 } else {
 console.log(' ');
 }
 }

 btn1.onclick = function () {
 requestIdleCallback(calc);
 }

 btn2.onclick = function () {
 console.log(number); // 0
 box.style.background = 'palegreen';
 }
 </script>
 </body>
</html>
```



- calc
- 1ms while
- calc number
- btn2 ""
- ""

## Fiber

Fiber React 16 DOM DOM Stack

## React 16

React 16 VirtualDOM

VirtualDOM

**JavaScript DOM Stack()**

**JavaScript**

**Stack**

React 16 DOM DOM

```
// jsx
const jsx = (
 <div id="a1">
 <div id="b1">
 <div id="c1"></div>
 <div id="c2"></div>
 </div>
 <div id="b2"></div>
 </div>
)
```

jsx Babel    React.createElement() DOM

```
"use strict";

const jsx = /*#__PURE__*/React.createElement("div", {
 id: "a1"
}, /*#__PURE__*/React.createElement("div", {
 id: "b1"
}, /*#__PURE__*/React.createElement("div", {
 id: "c1"
}), /*#__PURE__*/React.createElement("div", {
 id: "c2"
})), /*#__PURE__*/React.createElement("div", {
 id: "b2"
}));
```

```
const jsx = {
 type: 'div',
 props: {
 id: 'a1',
 children: [
 {
 type: 'div',
 props: {
 id: 'b1',
 children: [
 {
 type: 'div',
 props: {
 id: 'c1'
 }
 },
 {
 type: 'div',
 props: {
 id: 'c2'
 }
 }
]
 }
 },
 {
 type: 'div',
 props: {
 id: 'b2'
 }
 }
]
 }
}
```

DOM

```

const jsx = {...}
function render(vdom, container) {
 //
 const element = document.createElement(vdom.type);
 //
 Object.keys(vdom.props)
 .filter(prop => prop !== 'children')
 .forEach(prop => (element[prop] = vdom.props[prop]));
 //
 if (Array.isArray(vdom.props.children)) {
 vdom.props.children.forEach(child => render(child, element));
 }
 //
 container.appendChild(element);
}

render.jsx, document.getElementById('root'));

```

DOM Virtual DOM

## React 16 - Fiber

1.
  - React requestIdleCallback API
  - VirtualDOM VirtualDOM
  - VirtualDOM
  - VirtualDOM
  -
2.
  - 
  - 
  -
3.
  - 
  - 
  - 
  - VirtualDOM
    - VirtualDOM
    -

React 1 23 1

Fiber ""

[Demo \(https://claudiopro.github.io/react-fiber-vs-stack-demo/\)](https://claudiopro.github.io/react-fiber-vs-stack-demo/) Stack Fiber

## Fiber DOM

1. render
    - VirtualDOM Fiber
  2. commit
    - DOM
- 
1. React JSX
  2. Babel JSX    `React.createElement()`
  3. `React.createElement()` VirtualDOM
  4. **Fiber**
    - VirtualDOM VirtualDOM
    - VirtualDOM Fiber
    - Fiber JavaScript VirtualDOM typepropschildren
    - Fiber
5. **DOM**
    - DOM    VirtualDOM --> Fiber        --> Fiber    DOM
    - DOM    `newFiber( Fiber )`    --> `newFiber vs oldFiber( Fiber )`        -->  
            Fiber    DOM

## Fiber

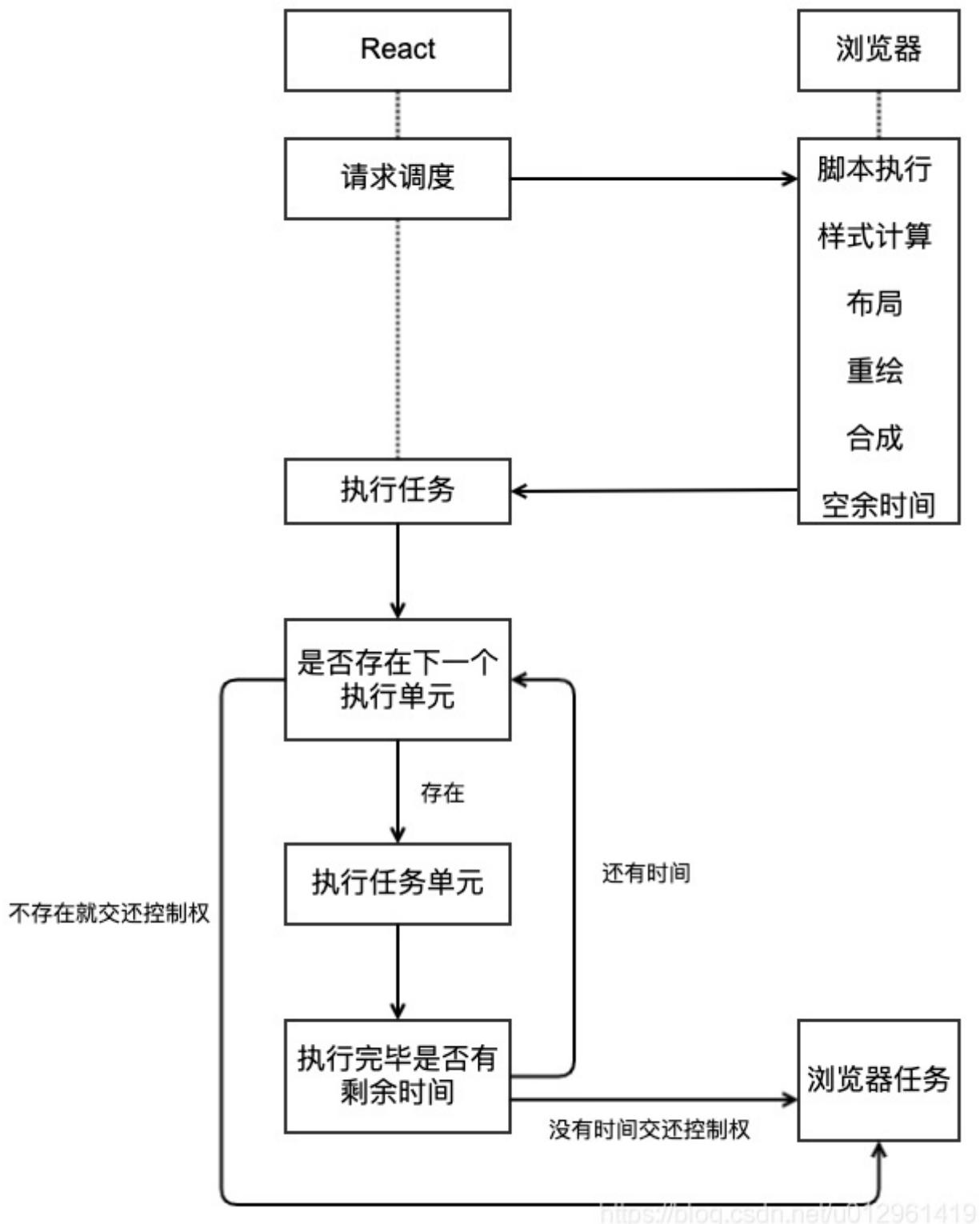
Fiber

- Fiber
- Fiber

React 16 Virtual DOM

React 16 Fiber

React



Fiber React

Fiber JavaScript DOM

render React root Fiber Root Fiber

•

<https://blog.csdn.net/u012961419>

- Root

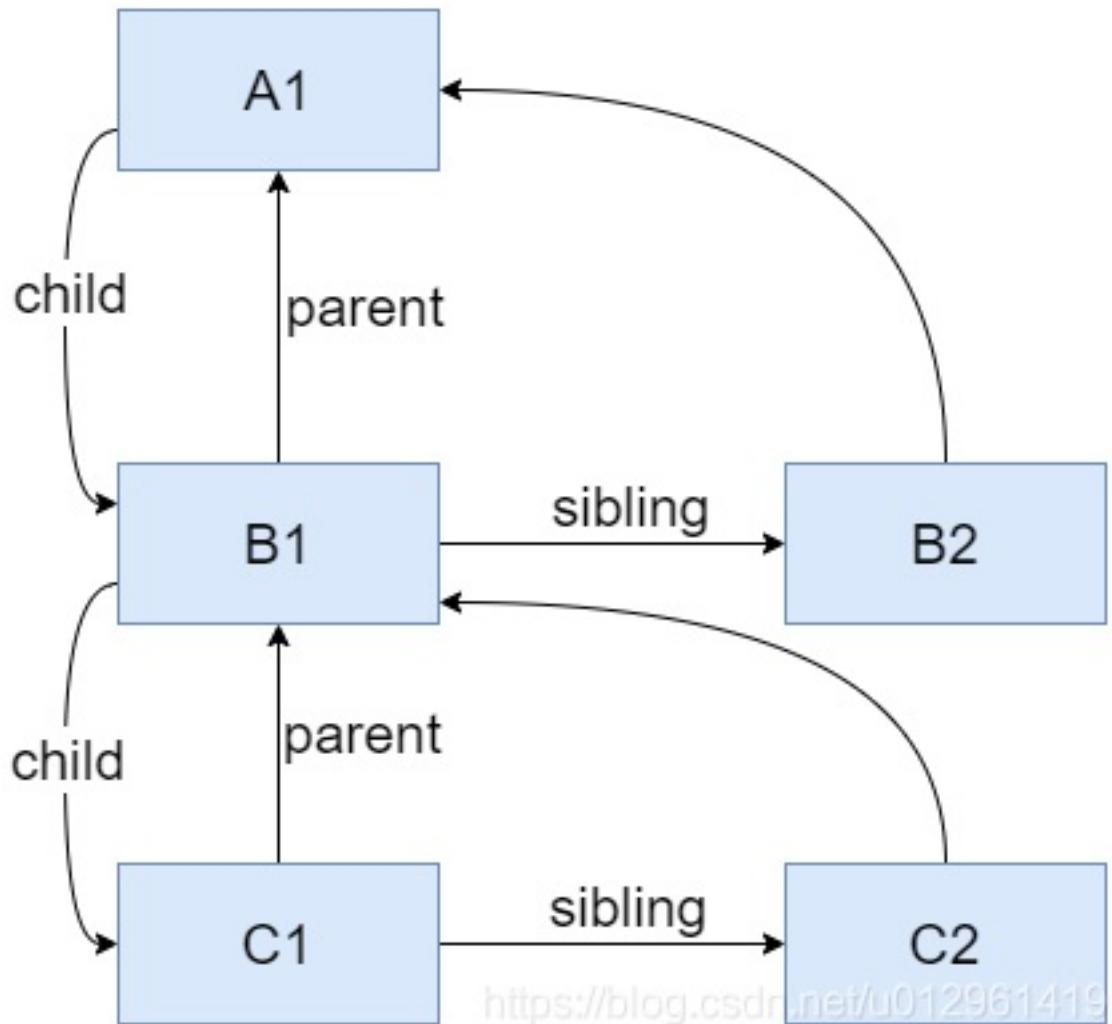
- 

- 
- 
- 
- 
- 

child sibling parent DOM DOM

```
// Fiber
{
 type //
 props // props.children VirtualDOM
 stateNode // DOM | |
 tag // host_root[root] || host_component[DOM] || class_component[]
 || function_component[]
 effectTag // Fiber commit /
 nextEffect // sideEffect
 lastEffect // nextEffect
 firstEffect // root DOM
 parent // Fiber FiberReact `return`
 child // Fiber Fiber
 sibling // Fiber Fiber
 alternate // Fiber Fiber
}
```

```
<div id="a1">
 <div id="b1">
 <div id="c1"></div>
 <div id="c2"></div>
 </div>
 <div id="b2"></div>
</div>
```



```
// B1_Fiber
{
 child: C1_Fiber,
 sibling: B2_Fiber,
 parent: A1_Fiber
}
```

## canvas

Canvas API JavaScript HTML <canvas>

Canvas API2D <canvas> WebGL API 2D3D

```
<canvas width="600" height="400" id="canvas"></canvas>
```

300+150

```
// canvas
var canvas = document.getElementById("canvas");
//
var context = canvas.getContext("2d");
```

## api

```
<!DOCTYPE html>
<html>
<body>

<canvas id="myCanvas" width="600" height="500" style="border:1px solid #d3d3d3;">
 Your browser does not support the HTML5 canvas tag.
</canvas>

<script>

var canvas = document.getElementById("myCanvas");
var context = canvas.getContext("2d");

//
context.moveTo(100, 100);
context.lineTo(300, 100);
context.lineTo(300, 200);

//
//
context.moveTo(100, 300);
context.lineTo(300, 300);

//
context.stroke();

//
context.beginPath();
//
context.moveTo(400, 100);
context.lineTo(400, 300);
context.lineTo(500, 300);
context.lineTo(500, 200);

// stroke
context.stroke();

//
context.fill();
context.fillStyle = "gray";

//
context.strokeStyle = "red"; // css
```

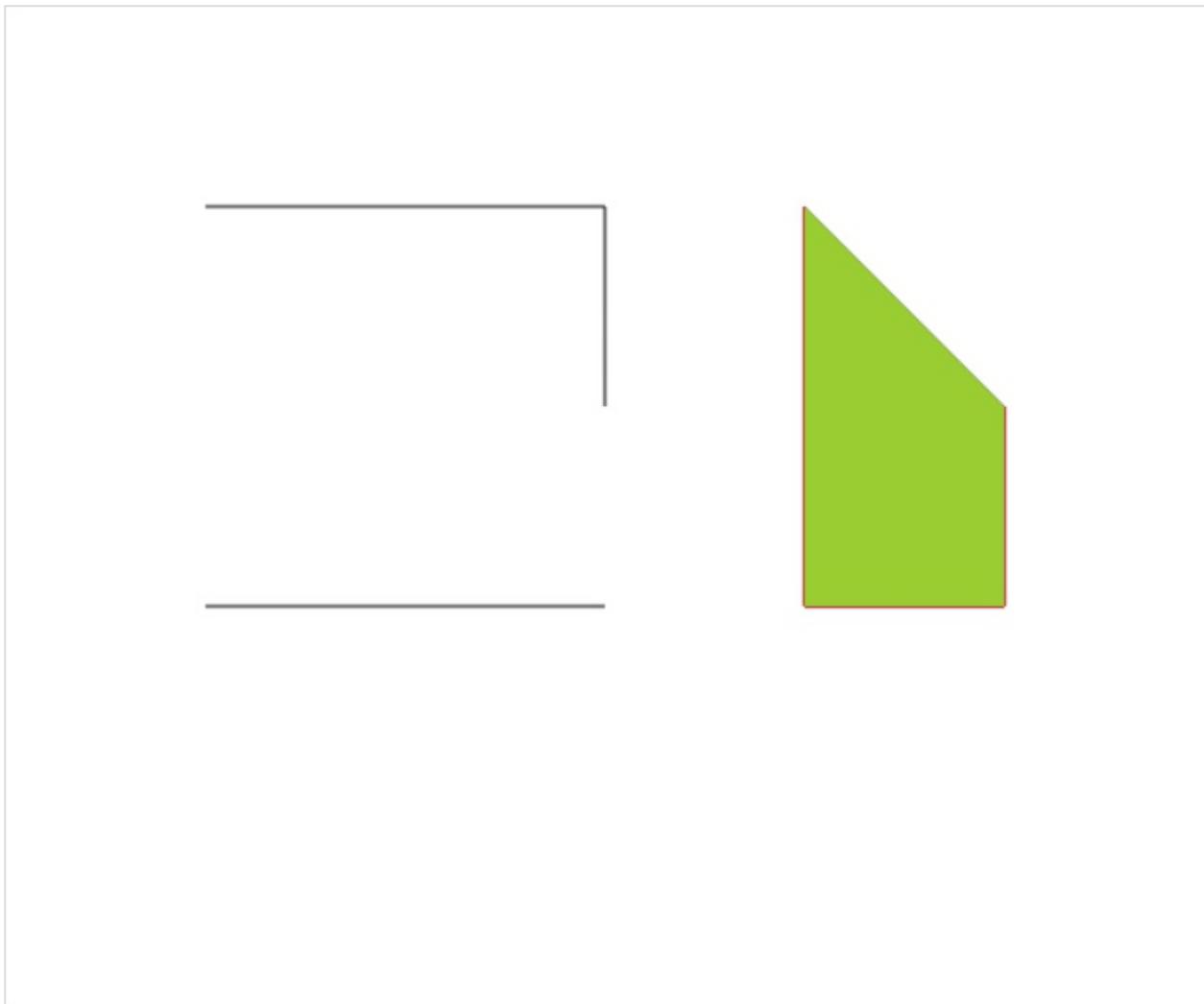
```
context.stroke();
//
//
context.fillStyle = "yellowgreen";
context.fill();

//
context.closePath();

// px
context.lineWidth = 15;
//
context.lineCap = "round"; //butt round
</script>

</body>
</html>
```

:



```
// x y width height

context.rect(100, 100, 200, 200);
context.strokeStyle = "red";
context.stroke();
context.fillStyle = "yellow";
context.fill();
```

```
//
//
context.fillRect(100, 100, 200, 200);

//
context.strokeStyle = "yellow";
context.stroke();
// fillRect
```

```
// x0
// x, y: radius ; startRadian, endRadian dircetion falsetrue
,

// context.arc(x, y, radius, startRadian, endRadian, direction);

// 3181
context.arc(300, 200, 100, 31/180*Math.PI, 81/180*Math.PI);

context.strokeStyle = "yellow";
context.stroke();

context.fillStyle = "red";
context.fill();
```

```
for (var i = 0; i < 10; i++) {
 context.moveTo(320+i*20,200);
 // i % 2
 context.arc(300, 200, 20 + i * 20, 0, 2*Math.PI, i%2==0);
}
context.fillStyle = "green";
context.fill();
context.stroke();
```

:



```
// 1.
// var gradient = context.createLinearGradient(100, 100, 300, 100);
//
var gradient = context.createLinearGradient(100, 100, 300, 380);

// 2.
gradient.addColorStop(0, "red");
gradient.addColorStop(0.5, "hotpink");
gradient.addColorStop(1, "yellowgreen");

// 3.
context.fillStyle = gradient;

// 4.
context.fillRect(100, 100, 200, 280);
```

:



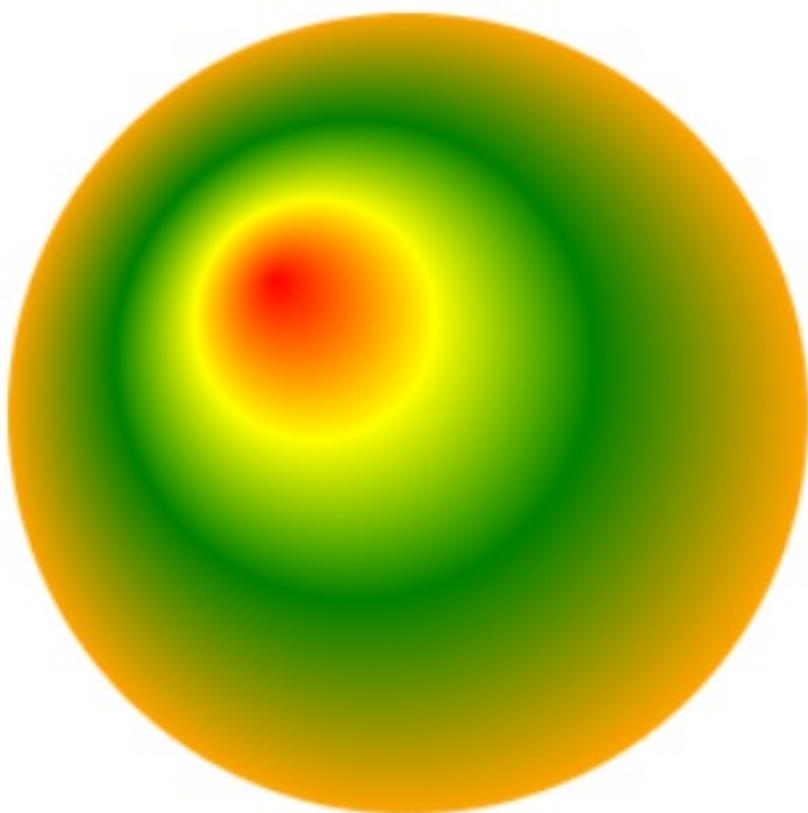
```
// 1.
//
var c1 = {x: 260, y: 160, r: 0};
//
var c2 = {x: 300, y: 200, r: 120};

var gradient = context.createRadialGradient(c1.x, c1.y, c1.r, c2.x, c2.y,
c2.r);
gradient.addColorStop(0, "red");
gradient.addColorStop(0.3, "yellow");
gradient.addColorStop(0.6, "green");
gradient.addColorStop(1, "orange");

// 2.
context.fillStyle = gradient;

// 3.
// 0;
context.arc(c2.x, c2.y, c2.r, 0, 2*Math.PI);
context.fill();
```

:



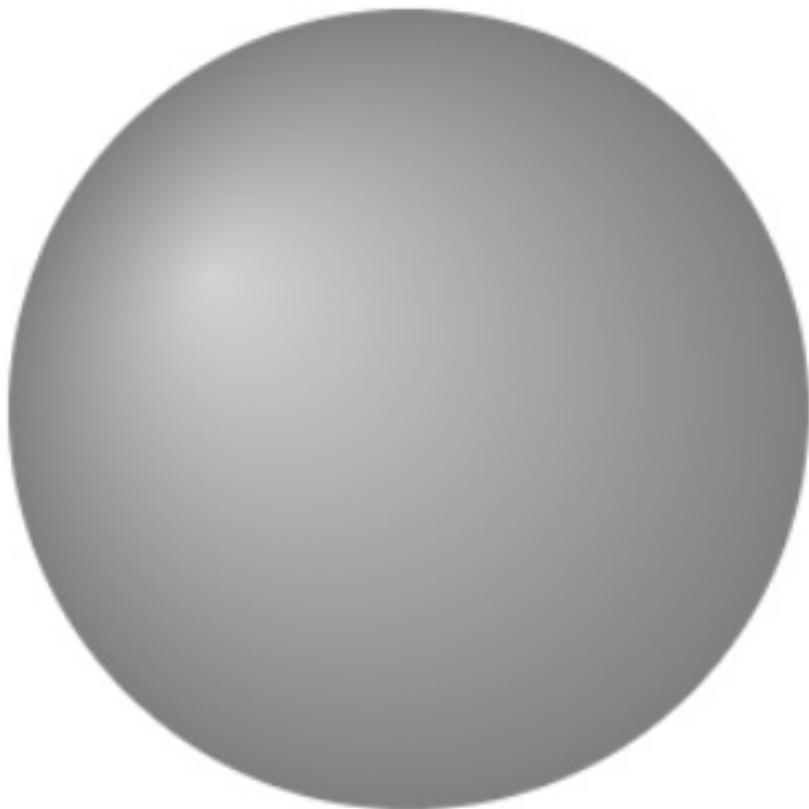
```
//1.
var c1 = {x: 240, y: 160, r: 0};
var c2 = {x: 300, y: 200, r: 120};

var gradient = context.createRadialGradient(c1.x, c1.y, c1.r, c2.x, c2.y,
c2.r);
gradient.addColorStop(1, "gray");
gradient.addColorStop(0, "lightgray");

//2.
context.fillStyle = gradient;

//3.
context.arc(c2.x, c2.y, c2.r, 0, 2*Math.PI);
context.fill();
```

:



```
//80
var c1 = {x: 300, y: 200, r: 80};
var c2 = {x: 300, y: 200, r: 150};
var gradient = context.createRadialGradient(c1.x, c1.y, c1.r, c2.x, c2.y,
c2.r);
gradient.addColorStop(1, "red");
gradient.addColorStop(6/7, "orange");
gradient.addColorStop(5/7, "yellow");
gradient.addColorStop(4/7, "green");
gradient.addColorStop(3/7, "cyan");
gradient.addColorStop(2/7, "skyblue");
gradient.addColorStop(1/7, "purple");
gradient.addColorStop(0, "white");

//
context.fillStyle = gradient;

//
context.arc(c2.x, c2.y, c2.r, 0, 2*Math.PI);
context.fill();

//
context.fillStyle = "white";
context.fillRect(0, 200, 600, 200);
```

:



```
//css3
//
//
context.shadowOffsetX = 10;
context.shadowOffsetY = 10;
context.shadowBlur = 10;
context.shadowColor = "yellowgreen";

//
context.fillStyle = "red";
context.fillRect(100, 100, 300, 200);
```

:



## api

```
//
//text x y
//context.strokeText("text", x, y)

context.font = "60px ";
//context.strokeText("hello, world", 100, 100);
context.fillText("hello, world", 100, 100);
```

:

# hello, world

```
//left
//apicontext.textAlign = "left";
context.textAlign = "left";
context.fillText("left", 300, 120);

context.textAlign = "center";
context.fillText("center", 300, 190);

context.textAlign = "right";
context.fillText("right", 300, 260);

// canvas
// 1. right
// 2. canvas.width,0
context.font = "60px ";
context.textAlign = "right";
context.textBaseline = "top";
context.fillText("hello, world", canvas.width, 0);
```

:

left

center

right

```
//top
//apicontext.textBaseline = "top";

context.fillText("default", 50, 200);

context.textBaseline = "top";
context.fillText("top", 150, 200);

context.textBaseline = "middle";
context.fillText("middle", 251, 200);

context.textBaseline = "bottom";
context.fillText("bottom", 400, 200);
```

:

default  
top

middle

bottom

3 imgx, y canvas

```
//context.drawImage(img, x, y)

var image = new Image();
image.src = "./img/gls.jpg";

//
image.onload = function () {
 context.drawImage(image, 100, 200);
}
```

5, x, y, w, h,

```
var image = new Image();
image.src = "./img/gls.jpg";

image.onload = function () {
 context.drawImage(image, 100, 100, 100, 100);
}
```

9 imgimageimageyimagegewimageh (canvasx, canvasy, canvasw, canvash)

```
//
//imageimageyimagegewimageh
//(canvasx, canvasy, canvasw, canvash)

var image = new Image();
image.src = "./img/gls.jpg";
image.onload = function () {
 /*
 image
 150 0 150 * 200
 100 100 150 200
 */
 context.drawImage(image, 150, 0, 150, 200, 100, 100, 150, 200);
}
```

## WebWorkerpostMessage

JavaScript CPU

Web Worker JavaScript Worker Worker Worker Worker  
UI

Worker Worker

Web Worker

**1**

Worker

**2DOM**

Worker DOM document window parentWorker navigator location

**3**

Worker (postMessage)

**4**

Worker alert() confirm() XMLHttpRequest AJAX

**5**

Worker file://

new Worker() Worker

```
var worker = new Worker('work.js');
```

Worker() Worker Worker 404 Worker

worker.postMessage() Worker

```
worker.postMessage('Hello World');
worker.postMessage({method: 'echo', args: ['Work']});
// worker.postMessage() Worker
```

worker.onmessage

```
worker.onmessage = function (event) {
 console.log('Received message ' + event.data);
 doSomething();
}

function doSomething() {
 //
 worker.postMessage('Work done!');
}
```

data Worker

Worker

```
worker.terminate();
```

## Worker

Worker message

```
self.addEventListener('message', function (e) {
 self.postMessage('You said: ' + e.data);
}, false);
```

self

```
//
this.addEventListener('message', function (e) {
 this.postMessage('You said: ' + e.data);
}, false);

//
addEventListener('message', function (e) {
 postMessage('You said: ' + e.data);
}, false);
```

self.addEventListener() self.onmessagedata self.postMessage()

Worker

```
self.addEventListener('message', function (e) {
 var data = e.data;
 switch (data.cmd) {
 case 'start':
 self.postMessage('WORKER STARTED: ' + data.msg);
 break;
 case 'stop':
 self.postMessage('WORKER STOPPED: ' + data.msg);
 self.close(); // Terminates the worker.
 break;
 default:
 self.postMessage('Unknown command: ' + data.msg);
 };
}, false);
```

self.close() Worker

## Worker

Worker importScripts()

```
importScripts('script1.js');
```

```
importScripts('script1.js', 'script2.js');
```

## Worker

Worker Worker error

```
worker.onerror(function (event) {
 console.log([
 'ERROR: Line ', e.lineno, ' in ', e.filename, ': ', e.message
].join('')));
});

//
worker.addEventListener('error', function (event) {
 // ...
});
```

Worker error

## Worker

Worker

```
//
worker.terminate();

// Worker
self.close();
```

Worker Worker Worker

Worker FileBlobArrayBuffer

```
//
var uInt8Array = new Uint8Array(new ArrayBuffer(10));
for (var i = 0; i < uInt8Array.length; ++i) {
 uInt8Array[i] = i * 2; // [0, 2, 4, 6, 8,...]
}
worker.postMessage(uInt8Array);

// Worker
self.onmessage = function (e) {
 var uInt8Array = e.data;
 postMessage('Inside worker.js: uInt8Array.toString() = ' +
uInt8Array.toString());
 postMessage('Inside worker.js: uInt8Array.byteLength = ' +
uInt8Array.byteLength);
};
```

Worker 500MB JavaScript Transferable Objects Worker

3D

```
// Transferable Objects
worker.postMessage(arrayBuffer, [arrayBuffer]);

//
var ab = new ArrayBuffer(1);
worker.postMessage(ab, [ab]);
```

## Web Worker

Worker JavaScript

```
<!DOCTYPE html>
<body>
 <script id="worker" type="app/worker">
 addEventListener('message', function () {
 postMessage('some message');
 }, false);
 </script>
</body>
</html>
```

```
<script>type app/worker
```

Worker

```
var blob = new Blob([document.querySelector('#worker').textContent]);
var url = window.URL.createObjectURL(blob);
var worker = new Worker(url);

worker.onmessage = function (e) {
 // e.data === 'some message'
};
```

URL Worker URL Worker

## Worker

Worker

```

function createWorker(f) {
 var blob = new Blob(['(' + f.toString() + ')()'']);
 var url = window.URL.createObjectURL(blob);
 var worker = new Worker(url);
 return worker;
}

var pollingWorker = createWorker(function (e) {
 var cache;

 function compare(new, old) { ... };

 setInterval(function () {
 fetch('/my-api-endpoint').then(function (res) {
 var data = res.json();

 if (!compare(data, cache)) {
 cache = data;
 self.postMessage(data);
 }
 })
 }, 1000)
});

pollingWorker.onmessage = function () {
 // render data
}

pollingWorker.postMessage('init');

```

Worker

## Worker Worker

Worker Worker Firefox 10 Worker

```

var worker = new Worker('worker.js');
worker.onmessage = function (event) {
 document.getElementById('result').textContent = event.data;
};

```

Worker

```
// worker.js

// settings
var num_workers = 10;
var items_per_worker = 1000000;

// start the workers
var result = 0;
var pending_workers = num_workers;
for (var i = 0; i < num_workers; i += 1) {
 var worker = new Worker('core.js');
 worker.postMessage(i * items_per_worker);
 worker.postMessage((i + 1) * items_per_worker);
 worker.onmessage = storeResult;
}

// handle the results
function storeResult(event) {
 result += event.data;
 pending_workers -= 1;
 if (pending_workers <= 0)
 postMessage(result); // finished!
}
```

Worker 10 Worker 10 Worker

```
// core.js
var start;
onmessage = getStart;
function getStart(event) {
 start = event.data;
 onmessage = getEnd;
}

var end;
function getEnd(event) {
 end = event.data;
 onmessage = null;
 work();
}

function work() {
 var result = 0;
 for (var i = start; i < end; i += 1) {
 // perform some complex calculation here
 result += 1;
 }
 postMessage(result);
 close();
}
```

**API**

Worker() Worker

```
var myWorker = new Worker(jsUrl, options);
```

Worker() JS Worker Worker

```
//
var myWorker = new Worker('worker.js', { name : 'myWorker' });

// Worker
self.name // myWorker
```

Worker() Worker WorkerWorker

- Worker.onerror error
- Worker.onmessage message Event.data
- Worker.onmessageerror messageerror
- Worker.postMessage() Worker
- Worker.terminate() Worker

## Worker

Web Worker window Worker window

Worker

- self.name Worker
- self.onmessagemessage
- self.onmessageerror messageerror
- self.close() Worker
- self.postMessage() Worker
- self.importScripts() JS

## OffscreenCanvas Canvas — Web WorkerCanvas

OffscreenCanvas canvas

Canvas

Canvas WebGL web

Canvas JavaScript Canvas API Canvas

webCanvas App

, [OffscreenCanvas \(https://developer.mozilla.org/zh-CN/docs/Web/API/OffscreenCanvas\)](https://developer.mozilla.org/zh-CN/docs/Web/API/OffscreenCanvas)  
Canvas

Canvas <canvas> Canvas API DOM OffscreenCanvas Canvas DOM Canvas API

OffscreenCanvas DOM Canvas Canvas DOM Canvas Web Worker Web Worker  
DOM Canvas



## WorkerOffscreenCanvas

web worker

[Workers \(\[https://developer.mozilla.org/zh-CN/docs/Web/API/Web\\\_Workers\\\_API\]\(https://developer.mozilla.org/zh-CN/docs/Web/API/Web\_Workers\_API\)\)](https://developer.mozilla.org/zh-CN/docs/Web/API/Web_Workers_API) Web—— WorkerDOMWorkerCanvas API

OffscreenCanvasDOMWorkerCanvas APIWorkerOffscreenCanvas

```
// file: worker.js

function getGradientColor(percent) {
 const canvas = new OffscreenCanvas(100, 1);
 const ctx = canvas.getContext('2d');
 const gradient = ctx.createLinearGradient(0, 0, canvas.width, 0);
 gradient.addColorStop(0, 'red');
 gradient.addColorStop(1, 'blue');
 ctx.fillStyle = gradient;
 ctx.fillRect(0, 0, ctx.canvas.width, 1);
 const imgd = ctx.getImageData(0, 0, ctx.canvas.width, 1);
 const colors = imgd.data.slice(percent * 4, percent * 4 + 4);
 return `rgba(${colors[0]}, ${colors[1]}, ${colors[2]}, ${colors[3]})`;
}

getGradientColor(40); // rgba(152, 0, 104, 255)
```

WorkertransferControlToOffscreen CanvasOffscreenCanvasOffscreenCanvasCanvas

```
<!DOCTYPE html>
<html>
<body>
<canvas id="myCanvas" width="600" height="500" style="border:1px solid #d3d3d3;">
 Your browser does not support the HTML5 canvas tag.
</canvas>
<script>
var canvas = document.getElementById("myCanvas");
// var context = canvas.getContext("2d");

// //
// context.moveTo(100, 100);
// context.lineTo(300, 100);
// context.lineTo(300, 200);

// //
// context.moveTo(100, 300);
// context.lineTo(300, 300);

// //
// context.stroke();

// //
// context.beginPath();
// //
// context.moveTo(400, 100);
// context.lineTo(400, 300);
// context.lineTo(500, 300);
// context.lineTo(500, 200);

// // stroke
// context.stroke();

// //
// context.fill();
// context.fillStyle = "gray";

// //
// context.strokeStyle = "red"; // css
// context.stroke();

// //
// context.fillStyle = "yellowgreen";
// context.fill();

// //
// context.closePath();
```

```

// // px
// context.lineWidth = 15;
// //
// context.lineCap = "round"; //butt round

// : canvascanvascanvascantextcanvastransferControlToOffscreen
OffscreenCanvas
// Uncaught DOMException: Failed to execute 'transferControlToOffscreen' on
'HTMLCanvasElement': Cannot transfer control from a canvas that has a rendering
context.
const offscreen = canvas.transferControlToOffscreen();
const worker = new Worker('worker.js');
worker.postMessage({ canvas: offscreen }, [offscreen]);
</script>
</body>
</html>

```

OffscreenCanvas postMessageWorkerWorkercontext

```

// worker.js

self.onmessage = function (event) {
 // Canvas(OffscreenCanvas)
 var canvas = event.data.canvas;
 var context = canvas.getContext('2d');

 //
 var c1 = {x: 240, y: 160, r: 0};
 var c2 = {x: 300, y: 200, r: 120};

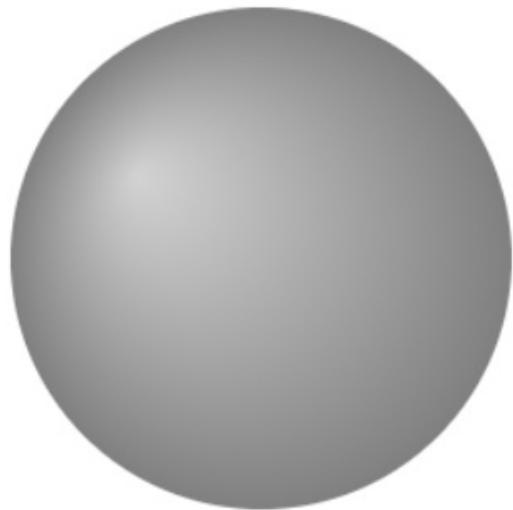
 var gradient = context.createRadialGradient(c1.x, c1.y, c1.r, c2.x, c2.y,
c2.r);
 gradient.addColorStop(1, "gray");
 gradient.addColorStop(0, "lightgray");

 //2.
 context.fillStyle = gradient;

 //3.
 context.arc(c2.x, c2.y, c2.r, 0, 2*Math.PI);
 context.fill();
}

```

:



Worker

## WebRTC YUV

WebRTC YUV YUV Cavans

[yuv-canvas](https://github.com/brion/yuv-canvas) (<https://github.com/brion/yuv-buffer>) YUV

render.js

```
"use strict";
exports.__esModule = true;
var isEqual = require('lodash.isequal');
var YUVBuffer = require('yuv-buffer');
var YUVCanvas = require('yuv-canvas');
var Renderer = /** @class */ (function () {
 function Renderer(workSource) {
 var _this = this;
 this._sendCanvas = function () {
 _this.canvasSent = true;
 _this.worker && _this.worker.postMessage({
 type: 'constructor',
```

```

 data: {
 canvas: _this.offCanvas,
 id: (_this.element && _this.element.id) ||
(Math.random().toString(16).slice(2) + Math.random().toString(16).slice(2))
 }
 }, [_this.offCanvas]);
};

/**
 *
 */
this._checkRendererWay = function () {
 if (_this.workerReady && _this.worker && _this.offCanvas &&
this.enableWorker) {
 return 'worker';
 }
 else {
 return 'software';
 }
};
// workerCanvas
this._workDrawFrame = function (width, height, yUint8Array,
uUint8Array, vUint8Array) {
 if (_this.canvasWrapper && _this.canvasWrapper.style.display !==
'none') {
 _this.canvasWrapper.style.display = 'none';
 }
 if (_this.workerCanvasWrapper &&
this.workerCanvasWrapper.style.display === 'none') {
 _this.workerCanvasWrapper.style.display = 'flex';
 }
 _this.worker && _this.worker.postMessage({
 type: 'drawFrame',
 data: {
 width: width,
 height: height,
 yUint8Array: yUint8Array,
 uUint8Array: uUint8Array,
 vUint8Array: vUint8Array
 }
 }, [yUint8Array, uUint8Array, vUint8Array]);
};
// Canvas
this._softwareDrawFrame = function (width, height, yUint8Array,
uUint8Array, vUint8Array) {
 if (_this.workerCanvasWrapper &&
this.workerCanvasWrapper.style.display !== 'none') {
 _this.workerCanvasWrapper.style.display = 'none';
 }
 if (_this.canvasWrapper && _this.canvasWrapper.style.display ===
'none') {
 _this.canvasWrapper.style.display = 'flex';
 }
}

```

```

 var format = YUVBuffer.format({
 width: width,
 height: height,
 chromaWidth: width / 2,
 chromaHeight: height / 2
 });
 var y = YUVBuffer.lumaPlane(format, yUint8Array);
 var u = YUVBuffer.chromaPlane(format, uUint8Array);
 var v = YUVBuffer.chromaPlane(format, vUint8Array);
 var frame = YUVBuffer.frame(format, y, u, v);
 _this.yuv.drawFrame(frame);
};

this.cacheCanvasOpts = {};
this.yuv = {};
this.ready = false;
this.contentMode = 0;
this.container = {};
this.canvasWrapper;
this.canvas = {};
this.element = {};
this.offCanvas = {};
this.enableWorker = !!workSource;
if (this.enableWorker) {
 this.worker = new Worker(workSource);
 this.workerReady = false;
 this.canvasSent = false;
 this.worker.onerror = function (evt) {
 console.error('[WorkerRenderer]: the renderer worker catch
error: ', evt);
 _this.workerReady = false;
 _this.enableWorker = false;
 };
 this.worker.onmessage = function (evt) {
 var data = evt.data;
 switch (data.type) {
 case 'ready':
 console.log('[WorkerRenderer]: the renderer worker was
ready');
 _this.workerReady = true;
 if (_this.offCanvas) {
 _this._sendCanvas();
 }
 break;
 case 'exited':
 console.log('[WorkerRenderer]: the renderer worker was
exited');
 _this.workerReady = false;
 _this.enableWorker = false;
 break;
 }
 }
}

```

```
 };
 }
}

Renderer.prototype._calcZoom = function (vertical, contentMode, width,
height, clientWidth, clientHeight) {
 if (vertical === void 0) { vertical = false; }
 if (contentMode === void 0) { contentMode = 0; }
 var localRatio = clientWidth / clientHeight;
 var tempRatio = width / height;
 if (isNaN(localRatio) || isNaN(tempRatio)) {
 return 1;
 }
 if (!contentMode) {
 if (vertical) {
 return localRatio > tempRatio ?
 clientHeight / height : clientWidth / width;
 }
 else {
 return localRatio < tempRatio ?
 clientHeight / height : clientWidth / width;
 }
 }
 else {
 if (vertical) {
 return localRatio < tempRatio ?
 clientHeight / height : clientWidth / width;
 }
 else {
 return localRatio > tempRatio ?
 clientHeight / height : clientWidth / width;
 }
 }
};

Renderer.prototype.getBindingElement = function () {
 return this.element;
};

Renderer.prototype.bind = function (element) {
 // record element
 this.element = element;
 // create container
 var container = document.createElement('div');
 container.className += ' video-canvas-container';
 Object.assign(container.style, {
 width: '100%',
 height: '100%',
 display: 'flex',
 justifyContent: 'center',
 alignItems: 'center',
 position: 'relative'
 });
 this.container = container;
 element && element.appendChild(this.container);
};
```

```
// canvasweb workercanvascanvas
var canvasWrapper = document.createElement('div');
canvasWrapper.className += ' video-canvas-wrapper canvas-renderer';
Object.assign(canvasWrapper.style, {
 width: '100%',
 height: '100%',
 justifyContent: 'center',
 alignItems: 'center',
 position: 'absolute',
 left: '0px',
 right: '0px',
 display: 'none'
});
this.canvasWrapper = canvasWrapper;
this.container.appendChild(this.canvasWrapper);
var workerCanvasWrapper = document.createElement('div');
workerCanvasWrapper.className += ' video-canvas-wrapper webworker-
renderer';
Object.assign(workerCanvasWrapper.style, {
 width: '100%',
 height: '100%',
 justifyContent: 'center',
 alignItems: 'center',
 position: 'absolute',
 left: '0px',
 right: '0px',
 display: 'none'
});
this.workerCanvasWrapper = workerCanvasWrapper;
this.container.appendChild(this.workerCanvasWrapper);
// create canvas
this.canvas = document.createElement('canvas');
this.workerCanvas = document.createElement('canvas');
this.canvasWrapper.appendChild(this.canvas);
this.workerCanvasWrapper.appendChild(this.workerCanvas);
// OffscreenCanvas
this.offCanvas = this.workerCanvas.transferControlToOffscreen();
if (!this.canvasSent && this.offCanvas && this.worker &&
this.workerReady) {
 this._sendCanvas();
}
this.yuv = YUVCanvas.attach(this.canvas, { webGL: false });
};
Renderer.prototype.unbind = function () {
 this.canvasWrapper && this.canvasWrapper.removeChild(this.canvas);
 this.workerCanvasWrapper &&
this.workerCanvasWrapper.removeChild(this.workerCanvas);
 this.container && this.container.removeChild(this.canvasWrapper);
 this.container && this.container.removeChild(this.workerCanvasWrapper);
 this.element && this.element.removeChild(this.container);
 this.worker && this.worker.terminate();
 this.workerReady = false;
```

```

 this.canvasSent = false;
 this.yuv = null;
 this.container = null;
 this.workerCanvasWrapper = null;
 this.canvasWrapper = null;
 this.element = null;
 this.canvas = null;
 this.workerCanvas = null;
 this.offCanvas = null;
 this.worker = null;
 };
 Renderer.prototype.refreshCanvas = function () {
 // Not implemented for software renderer
 };
 Renderer.prototype.updateCanvas = function (options) {
 if (options === void 0) { options = {
 width: 0,
 height: 0,
 rotation: 0,
 mirrorView: false,
 contentMode: 0,
 clientWidth: 0,
 clientHeight: 0
 }; }
 // check if display options changed
 if (isEqual(this.cacheCanvasOpts, options)) {
 return;
 }
 this.cacheCanvasOpts = Object.assign({}, options);
 // check for rotation
 if (options.rotation === 0 || options.rotation === 180) {
 this.canvas.width = options.width;
 this.canvas.height = options.height;
 // canvas transferControlToOffscreen canvascanvasstyle
 this.workerCanvas.style.width = options.width + "px";
 this.workerCanvas.style.height = options.height + "px";
 }
 else if (options.rotation === 90 || options.rotation === 270) {
 this.canvas.height = options.width;
 this.canvas.width = options.height;
 this.workerCanvas.style.height = options.width + "px";
 this.workerCanvas.style.width = options.height + "px";
 }
 else {
 throw new Error('Invalid value for rotation. Only support 0, 90, 180, 270');
 }
 var transformItems = [];
 transformItems.push("rotateZ(" + options.rotation + "deg)");
 var scale = this._calcZoom(options.rotation === 90 || options.rotation === 270, options.contentMode, options.width, options.height, options.clientWidth, options.clientHeight);
 };
}

```

```

 // transformItems.push(`scale(${scale})`)
 this.canvas.style.zoom = scale;
 this.workerCanvas.style.zoom = scale;
 // check for mirror
 if (options.mirrorView) {
 // this.canvas.style.transform = 'rotateY(180deg)';
 transformItems.push('rotateY(180deg)');
 }
 if (transformItems.length > 0) {
 var transform = "" + transformItems.join(' ');
 this.canvas.style.transform = transform;
 this.workerCanvas.style.transform = transform;
 }
 };
 Renderer.prototype.drawFrame = function (imageData) {
 if (!this.ready) {
 this.ready = true;
 }
 var dv = new DataView(imageData.header);
 // let format = dv.getUint8(0);
 var mirror = dv.getUint8(1);
 var contentWidth = dv.getUint16(2);
 var contentHeight = dv.getUint16(4);
 var left = dv.getUint16(6);
 var top = dv.getUint16(8);
 var right = dv.getUint16(10);
 var bottom = dv.getUint16(12);
 var rotation = dv.getUint16(14);
 // let ts = dv.getUint32(16);
 var width = contentWidth + left + right;
 var height = contentHeight + top + bottom;
 this.updateCanvas({
 width: width, height: height, rotation: rotation,
 mirrorView: !!mirror,
 contentMode: this.contentMode,
 clientWidth: this.container && this.container.clientWidth,
 clientHeight: this.container && this.container.clientHeight
 });
 if (this._checkRendererWay() === 'software') {
 // canvas
 this._softwareDrawFrame(width, height, imageData.yUint8Array,
imageData.uUint8Array, imageData.vUint8Array);
 }
 else {
 this._workDrawFrame(width, height, imageData.yUint8Array,
imageData.uUint8Array, imageData.vUint8Array);
 }
 };
 /**
 * Canvas
 *
 * @memberof Renderer

```

```

*/
Renderer.prototype.clearFrame = function () {
 if (this._checkRendererWay() === 'software') {
 this.yuv && this.yuv.clear();
 }
 else {
 this.worker && this.worker.postMessage({
 type: 'clearFrame'
 });
 }
};

Renderer.prototype.setContentMode = function (mode) {
 if (mode === void 0) { mode = 0; }
 this.contentMode = mode;
};

return Renderer;
}());

exports["default"] = Renderer;

```

Worker:

```

// render worker

(function() {
 const dateFormat = function(date, formatter = 'YYYY-MM-DD hh:mm:ss SSS') {
 if (!date) {
 return date;
 }

 let time;

 try {
 time = new Date(date);
 } catch (e) {
 return date;
 }

 const oDate = {
 Y: time.getFullYear(),
 M: time.getMonth() + 1,
 D: time.getDate(),
 h: time.getHours(),
 m: time.getMinutes(),
 s: time.getSeconds(),
 S: time.getMilliseconds()
 };

 return formatter.replace(/(Y|M|D|h|m|s|S)+/g, (res, key) => {
 let len = 2;

 switch (res.length) {

```

```

 case 1:
 len = res.slice(1, 0) === 'Y' ? 4 : 2;
 break;
 case 2:
 len = 2;
 break;
 case 3:
 len = 3;
 break;
 case 4:
 len = 4;
 break;
 default:
 len = 2;
 }
 return (`0${oDate[key]}`).slice(-len);
});
}

let yuv;

try {
 importScripts('./yuv-buffer/yuv-buffer.js');
 importScripts('./yuv-canvas/shaders.js');
 importScripts('./yuv-canvas/depower.js');
 importScripts('./yuv-canvas/YCbCr.js');
 importScripts('./yuv-canvas/FrameSink.js');
 importScripts('./yuv-canvas/SoftwareFrameSink.js');
 importScripts('./yuv-canvas/WebGLFrameSink.js');
 importScripts('./yuv-canvas/yuv-canvas.js');

 self.addEventListener('message', function (e) {
 const data = e.data;
 switch (data.type) {
 case 'constructor':
 console.log(`[${dateFormat(new Date())}] RENDER_WORKER [INFO]: received
canvas: `, data.data.canvas, data.data.id);
 yuv = YUVCanvas.attach(data.data.canvas, { webGL: false });
 break;
 case 'drawFrame':
 // requestAnimationFrame
 const width = data.data.width;
 const height = data.data.height;
 const yUint8Array = data.data.yUint8Array;
 const uUint8Array = data.data.uUint8Array;
 const vUint8Array = data.data.vUint8Array;
 const format = YUVBuffer.format({
 width: width,
 height: height,
 chromaWidth: width / 2,
 chromaHeight: height / 2
 });
 }
 });
}

```

```

 const y = YUVBuffer.lumaPlane(format, yUint8Array);
 const u = YUVBuffer.chromaPlane(format, uUint8Array);
 const v = YUVBuffer.chromaPlane(format, vUint8Array);
 const frame = YUVBuffer.frame(format, y, u, v);
 yuv && yuv.drawFrame(frame);
 break;
 case 'clearFrame': {
 yuv && yuv.clear(frame);
 break;
 }
 default:
 console.log(`[${dateFormat(new Date())}] RENDER_WORKER [INFO]:` +
[RendererWorker]: Unknown message: `, data);
 };
}, false);

self.postMessage({
 type: 'ready',
});
} catch (error) {
 self.postMessage({
 type: 'exited',
 });

 console.log(`[${dateFormat(new Date())}] RENDER_WORKER [INFO]:` +
[RendererWorker]: catch error`, error);
}
})();

```

OffscreenCanvasAPPWorkercanvasAPP

OffscreenCanvasChrome 69flag Firefox APIcanvasAPPOffscreenCanvasDOM  
DOM API

## VueReact Virtual DOM

1. vuereactdomDOM
2. tree diff, component diff, element diff tree diff domcomponent tree diff

### dom

react diff

vue

1. reactdiff, render dom tree, dom tree patchdom. react  
shouldComponentUpdaterender dom
2. vue Object.defineProperty data getter/setterwatcherdep, dep  
setterwatch

Diff Key

1. tree diff
  - DOMDOM
  - CSS DOM
2. component diff
  - shouldComponentUpdate()
  - component diff
3. element diff
  - 
  - key

## Vue2.0 “”””

Angular

- 
- 
- 

Angular

ReactAngular

ReactFluxReduxMobxReduxsaga

```
const getData = () => {
 //
 //
}
```

ReactReact

bug

1. JS

2.

bugOO

React

AngularReactAngularOO

VueReactAngularjQueryAngularOO

## **webpack CDN polyfill**

1.

speed-measure-webpack-plugin

- 
- plugin loader

```
npm install --save-dev speed-measure-webpack-plugin
```

webpack.config.js

```
//
const SpeedMeasurePlugin = require("speed-measure-webpack-plugin");

//
const smp = new SpeedMeasurePlugin();

const webpackConfig = smp.wrap({
 entry: {
 // ...
 },
 output: {
 // ...
 },
 resolve: {
 // ...
 },
 module: {
 rules: [
 //
]
 },
 plugins: [new MyPlugin(), new MyOtherPlugin()],
});

module.exports = webpackConfig;
```

15.48 secs

:

```
SMP ⏱
General output time took 15.48 secs

SMP ⏱ Plugins
Object took 1.7 secs
HtmlWebpackPlugin took 0.215 secs
HotModuleReplacementPlugin took 0.037 secs
NamedModulesPlugin took 0.013 secs
DefinePlugin took 0 secs
NoEmitOnErrorsPlugin took 0 secs

SMP ⏱ Loaders
modules with no loaders took 14.65 secs
 module count = 719
 css-loader, and
 postcss-loader took 9.35 secs
 module count = 3
 babel-loader, and
 eslint-loader took 8.95 secs
 module count = 41
 css-loader, and
 postcss-loader, and
 less-loader took 8.066 secs
 module count = 1
 css-loader, and
 vue-loader, and
 less-loader, and
 vue-loader took 4.78 secs
 module count = 54
 babel-loader, and
 vue-loader took 4.55 secs
 module count = 55
 css-loader, and
 vue-loader, and
 vue-loader took 4.33 secs
 module count = 1
 vue-loader, and
 eslint-loader took 3.91 secs
 module count = 55
 vue-loader, and
 vue-loader took 2.57 secs
 module count = 55
 svg-sprite-loader took 1.67 secs
 module count = 50
```

## 2.

webpack-bundle-analyzer 8888

```
npm install --save-dev webpack-bundle-analyzer
```

webpack.config.js

```
//
const SpeedMeasurePlugin = require("speed-measure-webpack-plugin");

//
const BundleAnalyzerPlugin = require("webpack-bundle-analyzer").BundleAnalyzerPlugin;

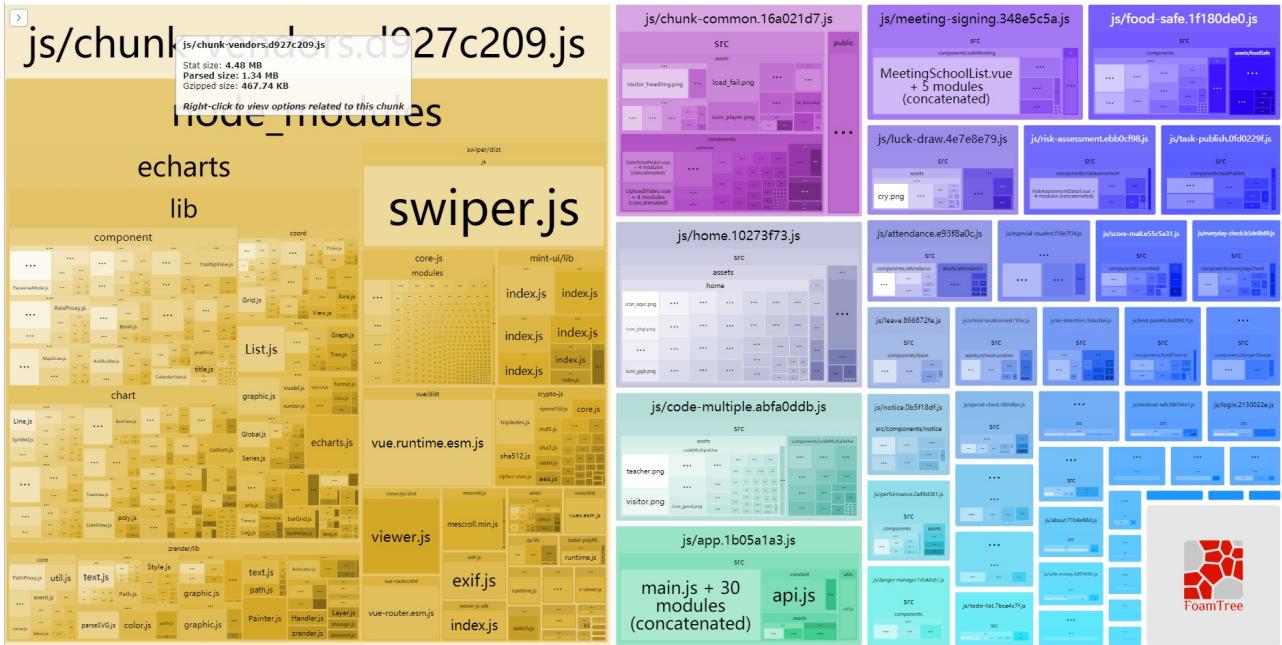
//
const smp = new SpeedMeasurePlugin();

const webpackConfig = smp.wrap({
 entry: {
 // ...
 },
 output: {
 // ...
 },
 resolve: {
 // ...
 },
 module: {
 rules: [
 //
]
 },
 plugins: [
 //
 new BundleAnalyzerPlugin(),
 new MyPlugin(),
 new MyOtherPlugin(),
],
});

module.exports = webpackConfig;
```

chunk-vendors 1.34MB

:



1.

- thread-loader ()
- parallel-webpack
- HappyPack

thread-loader

loader

```
npm install --save-dev thread-loader
```

loader

webpack.config.js

```

const path = require("path");
//
const SpeedMeasurePlugin = require("speed-measure-webpack-plugin");

//
const smp = new SpeedMeasurePlugin();

const webpackConfig = smp.wrap({
 entry: {
 // ...
 },
 output: {
 // ...
 },
 resolve: {
 // ...
 },
 module: {
 rules: [
 rules: [
 {
 test: /\.js$/,
 include: path.resolve('src'),
 use: [
 'thread-loader',
 // your expensive loader (e.g babel-loader)
],
 }
]
 },
 plugins: [
 new MyPlugin(),
 new MyOtherPlugin(),
],
 });
}

module.exports = webpackConfig;

```

## 2. CDN

vue.jswebpackCDNvuevuexvue-routeraxiosechartsswiperwebpackexternals

html-webpack-plugin webpack-cdn-plugin

```
npm install --save-dev html-webpack-plugin, webpack-cdn-plugin
```

webpack.config.js

```
const path = require("path");
//
const SpeedMeasurePlugin = require("speed-measure-webpack-plugin");

//
const BundleAnalyzerPlugin = require("webpack-bundle-analyzer").BundleAnalyzerPlugin;

const HtmlWebpackPlugin = require('html-webpack-plugin');

//
const isProduction = process.env.NODE_ENV === 'production';

//
const smp = new SpeedMeasurePlugin();

// CDN bootstrap cdn
const cdn = {
 css: [
 'https://cdn.bootcss.com/Swiper/4.5.1/css/swiper.min.css'
],
 js: [
 'https://cdn.bootcss.com/vue/2.6.10/vue.min.js',
 'https://cdn.bootcss.com/vue-router/3.1.3/vue-router.min.js',
 'https://cdn.bootcss.com/vuex/3.1.1/vuex.min.js',
 'https://cdn.bootcss.com/axios/0.19.0/axios.min.js',
 'https://cdn.bootcss.com/echarts/4.3.0/echarts.min.js',
 'https://cdn.bootcss.com/Swiper/4.5.1/js/swiper.min.js',
]
}

const webpackConfig = smp.wrap({
 entry: {
 // ...
 },
 output: {
 // ...
 },
 resolve: {
 // ...
 },
 // cdn
 externals: isProduction && {
 'vue': 'Vue',
 'vuex': 'Vuex',
 'vue-router': 'VueRouter',
 'axios': 'axios',
 'echarts': 'echarts',
 'swiper': 'Swiper'
 } || {},
 module: {
```

```
rules: [
 rules: [
 {
 test: /\.js$/,
 include: path.resolve('src'),
 use: [
 'thread-loader',
 // your expensive loader (e.g babel-loader)
],
 }
]
],
plugins: [
 new HtmlWebpackPlugin({ filename: '../index.html' }), // output file
relative to output.path
 new WebpackCdnPlugin({
 modules: [
 {
 name: 'vue',
 var: 'Vue',
 path: 'vue.min.js'
 },
 {
 name: 'vuex',
 var: 'Vuex',
 path: 'vuex.min.js'
 },
 {
 name: 'vue-router',
 var: 'VueRouter',
 path: 'vue-router.min.js'
 },
 {
 name: 'axios',
 var: 'axios',
 path: 'axios.min.js'
 },
 {
 name: 'echarts',
 var: 'echarts',
 path: 'echarts.min.js'
 },
 {
 name: 'swiper',
 var: 'Swiper',
 path: 'swiper.min.js'
 },
],
 prod: isProduction,
 prodUrl: '//cdn.bootcdn.net/ajax/libs/:name/:version/:path' // =>
https://cdn.bootcdn.net/ajax/libs/xxx/xxx/xxx(`:name`, `:version` `:path`)
```

```

 publicPath: '/node_modules/dist', // override when prod is false
 },
 new MyPlugin(),
 new MyOtherPlugin(),
],
});

module.exports = webpackConfig;

```

inde.html:

```

<!DOCTYPE html>
<html>
 <head>
 <meta charset="UTF-8">
 <title>Webpack App</title>
 <link href="https://cdn.bootcdn.net/ajax/libs/Swiper/6.7.5/swiper-
bundle.min.css" rel="stylesheet">
 </head>
 <body>
 <script type="text/javascript"
src="https://cdn.bootcdn.net/ajax/libs/vue/2.6.13/vue.min.js"></script>
 <script type="text/javascript" src="https://cdn.bootcdn.net/ajax/libs/vue-
router/3.1.3/vue-router.min.js"></script>
 <script type="text/javascript"
src="https://cdn.bootcdn.net/ajax/libs/vuex/3.1.1/vuex.min.js"></script>
 <script type="text/javascript"
src="https://cdn.bootcdn.net/ajax/libs/axios/0.19.0/axios.min.js"></script>
 <script type="text/javascript"
src="https://cdn.bootcdn.net/ajax/libs/echarts/4.3.0/echarts.min.js"></script>
 <script type="text/javascript"
src="https://cdn.bootcdn.net/ajax/libs/Swiper/6.7.5/js/swiper.min.js"></script>
 <script type="text/javascript" src="/assets/app.js"></script>
 </body>
</html>

```

3.

- parallel-uglify-plugin
- uglifyjs-webpack-plugin parallel
- terser-webpack-plugin parallel ES6

```
npm install --save-dev terser-webpack-plugin
```

webpack.config.js

```
const path = require("path");
```

```
//
const SpeedMeasurePlugin = require("speed-measure-webpack-plugin");

//
const TerserPlugin = require("terser-webpack-plugin");

//
const BundleAnalyzerPlugin = require("webpack-bundle-analyzer").BundleAnalyzerPlugin;

const HtmlWebpackPlugin = require('html-webpack-plugin');

//
const isProduction = process.env.NODE_ENV === 'production';

//
const smp = new SpeedMeasurePlugin();

// CDN bootstrap cdn
const cdn = {
 css: [
 'https://cdn.bootcss.com/Swiper/4.5.1/css/swiper.min.css'
],
 js: [
 'https://cdn.bootcss.com/vue/2.6.10/vue.min.js',
 'https://cdn.bootcss.com/vue-router/3.1.3/vue-router.min.js',
 'https://cdn.bootcss.com/vuex/3.1.1/vuex.min.js',
 'https://cdn.bootcss.com/axios/0.19.0/axios.min.js',
 'https://cdn.bootcss.com/echarts/4.3.0/echarts.min.js',
 'https://cdn.bootcss.com/Swiper/4.5.1/js/swiper.min.js',
]
}

const webpackConfig = smp.wrap({
 entry: {
 // ...
 },
 output: {
 // ...
 },
 resolve: {
 // ...
 },
 module: {
 rules: [
 rules: [
 {
 test: /\.js$/,
 include: path.resolve('src'),
 use: [
 'thread-loader',
 // your expensive loader (e.g babel-loader)
]
 }
]
]
 }
});
```

```
],
 }
]
},
// cdn
externals: isProduction && {
 'vue': 'Vue',
 'vuex': 'Vuex',
 'vue-router': 'VueRouter',
 'axios': 'axios',
 'echarts': 'echarts',
 'swiper': 'Swiper'
} || {},
optimization: {
 minimizer: [
 new TerserPlugin({
 parallel: 4
 })
]
},
plugins: [
 new HtmlWebpackPlugin({ filename: '../index.html' }), // output file
relative to output.path
 new WebpackCdnPlugin({
 modules: [
 {
 name: 'vue',
 var: 'Vue',
 path: 'vue.min.js'
 },
 {
 name: 'vuex',
 var: 'Vuex',
 path: 'vuex.min.js'
 },
 {
 name: 'vue-router',
 var: 'VueRouter',
 path: 'vue-router.min.js'
 },
 {
 name: 'axios',
 var: 'axios',
 path: 'axios.min.js'
 },
 {
 name: 'echarts',
 var: 'echarts',
 path: 'echarts.min.js'
 },
 {

```

```
 name: 'swiper',
 var: 'Swiper',
 path: 'swiper.min.js'
 },
],
prod: isProduction,
prodUrl: '//cdn.bootcdn.net/ajax/libs/:name/:version/:path' // =>
https://cdn.bootcdn.net/ajax/libs/xxx/xxx/xxx(`:name`, `:version` `:path`)
 publicPath: '/node_modules/dist', // override when prod is false
}),
new MyPlugin(),
new MyOtherPlugin(),
],
});
}

module.exports = webpackConfig;
```

#### 4. polyfill

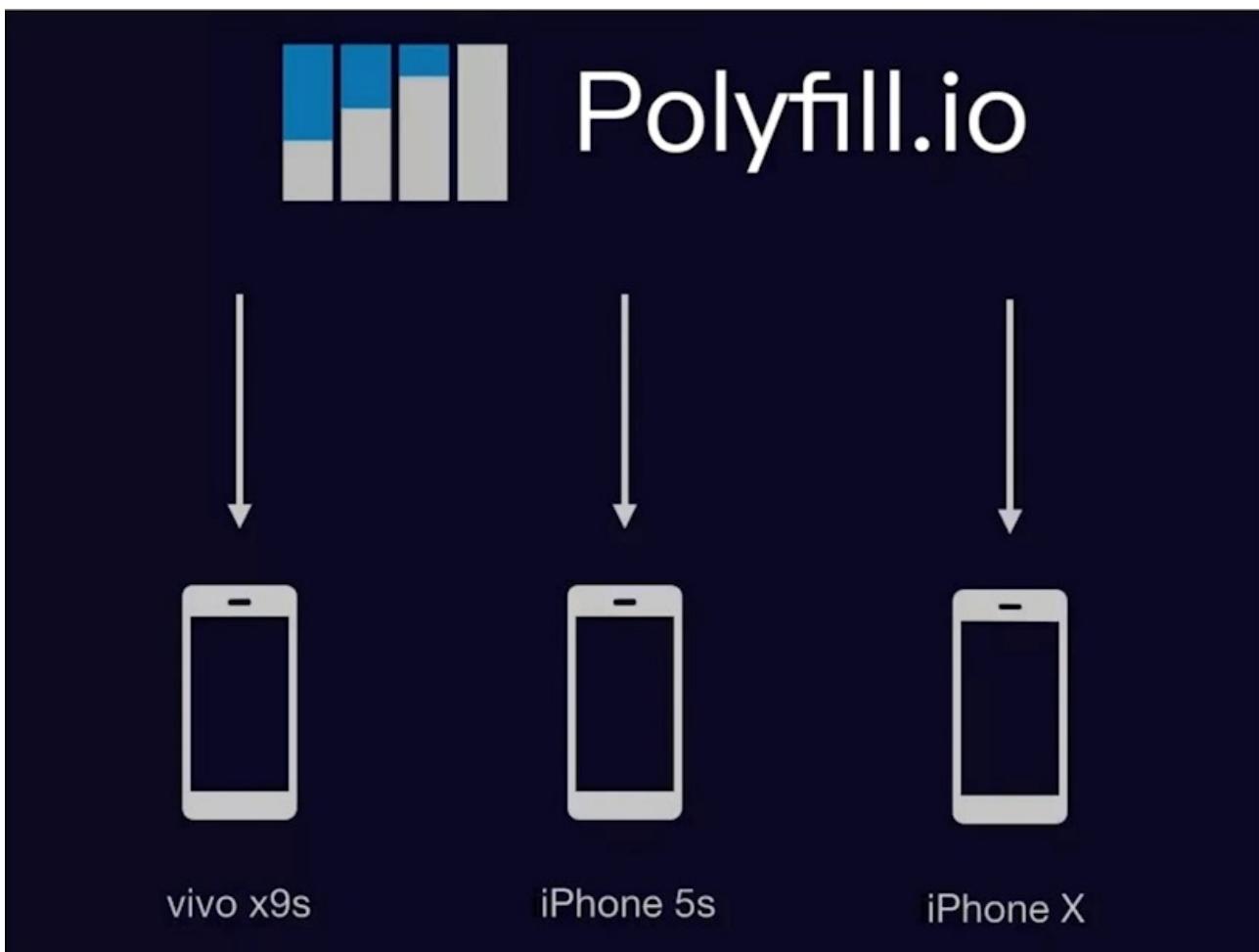
Polyfill API IE Promise fetch es6-promise whatwg-fetch Polyfill.io JS

Polyfill.io UserAgent polyfills Polyfill.io polyfills document.querySelector  
Element.classList ES5 Array Date.now ES6 Object.assign Promise

polyfill polyfill Polyfill.io polyfill

Polyfill Service

User Agent Polyfill



index.html script

```
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="UTF-8">
<title>Document</title>
</head>
<body>
</body>
<script src="https://cdn.polyfill.io/v2/polyfill.min.js?callback=main" async
defer></script>
<script>
function main () {
 var node=document.createElement("script");
 node.src="index.js";
 document.body.appendChild(node);
}
</script>
</html>
```

# 各种排序的比较

排序方法	平均情况	最好情况	最坏情况	辅助空间
直接插入	$O(n^2)$	$O(n)$	$O(n^2)$	$O(1)$
希尔排序	$O(n \log_2 n)$ ~ $O(n^2)$	$O(n^{1.3})$	$O(n^2)$	$O(1)$
起泡排序	$O(n^2)$	$O(n)$	$O(n^2)$	$O(1)$
快速排序	$O(n \log_2 n)$	$O(n \log_2 n)$	$O(n^2)$	$O(\log_2 n)$ ~ $O(n)$
简单选择	$O(n^2)$	$O(n^2)$	$O(n^2)$	$O(1)$
堆排序	$O(n \log_2 n)$	$O(n \log_2 n)$	$O(n \log_2 n)$	$O(1)$
归并排序	$O(n \log_2 n)$	$O(n \log_2 n)$	$O(n \log_2 n)$	$O(n)$

## SEO

1. title description keyword s title 2. title description  
description keywords
2. HTML W3C
3. HTML HTML
4. js js
5. iframe iframe
6. alt
- 7.

## web

1. cookie
2. session
3. url
4. input
5. ip

## <img> title alt

1. title global attributes (<http://www.w3.org/TR/html-markup/global-attributes.html#common.attrs.core>) advisory information
2. alt <img>

## doctype , doctype

1. <!doctype> HTML      <html>HTML5

2. <!doctype> HTML HTML
3. html doctype
4. HTML4.01 <!doctype> DTD HTML4.01 SGML DTD
5. HTML5 SGML DTD

doctype

1. **HTML4.01 strict**: font frameset <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
2. **HTML4.01 Transitional**: font frameset <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
3. **HTML4.01 Frameset**: frameset <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Frameset//EN" "http://www.w3.org/TR/html4/frameset.dtd">
4. **XHTML1.0 Strict**: frameset XML <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
5. **XHTML1.0 Transitional**: frameset XMI <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
6. **XHTML 1.0 Frameset**: frameset XML <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
7. **HTML 5**: <!doctype html>

## HTML (global attribute)

[MDN: html global attribute \(https://developer.mozilla.org/en-US/docs/Web/HTML/Global\\_attributes\)](https://developer.mozilla.org/en-US/docs/Web/HTML/Global_attributes) [W3C HTML global-attributes \(http://www.w3.org/TR/html-markup/global-attributes.html#common.attrs.core\)](http://www.w3.org/TR/html-markup/global-attributes.html#common.attrs.core)

- accesskey:<a href="#" accesskey="a">aaa</a> windows firefox alt + shift + a
- class:CSS javascript class
- contenteditable:
- contextmenu:
- data-\*:
- dir:
- draggable:
- dropzone: copy, move, link
- hidden:
- id: id
- lang:
- spellcheck:
- style: css
- tabindex: tab
- title:
- translate:

web ,

web HTML HTML css  
HTML h1-h6  
css html classid

[Microformat \(http://en.wikipedia.org/wiki/Microformat\)](http://en.wikipedia.org/wiki/Microformat)

- 
- 
- 
- 

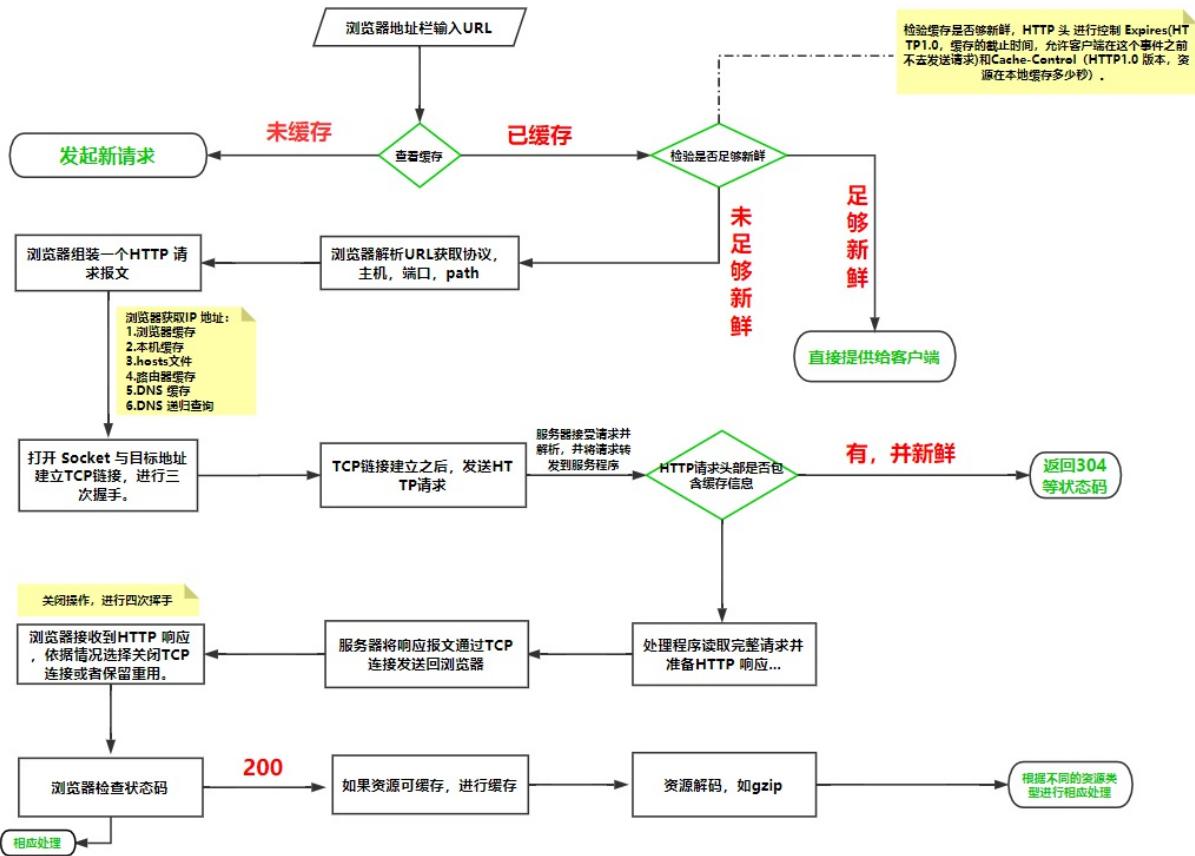
## HTTP method

1. HTTP1.1 **GETHEAD**
2. **GET**
3. **HEAD** GET
4. **PUT URL URL**
5. **POST** HTML
6. **TRACE** TRACE TRACE /
7. **OPTIONS** web
8. **DELETE** URL

## url ( HTTP )

1. URL
2.
  - 1.
  - 2.
  3. HTTP ExpiresCache-Control
    - HTTP1.0 Expires
    - HTTP1.1 Cache-Control: max-age=,
3. **URL** path
4. **HTTPGET**
5. **ip**
  - 1.
  - 2.
  3. hosts
  - 4.
  5. ISP DNS
  6. DNS IP
6. **socket IP TCP**
  1. TCP **SYN=1Seq=X**
  2. **SYN=1 ACK=X+1 Seq=Y**
  3. **ACK=Y+1 Seq=Z**
7. TCP **HTTP**
8. HTTP Host
9. **HTTP 304**

10. HTTP
11. **TCP**
12. HTTP    **TCP TCP**
  1. **Fin=1 Ack=Z Seq= X**
  2. **ACK=X+1 Seq=Z**
  3. **Fin=1 ACK=X Seq=Y**
  4. **ACK=Y+1 Seq=X**
13. 1XX3XX 4XX 5XX 2XX
- 14.
15. gzip
16. HTML
17. **HTML DOM CSSOM js**
18. **DOM**
  1. **Tokenizing** HTML
  2. **Lexing**
  3. **DOM construction** HTML DOM
19. js
20. **CSSOM**
  1. **Tokenizing**
  2. **Node**
  3. **CSSOM** CSSOM
21. **DOM CSSOM**  
[\(https://developers.google.com/web/fundamentals/performance/critical-rendering-path/render-tree-construction\)](https://developers.google.com/web/fundamentals/performance/critical-rendering-path/render-tree-construction):
  1. DOM 1 script,meta2) css        display: none
  2. CSSOM
  - 3.
22. **js**
  1. Document HTML    **document.readystate loading**
  2. HTML **async defer** script    document.write()                      **script**
  3. **async** script        **document.write()** script
  4. document.readState interactive
  5. **defer** document.write()
  6. **Document DOMContentLoaded**
  7.        document.readState complete,window load
23. HTML



## HTTP request

[rfc2616 \(<http://www.w3.org/Protocols/rfc2616/rfc2616-sec5.html>\)](http://www.w3.org/Protocols/rfc2616/rfc2616-sec5.html)

1. **Request-Line URI CRLF**
2. **general-headerrequest-headerentity-header CRLF**
3. **CRLF**
- 4.

```

GET /Protocols/rfc2616/rfc2616-sec5.html HTTP/1.1
Host: www.w3.org
Connection: keep-alive
Cache-Control: max-age=0
Accept:
text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
User-Agent: Mozilla/5.0 (Windows NT 6.1; WOW64) AppleWebKit/537.36 (KHTML, like
Gecko) Chrome/35.0.1916.153 Safari/537.36
Referer: https://www.google.com.hk/
Accept-Encoding: gzip,deflate,sdch
Accept-Language: zh-CN,zh;q=0.8,en;q=0.6
Cookie: authorstyle=yes
If-None-Match: "2cc8-3e3073913b100"
If-Modified-Since: Wed, 01 Sep 2004 13:24:52 GMT

name=qiu&age=25

```

## HTTP response

[rfc2616 \(http://www.w3.org/Protocols/rfc2616/rfc2616-sec6.html\)](http://www.w3.org/Protocols/rfc2616/rfc2616-sec6.html)

1. **HTTP** CRLF
- 2.
3. **CRLF**
- 4.

```
HTTP/1.1 200 OK
Date: Tue, 08 Jul 2014 05:28:43 GMT
Server: Apache/2
Last-Modified: Wed, 01 Sep 2004 13:24:52 GMT
ETag: "40d7-3e3073913b100"
Accept-Ranges: bytes
Content-Length: 16599
Cache-Control: max-age=21600
Expires: Tue, 08 Jul 2014 11:28:43 GMT
P3P: policyref="http://www.w3.org/2001/05/P3P/p3p.xml"
Content-Type: text/html; charset=iso-8859-1

{"name": "qiu", "age": 25}
```

[Best Practices for Speeding Up Your Web Site  
\(https://developer.yahoo.com/performance/rules.html\)](https://developer.yahoo.com/performance/rules.html)

- content
  1. HTTP CSS inline Image
  2. DNS DNS DNS DNS
  - 3.
  4. Ajax
  - 5.
  - 6.
  7. DOM
  - 8.
  9. iframe
  10. 404
- Server
  1. CDN
  2. Expires Cache-Control
  3. Gzip
  4. ETag
  5. Flush Buffer Early
  6. Ajax GET
  7. src img
- Cookie

- 1. cookie
- 2. cookie
- CSS
  - 1.
  - 2. CSS
  - 3. <link>@import
  - 4. IE Filter
- Javascript
  - 1.
  - 2. javascript css
  - 3. javascript css
  - 4.
  - 5. DOM
  - 6.
- - 1.
  - 2. css
  - 3. HTML
  - 4. favicon.ico
- - 1. 25k
  - 2. Pack Components into a Multipart Document

web HTML :

- 
- 
- 
- CSS
- javascript
- end-user web browser preferences are respected

## HTTP

[RFC 2616 \(<http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html>\)](http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html)

- 1XX
  - **100 Continue**
  - **101 Switching Protocols** Upgrade Upgrade
- 2XX
  - **200 OK**
  - **201 Created**

- **202 Accepted**
  - **203 Non-Authoritative Information**HTTP 1.1
  - **204 No Content**
  - **205 Reset Content**HTTP 1.1
  - **206 Partial Content**
- 3XX
  - **300 Multiple Choices**Location
  - **301 Moved Permanently**
  - **302 Found**
  - **303 See Other**301/302POSTLocationGETHTTP 1.1
  - **304 Not Modified**
  - **305 Use Proxy**LocationHTTP 1.1
  - **306 unused**
  - **307 Temporary Redirect**302 Found302POSTPOST303HTTP 1.1  
307303GETPOST307GETHTTP 1.1
- 4XX
  - **400 Bad Request**
  - **401 Unauthorized**
  - **402 Payment Required**
  - **403 Forbidden**
  - **404 Not Found** URI
  - **405 Method Not Allowed**GETPOSTHEADDELETEPUTTRACEHTTP 1.1
  - **406 Not Acceptable**MIMEAcceptHTTP 1.1
  - **407 Proxy Authentication Required**401HTTP 1.1
  - **408 Request Timeout**HTTP 1.1
  - **409 Conflict**PUTHTTP 1.1
  - **410 Gone**404407 404HTTP 1.1
  - **411 Length Required**Content-LengthHTTP 1.1
  - **412 Precondition Failed**HTTP 1.1
  - **413 Request Entity Too Large**Retry-AfterHTTP 1.1
  - **414 Request-URI Too Long**URIHTTP 1.1
  - **415 Unsupported Media Type**HTTP 1.1
  - **416 Requested Range Not Satisfiable**RangeHTTP 1.1
  - **417 Expectation Failed**100-continueExpect(417)100 (SC\_CONTINUE)  
HTTP 1.1

- 5XX:
  - **500 Internal Server Error**
  - **501 Not Implemented**PUT
  - **502 Bad Gateway**
  - **503 Service Unavailable**Servlet503503 Retry-After
  - **504 Gateway Timeout**HTTP 1.1
  - **505 HTTP Version Not Supported**HTTPHTTP 1.1

## CSS

```

1. * IE6+
2. #X id id X IE6+
3. .X class X IE6+
4. X Y X Y IE6+
5. X X IE6+
6. :link:visited:focus:hover:active LoVe HAte: IE4+
7. X + Y X Y IE7+
8. X > Y X Y IE7+
9. X ~ Y X Y IE7+
10. [attr] attr IE7+
11. [attr=value] value
12. [attr~=value] value
13. [attr|=value] value value-
14. [attr^=value] value
15. [attr$=value] value
16. [attr*=value] value
17. [:checked]IE9+
18. X:after, X::afterafter CSS3 ::after IE8+::after IE9+
19. :hover a IE4+ IE7+
20. :not(selector) selector IE9+
21. ::first-letter IE5.5+
22. ::first-line IE5.5+
23. :nth-child(an + b) an + b - 1 n
 >= 0 IE9+
24. :nth-last-child(an + b) an + b - 1
 n >= 0 IE9+
25. X:nth-of-type(an+b)X an + b - 1 IE9+
26. X:nth-last-of-type(an+b)X an+b-1 IE9+
27. X:first-child X IE7+
28. X:last-child X IE9+
29. X:only-child X IE9+
30. X:only-of-type X IE9+
31. X:first-of-type X
 IE9+

```

## CSS sprite ,

background-position

1. HTTP

2.

3.

1.

2.

**display: none; visibility: hidden;**

1. display:none;visibility: hidden;

2. display: none;visibility: hidden; hidden visibility: visible

3. display visibility

4. display: none; visibility: hidden;

## css hack hack

**CSS** hack 1 hack2 hack3IE

- IE [IE5, IE9]

```
<!--[if IE 6]>
Special instructions for IE 6 here
<![endif]-->
```

- hack

```
***** Selector Hacks *****

/* IE6 and below */
* html #uno {
 color: red;
}

/* IE7 */
*:first-child + html #dos {
 color: red;
}

/* IE7, FF, Saf, Opera */
html > body #tres {
 color: red;
}

/* IE8, FF, Saf, Opera (Everything but IE 6,7) */
html>/**/body #cuatro {
 color: red;
}
```

```
/* Opera 9.27 and below, safari 2 */
html:first-child #cinco {
 color: red;
}

/* Safari 2-3 */
html[xmlns*=''] body:last-child #seis {
 color: red;
}

/* safari 3+, chrome 1+, opera9+, ff 3.5+ */
body:nth-of-type(1) #siete {
 color: red;
}

/* safari 3+, chrome 1+, opera9+, ff 3.5+ */
body:first-of-type #ochos {
 color: red;
}

/* saf3+, chrome1+ */
@media screen and (-webkit-min-device-pixel-ratio: 0) {
 #diez {
 color: red;
 }
}

/* iPhone / mobile webkit */
@media screen and (max-device-width: 480px) {
 #veintiseis {
 color: red;
 }
}

/* Safari 2 - 3.1 */
html[xmlns*='']:root #trece {
 color: red;
}

/* Safari 2 - 3.1, Opera 9.25 */
|html[xmlns=''] #catorce {
 color: red;
}

/* Everything but IE6-8 */
:root * > #quince {
 color: red;
}

/* IE7 */
* + html #dieciocho {
```

```

 color: red;
}

/* Firefox only. 1+ */
#veinticuatro,
x:-moz-any-link {
 color: red;
}

/* Firefox 3.0+ */
#veinticinco,
x:-moz-any-link,
x:default {
 color: red;
}

```

- hack bug

```

/* IE6 */
#once { _color: blue }

/* IE6, IE7 */
#doce { *color: blue; /* or #color: blue */ }

/* Everything but IE6 */
#diecisiete { color/*/: blue }

/* IE6, IE7, IE8 */
#diecinueve { color: blue\9; }

/* IE7, IE8 */
#veinte { color/***/: blue\9; }

/* IE6, IE7 -- acts as an !important */
#veintesiete { color: blue !ie; } /* string after ! can be anything */

```

## specified value,computed value,used value

- specified value:
  - 1.
  - 2.
  3. css
- computed value: specified value em font-size width margin  
computed value line-height computed value used value
- used value window.getComputedStyle
  - background-position
  - bottom, left, right, top
  - height, width
  - margin-bottom, margin-left, margin-right, margin-top

- min-height, min-width
- padding-bottom, padding-left, padding-right, padding-top
- text-indent

## **link@import**

1. link HTML @import CSS
2. link @import [FOUC \(http://www.bluerobot.com/web/css/fouc.asp/\)](http://www.bluerobot.com/web/css/fouc.asp/)
3. linkrel="alternate stylesheet"
4. link@import@import
5. @import css
6. [link @import \(http://www.stevesouders.com/blog/2009/04/09/dont-use-import/\)](http://www.stevesouders.com/blog/2009/04/09/dont-use-import/)

## **display: block; display: inline;**

block

1. width
2. margin/padding
3. 4. 5. vertical-align

inline

- 1.direction
2. 3. white-space
4. margin/padding
5. width/height
6. line-height
- height,margin,padding,border
6. block
- 7.vertical-align

## **PNG,GIF,JPG**

[\(http://www.yuiblog.com/blog/2008/11/04/imageopt-2/\)](http://www.yuiblog.com/blog/2008/11/04/imageopt-2/)

**GIF:**

1. 8 256
- 2.
- 3.
4. boolean
- 5.

**JPEG**

1. 256
- 2.
- 3.
- 4.
- 5.

**PNG**

1. PNG8 truecolor PNG
2. PNG8 GIF 256 alpha
- 3.

**CSS**

-

- [font](https://developer.mozilla.org/en-US/docs/Web/CSS/font) (<https://developer.mozilla.org/en-US/docs/Web/CSS/font>)
- [word-break](https://developer.mozilla.org/en-US/docs/Web/CSS/word-break) (<https://developer.mozilla.org/en-US/docs/Web/CSS/word-break>)
- [letter-spacing](https://developer.mozilla.org/en-US/docs/Web/CSS/letter-spacing) (<https://developer.mozilla.org/en-US/docs/Web/CSS/letter-spacing>)
- [text-align](https://developer.mozilla.org/en-US/docs/Web/CSS/text-align) (<https://developer.mozilla.org/en-US/docs/Web/CSS/text-align>)
- [text-rendering](https://developer.mozilla.org/en-US/docs/Web/CSS/text-rendering) (<https://developer.mozilla.org/en-US/docs/Web/CSS/text-rendering>)
- [word-spacing](https://developer.mozilla.org/en-US/docs/Web/CSS/word-spacing) (<https://developer.mozilla.org/en-US/docs/Web/CSS/word-spacing>)
- [white-space](https://developer.mozilla.org/en-US/docs/Web/CSS/white-space) (<https://developer.mozilla.org/en-US/docs/Web/CSS/white-space>)
- [text-indent](https://developer.mozilla.org/en-US/docs/Web/CSS/text-indent) (<https://developer.mozilla.org/en-US/docs/Web/CSS/text-indent>)
- [text-transform](https://developer.mozilla.org/en-US/docs/Web/CSS/text-transform) (<https://developer.mozilla.org/en-US/docs/Web/CSS/text-transform>)
- [text-shadow](https://developer.mozilla.org/en-US/docs/Web/CSS/text-shadow) (<https://developer.mozilla.org/en-US/docs/Web/CSS/text-shadow>)
- [line-height](https://developer.mozilla.org/en-US/docs/Web/CSS/line-height) (<https://developer.mozilla.org/en-US/docs/Web/CSS/line-height>)
- [color](https://developer.mozilla.org/en-US/docs/Web/CSS/color) (<https://developer.mozilla.org/en-US/docs/Web/CSS/color>)
- [visibility](https://developer.mozilla.org/en-US/docs/Web/CSS/visibility) (<https://developer.mozilla.org/en-US/docs/Web/CSS/visibility>)
- [cursor](https://developer.mozilla.org/en-US/docs/Web/CSS/cursor) (<https://developer.mozilla.org/en-US/docs/Web/CSS/cursor>)

## IE6 bug,,

- IE6 min-height css hack

```
.target {
 min-height: 100px;
 height: auto !important;
 height: 100px; // IE6
}
```

- olli1 li display: list-item;
- overflow: auto;position: relative;1 position: relative;; 2 position: relative;

```
<style type="text/css">
.outer {
 width: 215px;
 height: 100px;
 border: 1px solid red;
 overflow: auto;
 position: relative; /* bug */
}
.inner {
 width: 100px;
 height: 200px;
 background-color: purple;
 position: relative;
}
</style>

<div class="outer">
 <div class="inner"></div>
</div>
```

- IE6 a:hover js mouseentermouseleave

```

<style type="text/css">
.p:hover,
.hover {
 background: purple;
}
</style>

<p class="p" id="target">aaaa bbbbbDDDDDDDDDDDDd aaaa lkjlkjdf
j</p>

<script type="text/javascript">
function addClass(elem, cls) {
 if (elem.className) {
 elem.className += ' ' + cls;
 } else {
 elem.className = cls;
 }
}
function removeClass(elem, cls) {
 var className = ' ' + elem.className + ' ';
 var reg = new RegExp(' ' + cls + ' ', 'g');
 elem.className = className.replace(reg, ' ').replace(/\^ +| +$/ , ' ');
}

var target = document.getElementById('target');
if (target.attachEvent) {
 target.attachEvent('onmouseenter', function () {
 addClass(target, 'hover');
 });
 target.attachEvent('onmouseleave', function () {
 removeClass(target, 'hover');
 })
}
</script>

```

- IE5-8 opacity

```

.opacity {
 opacity: 0.4;
 filter: alpha(opacity=60); /* for IE5-7 */
 -ms-filter: "progid:DXImageTransform.Microsoft.Alpha(Opacity=60)"; /* for
IE 8*/
}

```

- IE6 heightfont-sizefont-size font-size: 0;
- IE6 PNG : **IE6 gif**
- IE6-7 display: inline-block inline hasLayout

```

display: inline-block;
*display: inline;
*zoom: 1;

```

- IE6

```
1 padding
2 display: inline;css display:inline block
• margin auto IE6 text-align: center;
```

( )

1. clear: both
2. ()
3. [\(http://nicolasgallagher.com/micro-clearfix-hack/\)](http://nicolasgallagher.com/micro-clearfix-hack/)

```
/***
*
* 1 contentopera
* contenteditable
* 2 displaytableblock
* top-margin,BFCIE6/7
* zoom: 1;
**/

.clearfix:before,
.clearfix:after {
 content: " "; /* 1 */
 display: table; /* 2 */
}

.clearfix:after {
 clear: both;
}

/***
* IE 6/7
* hasLayout
*/
.clearfix {
 *zoom: 1;
}
```

## FOUC?

Flash Of Unstyled Content      head

## **(block formatting context),BFC**

- 1.
2. float:none
3. position:absolute,fixed
4. display:inline-block,table-cell, table-caption,flex, inline-flex
5. overflow:visible

- 1.
- 2.
3. margin

## display, float, position

1. display none position float
2. position absolute fixed float nonedisplay
3. float nonedisplay
4. display
5. display

### display

Specified value	Computed value
inline-table	table
inline, table-row-group, table-column, table-column-group, table-header-group, table-footer-group, table-row, table-cell, table-caption, inline-block	block
others	same as specified

## (collapsing margins)

margin margin

1. margin
2. /inline-block / margin margin
3. margin
4. margin-bottom margin-top

## (containing block)

1. viewport anchored at the canvas origin paged media page area direction
2. positionrelative static displayblock, list-item, table
3. positionfixed viewport paged media page area
4. positionabsolute positionrelative, absolute fixed
  - o the containing block is the bounding box around the **padding boxes** of the first and the last inline boxes generated for that element.
  - o **padding edge**

## stacking context,

z

- 1.
2. html
- 3.
4. positioned html

stacking context

- 1.
2. z-index auto
3. a flex item with a z-index value other than 'auto'
4. opacity 1
5. webkit chrome22+z-index autoposition: fixed stacking context

- **inline** text-align: center;
- **block** 12 margin auto3IE6 text-align: center;,

```
<body>
 <div class="content">
 aaaaaa aaaaaa a a a a a a a a a
 </div>
</body>

<style>
 body {
 background: #DDD;
 text-align: center; /* 3 */
 }
 .content {
 width: 500px; /* 1 */
 text-align: left; /* 3 */
 margin: 0 auto; /* 2 */

 background: purple;
 }
</style>
```

- 12 position: relative;3left right 50%4 margin -1

```
<body>
 <div class="content">
 aaaaaa aaaaaa a a a a a a a a
 </div>
</body>

<style>
 body {
 background: #DDD;
 }
 .content {
 width: 500px; /* 1 */
 float: left;

 position: relative; /* 2 */
 left: 50%; /* 3 */
 margin-left: -250px; /* 4 */

 background-color: purple;
 }
</style>
```

- 12 50%3-1

```
<body>
 <div class="content">
 aaaaaa aaaaaa a a a a a a a a
 </div>
</body>

<style>
 body {
 background: #DDD;
 position: relative;
 }
 .content {
 width: 800px;

 position: absolute;
 left: 50%;
 margin-left: -400px;

 background-color: purple;
 }
</style>
```

- 12 0,3 auto

```

<body>
 <div class="content">
 aaaaaa aaaaaa a a a a a a a a
 </div>
</body>

<style>
 body {
 background: #DDD;
 position: relative;
 }
 .content {
 width: 800px;

 position: absolute;
 margin: 0 auto;
 left: 0;
 right: 0;

 background-color: purple;
 }
</style>

```

[6 Methods For Vertical Centering With CSS](http://www.vanseodesign.com/css/vertical-centering/) (<http://www.vanseodesign.com/css/vertical-centering/>) [8 CSS](http://blog.csdn.net/freshlover/article/details/11579669) (<http://blog.csdn.net/freshlover/article/details/11579669>)

- font-sizeline-height

```

<p class="text">center text</p>

<style>
.text {
 line-height: 200px;
}
</style>

```

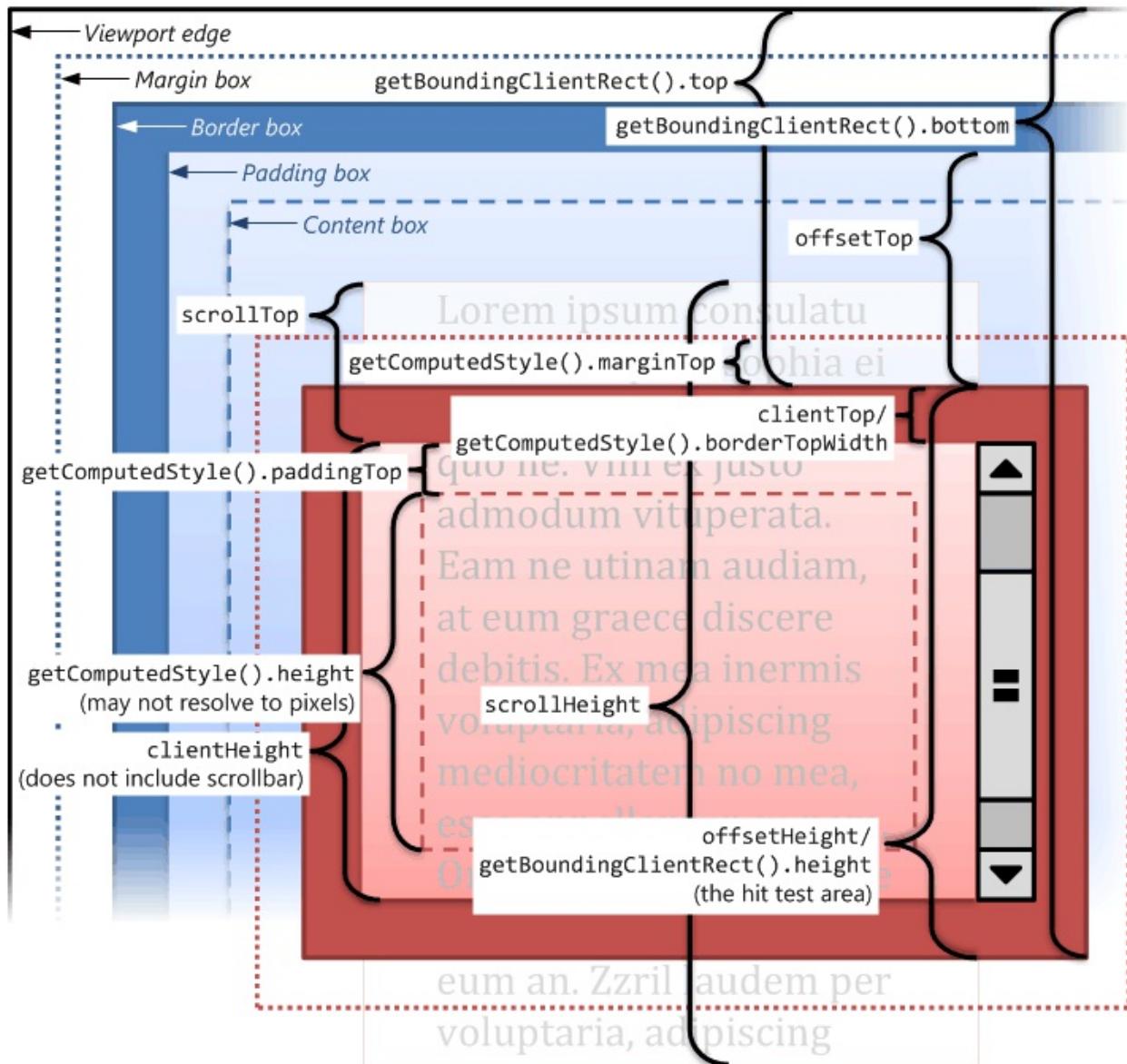
## DOM e e.getAttribute(propName) e.propName

- e.getAttribute() DOM
- e.propName HTML a HTMLAnchorElement getAttribute
- e.getAttribute() null""
- e.propName undefined
- attribute property idtitle
- <input hidden/> hasAttribute removeAttribute property
- <a href="../index.html">link</a> href property URL
- attribute property form <input value="hello"/> defaultValue value property setAttribute value value property

## offsetWidth/offsetHeight, clientWidth/clientHeight scrollWidth/scrollHeight

- offsetWidth/offsetHeight **content + padding + border** e.getBoundingClientRect()
- clientWidth/clientHeight **content + padding**
- scrollWidth/scrollHeight **content + padding +**

[Measuring Element Dimension and Location with CSSOM in Windows Internet Explorer 9](http://msdn.microsoft.com/en-us/library/ie/hh781509(v=vs.85).aspx)  
([http://msdn.microsoft.com/en-us/library/ie/hh781509\(v=vs.85\).aspx](http://msdn.microsoft.com/en-us/library/ie/hh781509(v=vs.85).aspx))



## XMLHttpRequest

1. readyState:
  - UNSENT0
  - OPENED1open() xhr send()
  - HEADERS\_RECEIVED(2) HTTP
  - LOADING(3)

- DONE(4)
3. onreadystatechange readyState
  4. status HTTP 200 404
  5. statusText: HTTP OK No Content
  6. responseText:
  7. responseXML: Document XML
  8. abort(): HTTP
  9. getAllResponseHeaders(): HTTP //
  10. getResponseHeader(headerName): headName
  11. open(method, url, asynchronous [, user, password]): method HTTP url  
URL asynchronous user password
  12. setRequestHeader(name, value): HTTP
  13. send(body): body POST GET null

## **focus/blur focusin/focusout**

1. focus/blur focusin/focusout
2. focus/blur focusin/focusout FireFox FireFox  
elem.addEventListener('focus', handler, true)
3.
  1. window
  - 2.
  - 3.
  4. tabindex

## **mouseover/mouseout mouseenter/mouseleave**

1. mouseover/mouseout mouseenter/mouseleave IE5.5 DOM3
2. mouseover/mouseout mouseenter/mouseleave / **mouseover/mouseout**
3. **event.target / event.relatedTarget/ IE**      **event.srcElement / event.toElement event.fromElement**

div#target

```

<div id="target">test</div>

<script type="text/javascript">
var target = document.getElementById('target');
if (target.addEventListener) {
 target.addEventListener('mouseout', mouseoutHandler, false);
} else if (target.attachEvent) {
 target.attachEvent('onmouseout', mouseoutHandler);
}

function mouseoutHandler(e) {
 e = e || window.event;
 var target = e.target || e.srcElement;

 //
 if (target.id !== 'target') {
 return;
 }

 //
 var relatedTarget = e.relatedTarget || e.toElement;
 while (relatedTarget !== target
 && relatedTarget.nodeName.toUpperCase() !== 'BODY') {
 relatedTarget = relatedTarget.parentNode;
 }

 //
 if (relatedTarget === target) {
 return;
 }

 //
 //alert('');
}

</script>

```

## **sessionStorage,localStorage,cookie**

- 1.
2. cookie cookieweb storage
3. cookie path cookie cookie
4. cookie sessionStorage localStorage
5. sessionStorage localStorage cookie path
6. localStorage update
7. cookie secure HTTPS
8. 300 cookie 20 cookie 4kweb storage 5M

## **javascript**

- 1.
- 2.
- 3.

js DOM

- log <img>,<script>,<link>,<iframe> srchref url
- **json** <script> jsonp
- HTML5 targetWindow.postMessage(data, origin); data origin origin window.addEventListener('message', handler, false); handler event.data postMessage event.origin originevent.source
- url
- HTML5 CORS HTTP           **Access-Control-Allow-Origin:** \* ajax

## javascript

- undefined
- null
- string
- boolean
- number
- [\(Symbol\)](https://developer.mozilla.org/en-US/docs/Glossary/Symbol)(ES6)
- Object

,

- 1.
- 2.
- 3.

- 1.
- 2.

## javascript

1. [\(function\)](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Statements/function)
2. [function](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Operators/function)
3. [Function](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Function)
4. [ES6:arrow function](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/arrow_functions)

[MDN:Functions\\_and\\_function\\_scope \(https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Functions\\_and\\_function\\_scope\)](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Functions_and_function_scope)

## web

HTML5 web

1. html manifest : <html manifest="myapp.appcache" > text/cache-manifest MIME
2. manifest CACHE MANIFEST URL manifest url#
3. url
  - CACHE
  - NETWORK  
  "\*
  - Fallback  
  URLURLURL URL URL

CACHE MANIFEST

CACHE:  
myapp.html  
myapp.css  
myapp.js

FALLBACK:  
videos/ offline\_help.html

NETWORK:  
cgi/

## localStorage sessionStorage

- localStorage sessionStorage
- localStorage sessionStorage iframe
- Storage javascript   **setItem(key, value)getItem(key)removeItem(key)  
clear()length key(index) key**

```
localStorage.setItem('x', 1); // storage x->1
localStorage.getItem('x'); // return value of x

//
for (var i = 0, len = localStorage.length; i < len; ++i) {
 var name = localStorage.key(i);
 var value = localStorage.getItem(name);
}

localStorage.removeItem('x'); // remove x
localStorage.clear(); // remove all data
```

## cookie

- cookie web HTTP cookie
- cookie
- cookie **max-agepath, domainsecure**
- cookie **max-age=seconds** cookie
- cookie **pathdomainweb**
- cookie document.cookie
- document.cookie '=key=value,

```
document.cookie = 'name=qiu; max-age=9999; path=/; domain=domain; secure';

document.cookie = 'name=aaa; path=/; domain=domain; secure';
// cookie
// cookie

// max-age 0cookie

//cookiedocument.cookie
// ';


```

[cookieUtil.js](https://github.com/qiu-deqing/google/blob/master/module/js/cookieUtil.js) (<https://github.com/qiu-deqing/google/blob/master/module/js/cookieUtil.js>) cookie

## javascript

1. var obj = {};
2. var obj = new Object();
3. Object.create(): var obj = Object.create(Object.prototype);

====

- 1.
2. null undefined
3. true false
4. **NaN**
5. -0 0
6. 16 =====
- 7.

==

1. ===
- 2.
3. null undefined
- 4.
5. **true 1false 0** ==
6. ==
- 7.

1. `toString()` javascript primitive value string number boolean,
2. `toString()` javascript `valueOf()`
3. javascript `toString()` `valueOf()` throws a `TypeError`

- ```
1. valueOf() javascript
2. toString() javascript
3. throws a TypeError
```

<,>,<=,>=

:

1. `valueOf` `toString`
2. 16 unicode
- 3.

+

- 1.
- 2.
- 3.

arguments ,

- `arguments`
- `arguments[index]` `arguments`
- `arguments.length` `Function.length`
- `arguments.callee` `this`
- `arguments.caller`
- <code>`var args = Array.prototype.slice.call(arguments, 0);`</code>

DOM , EventUtil

- DOM `capturebubble` `window` `DOM` `window`
- `elem.addEventListener(type, handler, capture)`/`elem.removeEventListener(type, handler, capture)``handler` event `event.target` `handler` `this`
`event.preventDefault()`/`event.stopPropagation()`/`event.stopImmediatePropagation()`
- IE `elem.attachEvent('on'+type, handler)`/`elem.detachEvent('on'+type, handler)`
`handler` event `window.event` `event.srcElement` `handler` `this` `window`
`handler.call(elem, event)``event.returnValue` `false` `event.cancelBubble`
`true`
-

```
/**  
 *  
 * @author (qiu_deqing@126.com)
```

```
/*
var EventUtil = {
    getEvent: function (event) {
        return event || window.event;
    },
    getTarget: function (event) {
        return event.target || event.srcElement;
    },
    // IE
    on: function (elem, type, handler) {
        if (elem.addEventListener) {
            elem.addEventListener(type, handler, false);
            return handler;
        } else if (elem.attachEvent) {
            var wrapper = function () {
                var event = window.event;
                event.target = event.srcElement;
                handler.call(elem, event);
            };
            elem.attachEvent('on' + type, wrapper);
            return wrapper;
        }
    },
    off: function (elem, type, handler) {
        if (elem.removeEventListener) {
            elem.removeEventListener(type, handler, false);
        } else if (elem.detachEvent) {
            elem.detachEvent('on' + type, handler);
        }
    },
    preventDefault: function (event) {
        if (event.preventDefault) {
            event.preventDefault();
        } else if ('returnValue' in event) {
            event.returnValue = false;
        }
    },
    stopPropagation: function (event) {
        if (event.stopPropagation) {
            event.stopPropagation();
        } else if ('cancelBubble' in event) {
            event.cancelBubble = true;
        }
    },
    /**
     * keypress
     * keypressnull
     */
    getChar: function (event) {
        if (event.which == null) {
            return String.fromCharCode(event.keyCode); // IE
        }
    }
};
```

```
        }
    else if (event.which != 0 && event.charCode != 0) {
        return String.fromCharCode(event.which);      // the rest
    }
    else {
        return null;      // special key
    }
};
```

,

```
function Shape() {}

function Rect() {}

// 1
Rect.prototype = new Shape();

// 2
Rect.prototype = Shape.prototype;

// 3
Rect.prototype = Object.create(Shape.prototype);

Rect.prototype.area = function () {
    // do something
};
```

1

- 1.
- 2.
- 3.
- 4.
- 5.

2

- 1.
- 2.

3

1. 1.2
2. ES5

- 1.

```
function Rect() {  
    Shape.call(this);  
}
```

2. Rect.prototype.constructor = Rect;
3. polyfill

```
function create(obj) {  
    if (Object.create) {  
        return Object.create(obj);  
    }  
  
    function f() {};  
    f.prototype = obj;  
    return new f();  
}
```

js , (, 0.2),, IE8+,:

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| | | | | |
|--|--|--|---|--|
|  |  |  |  |  |
| Case For iPhone 5s
US \$2.99 / piece
US-03-09/piece | 88 Colors Eyeshadow
US \$3.59 / piece
US-05-27/piece | Waterproof Smartphone
US \$140.00 / piece
US-\$199.00/piece | Aroma Diffuser
US \$25.30 / piece
US-\$28.30/piece | Glitter Wallpaper
US \$2.60 / Meter
US-03-30/Meter |

```

<style>
#target {
    width: 200px;
    height: 300px;
    margin: 40px;
    background-color: tomato;
}
</style>

<div id="target"></div>

<script>
function addMask(elem, opacity) {
    opacity = opacity || 0.2;

    var rect = elem.getBoundingClientRect();
    var style = getComputedStyle(elem, null);

    var mask = document.createElement('div');
    mask.style.position = 'absolute';
    var marginLeft = parseFloat(style.marginLeft);
    mask.style.left = (elem.offsetLeft - marginLeft) + 'px';
    var marginTop = parseFloat(style.marginTop);
    mask.style.top = (elem.offsetTop - marginTop) + 'px';
    mask.style.zIndex = 9999;
    mask.style.opacity = '' + opacity;
    mask.style.backgroundColor = '#000';

    mask.style.width = (parseFloat(style.marginLeft) +
        parseFloat(style.marginRight) + rect.width) + 'px';
    mask.style.height = (parseFloat(style.marginTop) +
        parseFloat(style.marginBottom) + rect.height) + 'px';

    elem.parentNode.appendChild(mask);
}

var target = document.getElementById('target');
addMask(target);

target.addEventListener('click', function () {
    console.log('click');
}, false);
</script>

```

(x) x ,,""

```

var days = [ "", "", "", "", "", "", "" ];
var date = new Date();

console.log('' + days[date.getDay()]);

```

0 1 2 3 4,,,

```
for (var i = 0; i < 5; ++i) {
  setTimeout(function () {
    console.log(i + ' ');
  }, 100);
}
```

setTimeout ijavascript setTimeout for i 5. 5
setTimeout i

```
for (var i = 0; i < 5; ++i) {
  (function (i) {
    setTimeout(function () {
      console.log(i + ' ');
    }, 100);
  })(i);
}
```

**Page , post (postMsg); chekc, ture false.,
Page postXXX , postXXX , chekc true
postXXX , false postXXX**

```

function Page() {}

Page.prototype = {
    constructor: Page,

    postA: function (a) {
        console.log('a:' + a);
    },
    postB: function (b) {
        console.log('b:' + b);
    },
    postC: function (c) {
        console.log('c:' + c);
    },
    check: function () {
        return Math.random() > 0.5;
    }
}

function checkfy(obj) {
    for (var key in obj) {
        if (key.indexOf('post') === 0 && typeof obj[key] === 'function') {
            function (key) {
                var fn = obj[key];
                obj[key] = function () {
                    if (obj.check()) {
                        fn.apply(obj, arguments);
                    }
                };
            }(key));
        }
    }
} // end checkfy()

checkfy(Page.prototype);

var obj = new Page();

obj.postA('checkfy');
obj.postB('checkfy');
obj.postC('checkfy');

```

javascript deepClone

```

function deepClone(obj) {
    var _toString = Object.prototype.toString;

    // null, undefined, non-object, function
    if (!obj || typeof obj !== 'object') {
        return obj;
    }
}

```

```

// DOM Node
if (obj.nodeType && 'cloneNode' in obj) {
    return obj.cloneNode(true);
}

// Date
if (_toString.call(obj) === '[object Date]') {
    return new Date(obj.getTime());
}

// RegExp
if (_toString.call(obj) === '[object RegExp]') {
    var flags = [];
    if (obj.global) { flags.push('g'); }
    if (obj.multiline) { flags.push('m'); }
    if (obj.ignoreCase) { flags.push('i'); }

    return new RegExp(obj.source, flags.join(''));
}

var result = Array.isArray(obj) ? [] :
    obj.constructor ? new obj.constructor() : {};

for (var key in obj) {
    result[key] = deepClone(obj[key]);
}

return result;
}

function A() {
    this.a = a;
}

var a = {
    name: 'qiu',
    birth: new Date(),
    pattern: /qiu/gim,
    container: document.body,
    hobbys: ['book', new Date(), /aaa/gim, 111]
};

var c = new A();
var b = deepClone(c);
console.log(c.a === b.a);
console.log(c, b);

```

, **Button1** **Button1** **Button2**

```

<!doctype html>
<html>
<head>
    <meta charset="utf-8">
    <title>TEst</title>
</head>
<body>

<div>
    <input type="button" id ="button1" value="1" />
    <input type="button" id ="button2" value="2" />
</div>

<script type="text/javascript">
    var btn1 = document.getElementById('button1');
    var btn2 = document.getElementById('button2');

    addListener(btn1, 'click', function (event) {
        btn1.parentNode.insertBefore(btn2, btn1);
    });

    function addListener(elem, type, handler) {
        if (elem.addEventListener) {
            elem.addEventListener(type, handler, false);
            return handler;
        } else if (elem.attachEvent) {
            function wrapper() {
                var event = window.event;
                event.target = event.srcElement;
                handler.call(elem, event);
            }
            elem.attachEvent('on' + type, wrapper);
            return wrapper;
        }
    }

```

,"×× ×× ×× ×× ×× "

```

<!doctype html>
<html>
<head>
    <meta charset="utf-8">
    <title>TEst</title>
</head>
<body>

<span id="target"></span>

```

```

<script type="text/javascript">
    // 30
    function getTimeString() {
        var start = new Date();
        var end = new Date(start.getFullYear() + 1, 0, 1);
        var elapse = Math.floor((end - start) / 1000);

        var seconds = elapse % 60 ;
        var minutes = Math.floor(elapse / 60) % 60;
        var hours = Math.floor(elapse / (60 * 60)) % 24;
        var days = Math.floor(elapse / (60 * 60 * 24)) % 30;
        var months = Math.floor(elapse / (60 * 60 * 24 * 30)) % 12;
        var years = Math.floor(elapse / (60 * 60 * 24 * 30 * 12));

        return start.getFullYear() + '' + years + '' + months + '' +
days + ''
            + hours + '' + minutes + '' + seconds + '';
    }

    function domText(elem, text) {
        if (text == undefined) {

            if (elem.textContent) {
                return elem.textContent;
            } else if (elem.innerText) {
                return elem.innerText;
            }
        } else {
            if (elem.textContent) {
                elem.textContent = text;
            } else if (elem.innerText) {
                elem.innerText = text;
            } else {
                elem.innerHTML = text;
            }
        }
    }

    var target = document.getElementById('target');

    setInterval(function () {
        domText(target, getTimeString());
    }, 1000)
</script>

</body>
</html>

```

"""

```
[1, [2, [ [3, 4], 5], 6]] => [1, 2, 3, 4, 5, 6]
```

```
var data = [1, [2, [ [3, 4], 5], 6]];

function flat(data, result) {
    var i, d, len;
    for (i = 0, len = data.length; i < len; ++i) {
        d = data[i];
        if (typeof d === 'number') {
            result.push(d);
        } else {
            flat(d, result);
        }
    }
}

var result = [];
flat(data, result);

console.log(result);
```

Array.isArray()

```
/** 
 * false
 *
 * @param {Object} arg
 * @return {Boolean} truefalse
 */
function isArray(arg) {
    if (typeof arg === 'object') {
        return Object.prototype.toString.call(arg) === '[object Array]';
    }
    return false;
}
```

```

if (window.addEventListener) {
    var addListener = function (el, type, listener, useCapture) {
        el.addEventListener(type, listener, useCapture);
    };
}
else if (document.all) {
    addListener = function (el, type, listener) {
        el.attachEvent('on' + type, function () {
            listener.apply(el);
        });
    };
}

```

DOM

- 1.
2. `listener.apply(el)` IE this
- 3.

1. `document.all` IE `if(el.attachEvent)`
2. `addListener API`
3. `listener.apply this`
4. IE `listener event target`

:

```

var addListener;

if (window.addEventListener) {
    addListener = function (el, type, listener, useCapture) {
        el.addEventListener(type, listener, useCapture);
        return listener;
    };
}
else if (window.attachEvent) {
    addListener = function (el, type, listener) {
        // thiseventtarget
        var wrapper = function () {
            var event = window.event;
            event.target = event.srcElement;
            listener.call(el, event);
        };

        el.attachEvent('on' + type, wrapper);
        return wrapper;
        // wrapperremove
    };
}

```

```
/**  
 *  
 *  typeof'function'  
 *  
 * @param {Any} arg  
 * @return {boolean} truefalse  
 */  
  
function isFunction(arg) {  
    if (arg) {  
        if (typeof (/./) !== 'function') {  
            return typeof arg === 'function';  
        } else {  
            return Object.prototype.toString.call(arg) === '[object Function]';  
        }  
    } // end if  
    return false;  
}
```

url query string , Object,query string application/x-www-form-urlencoded

```
/**  
 * query stringkey  
 *  
 * @param {String} query query?  
 * application/x-www-form-urlencoded  
 * @return {Object}  
 */  
  
function parseQuery(query) {  
    var result = {};  
  
    //  
    if (typeof query !== 'string') {  
        return result;  
    }  
  
    // ?  
    if (query.charAt(0) === '?') {  
        query = query.substring(1);  
    }  
  
    var pairs = query.split('&');  
    var pair;  
    var key, value;  
    var i, len;  
  
    for (i = 0, len = pairs.length; i < len; ++i) {  
        pair = pairs[i].split('=');
```

```

// application/x-www-form-urlencoded' '+
key = decodeURIComponent(pair[0]).replace(/\+/g, ' ');
value = decodeURIComponent(pair[1]).replace(/\+/g, ' ');

// key
if (!(key in result)) {
    result[key] = value;
}
// keyvalue
else if (isArray(result[key])) {
    result[key].push(value);
}
// key
else {
    var arr = [result[key]];
    arr.push(value);
    result[key] = arr;
} // end if-else
} // end for

return result;
}

function isArray(arg) {
    if (arg && typeof arg === 'object') {
        return Object.prototype.toString.call(arg) === '[object Array]';
    }
    return false;
}
/**/
console.log(parseQuery('sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8'));
*/

```

url, Object window.location

```

/** 
 * urlwindow.location
 * location:
 * {
 *     href: 'url',
 *     origin: 'pathname',
 *     protocol: 'url:',
 *     username: '', //
 *     password: '', //
 *     host: ':',
 *     hostname: ''
 *     port: '',
 *     pathname: '/',
 *     search: 'query string?',
 *     hash: '#fragment identifier'
 * }
 *
 * @param {string} url url
 * @return {Object} url
 */
function parseUrl(url) {
    var result = {};
    var keys = ['href', 'origin', 'protocol', 'host',
               'hostname', 'port', 'pathname', 'search', 'hash'];
    var i, len;
    var regexp = /(([^\:]+)\//((([^\:\/\?\#]+)(\:\d+)?))(\//[^?\#]*?(\?[^\#]*?)?
    (\?.*)?/;

    var match = regexp.exec(url);

    if (match) {
        for (i = keys.length - 1; i >= 0; --i) {
            result[keys[i]] = match[i] ? match[i] : '';
        }
    }

    return result;
}

```

getViewportSize

```
/**  
*  
**/  
function getViewportSize(w) {  
    w = w || window;  
  
    // IE9  
    if ('innerHeight' in w) {  
        return {  
            width: w.innerWidth,  
            height: w.innerHeight  
        };  
    }  
  
    var d = w.document;  
    // IE 8  
    if (document.compatMode === 'CSS1Compat') {  
        return {  
            width: d.documentElement.clientWidth,  
            height: d.documentElement.clientHeight  
        };  
    }  
  
    // IE8  
    return {  
        width: d.body.clientWidth,  
        height: d.body.clientHeight  
    };  
}
```

getScrollOffset

```

/**
 * windowwindow
 *
 *
 * @param {window} w
 * @return {Object} obj.x,obj.y
 */
function getScrollOffset(w) {
    w = w || window;
    //
    if (w.pageXOffset != null) {
        return {
            x: w.pageXOffset,
            y: w.pageYOffset
        };
    }

    // IE
    var d = w.document;
    if (d.compatMode === 'CSS1Compat') {
        return {
            x: d.documentElement.scrollLeft,
            y: d.documentElement.scrollTop
        }
    }

    return {
        x: d.body.scrollLeft,
        y: d.body.scrollTop
    };
}

```

richText,,, img p pic class.. jQuery KISSY.

```

function richText(text) {
    var div = document.createElement('div');
    div.innerHTML = text;
    var p = div.getElementsByTagName('p');
    var i, len;

    for (i = 0, len = p.length; i < len; ++i) {
        if (p[i].getElementsByTagName('img').length === 1) {
            p[i].classList.add('pic');
        }
    }

    return div.innerHTML;
}

```

Event , on,off,once trigger

```
function Event() {
    if (!(this instanceof Event)) {
        return new Event();
    }
    this._callbacks = {};
}

Event.prototype.on = function (type, handler) {
    this._callbacks = this._callbacks || {};
    this._callbacks[type] = this.callbacks[type] || [];
    this._callbacks[type].push(handler);

    return this;
};

Event.prototype.off = function (type, handler) {
    var list = this._callbacks[type];

    if (list) {
        for (var i = list.length; i >= 0; --i) {
            if (list[i] === handler) {
                list.splice(i, 1);
            }
        }
    }

    return this;
};

Event.prototype.trigger = function (type, data) {
    var list = this._callbacks[type];

    if (list) {
        for (var i = 0, len = list.length; i < len; ++i) {
            list[i].call(this, data);
        }
    }
};

Event.prototype.once = function (type, handler) {
    var self = this;

    function wrapper() {
        handler.apply(self, arguments);
        self.off(type, wrapper);
    }
    this.on(type, wrapper);
    return this;
};
```

```

<ul id="target">
    <li>1</li>
    <li>2</li>
    <li>3</li>
    <li>4</li>
</ul>

<script>
    var target = document.getElementById('target');
    var i;
    var frag = document.createDocumentFragment();

    for (i = target.children.length - 1; i >= 0; --i) {
        frag.appendChild(target.children[i]);
    }
    target.appendChild(frag);
</script>

```

?

```

// define
(function (window) {
    function fn(str) {
        this.str = str;
    }

    fn.prototype.format = function () {
        var arg = __1__;
        return this.str.replace(__2__, function (a, b) {
            return arg[b] || '';
        });
    };

    window.fn = fn;
})(window);

// use
(function () {
    var t = new fn('<p><a href="{0}">{1}</a><span>{2}</span></p>');
    console.log(t.format('http://www.alibaba.com', 'Alibaba', 'Welcome'));
})();

```

define {}format

1. Array.prototype.slice.call(arguments, 0)
2. /\{\s*(\d+)\s*\}/g

form ()

```

<form id="target">
    <select name="age">
        <option value="aaa">aaa</option>
        <option value="bbb" selected>bbb</option>
    </select>
    <select name="friends" multiple>
        <option value="qiu" selected>qiu</option>
        <option value="de">de</option>
        <option value="qing" selected>qing</option>
    </select>
    <input name="name" value="qiudeqing">
    <input type="password" name="password" value="11111">
    <input type="hidden" name="salery" value="3333">
    <textarea name="description">description</textarea>
    <input type="checkbox" name="hobby" checked value="football">Football
    <input type="checkbox" name="hobby" value="basketball">Basketball
    <input type="radio" name="sex" checked value="Female">Female
    <input type="radio" name="sex" value="Male">Male
</form>

<script>

/**
 *
 *
 * @param {FormElement} form
 * @return {string}
 */
function serializeForm(form) {
    if (!form || form.nodeName.toUpperCase() !== 'FORM') {
        return;
    }

    var result = [];

    var i, len;
    var field, fieldName, fieldType;

    for (i = 0, len = form.length; i < len; ++i) {
        field = form.elements[i];
        fieldName = field.name;
        fieldType = field.type;

        if (field.disabled || !fieldName) {
            continue;
        } // enf if

        switch (fieldType) {
            case 'text':
            case 'password':

```

```

        case 'hidden':
        case 'textarea':
            result.push(encodeURIComponent(fieldName) + '=' +
                encodeURIComponent(field.value));
            break;

        case 'radio':
        case 'checkbox':
            if (field.checked) {
                result.push(encodeURIComponent(fieldName) + '=' +
                    encodeURIComponent(field.value));
            }
            break;

        case 'select-one':
        case 'select-multiple':
            for (var j = 0, jLen = field.options.length; j < jLen; ++j) {
                if (field.options[j].selected) {
                    result.push(encodeURIComponent(fieldName) + '=' +
                        encodeURIComponent(field.options[j].value || field.options[j].text));
                }
            } // end for
            break;

        case 'file':
        case 'submit':
            break; //

        default:
            break;
        } // end switch
    } // end for

    return result.join('&');
}

var form = document.getElementById('target');
console.log(serializeForm(form));
</script>

```

javascript li , Object , IE

```

<ul id="nav">
    <li><a href="http://11111">111</a></li>
    <li><a href="http://2222">222</a></li>
    <li><a href="http://333">333</a></li>
    <li><a href="http://444">444</a></li>
</ul>

```

Object:

```
{
  "index": 1,
  "name": "111",
  "link": "http://1111"
}
```

script:

```
var EventUtil = {
  getEvent: function (event) {
    return event || window.event;
  },
  getTarget: function (event) {
    return event.target || event.srcElement;
  },
  // IE
  on: function (elem, type, handler) {
    if (elem.addEventListener) {
      elem.addEventListener(type, handler, false);
      return handler;
    } else if (elem.attachEvent) {
      function wrapper(event) {
        return handler.call(elem, event);
      };
      elem.attachEvent('on' + type, wrapper);
      return wrapper;
    }
  },
  off: function (elem, type, handler) {
    if (elem.removeEventListener) {
      elem.removeEventListener(type, handler, false);
    } else if (elem.detachEvent) {
      elem.detachEvent('on' + type, handler);
    }
  },
  preventDefault: function (event) {
    if (event.preventDefault) {
      event.preventDefault();
    } else if ('returnValue' in event) {
      event.returnValue = false;
    }
  },
  stopPropagation: function (event) {
    if (event.stopPropagation) {
      event.stopPropagation();
    } else if ('cancelBubble' in event) {
      event.cancelBubble = true;
    }
  }
};
var DOMUtil = {
  text: function (elem) {
```

```

        if ('textContent' in elem) {
            return elem.textContent;
        } else if ('innerText' in elem) {
            return elem.innerText;
        }
    },
    prop: function (elem, propName) {
        return elem.getAttribute(propName);
    }
};

var nav = document.getElementById('nav');

EventUtil.on(nav, 'click', function (event) {
    var event = EventUtil.getEvent(event);
    var target = EventUtil.getTarget(event);

    var children = this.children;
    var i, len;
    var anchor;
    var obj = {};

    for (i = 0, len = children.length; i < len; ++i) {
        if (children[i] === target) {
            obj.index = i + 1;
            anchor = target.getElementsByTagName('a')[0];
            obj.name = DOMUtil.text(anchor);
            obj.link = DOMUtil.prop(anchor, 'href');
        }
    }

    alert('index: ' + obj.index + ' name: ' + obj.name +
        ' link: ' + obj.link);
});

```

,var a = ['1', '2', '3', ...];a 100,. a,

```


/*
 *
 */
function normalize(arr) {
    if (arr && Array.isArray(arr)) {
        var i, len, map = {};
        for (i = arr.length; i >= 0; --i) {
            if (arr[i] in map) {
                arr.splice(i, 1);
            } else {
                map[arr[i]] = true;
            }
        }
    }
    return arr;
}

/*
 * 100
 */
function fillArray(arr, start, end) {
    start = start == undefined ? 1 : start;
    end = end == undefined ? 100 : end;

    if (end <= start) {
        end = start + 100;
    }

    var width = end - start;
    var i;
    for (i = 100; i >= 1; --i) {
        arr.push('' + (Math.floor(Math.random() * width) + start));
    }
    return arr;
}

var input = [];
fillArray(input, 1, 100);
input.sort(function (a, b) {
    return a - b;
});
console.log(input);

normalize(input);
console.log(input);


```

**mySetInterVal(fn, a, b), a,a+b,a+2b,...,a+nb
myClear mySetInterVal**

```

function mySetInterval(fn, a, b) {
  let timer = setTimeout(() => {
    fn();
    mySetInterval(fn,a+b,b);
  }, a)
  return () => {
    clearTimeout(timer);
  }
}
const myClear =mySetInterval(()=>{console.log('abc')},1000,500);
//myClear()

```

```

// 
function merge(leftArr, rightArr) {
  const result = [];
  if (leftArr[0] instanceof Array) {
    leftArr = leftArr.shift();
  }
  if (rightArr[0] instanceof Array) {
    rightArr = rightArr.shift();
  }
  while (leftArr.length > 0 && rightArr.length > 0) {
    if (leftArr[0] < rightArr[0]) {
      result.push(leftArr.shift());
    } else {
      result.push(rightArr.shift());
    }
  }

  return result.concat(leftArr).concat(rightArr);
};

function mergeSort(arr) {
  if (arr.length === 1) return arr;
  const middle = Math.floor(arr.length / 2);
  const leftArr = arr.slice(0, middle);
  const rightArr = arr.slice(middle);
  return merge(mergeSort(leftArr), mergeSort(rightArr));
};

console.log(mergeSort([[1,4,7],[2,5,8],[3,6,9]]));

```

```
F(0) = 0;  
F(1) = 1;  
F(n) = F(n - 1) + F(n - 2);
```

```
function fib(n) {  
    if(n < 0) throw new Error('0');  
    if (n < 2) {  
        return n;  
    }  
    return fib(n - 1) + fib(n - 2);  
}
```

n 5 fib(4) + fib(3) n 4 fib(3) + fib(2) fib(3) fib(50)

:for

```
function fib(n) {  
    if(n < 0) throw new Error('0');  
    let f0 = 0, f1 = 1, curFib = f0;  
    if (n < 2) {  
        return n;  
    }  
    for (let i = 1; i < n; i++) {  
        curFib = f0 + f1;  
        f0 = f1;  
        f1 = curFib;  
    }  
    return curFib;  
}
```

fib 4 (f0,f1,curFib,i)

```
function fib(n) {  
    if(n < 0) throw new Error('0');  
    if (n < 2) return n;  
    function _fib(n, a, b) {  
        if (n === 0) return a;  
        return _fib(n - 1, b, a + b);  
    }  
    return _fib(n, 0, 1);  
}
```

n ,

ES6 Generator

```
function* fib(n) {
  if(n < 0) throw new Error('0');
  let f0 = 1, f1 = 1, count = 0;
  while (count < n) {
    yield f0;
    [f0, f1] = [f1, f0 + f1];
    count++;
  }
}
```

```
function fib(n) {
  if(n < 0) throw new Error('0');
  if (n < 2) {
    return n;
  }
  let list = [];
  list[0] = 0;
  list[1] = 1;
  for (let i = 1; i < n; i++) {
    list[i + 1] = list[i] + list[i - 1];
  }
  return list[n];
}
```

```
/***
 *
 *
 *
 *
 *   map
 *
 */
var lengthOfLongestSubstring = function (s) {
  const map = {};
  let i = -1;
  let res = 0;
  const n = s.length;
  for (let j = 0; j < n; j++) {
    if (map[s[j]]) {
      i = Math.max(i, map[s[j]]);
    }
    res = Math.max(res, j - i);
    map[s[j]] = j;
  }

  return res;
};
```

chrome

1Chrome 4 (Stable)(Beta)(Dev)(Canary)

Chrome iOS Beta iOS 12 12

Chrome Canary 1-2

1. Canary

Canary Chrome Chrome Chrome Canary
Chrome Canary Chrome Flash Chromium

2. (Dev)

Chrome Dev Chromium Chrome Canary Dev Web

IT Chrome API 9 12 Chrome

3. (Beta)

Chrome Beta Dev
5% 4-6 Chrome

4. (Stable)

Chrome Stable Beta Chrome

2-3 6

Chrome API API

2Chrome

Docker Selenium

React

1

•

- FPFCPFMPFCP
-
- CSRFCPjscssjsCSRuspecelazy
- SSRSSRNodestreamnode
- CSRSSRService worker
- reactReact.ProfilerProfilecommitreactperformance API
- ReactpropspropsrenderReactPureComponentReact.memo ShouldComponentUpdate
- renderReact.useMemoReact.useCallback

- reduxcontextreducer
- componentDidCatch
-
- 1.
- 2.
- 3. web worker
- 4. render
- 5. React.Fragments

react

1React 16.x Time Slicing, Suspensehooks

- Time SlicingCPUreact
- Suspense IOLazy , react
- componentDidCatch, fallback

2React16.8

- hooksReact
- hooksReact
 -
 -
 - classthis
 -
- hookshooks
 - useState
 - useEffect
 - useContext React.createContext
 - useReducer useState(stateaction) => newStatereducerdispatch
 - useCallback memoized
 - useMemo
 - useRef ref.current ref
 - useImperativeMethods ref
 - useMutationEffect ReactDOM
 - useLayoutEffect DOMDOM

3React16.9

- Unsafe UNSAFE_ review debug
- javascript: URL javascript: URL
- “Factory” React
- act() await
- <React.Profiler>

4React16.13.0

- setState

-
- unstable_createPortalcreatePortal
- bug

Http

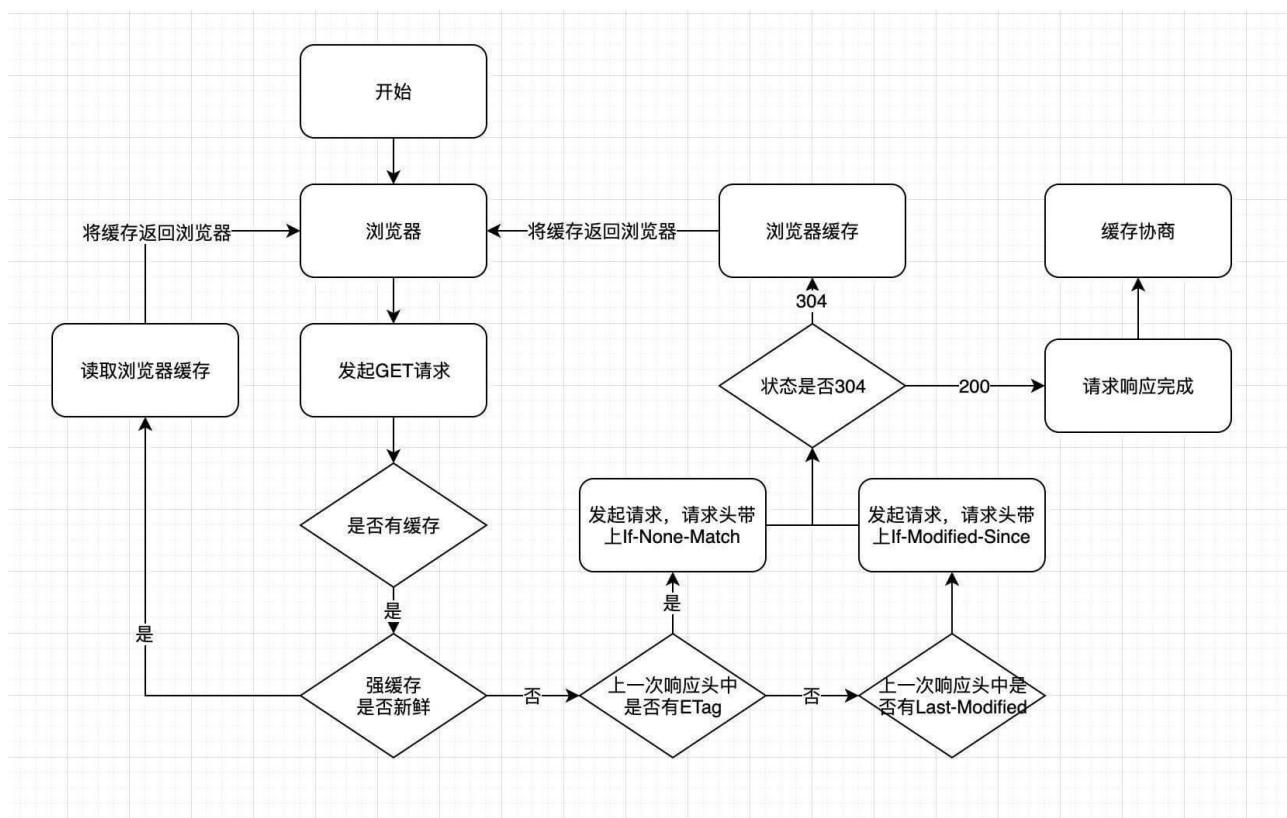
1

HTTP

-
- EtagLast-Modified
304

HTTP

- response header
- 200request header304



2

- networkfrom memoryfrom disk
- Cache-Controlhttp1.1Expireshttp1.0
- Cache-control
- Expires
- Cache-ControlExpiresExpires

- Cache-control

3(expires)

-
- Expires HTTP 1.0 (+)
 - 1. HTTP 1.0 HTTP 1.01.1
 - 2.
- - 1. (UTC)
 - 2.

4(cache-control)

- ExpiresHTTP/1.1Cache-control
- Cache-control (MDN)
 - max-age
 - must-revalidate max-age
 - no-cache
 - no-store: ""
 - public (CDN)
 - private
- **Cache-control Expires** HTTP/1.0 HTTP/1.1
 - - - public
 - privatedefault
 - no-cacheprivate
 - only-if-cache
 - - max-age=
 - s-maxage=canmax-ageexpires
 - max-stale[=]
 - min-fresh=
 - stale-while-revalidate=
 - stale-if-error=
 -

- must-revalidate
- proxy-revalidate
- immutable
- - no-store
 - no-transform
- - 1. HTTP 1.1 Expires
 - 2. Expires
- - 1.

5

- 200304
- If-Modified-Since If-None-Match 304 Last-Modified ETag
- 304
- 2 ()Last-Modified/If-Modified-sincehttp1.0Etag/If-None-matchhttp1.1
- Last-Modified/If-Modified-sinceEtag/If-None-match
Etag
- Etag/If-None-matchLast-Modified/If-Modified-since

(Last-Modified/If-Modified-since)

- Last-Modified Last-Modified: Mon, 10 Nov 2018 09:10:11 GMT
-
- Last-Modified If-Modified-Since
- If-Modified-Since Last-Modified 304 200
- - 1. 304200
 - 2.
 - 3.
 - 4.

(Etag/If-None-match)

- Etag If-None-Match

- Etag (hash) Etag Last-Modified Last-Modified Etag
hash If-Modified-Since If-None-Match 304, 200
- Response headerEtagIf-No-MatchedRequest Headerif-no-matchedETag
304200
- **Etag Last-Modified**
- - 1.
 - 2.
- - 1. ETag
 - 2. ETagETag

JavaScript

1

- nn

-

-
-

-

```
/**  
 * :  
 *  
 * () ,  
 * :  
 * @params fun (callback) delay  
 *  
 */  
const debounce = (fun, delay = 500) => {  
  let timer = null //  
  return function (...args) {  
    clearTimeout(timer);  
    timer = setTimeout(() => {  
      fun.apply(this, args)  
    }, delay)  
  }  
}
```

-

n

```
// n
function debounce(func, wait, immediate) {
  let timeout;
  return function () {
    const context = this;
    const args = arguments;
    if (timeout) clearTimeout(timeout);
    if (immediate) {
      const callNow = !timeout;
      timeout = setTimeout(function () {
        timeout = null;
      }, wait)
      if (callNow) func.apply(context, args)
    } else {
      timeout = setTimeout(function () {
        func.apply(context, args)
      }, wait);
    }
  }
}
```

-

func immediate false setTimeout func.apply(context, args) return
undefined immediate true

```
function debounce(func, wait, immediate) {
  let timeout, result;
  return function () {
    const context = this;
    const args = arguments;
    if (timeout) clearTimeout(timeout);
    if (immediate) {
      const callNow = !timeout;
      timeout = setTimeout(function () {
        timeout = null;
      }, wait)
      if (callNow) result = func.apply(context, args)
    }
    else {
      timeout = setTimeout(function () {
        func.apply(context, args)
      }, wait);
    }
    return result;
  }
}
```

2

-

-

-
- resize

•

```
/**  
*  
*  
* :()  
* :  
*  
* @params fun (callback) delay  
*  
*/  
const throttle = (fun, delay = 1000) => {  
  let flag = true;  
  return function (...args) {  
    if (!flag) return;  
    flag = false;  
    setTimeout(() => {  
      fun.apply(this, args);  
      flag = true;  
    }, delay);  
  }  
}
```

•

(0)

```
function throttle(func, wait) {  
  let context, args;  
  let previous = 0;  
  
  return function () {  
    let now = +new Date();  
    context = this;  
    args = arguments;  
    if (now - previous > wait) {  
      func.apply(context, args);  
      previous = now;  
    }  
  }  
}
```

•

```
function throttle(func, wait) {
  let timeout;
  return function () {
    const context = this;
    const args = arguments;
    if (!timeout) {
      timeout = setTimeout(function () {
        timeout = null;
        func.apply(context, args)
      }, wait);
    }
  }
}
```

1XSS

(server)

- - - 1.
 - 2. HTML
 - 3.
 - 4.

(Server)

URL

- URL
- - 1. URL
 - 2. URL URL HTML
 - 3.
 - 4.

Dom ()

DOM XSS JavaScript XSS

- URL

- - 1. URL
 - 2. URL
 - 3. JavaScript URL
 - 4.
- 1. HTMLJSCSSURL
 - HTMLVue/React v-html / dangerouslySetInnerHTML
- 2. CSP HTTP Header Content-Security-PolicyX-XSS-Protection
 - CSP()
 - Content-Security-Policy: default-src 'self' -
 - Content-Security-Policy: default-src 'self' *.trusted.com - (CSP)
 - Content-Security-Policy: default-src https://yideng.com - HTTPS yideng.com
- 3. URL
- 4. XSSHttp Only cookie JavaScript Cookie XSS Cookie
- 5.

CSRF

1. a.comCookie
2. b.com
3. b.com a.com a.com/act=xxa.comCookie
4. a.com
5. a.comact=xx
6. a.com

1. GET img get
2. POST
- 3.

CSRFCSRF

- 1. HeaderOrigin Header Referer Header
- 2. CSRF Token CSRF TokenSessionTokenToken
- 3. cookie
 - - 1Cookiecsrfcookie=v8g9e4ksfhw
 - 2CookieURLPOST https://www.a.com/comment? csrfcookie=v8g9e4ksfhw
 - 3CookieURL
 - - Session
 - Token
 - Token
 - - Cookie
 - XSSCookie
 -
 - CookieHTTPSHTTPS
- 4. Samesite CookieGoogleHTTPSet-CookieSamesite Cookie“ Cookie” CookieCookieCookieSamesite Strict Cookie Lax Cookie , Get

3iframe

- 1. iframe iframe
- 2.
 - iframe iframe
- 3. iframe JS
- 1. iframe sandbox iframe““
- 2. X-Frame-Options HeaderX-Frame-Options HTTP <iframe>
 - eg.X-Frame-Options: SAMEORIGIN
 - SAMEORIGIN: iframe
 - ALLOW-FROM: iframe
 - DENY: iframe
- 3. CSP Content-Security-Policy
- 4. iframe

4

JS Content-Type Header JS

X-Content-Type-Options

5

npm event-stream

6HTTPS

SSL Stripping HTTPSHTTP

HSTSHTTP Strict Transport SecurityHTTP HeaderHTTPSHTTP

`Strict-Transport-Security: max-age=<seconds>; includeSubDomains; preload`

""HTTPSHTTPHTTPS

7

8

(CDNs) CDN CDN CDN CDN

base64 <script> integrity

9

- DNS DNS DNS DNS DNS
- HTTP HTTP HTTP HTTP

HTTPS

10

Man-in-the-middle attack, MITM SSL WiFi

1. Wi-Fi
2. Fiddler / Charles
3. 12306

- 1.
- 2.
- 3.
4. hash
5. hash,hash
6. ,

fiddle

- 1.
2. fiddle
- 3.
4. fiddlefiddle
5. fiddle

- 1.
- 2.
- 3.
4. SSLHTTPSSSL/TLSSSLSSL/TLSHTTPSHTTP
5. DNSDNSHosts
6. ARP ARP(address resolution protocol)APRMACMACMACARP
- 7.

1. CA
- 2.
3. URLHTTPSSSLSSLTLS1.1TLS1.2
- 4.
- 5.

11sql

SQLWebSQL,

- 1.
 2. SQLSQL

12

1. font-face
 2. background
 - 3.
 - 4.
 5. iframe

13

- 1.
 2. CI
 3. code review
 4. Header X-XSS-Protection X-Content-Type-Options X-Frame-Options Header Content-Security-Policy
 5. NSP(Node Security Platform)Snyk

1

null

2

()

- —

3

- 1.
 - 2.
 - 3.

4

- 1.
- 2.
3. (captured value)

5

```
var Yideng = (function () {
  //
  var foo = 0;

  function Yideng() {}
  Yideng.prototype.bar = function bar() {
    return foo;
  };

  return Yideng;
}());
```

3 i i 3

```
for (var i = 0; i < 3; i++) {
  document.getElementById('id' + i).onfocus = function() {
    alert(i);
  };
}

// 
function makeCallback(num) {
  return function() {
    alert(num);
  };
}

for (var i = 0; i < 3; i++) {
  document.getElementById('id' + i).onfocus = makeCallback(i);
}
```

CSS

1(pseudo-classes)

- DOM
- :hover :active :visited :link :first-child :focus :lang
-

- class

2(Pseudo-elements)

- DOM
-
- ::before ::after
-

3

- - CSS2 :,
 - CSS2.1 ,::
 - CSS2 (:before, :after, :first-line, :first-letter)
 - CSS2 (::selection)
 - CSS3::::
- -
 -
- - ""
 - :::
 - ()
 -

4

- DOMhtml

5

- DOMDOM
- DOM

114223456, 4, 5, 6, 11, 23, 42, 56, 78, 90

```

function f1(arr, count) {
    //
    arr.sort((a, b) => b - a);
    //
    let avg = arr.reduce((a,b) => a + b) / count;
    let resArr = [];
    let current = 0;

    //
    for (let i = 0; i < count - 1; i++) {
        if (current + arr[arr.length-1] / 2 < avg && i) {
            arr.pop();
            resArr[i-1].push(arr[arr.length-1]);
        }
        current = 0;
        resArr[i] = [];
        arr.forEach((item, index) => {
            current += item;
            arr.splice(index,1);
            resArr[i].push(item);
            if (current > avg) {
                current -= item;
                arr.splice(index,0,item);
                resArr[i].pop();
            }
        });
    }

    resArr[count-1] = arr;

    return resArr;
}
//  

console.log(f1([11,42,23,4,5,6,4,5,6,11,23,42,56,78,90], 3))

```

lodash `_get`

js a.b.c.d.e a && a.b && a.b.c && a.b.c.d && a.b.c.d.e graphql

get `get(a, 'b.c.d.e')`

1

```

function get(source, path, defaultValue = undefined) {
  // a[3].b -> a.3.b -> [a,3,b]
  // path .
  const paths = path.replace(/\[(\d+)\]/g, ".$1").split(".");
  let result = source;
  for (const p of paths) {
    // null undefined Object
    result = Object(result)[p];
    if (result == undefined) {
      return defaultValue;
    }
  }
  return result;
}
//  

console.log(get({ a: null }, "a.b.c", 3)); // output: 3
console.log(get({ a: undefined }, "a", 3)); // output: 3
console.log(get({ a: null }, "a", 3)); // output: 3
console.log(get({ a: [{ b: 1 }] }, "a[0].b", 3)); // output: 1

```

2

```

const _get = (object, keys, val) => {
  return keys.split(/\./).reduce(
    (o, j)=>( (o || {})[j] ),
    object
  ) || val
}

console.log(get({ a: null }, "a.b.c", 3)); // output: 3
console.log(get({ a: undefined }, "a", 3)); // output: 3
console.log(get({ a: null }, "a", 3)); // output: 3
console.log(get({ a: { b: 1 } }, "a.b", 3)); // output: 1

```

add(1)(2)(3)

Currying

1

```

function add (a) {
  return function (b) {
    return function (c) {
      return a + b + c;
    }
  }
}
console.log(add(1)(2)(3)); // 6

```

2

```
const curry = (fn) =>(judge = (...args) => args.length === fn.length ?
fn(...args) : (...arg) => judge(...args, ...arg));
const add = (a, b, c) => a + b + c;
const curryAdd = curry(add);
console.log(curryAdd(1)(2)(3)); // 6
console.log(curryAdd(1, 2)(3)); // 6
console.log(curryAdd(1)(2, 3)); // 6
```

```
function add (...args) {
  //
  return args.reduce((a, b) => a + b);
}

function currying (fn) {
  let args = [];

  return function temp (...newArgs) {
    if (newArgs.length) {
      args = [
        ...args,
        ...newArgs
      ];
      return temp;
    } else {
      let val = fn.apply(this, args);
      args = []; //
      return val;
    }
  }
}

let addCurry = currying(add);
console.log(addCurry(1)(2)(3)(4, 5)()); //15
console.log(addCurry(1)(2)(3, 4, 5)()); //15
console.log(addCurry(1)(2, 3, 4, 5)()); //15
```

1

```

function Class1() {
  console.log(' ');
}

Class1.prototype.method = function(param) {
  console.log(param);
  return this;
}

let cl = new Class1();
//new this this.method
cl.method('').method('').method('');

```

2

```

var obj = {
  a: function() {
    console.log("a");
    return this;
  },
  b: function() {
    console.log("b");
    return this;
  },
};
obj.a().b();

```

3

```

// 
class Math {
  constructor(value) {
    this.hasInit = true;
    this.value = value;

    if (!value) {
      this.value = 0;
      this.hasInit = false;
    }
  }
  add() {
    let args = [...arguments];
    let initialValue = this.hasInit ? this.value : args.shift();
    const value = args.reduce((prev, curv) => prev + curv, initialValue);
    return new Math(value);
  }
  minus() {
    let args = [...arguments];
    let initialValue = this.hasInit ? this.value : args.shift();
    const value = args.reduce((prev, curv) => prev - curv, initialValue);
    return new Math(value);
  }
}

```

```

mul() {
  let args = [...arguments];
  let initialValue = this.hasInit ? this.value : args.shift();
  const value = args.reduce((prev, curv) => prev * curv, initialValue);
  return new Math(value);
}

divide() {
  let args = [...arguments];
  let initialValue = this.hasInit ? this.value : args.shift();
  const value = args.reduce((prev, curv) => prev / (+curv ? curv : 1),
initialValue);
  return new Math(value);
}

let test = new Math();
const res = test.add(222, 333, 444).minus(333, 222).mul(3, 3).divide(2, 3);
console.log(res.value);

// 
Number.prototype.add = function() {
  let _that = this;
  _that = [...arguments].reduce((prev, curv) => prev + curv, _that);
  return _that;
}
Number.prototype.minus = function() {
  let _that = this;
  _that = [...arguments].reduce((prev, curv) => prev - curv, _that);
  return _that;
}
Number.prototype.mul = function() {
  let _that = this;
  _that = [...arguments].reduce((prev, curv) => prev * curv, _that);
  return _that;
}
Number.prototype.divide = function() {
  let _that = this;
  _that = [...arguments].reduce((prev, curv) => prev / (+curv ? curv : 1),
that);
  return _that;
}
let num = 0;
let newNum = num.add(222, 333, 444).minus(333, 222).mul(3, 3).divide(2, 3)
console.log(newNum)

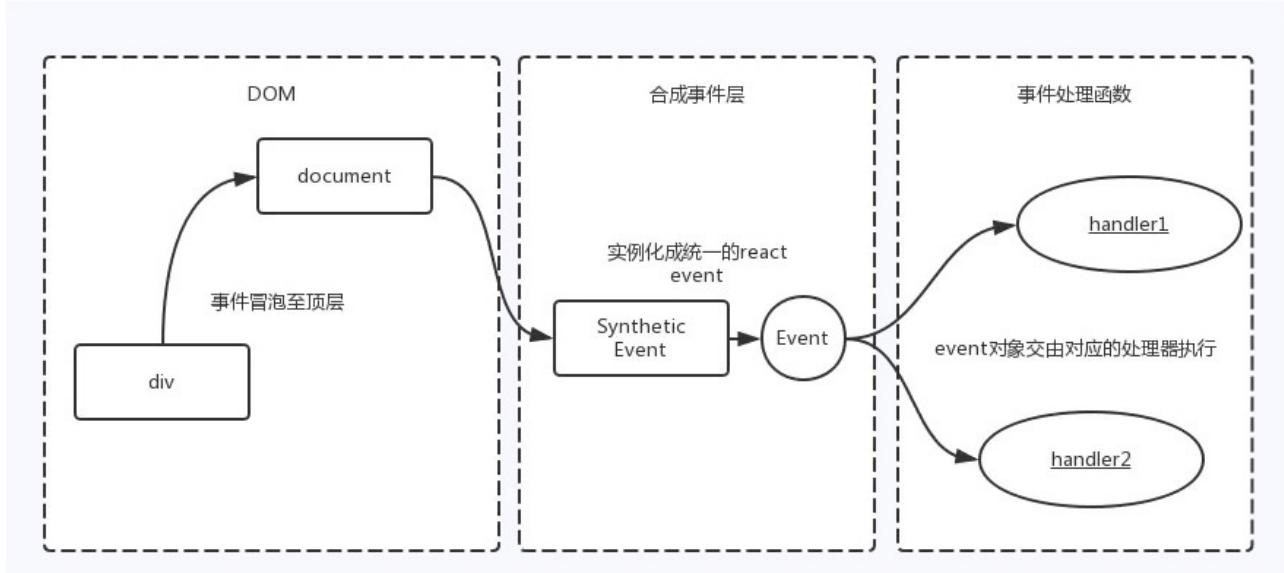
```

React

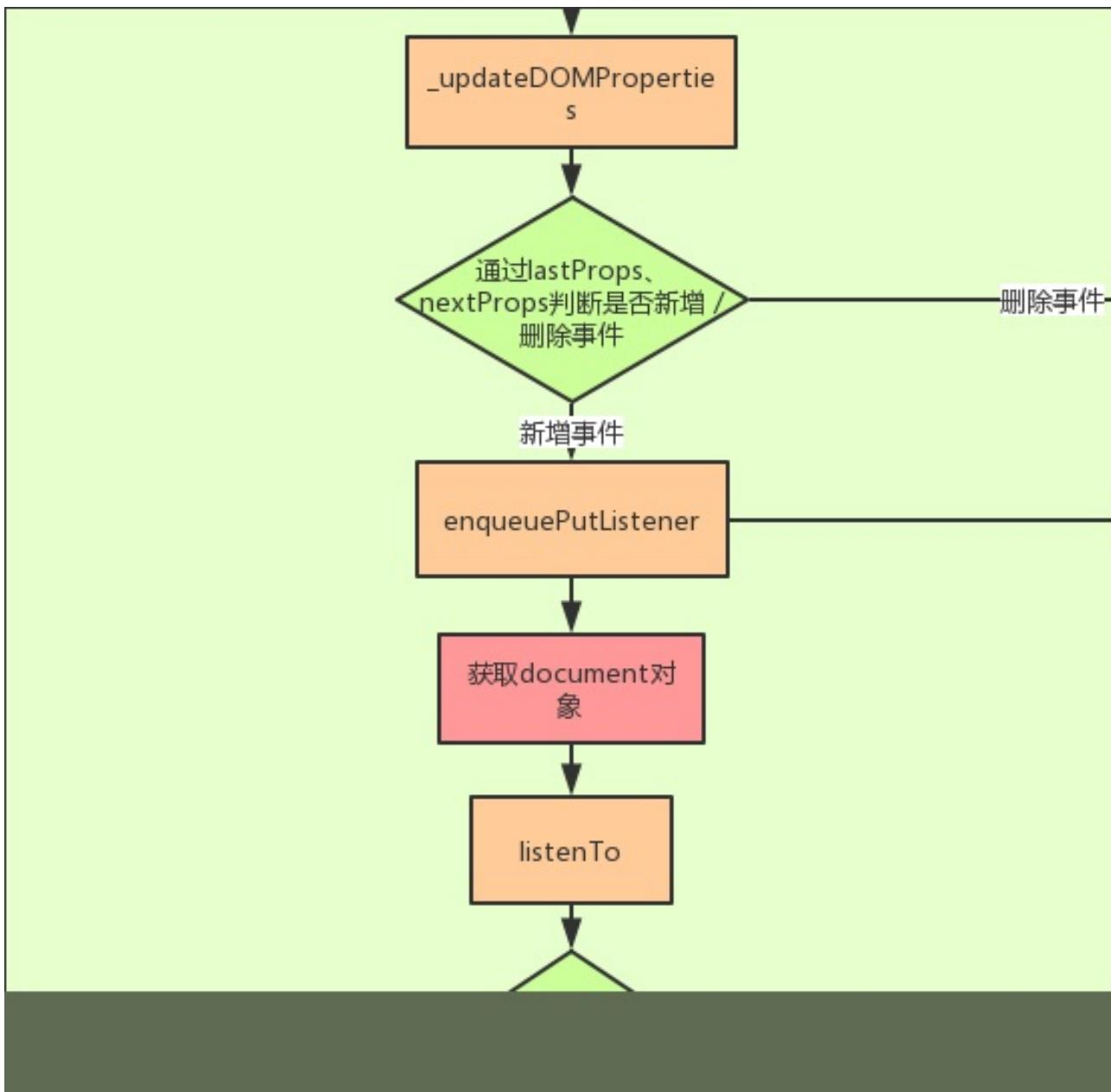
```

React click div DOM document document React
document React SyntheticEvent event.stopPropagation
event.preventDefault

```

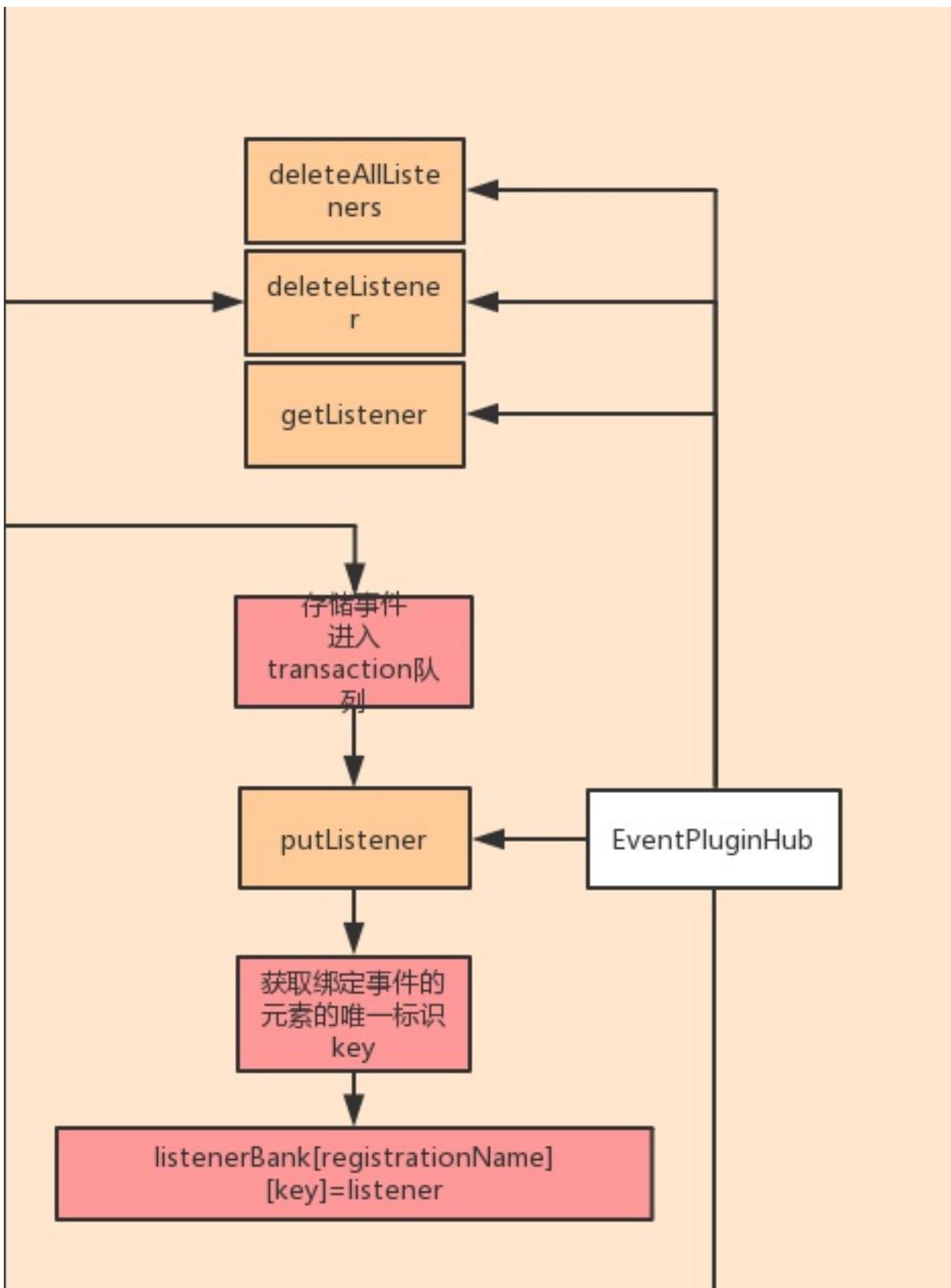


1



- /
- lastPropsnextProps
- EventPluginHubenqueuePutListener
- document
- onClickonCaptureClick
- addEventListenerattachEventIE
- documentdispatchEvent

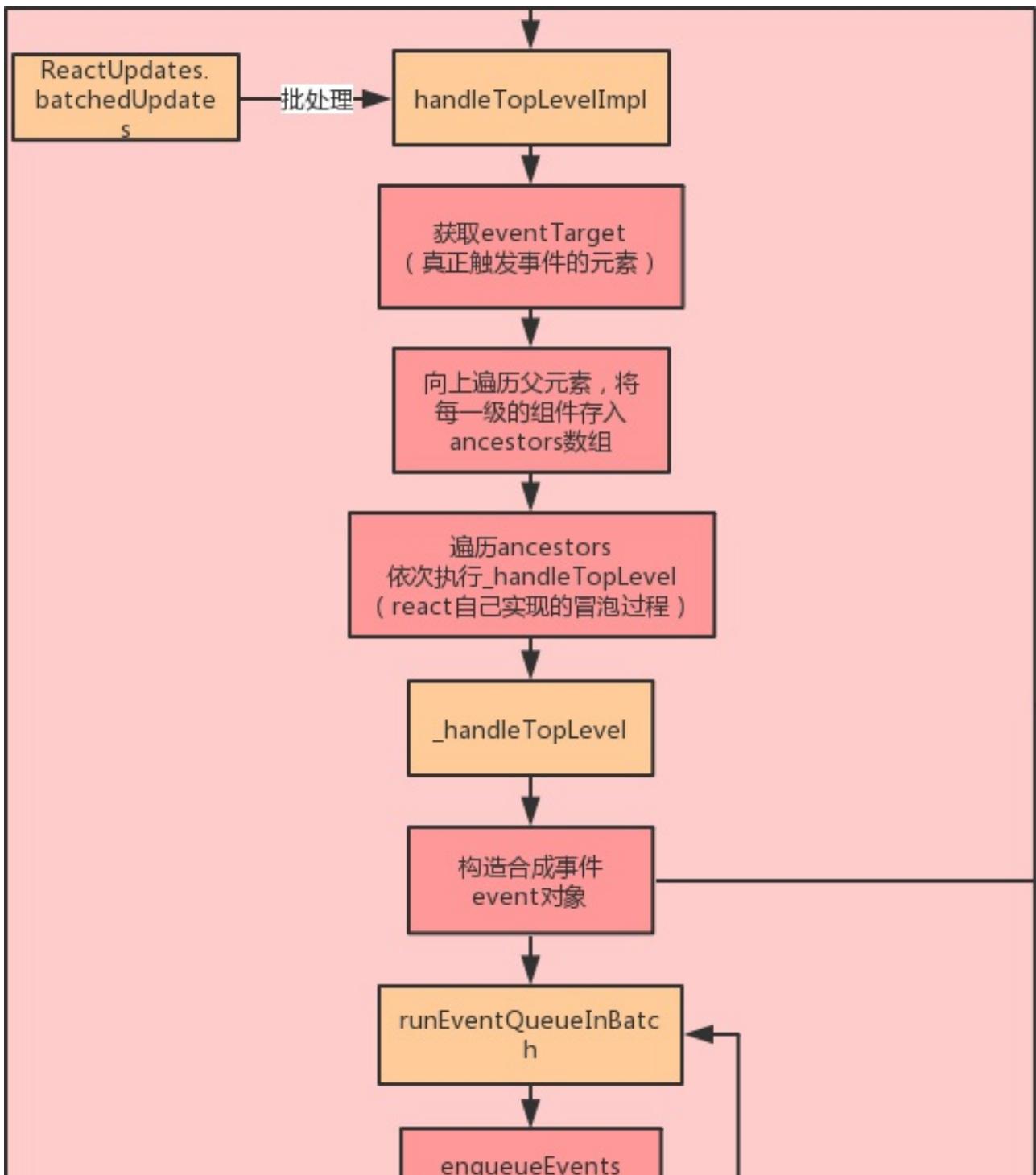
2

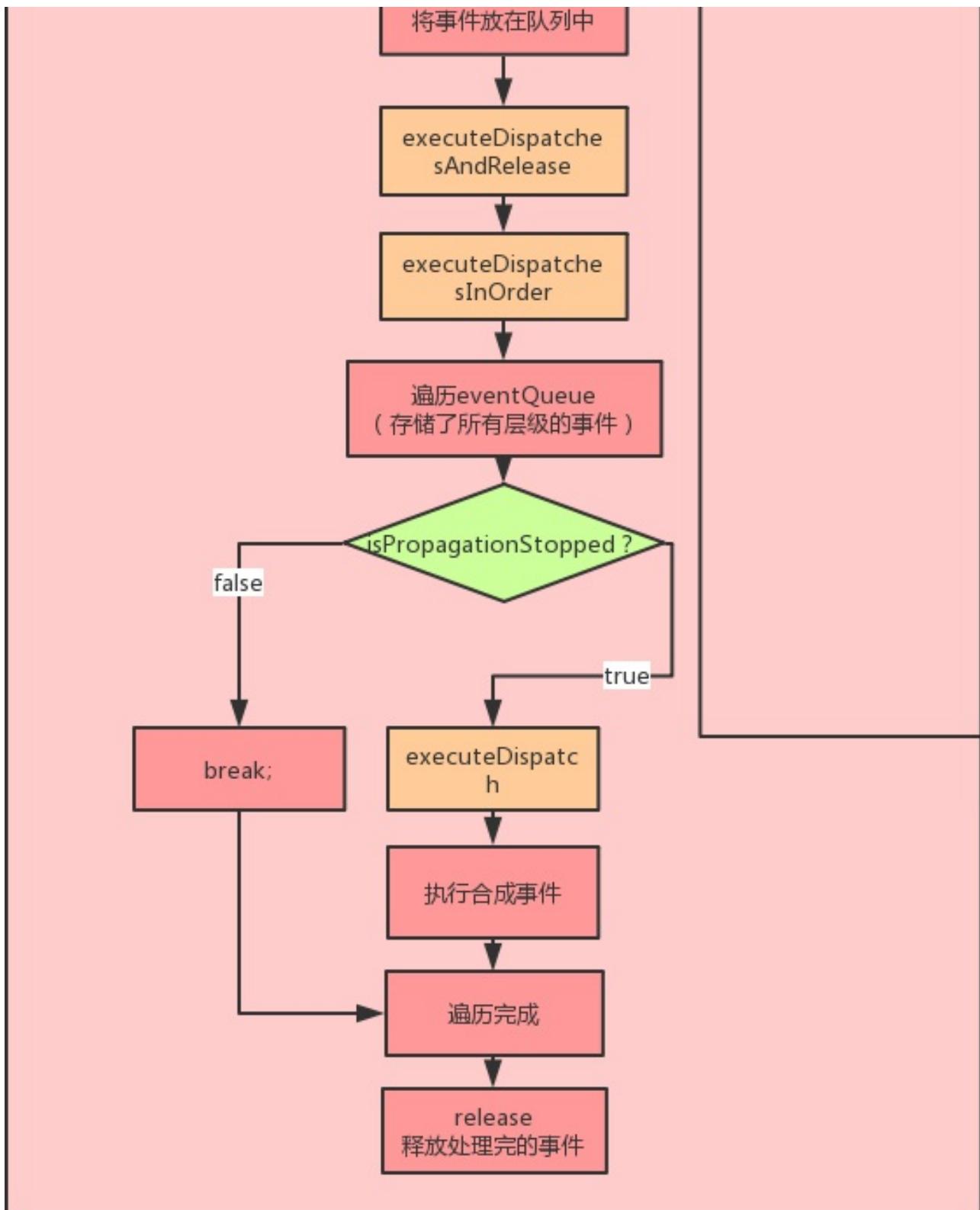


- EventPluginHubReactcallbackcallbacklistenerBankPlugin
- EventPluginHubputListenerlistener
- key
- callbackkeylistenerBank
- listenerBanklistenerBank[registrationName][key]

```
{  
  onClick:{  
    nodeid1: ()=>{...}  
    nodeid2: ()=>{...}  
  },  
  onChange:{  
    nodeid3: ()=>{...}  
    nodeid4: ()=>{...}  
  }  
}
```

3



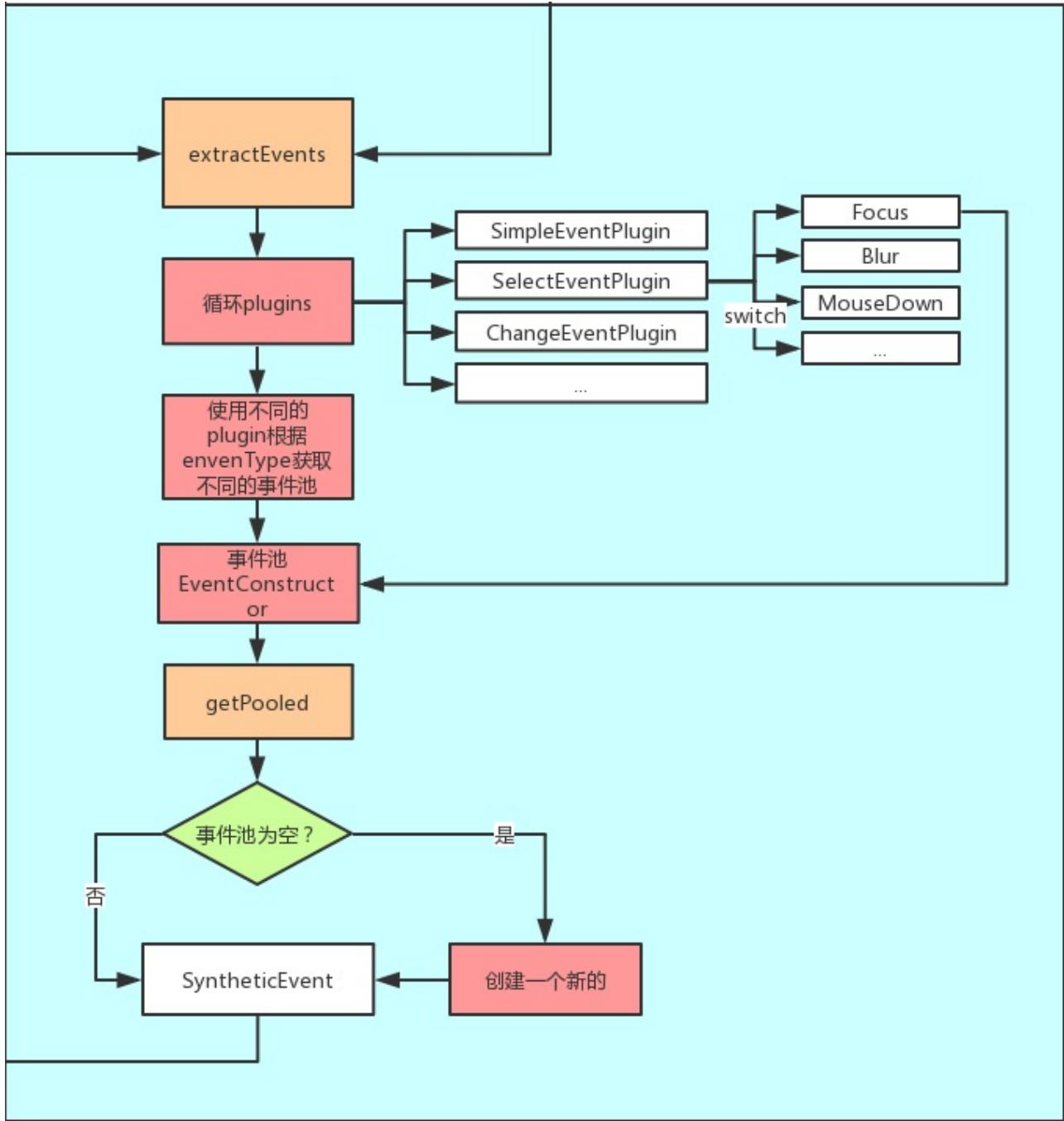


- `documentdispatchEvent`
- React

```
<div onClick={this.parentClick} ref={ref => this.parent = ref}>
  <div onClick={this.childClick} ref={ref => this.child = ref}>
    test
  </div>
</div>
```

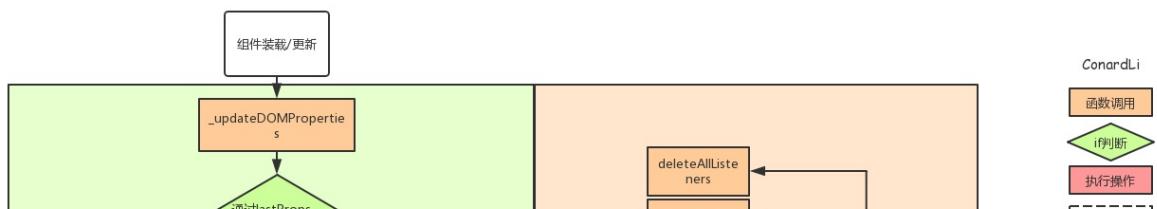
- this.child
-
-
- eventQueue
- eventQueue
- isPropagationStopped
- executeDispatch
-

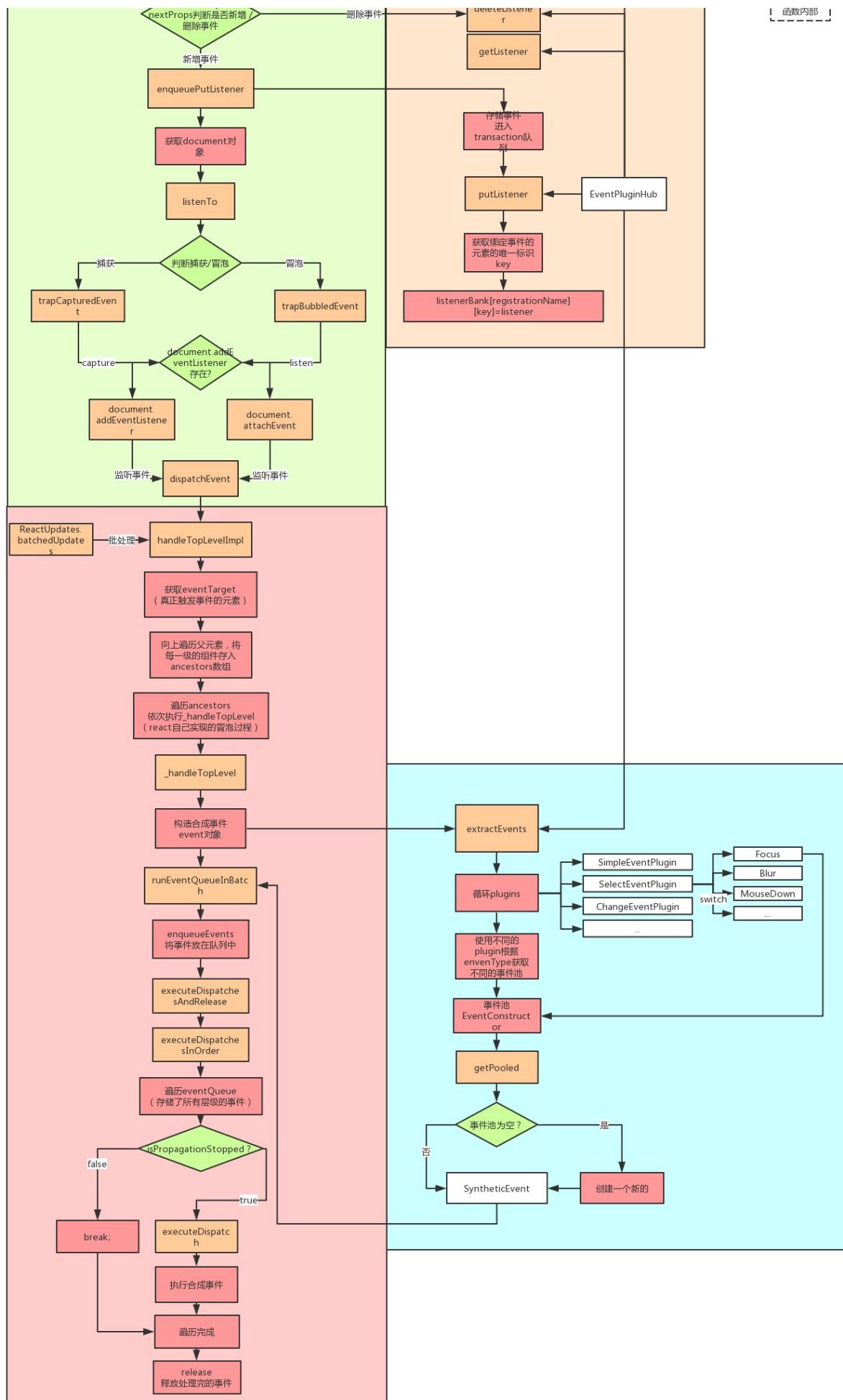
4



- EventPluginHub.extractEvents
- EventPlugin
- EventPlugin
-
- nodeid(key).listenerBink
-

5





dom

1

- ,
 - 1. length
 - 2. length
 - 3. Array.prototype
 - 4. 'Array'
- length

2

```
//  
let arrayLike = {  
    length: 10,  
};  
console.log(arrayLike instanceof Array); // false  
console.log(arrayLike.__proto__.constructor === Array); // false  
console.log(arrayLike.toString()); // [object Object]  
console.log(arrayLike.valueOf()); // {length: 10}  
  
let array = [];  
console.log(array instanceof Array); // true  
console.log(array.__proto__.constructor === Array); // true  
console.log(array.toString()); // ''  
console.log(array.valueOf()); // []
```

3

- - 1. Array.from()
 - 2. Array.prototype.slice.call()
 - 3. Array.prototype.forEach()
- - length
 -

```
let al1 = {
    length: 4,
    0: 0,
    1: 1,
    3: 3,
    4: 4,
    5: 5,
};
console.log(Array.from(al1)) // [0, 1, undefined, 3]
```

◦ 0

```
//
let al2 = {
    length: 4,
    '-1': -1,
    '0': 0,
    a: 'a',
    1: 1
};
console.log(Array.from(al2)); // [0, 1, undefined, undefined]
```

◦ slice

```
//
let al2 = {
    length: 4,
    '-1': -1,
    '0': 0,
    a: 'a',
    1: 1
};
console.log(Array.prototype.slice.call(al2)); // [0, 1, empty × 2]
```

4

```
let arrayLike2 = {
    2: 3,
    3: 4,
    length: 2,
    push: Array.prototype.push
}

// push length
arrayLike2.push(1);
console.log(arrayLike2); // {2: 1, 3: 4, length: 3, push: f}
arrayLike2.push(2);
console.log(arrayLike2); // {2: 1, 3: 2, length: 4, push: f}
```

webpack

1 Webpack

- Webpack webpack4
- /HappyPack()thread-loader
- - exclude/include (loader)
 - resolve.modules ()
 - resolve.extensions
 - noParse (bundle importrequiredefine)
 - IgnorePlugin ()
 - alias
- - babel-loader
 - terser-webpack-plugin
 - cache-loader hard-source-webpack-plugin
thread-loader cache-loader cache-loader thread-loader heavy-loader
- DLL
 - DllPlugin DllReferencePlugin() manifest.json

2webpack4-

1. V8for offorEachMapSetObjectincludesindexOf
2. md4 hash
3. webpacs ASTloaderAST
- 4.

noParse

-
- jquery
-

```
module.exports = {
  module: {
    noParse: /jquery/,
    rules: []
  }
}
```

IgnorePlugin

-
- moment ./local
- local import 'moment/locale/zh-cn'

```
module.exports = {
  plugins: [
    new Webpack.IgnorePlugin(/./local/, /moment/),
  ]
}
```

dllPlugin

-
-
- manifest.json
- webpack.config
- webpack.DllPlugin Webpack.DllReferencePlugin

happypack -> thread-loader

-
-

thread-loader

thread-loader loader worker
loader loader example loader loader worker (worker pool)

```
// webpack.config.js
module.exports = {
  module: {
    rules: [
      {
        test: /\.js$/,
        include: path.resolve("src"),
        use: [
          "thread-loader",
          // loader (e.g babel-loader)
        ]
      }
    ]
  }
}
```

worker 600ms node.js loader

- webpack-paralle-uglify-plugin issue pr
Webpack 4.0 uglifyjs-webpack-plugin parallel

```
module.exports = {
  optimization: {
    minimizer: [
      new UglifyJsPlugin({
        parallel: true,
      }),
    ],
  },
};
```

- terser-webpack-plugin

```

module.exports = {
  optimization: {
    minimizer: [
      new TerserPlugin({
        parallel: true // 
      })
    ],
  },
};

```

2 Webpack

- - webpack-paralle-uglify-plugin
 - uglifyjs-webpack-plugin parallel (ES6)
 - terser-webpack-plugin parallel
 -
 - mini-css-extract-plugin Chunk CSS optimize-css-assets-webpack-plugin cssnano CSS
- - html-webpack-externals-plugin CDN bundle
 - SplitChunksPlugin ()(Webpack4) CommonsChunkPlugin
 - cdnvuewebpack externalvaluebundle
- Tree shaking
 - purgecss-webpack-plugin mini-css-extract-plugin()
 - bundle(ES6 Modlue) ES6 Moduletree shaking
 - babel-loader Webpack CommonJS tree-shaking
 - PurifyCSS() uncss CSS
- Scope hosting
 - Scope hosting
 - ES6 CommonJS Scope hosting mainFields jsnext:main ES6
- - Node imagemin ()
 - image-webpack-loader
- Polyfill
 - polyfill-service polyfill(UApolyfill)
 - @babel-preset-env useBuiltIns: 'usagepolyfill'

3speed-measure-webpack-plugin

SMP Webpack Loader Plugin

terser-webpack-plugin

```
const TerserPlugin = require('terser-webpack-plugin')
module.exports = {
  optimization: {
    minimizer: [
      new TerserPlugin({
        parallel: true,
        terserOptions: {
          ecma: 6,
        },
      }),
    ],
  }
}
```

speed-measure-webpack-plugin

loader, plugin

```
// webpack.config.js
const SpeedMeasurePlugin = require('speed-measure-webpack-plugin');
const smp = new SpeedMeasurePlugin();
//.....
// smp.warp() config
module.exports = smp.wrap(merge(_mergeConfig, webpackConfig));
```

webpack-build-notifier

```
// webpack.config.js
const WebpackBuildNotifierPlugin = require('webpack-build-notifier');
const webpackConfig= {
  plugins: [
    new WebpackBuildNotifierPlugin({
      title: 'webpack' ,
      // logo: path.resolve('./img/favicon.png'),
      suppressSuccess: true
    })
  ]
}
```

progress-bar-webpack-plugin

```
// webpack.config.js
const ProgressBarPlugin = require('progress-bar-webpack-plugin');
const webpackConfig= {
  plugins: [
    new ProgressBarPlugin(),
  ]
}
```

webpack-dashboard

```
// webpack.config.js
const DashboardPlugin = require('webpack-dashboard/plugin');
const webpackConfig= {
  plugins: [
    new DashboardPlugin()
  ]
}
```

```
// package.json
{
  "scripts": {
    "dev": "webpack-dashboard webpack --mode development",
  },
}
```

: node-bash-title

macitemwindows

```
// webpack.config.js
const setTitle = require('node-bash-title');
setTitle('server');
```

friendly-errors-webpack-plugin

friendly-errors-webpack-plugin

```

const webpackConfig= {
  plugins: [
    new FriendlyErrorsWebpackPlugin({
      compilationSuccessInfo: {
        messages: ['You application is running here http://localhost:3000'],
        notes: ['Some additionnal notes to be displayed upon successful compilation']
      },
      onErrors: function (severity, errors) {
        // You can listen to errors transformed and prioritized by the plugin
        // severity can be 'error' or 'warning'
      },
      // should the console be cleared between each compilation?
      // default is true
      clearConsole: true,
      // add formatters and transformers (see below)
      additionalFormatters: [],
      additionalTransformers: []
    }),
  ]
}

```

(node)

1 Event Loop

JavaScript

JavaScript jsjs ajaxajaxjsajax

event loopJavaScript

2 Event Loop

Micro-Task Macro-Task

macro micro

macro-tasksetTimeoutsetIntervalscript I/O UI

micro-task: new Promise().then()MutationObserve

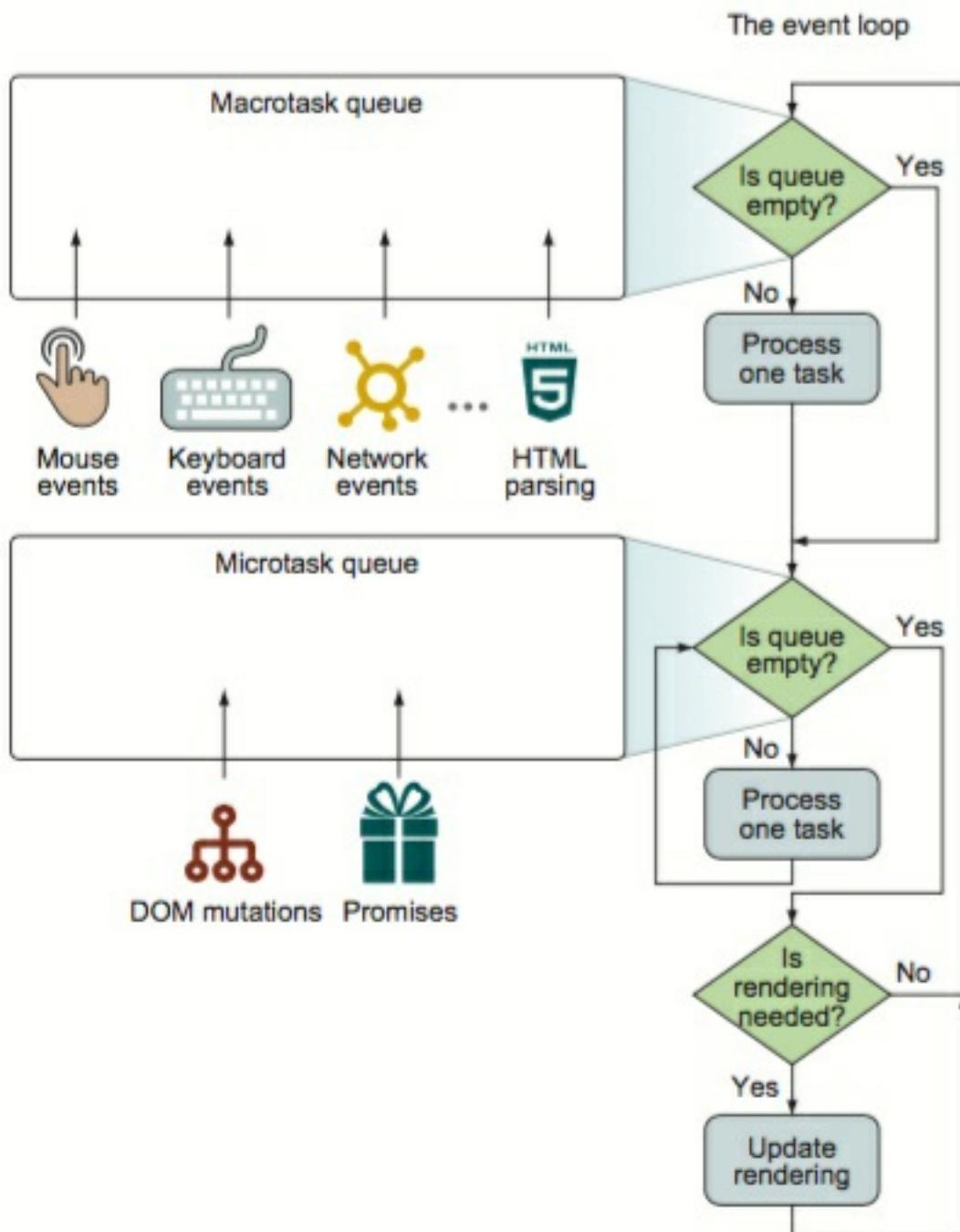
requestAnimationFrame

requestAnimationFrameMDN

window.requestAnimationFrame() ——

requestAnimationFrameGUIMicro-TaskrequestAnimationFrame

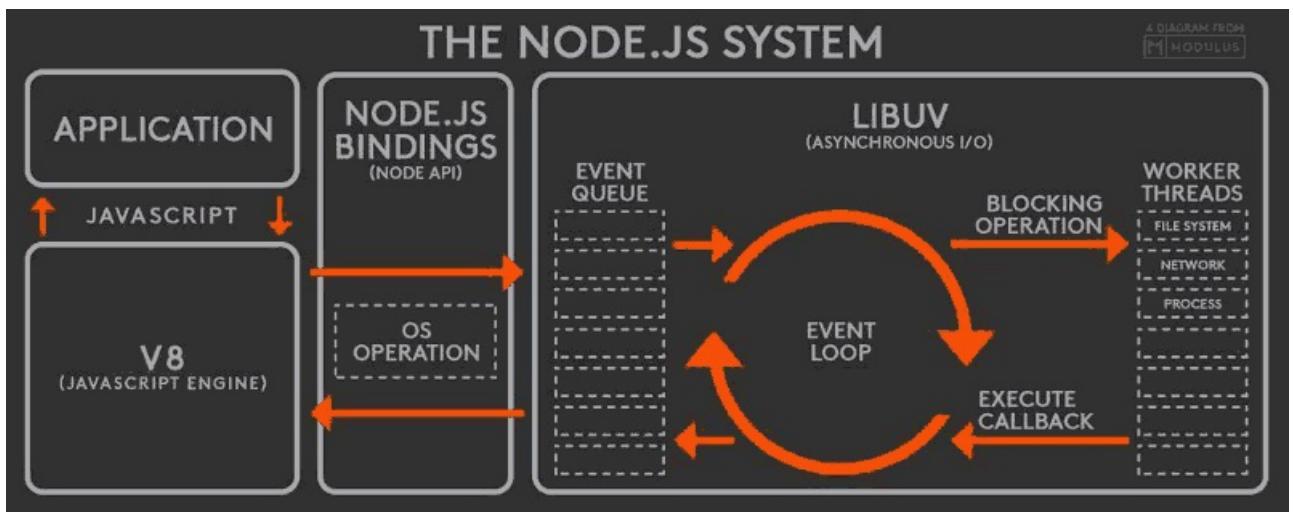
event loop



1. macrotask23
2. macrotask
3. microtask45
4. microtask3
- 5.

3node Event Loop

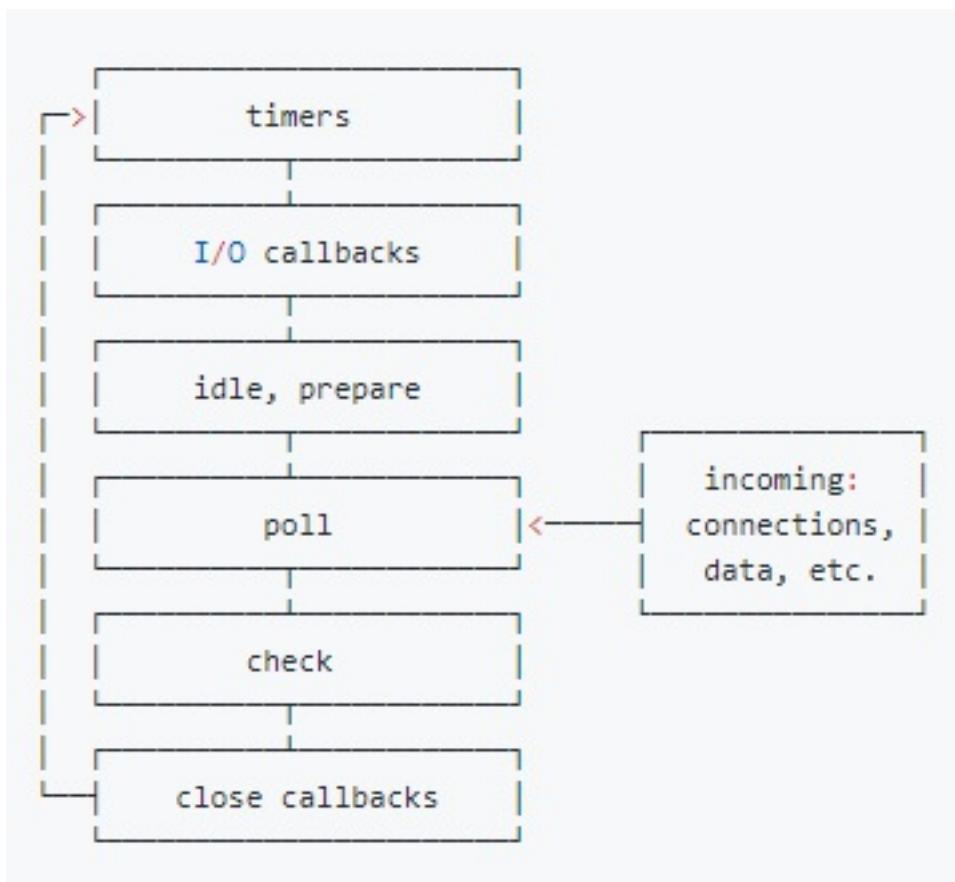
Node Event Loop Node.jsV8jsI/OlibuvlibuvAPI



node:

1. V8JavaScript
2. Node API
3. libuvNode APIEvent LoopV8
4. V8

libuv 6



1. timers timersetTimeoutsetInterval poll
2. I/O callbacks I/O
3. idle, prepare node

4. poll I/O, node
5. check setImmediate()
6. close callbacks socket close

poll

poll

1. timer
2. I/O

timer

- poll
- poll
 - setImmediate poll check
 - setImmediate

timer poll timer timer

Micro-Task Macro-Task

Node macro micro

macro-task	setTimeout	setInterval	setImmediate	script	I/O
micro-task :	process.nextTick				new Promise().then()

setTimeout setImmediate

- setImmediate pollcheck
- setTimeout polltimer

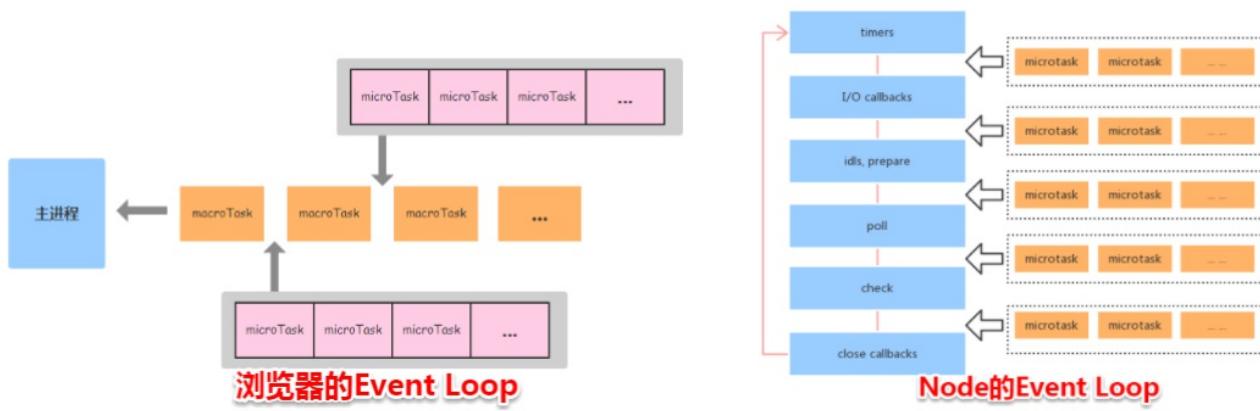
```
setTimeout(function timeout () {
  console.log('timeout');
}, 0);
setImmediate(function immediate () {
  console.log('immediate');
});
```

1. setTimeout
2. setTimeout(fn, 0) === setTimeout(fn, 1) 1ms timer setTimeout
3. 1ms setImmediate

process.nextTick

Event Loop nextTick microtask

4 Node Event Loop



- Nodemicrotask
- microtask macrotask

node

NodeJSHttpHttpipCookieWeb

Java

```

const http = require('http')
function compose(middlewareList) {
  return function (ctx) {
    function dispatch (i) {
      const fn = middlewareList[i]
      try {
        return Promise.resolve(fn(ctx, dispatch.bind(null, i + 1)))
      } catch (err) {
        Promise.reject(err)
      }
    }
    return dispatch(0)
  }
}
class App {
  constructor(){
    this.middlewares = []
  }
  use(fn){
    this.middlewares.push(fn)
    return this
  }
  handleRequest(ctx, middleware) {
    return middleware(ctx)
  }
  createContext (req, res) {
    const ctx = {
      req,
      res
    }
    return ctx
  }
  callback () {
    const fn = compose(this.middlewares)
    return (req, res) => {
      const ctx = this.createContext(req, res)
      return this.handleRequest(ctx, fn)
    }
  }
  listen(...args) {
    const server = http.createServer(this.callback())
    return server.listen(...args)
  }
}
module.exports = App

```

node

1

- -----> nodejs -----> ----->nodejs----->

- nodejsjava
- WebSSR
- SSRSEO

2

-
- node
- node
- node
-
-
-
- nodeSSRJS

3nodeAPInode

- java|php
-
-

4

- expressmultifetch
- express+http-proxy-middleware

5nodejs

- 1. httpNodehttpcreateServer
 - 2.
 - 3. httprequest
-
- http

```
const http = require("http");
const server = http.createServer();
server.on('request',(req,res)=>{
  res.end("hello world")
})
server.listen(3000, ()=>{
  console.log("running");
})
```

-

```
const http = require("http");
const server = http.createServer();
server.on('request', (req, res)=>{
  // reqdataend
  // Buffer.concat
  //
  let postbody = [];
  req.on("data", chunk => {
    postbody.push(chunk);
  })
  req.on('end', () => {
    let postbodyBuffer = Buffer.concat(postbody);
    res.end(postbodyBuffer);
  })
})
server.listen(3000,()=>{
  console.log("running");
})
```

nodejsbufferchunkBuffer.concatbuffer

- httprequest

```

const http = require("http");
const server = http.createServer();

server.on("request", (req, res) => {
  var { connection, host, ...originHeaders } = req.headers;
  var options = {
    "method": req.method,
    //
    "hostname": "www.nanjingmb.com",
    "port": "80",
    "path": req.url,
    "headers": { originHeaders }
  };
  //
  var p = new Promise((resolve, reject) => {
    let postbody = [];
    req.on("data", chunk => {
      postbody.push(chunk);
    })
    req.on('end', () => {
      let postbodyBuffer = Buffer.concat(postbody);
      resolve(postbodyBuffer)
    });
  });
  //
  p.then((postbodyBuffer) => {
    let responsebody = [];
    var request = http.request(options, (response) => {
      response.on('data', (chunk) => {
        responsebody.push(chunk);
      });
      response.on("end", () => {
        responsebodyBuffer = Buffer.concat(responsebody)
        res.end(responsebodyBuffer);
      });
    });
    //
    // requestwrite
    request.write(postbodyBuffer);
    // end
    request.end();
  });
});
server.listen(3000, () => {
  console.log("running");
});

```

promise Promise

1Promise

1. Promise pending() fulfilled() rejected()

2. Promise, resolverejectresolve PromiserejectError
3. thenPromiseonResolved(fulfilled)onRejected(rejected)
4. catchPromise
5. finallyPromise
6. Promise.all()PromisePromisePromise(Promise.all()IteratorPromise)catch
Promise.all()catchcatchPromise.all()catch
7. Promise.race()Promise.allPromise.race()Promise.race()Promise
8. Promise.resolve()PromisePromisePromise.resolve()thenable(then)
Promise.resolve()PromisethenPromise.resolvePromisefulfilledthen
onResolvedPromise.resolvefulfilled Promise resolve() Promise “
“event loop””
9. Promise.reject()Promiserejectedreject()

2Promise

- API
Promise API API
- Promise
Promise Promise Promise Promise
- Promise
- Promise Array.prototype.map()

3Promise

1. Promise
2. Promise
3. Pending
4. Promise Promise Promise

4

Promise7, state(), value(), reason(), resolve, reject, then

```
class Promise{
  constructor(executor) {
    this.state = 'pending';
    this.value = undefined;
    this.reason = undefined;
    let resolve = value => {
      if (this.state === 'pending') {
        this.state = 'fulfilled';
        this.value = value;
      }
    };
    let reject = reason => {
      if (this.state === 'pending') {
        this.state = 'rejected';
        this.reason = reason;
      }
    };
    try {
      //
      executor(resolve, reject);
    } catch (err) {
      reject(err);
    }
  }
  then(onFulfilled, onRejected) {
    if (this.state === 'fulfilled') {
      let x = onFulfilled(this.value);
    };
    if (this.state === 'rejected') {
      let x = onRejected(this.reason);
    };
  }
}
```

5

```

function myPromise(constructor){ let self=this;
  self.status="pending" //
  self.value=undefined;//resolved
  self.reason=undefined;//rejected
  function resolve(value){
    //=="pending"
    if(self.status=="pending"){
      self.value=value;
      self.status="resolved";
    }
  }
  function reject(reason){
    //=="pending"
    if(self.status=="pending"){
      self.reason=reason;
      self.status="rejected";
    }
  }
}
// 
try{
  constructor(resolve,reject);
} catch(e){
  reject(e);
}
}

myPromise.prototype.then=function(onFullfilled,onRejected){
  let self=this;
  switch(self.status){
    case "resolved": onFullfilled(self.value); break;
    case "rejected": onRejected(self.reason); break;
    default:
  }
}

// 
var p=new myPromise(function(resolve,reject){resolve(1)});
p.then(function(x){console.log(x)})
//1

```

6

```

const PENDING = "pending";
const FULFILLED = "fulfilled";
const REJECTED = "rejected";
const resolvePromise = (promise, x, resolve, reject) => {
  if (x === promise) {
    // If promise and x refer to the same object, reject promise with a
    // TypeError as the reason.
    reject(new TypeError(''))
  }
  // if x is an object or function,

```

```

if (x !== null && typeof x === 'object' || typeof x === 'function') {
    // If both resolvePromise and rejectPromise are called, or multiple calls
    // to the same argument are made, the first call takes precedence, and any further
    // calls are ignored.
    let called
    try { // If retrieving the property x.then results in a thrown exception e,
        // reject promise with e as the reason.
        let then = x.then // Let then be x.then
        // If then is a function, call it with x as this
        if (typeof then === 'function') {
            // If/when resolvePromise is called with a value y, run [[Resolve]]
            (promise, y)
                // If/when rejectPromise is called with a reason r, reject promise with
                r.
            then.call(x, y => {
                if (called) return
                called = true
                resolvePromise(promise, y, resolve, reject)
            }, r => {
                if (called) return
                called = true
                reject(r)
            })
        } else {
            // If then is not a function, fulfill promise with x.
            resolve(x)
        }
    } catch (e) {
        if (called) return
        called = true
        reject(e)
    }
} else {
    // If x is not an object or function, fulfill promise with x
    resolve(x)
}
}

function Promise(excutor) {
    let that = this; // promise
    that.status = PENDING; //
    that.value = undefined; // fulfilled
    that.reason = undefined; // rejected
    that.onFulfilledCallbacks = []; // fulfilledonFulfilled
    that.onRejectedCallbacks = []; // rejectedonRejected
    function resolve(value) { // value
        if(value instanceof Promise) {
            return value.then(resolve, reject);
        }
        // onFulfilled onRejected then
        setTimeout(() => {
            // resolve onFulfilled
            if (that.status === PENDING) {

```

```

        // pending => fulfilled (resolve reject)
        that.status = FULFILLED;
        that.value = value;
        that.onFulfilledCallbacks.forEach(cb => cb(that.value));
    }
});

}

function reject(reason) { // reason
    setTimeout(() => {
        // reject onRejected
        if (that.status === PENDING) {
            // pending => rejected (resolve reject)
            that.status = REJECTED;
            that.reason = reason;
            that.onRejectedCallbacks.forEach(cb => cb(that.reason));
        }
    });
}

// excutor
// new Promise((resolve, reject) => {
//     throw new Error('error in excutor')
// })
try {
    excutor(resolve, reject);
} catch (e) {
    reject(e);
}
}

Promise.prototype.then = function(onFulfilled, onRejected) {
    const that = this;
    let newPromise;
    //
    onFulfilled = typeof onFulfilled === "function" ? onFulfilled : value =>
value;
    onRejected = typeof onRejected === "function" ? onRejected : reason => {
        throw reason;
    };
    if (that.status === FULFILLED) { //
        return newPromise = new Promise((resolve, reject) => {
            setTimeout(() => {
                try{
                    let x = onFulfilled(that.value);
                    resolvePromise(newPromise, x, resolve, reject); //promise resolve
onFulfilled
                } catch(e) {
                    reject(e); // onFulfilledthen(onFulfilled, onRejected);
                }
            });
        })
    }
    if (that.status === REJECTED) { //

```

```

return newPromise = new Promise((resolve, reject) => {
  setTimeout(() => {
    try {
      let x = onRejected(that.reason);
      resolvePromise(newPromise, x, resolve, reject);
    } catch(e) {
      reject(e);
    }
  });
});
}

if (that.status === PENDING) { //  

// resolve/rejected onFulfilled/onRejected
return newPromise = new Promise((resolve, reject) => {
  that.onFulfilledCallbacks.push((value) => {
    try {
      let x = onFulfilled(value);
      resolvePromise(newPromise, x, resolve, reject);
    } catch(e) {
      reject(e);
    }
  });
  that.onRejectedCallbacks.push((reason) => {
    try {
      let x = onRejected(reason);
      resolvePromise(newPromise, x, resolve, reject);
    } catch(e) {
      reject(e);
    }
  });
});
}
};

}

```

7

```

/**  

*  

* Promise js  

*  

* 1 Promise  

* 2 promise  

*  

* pending resolved  

* pending rejected  

* promise  

*  

* value reason  

* promise  

*  

* 1  

*

```

```
* promise => promise=>promise
* /
*
* 2 promise
*
*
* /
* promise
* :
* then
* new Promise
* Promise.all promise
*
*/
(function (window) {
    /**
     * Promise
     * excutor
     */
    const PENDING='pending'
    const RESOLVED='resolved'
    const REJECTED='rejected'
    function Promise(excutor) {
        const self = this
        self.status = 'pending'// promise status pending
        self.data = undefined// promise
        self.callbacks=[]// {onResolve(){}},onRejected(){}}
        // excutor
        function resolve(value) {
            if(self.status !==PENDING) return
            //resolve
            self.status= RESOLVED
            //value
            self.data = value
            //callback, onResolved
            if(self.callbacks.length>0){
                setTimeout(()=>{//}
                    self.callbacks.forEach((callbacksObj)=>{
                        callbacksObj.onResolved(value)
                    })
                })
            }
        }
        function reject(reason) {
            if(self.status !==PENDING) return
            //rejected
            self.status= REJECTED
            //value
            self.data = reason
            //callback, onRejected
            if(self.callbacks.length>0){
                setTimeout(()=>{//
```

```
        self.callbacks.forEach((callbacksObj)=>{
            callbacksObj.onRejected(reason)
        })
    })
}
try{
    excutor(resolve,reject)
}catch (error) {//
    reject(error)
}

}

/***
 *  Promisethen
 *
 *  promise
 */
Promise.prototype.then = function (onResolved, onRejected) {
    const self = this
    // promise
    return new Promise((resolve,reject)=>{
        if(self.status==PENDING){
            this.callbacks.push({
                onResolved,
                onRejected
            })
        }else if(self.status === RESOLVED){
            setTimeout(()=>{
                /**
                 *  return promise  reason error
                 *  promise
                 */
                try{
                    const result = onResolved(self.data)
                    if(result instanceof Promise){
                        result.then(
                            value=> resolve(value),
                            reason=> reject(reason)
                        )
                    }else{
                        resolve(result)
                    }
                }catch (error) {
                    reject(error)
                }
            })
        }else{
            // rejected
            setTimeout(()=>{
```

```
        onRejected(self.data)
    })
}
}

}

//promise
window.Promise = Promise
}) (window)
```

Promise.all

1

1. Promise Iterator
2. promise
3. Promise.resolve()""promise
- 4.
5. Promise Promise.all

2

Promise.all

```

function promiseAll(promises) {
  return new Promise(function(resolve, reject) {
    if (!Array.isArray(promises)) {
      throw new TypeError(`argument must be a array`);
    }
    var resolvedCounter = 0;
    var promiseNum = promises.length;
    var resolvedResult = [];
    for (let i = 0; i < promiseNum; i++) {
      Promise.resolve(promises[i]).then(value=>{
        resolvedCounter++;
        resolvedResult[i] = value;
        if (resolvedCounter === promiseNum) {
          return resolve(resolvedResult);
        }
      }, error=>{
        return reject(error);
      });
    }
  });
}

// test
let p1 = new Promise(function (resolve, reject) {
  setTimeout(function () {
    resolve(1);
  }, 1000);
})
let p2 = new Promise(function (resolve, reject) {
  setTimeout(function () {
    resolve(2);
  }, 2000);
})
let p3 = new Promise(function (resolve, reject) {
  setTimeout(function () {
    resolve(3);
  }, 3000);
})
promiseAll([p3, p1, p2]).then(res => {
  console.log(res); // [3, 1, 2]
});

```

React

react:

- 1.
- 2.
- 3.
- 4.

1

```
props

// : Child
const Child = props =>{
  return <p>{props.name}</p>
}

// Parent
const Parent = ()=>{
  return <Child name=""      ></Child>
}
```

2

props+

```
// : Child
const Child = props =>{
  const cb = msg =>{
    return () => {
      props.callback(msg);
    }
  }
  return (
    <button onClick={cb(!)}>          </button>
  );
}

// Parent
class Parent extends Component {
  callback(msg) {
    console.log(msg);
  }
  render() {
    return (<Child callback={this.callback.bind(this)}></Child>);
  }
}
```

3

- props, props, props
- context, context, context

```

// context
// Context ""

const BatteryContext = createContext();

// GrandChild extends Component {
class GrandChild extends Component {
  render(){
    return (
      <BatteryContext.Consumer>
        {
          color => <h1 style={{"color":color}}>:{color}</h1>
        }
      </BatteryContext.Consumer>
    );
  }
}

// Child = () =>{
const Child = () =>{
  return (
    <GrandChild/>
  );
}

// Parent extends Component {
class Parent extends Component {
  state = {
    color: "red"
  }

  render() {
    const { color } = this.state;
    return (
      <BatteryContext.Provider value={color}>
        <Child></Child>
      </BatteryContext.Provider>
    );
  }
}

```

4

- 1.
2. redux
3. ,

redux-saga mobx

1

- redux-sage redux
- mobx redux

2

- redux-sage flux
- mobx flux

3

- redux-sage Generator action action creator pure action
- Generator call put takeEverytakeLasttrace
- mobx Store state actionstate action state Computed values
state Reactions state state

4

- redux-sage state state action reducer state state state
- mobx state state state

5

- redux-sage redux action reducer dispatch state mapStateToProps
state
- mobx action reducer action state

6

- redux-sage redux redux
- mobx

react-fiber

1

- reactsetState""jsreact
- Stack reconcilervDOMreconciliation(x00ms)16ms,js

2

React JS FiberrequestIdleCallback API

Fiber JS

```
const fiber = {  
  stateNode,      //  
  child,         //  
  sibling,        //  
  return,         //  
}
```

- react
 - Virtual DOM
 - Reconciler Diff
 - Renderer ReactDOM ReactNative
- (Scheduler) Diff
 - synchronousStack Reconciler
 - tasknext tick
 - animation
 - high
 - low
 - offscreenrenderscroll
- Fiber Reconcilerreact
 - Fiber
 -
- FiberReact render React.createElement Element Virtual DOM Tree
Fiber Element Fiber Node Fiber Node Fiber TreeFiber Tree
requestIdleCallback API,
- Stack ReconcilerFiber Reconciler

```
// , on-, off, emit, caches;

interface CacheProps {
  [key: string]: Array<((data?: unknown) => void)>;
}

class Observer {

  private caches: CacheProps = {}; //

  on (eventName: string, fn: (data?: unknown) => void){ // eventName-, fn
    this.caches[eventName] = this.caches[eventName] || [];
    this.caches[eventName].push(fn);
  }

  emit (eventName: string, data?: unknown) { //  =>
    if (this.caches[eventName]) {
      this.caches[eventName].forEach((fn: (data?: unknown) => void) =>
fn(data));
    }
  }

  off (eventName: string, fn?: (data?: unknown) => void) { //  => fn,
    if (this.caches[eventName]) {
      const newCaches = fn ? this.caches[eventName].filter(e => e !== fn) : [];
      this.caches[eventName] = newCaches;
    }
  }
}
```

```
class EventListener {
  listeners = {};
  on(name, fn) {
    (this.listeners[name] || (this.listeners[name] = [])).push(fn);
  }
  once(name, fn) {
    let tem = (...args) => {
      this.removeListener(name, fn);
      fn(...args);
    }
    fn.fn = tem;
    this.on(name, tem);
  }
  removeListener(name, fn) {
    if (this.listeners[name]) {
      this.listeners[name] = this.listeners[name].filter(listener => (listener
!= fn && listener != fn.fn));
    }
  }
  removeAllListeners(name) {
    if (name && this.listeners[name]) {
      delete this.listeners[name];
    }
    this.listeners = {};
  }
  emit(name, ...args) {
    if (this.listeners[name]) {
      this.listeners[name].forEach(fn => fn.call(this, ...args));
    }
  }
}
```

```

let input = [
  {
    id: 1,
    val: "",
    parentId: null,
  },
  {
    id: 2,
    val: "1",
    parentId: 1,
  },
  {
    id: 3,
    val: "2",
    parentId: 1,
  },
  {
    id: 4,
    val: "1",
    parentId: 2,
  },
  {
    id: 5,
    val: "2",
    parentId: 2,
  },
  {
    id: 6,
    val: "3",
    parentId: 3,
  },
];
}

function buildTree(arr, parentId, childrenArray) {
  arr.forEach((item) => {
    if (item.parentId === parentId) {
      item.children = [];
      buildTree(arr, item.id, item.children);
      childrenArray.push(item);
    }
  });
}

function arrayToTree(input, parentId) {
  const array = [];
  buildTree(input, parentId, array);
  return array.length > 0 ? (array.length > 1 ? array : array[0]) : {};
}
const obj = arrayToTree(input, null);
console.log(obj);

```

```

/**
 * function TreeNode(val) {
 *     this.val = val;
 *     this.left = null;
 *     this.right = null;
 * }
 */

var sortedArrayToBST = function (nums) {
    if (!nums.length) {
        return null
    };
    const root = new TreeNode(null);

    if (nums.length > 1) {
        root.left = sortedArrayToBST(nums.splice(0, nums.length / 2))
    };
    root.val = nums[0];
    root.right = sortedArrayToBST(nums.splice(1));
    return root;
};

```

ES6 Proxy arr[-1]arr[arr.length-1][-2]

```

const negativeArray = els =>
    new Proxy(els, {
        get: (target, propKey, receiver) =>
            Reflect.get(target, +propKey < 0 ? String(target.length + +propKey) :
propKey, receiver)
    });
const unicorn = negativeArray(["", "", "", "", ""]);
unicorn[-1];

```

```
// 30. ES6proxy arr[-1]
function PythonArray(arr) {
  return new Proxy(arr, {
    get(target, prop, receiver) {
      if ((key = Number.parseInt(prop))) {
        const len = Reflect.get(target, 'length', receiver);
        prop = key < 0 && Math.abs(key) <= len ? len + key : prop;
      }
      return Reflect.get(target, prop, receiver);
    },
    set(target, prop, value, receiver) {
      if ((key = Number.parseInt(prop))) {
        const len = Reflect.get(target, 'length', receiver);
        prop = key < 0 && Math.abs(key) <= len ? len + key : prop;
      }
      return Reflect.set(target, prop, value, receiver);
    },
    deleteProperty(target, prop) {
      if ((key = Number.parseInt(prop))) {
        const len = target.length;
        prop = key < 0 && Math.abs(key) <= len ? len + key : prop;
      }
      return Reflect.deleteProperty(target, prop);
    },
  });
}
```

```

console.log(1);
setTimeout(() => {
  console.log(2);
  process.nextTick(() => {
    console.log(3);
  });
  new Promise((resolve) => {
    console.log(4);
    resolve();
  }).then(() => {
    console.log(5);
  });
});

new Promise((resolve) => {
  console.log(7);
  resolve();
}).then(() => {
  console.log(8);
});

// nextTickpromise.then
process.nextTick(() => {
  console.log(6);
});

setTimeout(() => {
  console.log(9);
  process.nextTick(() => {
    console.log(10);
  });
  new Promise((resolve) => {
    console.log(11);
    resolve();
  }).then(() => {
    console.log(12);
  });
});

```

```

// node11
// 1 7 6 8 2 4 9 11 3 10 5 12

// node11
// 1 7 6 8 2 4 3 5 9 11 10 12

```

•

- macrotask, setTimeoutsetInerValsetImmediate(node)

- requestAnimationFrame()I/OUI rendering()
 - microtask,process.nextTick(Node)Promise.then()Object.observe MutationObserver
- Promisenew Promise()
- Node.jsEventLoop**6**
 - 1. timerssetTimeoutsetIntervalcallback
 - 2. I/O callbackclosecallbackstimerscallbackssetImmediate()callbacks callbacks
 - 3. idle, preparenode
 - 4. pollI/Onode
 - 5. checksetImmediate()callbacks
 - 6. close callbackssocket.on('close',)callbacks
- NodeJs4
 - 1. Timers Queue
 - 2. IO Callbacks Queue
 - 3. Check Queue
 - 4. Close Callbacks Queue
 - 4macrotaskNodeJSmacrotask
- NodeJS2
 - 1. Next Tick Queueprocess.nextTick(callback)
 - 2. Other Micro QueuemicrotaskPromise
 - microtaskNodeJSmicrotask
- Node.jsEventLoop
 - 1. Script
 - 2. microtaskNext Tick QueueOther Microtask Queue
 - 3. macrotask61macrotaskEvent Loopmacrotask2
 - 4. Timers Queue -> 2 -> I/O Queue -> 2 -> Check Queue -> 2 -> Close Callback Queue -> 2 -> Timers Queue
 - 5. NodeEvent Loop
- Node 11.x
 - node11timerssetTimeout,setInterval...checkimmediatenode11

```
function side(arr) {
  arr[0] = arr[2];
  console.log(arr); // [1, 1, 1, callee: f, Symbol(Symbol.iterator): f]
}
function a(a, b, c = 3) {
  c = 10;
  side(arguments);
  console.log(a, b, c); // 1, 1, 10
  return a + b + c;
}
a(1, 1, 1);
//
```

12

arguments c 1 10
a ES ES6 c

```
function side(arr) {
  arr[0] = arr[2];
  console.log(arr); // [10, 1, 10, callee: f, Symbol(Symbol.iterator): f]
}
function a(a, b, c) {
  c = 10;
  side(arguments);
  console.log(a, b, c); // 10, 1, 10
  return a + b + c;
}
a(1, 1, 1);
//  
// 21
```

21

```
var min = Math.min();
max = Math.max();
console.log(min < max);
//
```

false

- true false
- MDN
 - Math.min 0 Infinity
 - Math.max -Infinity, false

,

```
var a = 1;
(function a () {
  a = 2;
  console.log(a);
})();
//
```

```
f a () {
a = 2;
console.log(a);
}
```

IIFE

,

```
var a = [0];
if (a) {
  console.log(a == true);
} else {
  console.log(a);
}
//
```

false

- 1 a if Boolean([0]) true, a == true,[0] 0 0==true false
- primitive primitive join “0”string boolean number 0==1

```

var a = [1];
if (a) {
  console.log(a == true);
} else {
  console.log(a);
}
// true

```

```

//0
Number(false)//0
Number(['1'])//1

```

- 2 a if Boolean([0]) true, a == true,js

- 1.

```

1 == true //true 1 === Number(true)
'true' == true //false Number('true')->NaN Number(true)->1
'' = 0//true
'1' == true//true Number('1')->1

```

- 2.
 - 3. undefinednullfalsetrue

```

(function () {
  var a = (b = 5);
})();
console.log(b);
console.log(a);
// 

```

5 Error, a is not defined

IIFEavarb
(use strict;) b Uncaught ReferenceError: b is not defined,

```

(function () {
  "use strict";
  var a = (window.b = 5);
})();
console.log(b);

```

```

(function() {
    'use strict';
    var a = b = 5;
})();

console.log(b); //Uncaught ReferenceError: b is not defined

/*-----*/
(function() {
    'use strict';
    var a = window.b = 5;
})();

console.log(b); // 5

```

,

```

var fullname = 'a';
var obj = {
    fullname: 'b',
    prop: {
        fullname: 'c',
        getfullname: function() {
            return this.fullname;
        }
    }
};

console.log(obj.prop.getfullname()); // c
var test = obj.prop.getfullname;
console.log(test()); // a

```

c a

- this this
- console.log() getFullName()obj.prop getFullName()test window test
thisfullnamea

,

```
var company = {  
    address: 'beijing'  
}  
var yideng = Object.create(company);  
delete yideng.address  
console.log(yideng.address);  
//
```

beijing

yideng prototype company addressyidengaddressdelete

- 1. deletedelete
- 2. delete:
 - 1 non-configurable;
 - 2 false
- 3. deleteglobal(window)
- 4. delete
 - 1
 - 2
 - 3
 - 4 ECMAScript 6 const let "temporal dead zone" (TDZ) delete
- 5. delete
 - 1
 - 2
 - 3
- 6. delete
 - 1 length undefined
 - 2 delete
 - 3 undefined undefined delete
- 7. delete
- 8.

```
var output = (function(x){
  delete x;
  return x;
})(0);
console.log(output);
```

0 delete object x delete

2

```
var x = 1;
var output = (function(){
  delete x;
  return x;
})();
console.log(output);
```

1 delete object x delete

3?

```
x = 1;
var output = (function(){
  delete x;
  return x;
})();
console.log(output);
```

VM548:1 Uncaught ReferenceError: x is not defined,

4

```
var x = { foo : 1};
var output = (function(){
  delete x.foo;
  return x.foo;
})();
console.log(output);
```

undefinedxobjectdeletex.foox.fooundefined

,

```
var foo = function bar(){ return 12; };
console.log(typeof bar());
//
```

bar is not defined

```
var foo = function bar(){
    // foo is visible here
    // bar is visible here
    console.log(typeof bar()); // Work here :)
};

// foo is visible here
// bar is undefined here
```

```
,
```



```
var x=1;
if(function f(){}){
    x += typeof f;
}
console.log(x)
//
```

1 undefined

0false"nullundefinedtruetypeOfundefined

```
,
```



```
function f(){
    return f;
}
console.log(new f() instanceof f);
//
```

false

a instanceof b abfreturn f,true;new f()ff

```
,
```



```
function f(){}
console.log(new f() instanceof f);
// true
```

```
var foo = {
  bar: function(){
    return this.baz;
  },
  baz:1
}
console.log(typeof (f=foo.bar)());
//
```

undefined

AMDCMD

- AMD RequireJS
- CMDSeaJS
- CMD AMD
- CMD AMD
- CMDAMD

SPA

SPA single-page application Web HTMLJavaScript CSSSPA HTML UI

SPA

-
- SPA
-

SPA

- Web JavaScriptCSS
-
- SEO SEO

Vue.jsDOM

1

- DOM API DOM DOM DOM
- **DOM** DOM View-Model DOM
- DOM JavaScript , DOM DOM weex

2

- DOM + DOM VScodeDOM

,

```
for (let i = 0; i < 3; i++) {
  setTimeout(() => console.log(i), 1);
}
```

0 1 2

letilet const {} i

```
//
for (var i = 0; i < 3; i++) {
  setTimeout(() => console.log(i), 1);
}
```

3 3 3JavaScriptsetTimeout ivar ++i1 setTimeouti3

CSSLess

CSS

CSS

csscss

less, sasscsscsscsscss

less@sass\$

CSS

@import

CSS

CSS
(lighten,darken,transparentize)mixinssloopscsscss

Node

work_thread
Node 10.5.0 work_thread Node worker_thread 4 2

- isMainThread: threadId === 0
- MessagePort: EventEmitter
- MessageChannel:
- threadId: ID
- Worker: filename
- parentPort: worker MessagePort null
- workerData: data

```

const {
  isMainThread,
  parentPort,
  workerData,
  threadId,
  MessageChannel,
  MessagePort,
  Worker,
} = require("worker_threads");

function mainThread() {
  for (let i = 0; i < 5; i++) {
    const worker = new Worker(__filename, { workerData: i });
    worker.on("exit", (code) => {
      console.log(`main: worker stopped with exit code ${code}`);
    });
    worker.on("message", (msg) => {
      console.log(`main: receive ${msg}`);
      worker.postMessage(msg + 1);
    });
  }
}

function workerThread() {
  console.log(`worker: workerData ${workerData}`);
  parentPort.on("message", (msg) => {
    console.log(`worker: receive ${msg}`);
  }),
  parentPort.postMessage(workerData);
}

if (isMainThread) {
  mainThread();
} else {
  workerThread();
}

//
```

React keys

Keys React

- key React Diff React Key React Key Key

setState

setState

```
this.setState(  
  { username: 'tylermcginnis33' },  
  () => console.log('setState has finished and the component has re-rendered.'))
```

```
this.setState((prevState, props) => {  
  return {  
    streak: prevState.streak + props.count  
  }  
})
```

React refs

- Refs React DOM
- ref DOM

AJAX

AJAX componentDidMount

- React Fiber componentWillMount componentWillMount React
- componentWillMount AJAX componentWillMount
- AJAX setState componentDidMount AJAX

shouldComponentUpdate

shouldComponentUpdate

```
Webpack DefinePlugin NODE_ENV production React PropTypes  
React Uglify
```

React

React Browser Native EventSyntheticEventReact
React DOM DOM

createElement cloneElement

createElement JSX React Element cloneElement Props

redux

action -> reducer action -> middlewares -> reducer action
action

- redux-logger
- redux-thunk
- redux-promise actionCreatorpromise

redux

- fluxstore
- render shouldComponentUpdate

react

- UI
- UI UI
- React-Redux connect

react

- getDefaultProps:
- getInitialState:
- componentWillMount:
- render:DOM
- componentDidMount:

- componentWillReceiveProps:
- shouldComponentUpdate:false render
- componentWillUpdate:
- render:
- componentDidUpdate:

- `componentWillUnmount`:

react

```
shouldComponentUpdate render dom dom shouldComponentUpdate dom  
diff
```

dom

```
dom js dom dom diff dom
```

- JavaScript DOM DOM
-
- 21DOM

diff?

-
- key
- React class component class
- component `setState`, React - dirty., React dirty component .
- `shouldComponentUpdate diff`

react

- `shouldComponentUpdate dom`
- production react.js
- `keyReact`

setState

`setState` react diff

React

- `create-react-app`

Create React App React

Create React App FaceBook React React Webpack loader npm React

- Next. js Node. js

Next. js TypeScript

- Gatsby

Gatsby.js React : Gatsby

- nwbReactweb npm
- razzleJavaScript
- Razzlenext.js, React
- NeutrinoJavaScript
- Yeoman

Yeoman generator generator 'yo' generator Generators Yeoman Yeoman

Yeoman Yeoman

Yeoman yo grunt bower

- umi.js

umi react next.js

- react-cli
- Rekit

(Functional Component)(Class Component)

(state) Class

React Functional Components) Class Components

```
function Welcome = (props) => {
  const sayHi = () => {
    alert(`Hi ${props.name}`);
  }
  return (
    <div>
      <h1>Hello, {props.name}</h1>
      <button onClick ={sayHi}>Say Hi</button>
    </div>
  )
}
```

```

import React from 'react'

class Welcome extends React.Component {
  constructor(props) {
    super(props);
    this.sayHi = this.sayHi.bind(this);
  }
  sayHi() {
    alert(`Hi ${this.props.name}`);
  }
  render() {
    return (
      <div>
        <h1>Hello, {this.props.name}</h1>
        <button onClick={this.sayHi}>Say Hi</button>
      </div>
    )
  }
}

```

- 1.
2. DOM Stateless Components State Presentational Components Props DOM
3. this this this sayHi
4. UI DOM
5. React React
6. UI

React keys

Keys React

```

render () {
  return (
    <ul>
      {this.state.todoItems.map(({item, key}) => {
        return <li key={key}>{item}</li>
      })}
    </ul>
  )
}

```

key React Diff React Key React Key Key

React

1. React DOM DOM javascript DOM
2. DOM API IE8
3. component
4. Flux JavaScript React Facebook
5. javascript JavaScript
6. RequireJS Browserify Webpack

React setState render

reactstatesetStatesetStatedom

reactisBatchingUpdatestruefalsereactrender

react diff

- 1.
2. key
3. React class component class
4. component setState , React dirty. , React dirty component .
5. shouldComponentUpdate diff

react

react15

getDefaultProps:
getInitialState:
componentWillMount
render: DOM
componentDidMount:

componentWillReceiveProps:
shouldComponentUpdate: false render
componentWillUpdate:
render:
componentDidUpdate:

componentWillUnmount:

react16

React v16.3 componentWillMount, componentWillReceiveProps componentWillUpdate
UNSAFE_React 17.0

- getDerivedStateFromProps: "", ., nextProps currentState , .
- getSnapshotBeforeUpdate: renderdom

shouldComponentUpdate react

1. shouldComponentUpdate true render() false,
2. render dom
3. dom shouldComponentUpdate dom diff

dom ?()

dom(virtual dom) JavaScript JavaScript dom

dom dom dom dom dom

= DOM +

dom js dom dom diff dom

= DOM + DiffDOM +

1. JavaScript DOM DOM;
2. ;
3. 21 DOM

React refs

refs React DOM ref DOM

```
class CustomForm extends Component {
  handleSubmit = () => {
    console.log("Input Value: ", this.input.value)
  }
  render () {
    return (
      <form onSubmit={this.handleSubmit}>
        <input
          type='text'
          ref={(input) => this.input = input} />
        <button type='submit'>Submit</button>
      </form>
    )
  }
}
```

input ref input DOM this refs

```
function CustomForm ({handleSubmit}) {
  let inputElement
  return (
    <form onSubmit={() => handleSubmit(inputElement.value)}>
      <input
        type='text'
        ref={(input) => inputElement = input} />
      <button type='submit'>Submit</button>
    </form>
  )
}
```

setState replaceState

1. setState Object.assign
2. replaceState state state

redux

- flux store
- render shouldComponentUpdate

flux

Flux ""

1. View
2. View Action
3. Dispatcher Action Store
4. Store "change"
5. View "change"

redux redux

1redux

Reactprops, reduxstate

2Redux

Reduxstore, store tree, (dispatch)(action)store, storestate

redux

3Redux

1.
statestore

2. statestateactionaction
3. actionstatedreducers

4Redux

1. Store
 - storestore
 - ReduxcreateStoreStore

```
import {
  createStore
} from 'redux'
const store = createStore(fn);
```

2. State

statestorestorestateReduxstateView, stateviewstore.getState()

```
import {
  createStore
} from 'redux'
const store = createStore(fn);
const state = store.getState();
```

3. Action

stateViewreduxstatethis. setStateViewReduxStorestateActiontypeAction

```
const action = {
  type: 'ADD_TODO',
  payload: 'redux'
}
```

ActionADD_TODO'redux'Actionstate

4. store.dispatch()
 - store.dispatch() // viewAction

```
store.dispatch({
  type: 'ADD_TODO',
  payload: 'redux'
})
```

store.dispatchActionstorestorestate

5. Reducer

StoreActionstateviewstateReducer ReducerActionstatestate

Reducerstateactionstateaction

```

const reducer = (state, action) => {
  switch (action.type) {
    case ADD_TODO:
      return newstate;
    default
      return state
  }
}

```

5Redux

```

let createStore = (reducer) => {
  let state;
  //
  //
  let listeners = [];
  let getState = () => state;
  //action
  let dispatch = (action) => {
    //reducerstate
    state = reducer(state, action);
    //
    listeners.forEach((l) => l())
  }
  //
  let subscribe = (listener) => {
    listeners.push(listener);
  }
  dispatch();
  return {
    getState,
    dispatch,
    subscribe
  }
}

let combineReducers = (reducers) => {
  //reducersreducer
  return function(state = {}, action = {}) {
    let newState = {};
    for (var attr in reducers) {
      newState[attr] = reducers[attr](state[attr], action)
    }
    return newState;
  }
}

export {
  createStore,
  combineReducers
};

```

6Redux

html

```
<div id="counter"></div>
<button id="addBtn">+</button>
<button id="minusBtn">-</button>
```

js

```

function createStore(reducer) {
  var state;
  var listeners = [];
  var getState = () => state;
  var dispatch = (action) => {
    state = reducer(state, action);
    listeners.forEach(l => l());
  }
  var subscribe = (listener) => {
    listeners.push(listener);
    return () => {
      listeners = listeners.filter((l) => l !== listener)
    }
  }
  dispatch();
  return {
    getState,
    dispatch,
    subscribe
  }
}
var reducer = (state = 0, action) => {
  if (!action) return state;
  console.log(action);
  switch (action.type) {
    case 'INCREMENT':
      return state + 1;
    case 'DECREMENT':
      return state - 1;
    default:
      return state;
  }
}
var store = createStore(reducer);
store.subscribe(function() {
  document.querySelector('#counter').innerHTML = store.getState();
});

document.querySelector('#addBtn').addEventListener('click', function() {
  store.dispatch({
    type: 'INCREMENT'
  });
});
document.querySelector('#minusBtn').addEventListener('click', function() {
  store.dispatch({
    type: 'DECREMENT'
  });
});

```

React

React.createClass()ES6 class

react

- UI
- UI UI
- React-Redux connect

React

React SyntheticEvent React

SyntheticEvent React React DOM React

React Ajax

React componentDidMount ""(DOM) Ajax setState
componentDidMount

() super(props)

super() this ES2015 constructor super() props super() () constructor
this. props

this

(property initializers)create-react-app

setState callback

this. props this. state state

(higher order component)

HOC Redux connect HOC React HOC

(controlled component)

HTML <input> , <textarea> <select> React state onChange
state React ""

React Element Component

React Element UI React Element JSX createElement

React Component React Element

()(state)(props)

- State State
- Props(properties) props props (immutable) props props ()Props -
- props

(Presentational component)(Container component)

- props UI
- (behavior) Flux actions()

(Class component) (Functional component)

1. JSX
- 2.
3. store
4. props '(stateless component)'(dumb components)

createElement cloneElement

React.createElement(): JSX React.createElement() React divspan React

```
React.createElement(type, [props], [...children]);
```

React.cloneElement() React.createElement() React

```
React.cloneElement(element, [props], [...children]);
```

React

1.

keyupkeydownresizescrollmousemove
keyupReact

2. debounce

nn

lodashdebounce

```

function debounce(fn, ms) {
  let timerId // 
  return function () {
    timerId && clearTimeout(timerId) //  setTimeout clear
    //  setTimeout,  interval  fn
    timerId = setTimeout(() => {
      fn.apply(this, arguments)
    }, ms)
  }
}

// 
function sayHi() {
  console.log(''      );
}

var inp = document.getElementById('inp');
inp.addEventListener('input', debounce(sayHi, 1000)); //

```

input

3. throttle

n

lodash throttle

```

function throttle(fn, ms) {
  let timerId // id
  return function () {
    //
    if (!timerId) {
      timerId = setTimeout(() => {
        // id
        timerId = null
        fn.apply(this, arguments)
      }, ms)
    }
  }
}

// 
function sayHi(e) {
  console.log(e.target.innerWidth, e.target.innerHeight);
}
window.addEventListener('resize', throttle(sayHi, 1000));

```

4.

```
msininputsayHisetTimeout  
setTimeout
```

```
setTimeout
```

5. React

5.1

```

import * as React from 'react'
import './App.css'

class App extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      tip: null,
      triggerTimes: 1
    }
  }
  handleKeyUp = (e) => {
    this.isPhoneLegal(e.target.value) //
  }

  isPhoneLegal = (phone) => {
    const phoneRegexp = /^1([38]\d|5[0-35-9]|7[3678])\d{8}$/ // 
    const { triggerTimes } = this.state
    if(phoneRegexp.test(phone)) {
      this.setState({
        tip: `!`,
        triggerTimes: 0
      })
    } else {
      this.setState({
        tip: ` `,
        triggerTimes: triggerTimes + 1
      })
    }
  }

  render() {
    return (
      <div className="container">
        <input onKeyUp={ this.handleKeyUp } placeholder="" />
        <span>
          {this.state.tip}
        </span>
      </div>
    )
  }
}

export default App;

```

keyup

5.2

```

import * as React from 'react'
import './App.css'

```

```
class App extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      tip: null,
      triggerTimes: 1
    }
    this.isPhoneLegal = debounce(this.isPhoneLegal, 1000)
  }
  handleKeyUp = (e) => {
    this.isPhoneLegal(e.target.value) // 
  }
  isPhoneLegal = (phone) => {
    const phoneRegexp = /^1([38]\d|5[0-35-9]|7[3678])\d{8}$/
    const { triggerTimes } = this.state
    if(phoneRegexp.test(phone)) {
      this.setState({
        tip: `!`,
        triggerTimes: 0
      })
    } else {
      this.setState({
        tip: ` `,
        triggerTimes: triggerTimes + 1
      })
    }
  }
}

render() {
  return (
    <div className="container">
      <input onKeyUp={ this.handleKeyUp } placeholder="" />
      <span>
        {this.state.tip}
      </span>
    </div>
  )
}
}

function debounce(fn, ms) {
  let timeoutId
  return function () {
    clearTimeout(timeoutId)
    timeoutId = setTimeout(() => {
      fn.apply(this, arguments)
    }, ms)
  }
}

export default App;
```

10Ajax

React Vue diff $O(n^3)$ $O(n)$ $O(n^3)$ $O(n)$

React setState

react-router <Link> <a>

<a> <Link>

link:

```
if (_this.props.onClick) _this.props.onClick(event);

if (!event.defaultPrevented && // onClick prevented default
    event.button === 0 && // ignore everything but left clicks
    !_this.props.target && // let browser handle "target=_blank" etc.
    !isModifiedEvent(event) // ignore clicks with modifier keys
) {
  event.preventDefault();

  var history = _this.context.router.history;
  var _this$props = _this.props,
      replace = _this$props.replace,
      to = _this$props.to;

  if (replace) {
    history.replace(to);
  } else {
    history.push(to);
  }
}
```

Link3

1. onclickonclick
2. clicka [123\(\)](#)
3. hreftohistoryhistory & hash

react-router

React

RNIOS

ReactVue

1. Virtual DOM
2. props
3. , DOM,
- 4.
5. native, React Native, Vue Weex

1. : vue, react
2. , React JSX , HTML CSS JavaScript, 'all in js'; Vue webpack + vue-loader, html, css, js
3. state react, setState; vue, state, data vue
4. virtual DOM, vue, React, , , reactShouldComponentUpdate
5. React MVC view, Vue MVVM

- :
- : DOM

1.

HTML <textarea>React setState() React React ""

2.

DOM setState() HTML input ref DOM

React?

React JavaScript React Facebook Jordan Walke 2011 React
Facebook 2012 Instagram

React ?

- DOM Virtual DOM DOM
-
-
- / UI

JSX?

JSX ECMAScript XML React.createElement() JavaScript HTML

<h1> JavaScript

```
class App extends React.Component {  
  render() {  
    return(  
      <div>  
        <h1>'Welcome to React world!'</h1>  
      </div>  
    )  
  }  
}
```

render JSX

```
React.createElement(  
  "div",  
  null,  
  React.createElement("h1", null, 'Welcome to React world!')  
)
```

?

Element DOM Elements Elements React

React Element

```
const element = React.createElement(  
  'div',  
  {id: 'login-btn'},  
  'Login'  
)
```

React.createElement()

```
{  
  type: 'div',  
  props: {  
    children: 'Login',  
    id: 'login-btn'  
  }  
}
```

ReactDOM.render() DOM

```
<div id='login-btn'>Login</div>
```

render() props JSX

```
const Button = ({ onLogin }) =>  
  <div id={'login-btn'} onClick={onLogin} />
```

JSX React.createElement()

```
const Button = ({ onLogin }) => React.createElement(
  'div',
  { id: 'login-btn', onClick: onLogin },
  'Login'
)
```

React ?

1. Function Components: JavaScript props React

```
function Greeting({ message }) {
  return <h1>`Hello, ${message}`</h1>
}
```

2. Class Components: ES6 ES6

```
class Greeting extends React.Component {
  render() {
    return <h1>`Hello, ${this.props.message}`</h1>
  }
}
```

```
<Greeting message="semilinker"/>
```

React

```
// Greeting
const result = Greeting(props); // <p>Hello</p>

// Greeting
const instance = new Greeting(props); // Greeting {}
const result = instance.render(); // <p>Hello</p>
```

?

Pure Components?

```
React.PureComponent  React.Component    shouldComponentUpdate()
  PureComponent           shouldComponentUpdate true
```

React ?

User

```
class User extends React.Component {  
  constructor(props) {  
    super(props)  
  
    this.state = {  
      message: 'Welcome to React world'  
    }  
  }  
  
  render() {  
    return (  
      <div>  
        <h1>{this.state.message}</h1>  
      </div>  
    )  
  }  
}
```

StateProps

React props ?

Props HTML

Props

- 1.
- 2.
3. render() this.props.reactProp

reactProp

```
<Element reactProp={'1'} />
```

reactProp React props React

```
props.reactProp
```

?

state props JavaScript Props

States vs Props

Conditions States Props

?

```
//Wrong  
this.state.message = 'Hello world'
```

setState()

```
//Correct  
this.setState({ message: 'Hello World' })
```

constructor JavaScript

Reactthis.statethis.setState

- setStatesetStatesetState
- shouldComponentUpdate====

/

1. slice
2. Object.assign
3. ES6Spread operator
- 4.

setState() ?

setState setState()

```
setState({ name: 'John' }, () => console.log('The name has updated and component re-rendered'))
```

HTML React ?

1. HTML

```
<button onclick='activateLasers()'>
```

React camelCase ()

```
<button onClick={activateLasers}>
```

2. HTML false

```
<a href='#' onclick='console.log("The link was clicked."); return false;' />
```

React preventDefault()

```
function handleClick(event) {  
  event.preventDefault()  
  console.log('The link was clicked.')  
}
```

JSX ?

1. Binding in Constructor: JavaScript React

```
class Component extends React.Component {
  constructor(props) {
    super(props)
    this.handleClick = this.handleClick.bind(this)
  }

  handleClick() {
    // ...
  }
}
```

2. Public class fields syntax: bind public class fields syntax

```
handleClick = () => {
  console.log('this is:', this)
}
<button onClick={this.handleClick}>
  {'Click me'}
</button>
```

3. Arrow functions in callbacks: arrow functions

```
<button onClick={(event) => this.handleClick(event)}>
  {'Click me'}
</button>
```

.bind() public class fields syntax

?

```
<button onClick={() => this.handleClick(id)} />
```

.bind:

```
<button onClick={this.handleClick.bind(this, id)} />
```

React ?

SyntheticEvent API stopPropagation() preventDefault()

?

JS if JSX JS &&

```
<h1>Hello!</h1>
{
  messages.length > 0 && !isLogin ?
    <h2>
      You have {messages.length} unread messages.
    </h2>
    :
    <h2>
      You don't have unread messages.
    </h2>
}
```

if

```
{
  isLogin && <span>Your have been login!</span>
}
```

isLogin ? Your have been login! : null

"key" ?

key Keys React

IDs keys:

```
const todoItems = todos.map((todo) =>
  <li key={todo.id}>
    {todo.text}
  </li>
)
```

IDs index key

```
const todoItems = todos.map((todo, index) =>
  <li key={index}>
    {todo.text}
  </li>
)
```

1. indexes keys
2. keys li
3. key

refs ?

ref DOM

refs?

1. Refs React.createRef() ref React refs ref

```
class MyComponent extends React.Component {
  constructor(props) {
    super(props)
    this.myRef = React.createRef()
  }
  render() {
    return <div ref={this.myRef} />
  }
}
```

2. ref React input

```
class SearchBar extends Component {
  constructor(props) {
    super(props);
    this.txtSearch = null;
    this.state = { term: '' };
    this.setInputSearchRef = e => {
      this.txtSearch = e;
    }
  }

  onChange(event) {
    this.setState({ term: this.txtSearch.value });
  }

  render() {
    return (
      <input
        value={this.state.term}
        onChange={this.onChange.bind(this)}
        ref={this.setInputSearchRef} />
    );
  }
}
```

closures refs

forward refs?

Ref forwarding ref

```

const ButtonElement = React.forwardRef((props, ref) => (
  <button ref={ref} className="CustomButton">
    {props.children}
  </button>
));

// Create ref to the DOM button:
const ref = React.createRef();
<ButtonElement ref={ref}>{'Forward Ref'}</ButtonElement>

```

callback refs findDOMNode() ?

callback refs findDOMNode() API findDOMNode() React
 findDOMNode

```

class MyComponent extends Component {
  componentDidMount() {
    findDOMNode(this).scrollIntoView()
  }

  render() {
    return <div />
  }
}

```

```

class MyComponent extends Component {
  componentDidMount() {
    this.node.scrollIntoView()
  }

  render() {
    return <div ref={node => this.node = node} />
  }
}

```

String Refs ?

React API ref ref={'textInput'} DOM this.refs.textInput refs
 React v16

1. thisReactReact
2. refref
3. FlowFlow this.refs Callback refs
4. stringrefsrefDataTableMyComponent

```

class MyComponent extends Component {
  renderRow = (index) => {
    // This won't work. Ref will get attached to DataTable rather than
    MyComponent:
    return <input ref={'input-' + index} />;

    // This would work though! Callback refs are awesome.
    return <input ref={input => this['input-' + index] = input} />;
  }

  render() {
    return <DataTable data={this.props.data} renderRow={this.renderRow} />
  }
}

```

Virtual DOM?

Virtual DOM (VDOM) Real DOM UI DOM reconciliation

Real DOM vs Virtual DOM

Real DOM Virtual DOM

HTML	HTML
DOM	JSX
DOM	DOM

Virtual DOM ?

Virtual DOM

1. UI Virtual DOM
2. Virtual DOM Virtual DOM
3. DOM

Shadow DOM Virtual DOM ?

Shadow DOM Shadow DOM CSS DOM JavaScript CSS Virtual DOM
JavaScript API

React Fiber?

Fiber React v16 reconciliation React Fiber

React Fiber ?

React Fiber **incremental rendering:**

?

handleChange

```
handleChange(event) {
  this.setState({value: event.target.value.toUpperCase()})
}
```

?

ref DOM HTML

UserProfile ref name

```
class UserProfile extends React.Component {
  constructor(props) {
    super(props)
    this.handleSubmit = this.handleSubmit.bind(this)
    this.input = React.createRef()
  }

  handleSubmit(event) {
    alert('A name was submitted: ' + this.input.current.value)
    event.preventDefault()
  }

  render() {
    return (
      <form onSubmit={this.handleSubmit}>
        <label>
          {'Name:'}
          <input type="text" ref={this.input} />
        </label>
        <input type="submit" value="Submit" />
      </form>
    );
  }
}
```

createElement cloneElement ?

JSX React.createElement() React UI cloneElement

React ?

?

1. **Mounting:** DOM . constructor(), getDerivedStateFromProps(), render(), componentDidMount()
2. **Updating:** setState() forceUpdate() . getDerivedStateFromProps(), shouldComponentUpdate(), render(), getSnapshotBeforeUpdate() componentDidUpdate()
3. **Unmounting:** DOM componentWillUnmount()

DOM React

1. **Render** Pure ComponentReact
2. **Pre-commit** DOM React getSnapshotBeforeUpdate() DOM
3. **Commit** React DOM componentDidMount() DOM , componentDidUpdate() , componentWillUnmount() React 16.3+ ()

React ?

React 16.3+

- **getDerivedStateFromProps:** render() .
- **componentDidMount:** Ajax DOM
- **shouldComponentUpdate:** true false
- **getSnapshotBeforeUpdate:** DOM DOM
- **componentDidUpdate:** DOM prop state shouldComponentUpdate() false
- **componentWillUnmount:** DOM

Before 16.3

- **componentWillMount:** render()
- **componentDidMount:** Ajax DOM
- **componentWillReceiveProps:** this.propsnextPropsthis.setState()
- **shouldComponentUpdate:** true false
- **componentWillUpdate:** shouldComponentUpdatetruethis.setState()
- **componentDidUpdate:** DOM prop state shouldComponentUpdate() false
- **componentWillUnmount:** DOM

HOC?

(HOC) react

```
const EnhancedComponent = higherOrderComponent(WrappedComponent)
```

HOC

- 1.

- 2.
3. state
4. props

?

props

```
function HOC(WrappedComponent) {
  return class Test extends Component {
    render() {
      const newProps = {
        title: 'New Header',
        footer: false,
        showFeatureX: false,
        showFeatureY: true
      };

      return <WrappedComponent {...this.props} {...newProps} />
    }
  }
}
```

Context?

Context propsUI

```

// theme Context, theme light
const ThemeContext = React.createContext('light');

function ThemedButton(props) {
  // ThemedButton context theme
  return (
    <ThemeContext.Consumer>
      {theme => <Button {...props} theme={theme} />}
    </ThemeContext.Consumer>
  );
}

// 
function Toolbar(props) {
  return (
    <div>
      <ThemedButton />
    </div>
  );
}

class App extends React.Component {
  render() {
    return (
      <ThemeContext.Provider value="dark">
        <Toolbar />
      </ThemeContext.Provider>
    );
  }
}

```

children ?

Children this.props.children

React API

React.Children.map React.Children.forEach React.Children.count React.Children.on

```

const MyDiv = React.createClass({
  render: function() {
    return <div>{this.props.children}</div>
  }
})

```

```

ReactDOM.render(
  <MyDiv>
    <span>'Hello'</span>
    <span>'World'</span>
  </MyDiv>,
  node
)

```

React ?

React/JSX JavaScript

```
<div>
  /* JavaScript // */
  {'Welcome ${user}, let's play React'}
</div>
```

```
<div>
  /*
   */
  {'Welcome ${user}, let's play React'}
</div>
```

props ?

super()thisES6propssuper()this.props

props :

```
class MyComponent extends React.Component {
  constructor(props) {
    super(props)

    console.log(this.props) // prints { name: 'John', age: 42 }
  }
}
```

props :

```
class MyComponent extends React.Component {
  constructor(props) {
    super()

    console.log(this.props) // prints undefined

    // but props parameter is still available
    console.log(props) // prints { name: 'John', age: 42 }
  }

  render() {
    // no difference outside constructor
    console.log(this.props) // prints { name: 'John', age: 42 }
  }
}
```

this.props

?

propsstateReact DOM React DOM reconciliation

state ?

ES6 Babel JSX

```
handleInputChange(event) {  
  this.setState({ [event.target.id]: event.target.value })  
}
```

?

```
render() {  
  // Wrong: handleClick is called instead of passed as a reference!  
  return <button onClick={this.handleClick}>{'Click Me'}/>  
}
```

```
render() {  
  // Correct: handleClick is passed as a reference!  
  return <button onClick={this.handleClick}>{'Click Me'}/>  
}
```

?

DOM JSX HTML

React className class ?

class JavaScript JSX JavaScript React className class className

```
render() {  
  return <span className='menu navigation-menu'>{'Menu'}/>  
}
```

classnamesclassName

Fragments ?

React Fragments DOM

```
render() {
  return (
    <React.Fragment>
      <ChildA />
      <ChildB />
      <ChildC />
    </React.Fragment>
  )
}
```

```
render() {
  return (
    <>
      <ChildA />
      <ChildB />
      <ChildC />
    </>
  )
}
```

React 16 render

Fragments div ?

1. DOM Fragments
2. CSS FlexboxCSS Grid div
3. DOM

React Portal ?

Portal DOM

```
ReactDOM.createPortal(child, container)
```

React DOM

?

this

?

stateconstructor

```

class App extends Component {
  constructor(props) {
    super(props)
    this.state = { count: 0 }
  }

  render() {
    // ...
  }
}

```

React props ?

React React.isRequired

prop

1. PropTypes.number
2. PropTypes.string
3. PropTypes.array
4. PropTypes.object
5. PropTypes.func
6. PropTypes.node
7. PropTypes.element
8. PropTypes.bool
9. PropTypes.symbol
10. PropTypes.any

User propTypes

```

import React from 'react'
import PropTypes from 'prop-types'

class User extends React.Component {
  static propTypes = {
    name: PropTypes.string.isRequired,
    age: PropTypes.number.isRequired
  }

  render() {
    return (
      <>
        <h1>`Welcome, ${this.props.name}`</h1>
        <h2>`Age, ${this.props.age}`</h2>
      </>
    )
  }
}

```

: React v15.5 PropTypes React.PropTypes prop-types

React ?

1. Virtual DOM
2. JSX
- 3.
4. AngularBackbone
5. Jest

React ?

1. React
2. Web
3. React MVC
4. JSX
- 5.

React v16 ?

JavaScript UI

```
componentDidCatch(error, info) static getDerivedStateFromError()
```

```
class ErrorBoundary extends React.Component {
  constructor(props) {
    super(props)
    this.state = { hasError: false }
  }

  componentDidCatch(error, info) {
    // You can also log the error to an error reporting service
    logErrorToMyService(error, info)
  }

  static getDerivedStateFromError(error) {
    // Update state so the next render will show the fallback UI.
    return { hasError: true };
  }

  render() {
    if (this.state.hasError) {
      // You can render any custom fallback UI
      return <h1>'Something went wrong.'</h1>
    }
    return this.props.children
  }
}
```

```
<ErrorBoundary>
  <MyWidget />
</ErrorBoundary>
```

React v15 ?

React v15 unstable_handleError React v16 componentDidCatch

?

PropTypes React v15.5 React.PropTypes prop-types React
Flow TypeScript auto-completion

react-dom ?

react-dom DOM

1. render()
2. hydrate()
3. unmountComponentAtNode()
4. findDOMNode()
5. createPortal()

react-dom render ?

React DOM React DOM

```
ReactDOM.render(element, container[, callback])
```

ReactDOMServer ?

ReactDOMServer Node SSR

1. renderToString()
2. renderToStaticMarkup()

Node Web ExpressHapi Koa renderToString

```
// using Express
import { renderToString } from 'react-dom/server'
import MyPage from './MyPage'

app.get('/', (req, res) => {
  res.write('<!DOCTYPE html><html><head><title>My Page</title></head><body>')
  res.write('<div id="content">')
  res.write(renderToString(<MyPage/>))
  res.write('</div></body></html>')
  res.end()
})
```

React innerHTML?

dangerouslySetInnerHTML React DOM innerHTML innerHTML XSS
__html HTML

MyComponent dangerouslySetInnerHTML HTML

```
function createMarkup() {
  return { __html: 'First &nbsp; Second' }
}

function MyComponent() {
  return <div dangerouslySetInnerHTML={createMarkup()} />
}
```

React ?

style camelCased JavaScript CSS DOM JavaScript XSS

```
const divStyle = {
  color: 'blue',
  backgroundImage: `url(${ imgUrl })`
};

function HelloWorldComponent() {
  return <div style={divStyle}>Hello World!</div>
}
```

JavaScript DOM camelcased node.style.backgroundImage

React ?

React

1. React
2. JSX

setState() ?

setState() React Can only update a mounted or mounting component.
this.state

?

Keys React

React

```
{todos.map((todo, index) =>
  <Todo
    {...todo}
    key={index}
  />
)}
```

todo.id React

```
{todos.map((todo) =>
  <Todo {...todo}
    key={todo.id} />
)}
```

componentWillMount() setState() ?

componentWillMount() mounting componentWillMount() render()
componentDidMount() componentWillMount()

```
componentDidMount() {
  axios.get(`api/todos`)
    .then((result) => {
      this.setState({
        messages: [...result.data]
      })
    })
}
```

props ?

props

```
class MyComponent extends React.Component {
  constructor(props) {
    super(props)

    this.state = {
      records: [],
      inputValue: this.props.inputValue
    };
  }

  render() {
    return <div>{this.state.inputValue}</div>
  }
}
```

render props

```

class MyComponent extends React.Component {
  constructor(props) {
    super(props)

    this.state = {
      record: []
    }
  }

  render() {
    return <div>{this.props.inputValue}</div>
  }
}

```

?

JSX false undefined && true

```

const MyComponent = ({ name, address }) => (
  <div>
    <h2>{name}</h2>
    {address &&
      <p>{address}</p>
    }
  </div>
)

```

if-else

```

const MyComponent = ({ name, address }) => (
  <div>
    <h2>{name}</h2>
    {address
      ? <p>{address}</p>
      : <p>'Address is not available'</p>
    }
  </div>
)

```

DOM props ?

HTML ...rest props

```

const ComponentA = () =>
  <ComponentB isDisplay={true} className={'componentStyle'} />

const ComponentB = ({ isDisplay, ...domProps }) =>
  <div {...domProps}>{'ComponentB'}

```

React ?

```

@setTitle('Profile')
class Profile extends React.Component {
    //....
}

/*
    title is a string that will be set as a document title
    WrappedComponent is what our decorator will receive when
    put directly above a component class as seen in the example above
*/
const setTitle = (title) => (WrappedComponent) => {
    return class extends React.Component {
        componentDidMount() {
            document.title = title
        }

        render() {
            return <WrappedComponent {...this.props} />
        }
    }
}

```

memoize?

memoize moize

```

import moize from 'moize'
import Component from './components/Component' // this module exports a non-
memoized component

const MemoizedFoo = moize.react(Component)

const Consumer = () => {
    <div>
        {'I will memoize the following entry:'}
        <MemoizedFoo/>
    </div>
}

```

Server Side Rendering SSR?

React Node DOM

```

import ReactDOMServer from 'react-dom/server'
import App from './App'

ReactDOMServer.renderToString(<App />)

```

HTMLReact

React ?

Webpack DefinePlugin NODE_ENV production propType Uglify

CRA ?

create-react-app CLI React

CRA Todo

```
# Installation
$ npm install -g create-react-app

# Create new project
$ create-react-app todo-app
$ cd todo-app

# Build, test and run
$ npm run build
$ npm run test
$ npm start
```

React

1. React, JSX, ES6, Flow
2. ES6
3. Autoprefixed CSS -webkit-
- 4.
- 5.
6. hashes sourcemaps JSCSS Images

mounting ?

DOM

1. constructor()
2. static getDerivedStateFromProps()
3. render()
4. componentDidMount()

React v16 ?

1. componentWillMount()
2. componentWillReceiveProps()
3. componentWillUpdate()

React v16.3 UNSAFE_ React v17

getDerivedStateFromProps() ?

```
getDerivedStateFromProps() null

class MyComponent extends React.Component {
  static getDerivedStateFromProps(props, state) {
    // ...
  }
}
```

componentDidUpdate() componentWillMount()

getSnapshotBeforeUpdate() ?

getSnapshotBeforeUpdate() DOM componentDidUpdate()

```
class MyComponent extends React.Component {
  getSnapshotBeforeUpdate(prevProps, prevState) {
    // ...
  }
}
```

componentDidUpdate() componentWillUpdate()

?

displayName

displayName :

```
export default React.createClass({
  displayName: 'TodoApp',
  // ...
})
```

```
export default class TodoApp extends React.Component {
  // ...
}
```

?

mounting render stage

1. static
2. constructor()
3. getChildContext()
4. componentWillMount()
5. componentDidMount()
6. componentWillReceiveProps()
7. shouldComponentUpdate()
8. componentWillUpdate()
9. componentDidUpdate()
10. componentWillUnmount()

11. onClickSubmit() onChangeDescription()
12. getter getSelectReason() getFooterContent()
13. renderNavigation() renderProfilePicture()
14. render()

switching ?

switching prop

switching page

```
import HomePage from './HomePage'
import AboutPage from './AboutPage'
import ServicesPage from './ServicesPage'
import ContactPage from './ContactPage'

const PAGES = {
  home: HomePage,
  about: AboutPage,
  services: ServicesPage,
  contact: ContactPage
}

const Page = (props) => {
  const Handler = PAGES[props.page] || ContactPage

  return <Handler {...props} />
}

// The keys of the PAGES object can be used in the prop types to catch dev-time
// errors.
Page.propTypes = {
  page: PropTypes.oneOf(Object.keys(PAGES)).isRequired
}
```

setState() ?

setState() React	setState()	setState()	setState()
useState()			

```
// assuming this.state.count === 0
this.setState({ count: this.state.count + 1 })
this.setState({ count: this.state.count + 1 })
this.setState({ count: this.state.count + 1 })
// this.state.count === 1, not 3
setState() count

this.setState((prevState, props) => ({
  count: prevState.count + props.increment
}))
// this.state.count === 3 as expected
```

React ?

React.StrictMode <Fragment><StrictMode> DOM

```
import React from 'react'

function ExampleApplication() {
  return (
    <div>
      <Header />
      <React.StrictMode>
        <div>
          <ComponentOne />
          <ComponentTwo />
        </div>
      </React.StrictMode>
      <Footer />
    </div>
  )
}
```

strict mode <ComponentOne> <ComponentTwo>

React Mixins ?

Mixins Mixins

mixins PureRenderMixin props props

```
const PureRenderMixin = require('react-addons-pure-render-mixin')

const Button = React.createClass({
  mixins: [PureRenderMixin],
  // ...
})
```

isMounted() ?

isMounted() setState()

```
if (this.isMounted()) {  
  this.setState({...})  
}
```

```
  setState()  isMounted()      isMounted()  
  setState()          componentWillUnmount()
```

React ?

Pointer Events Pointer Events

React DOM

1. onPointerDown
2. onPointerMove
3. onPointerUp
4. onPointerCancel
5. onGotPointerCapture
6. onLostPointerCapture
7. onPointerEnter
8. onPointerLeave
9. onPointerOver
10. onPointerOut

?

JSX React HTML SVG

```
class myComponent extends Component {  
  render() {  
    return <div />  
  }  
}  
  
export default myComponent
```

```
import MyComponent from './MyComponent'
```

React v16 DOM ?

React DOM JSX React React

```
<div mycustomattribute={'something'} />
```

React 15 DOM div

```
<div />
```

React 16 DOM

```
<div mycustomattribute='something' />
```

DOM APIs

constructor getInitialState ?

ES6 React.createClass() getInitialState()

ES6 :

```
class MyComponent extends React.Component {
  constructor(props) {
    super(props)
    this.state = { /* initial state */ }
  }
}
```

React.createClass():

```
const MyComponent = React.createClass({
  getInitialState() {
    return { /* initial state */ }
  }
})
```

React v16 React.createClass() JavaScript

setState ?

render() forceUpdate() React

```
component.forceUpdate(callback)
```

forceUpdate() render() this.props this.state

ES6 React super() super(props) ?

constructor() this.props props super()

super(props):

```
class MyComponent extends React.Component {
  constructor(props) {
    super(props)
    console.log(this.props) // { name: 'John', ... }
  }
}
```

super():

```
class MyComponent extends React.Component {  
  constructor(props) {  
    super()  
    console.log(this.props) // undefined  
  }  
}
```

constructor() this.props

JSX ?

ES6 Array.prototype.map items

```
<tbody>  
  {items.map(item => <SomeComponent key={item.id} name={item.name} />)}  
</tbody>
```

for

```
<tbody>  
  for (let i = 0; i < items.length; i++) {  
    <SomeComponent key={items[i].id} name={items[i].name} />  
  }  
</tbody>
```

JSX do

attribute props ?

React (JSX)

```
<img className='image' src='images/{this.props.image}' />
```

JS

```
<img className='image' src={'images/' + this.props.image} />
```

```
<img className='image' src={`images/${this.props.image}`} />
```

React propotype ?

React.PropTypes.shape() React.PropTypes.arrayOf()

```
ReactComponent.propTypes = {  
  arrayWithShape: React.PropTypes.arrayOf(React.PropTypes.shape({  
    color: React.PropTypes.string.isRequired,  
    fontSize: React.PropTypes.number.isRequired  
  })).isRequired  
}
```

?

```
<div className="btn-panel {this.props.visible ? 'show' : 'hidden'}">
```

```
<div className={'btn-panel ' + (this.props.visible ? 'show' : 'hidden')}>
```

```
<div className={`btn-panel ${this.props.visible ? 'show' : 'hidden'}`}>
```

React ReactDOM ?

react React.createElement(), React.Component, React.Children react-dom
ReactDOM.render() react-dom/server ReactDOMServer.renderToString()
ReactDOMServer.renderToStaticMarkup()

ReactDOM React ?

React DOM ReactDOM React v0.14 react-native react-art react-canvas
react-threeReact DOM React React React react react-dom React
React Native Web

React label ?

for <label> HTML

```
<label htmlFor={'user'}>{'User'}</label>
<input type={'text'} id={'user'} />
```

for JavaScript htmlFor

```
<label htmlFor={'user'}>{'User'}</label>
<input type={'text'} id={'user'} />
```

?

React :

```
<button style={{...styles.panel.button, ...styles.panel.submitButton}}>
{'Submit'}</button>
```

React Native

```
<button style={[styles.panel.button, styles.panel.submitButton]}>{'Submit'}
</button>
```

?

```
componentDidMount() resize width height componentWillUnmount()
```

```
class WindowDimensions extends React.Component {
  componentWillMount() {
    this.updateDimensions()
  }

  componentDidMount() {
    window.addEventListener('resize', this.updateDimensions)
  }

  componentWillUnmount() {
    window.removeEventListener('resize', this.updateDimensions)
  }

  updateDimensions() {
    this.setState({width: $(window).width(), height: $(window).height()})
  }

  render() {
    return <span>{this.state.width} x {this.state.height}</span>
  }
}
```

setState() replaceState() ?

```
setState()      replaceState()      setState()      setState() false/null  
replaceState()
```

?

```
componentWillUpdate(object nextProps, object nextState)  
componentDidUpdate(object prevState)
```

React ?

```
Array.prototype.filter()
```

```
removeItem()
```

```
removeItem(index) {
  this.setState({
    data: this.state.data.filter((item, i) => i !== index)
  })
}
```

React HTML ?

(>=16.2)

```
render() {
  return false
}
```

```
render() {
  return null
}
```

```
render() {
  return []
}
```

```
render() {
  return <React.Fragment></React.Fragment>
}
```

```
render() {
  return <></>
}
```

undefined

React JSON?

```
<pre> JSON.stringify()
```

```
const data = { name: 'John', age: 42 }

class User extends React.Component {
  render() {
    return (
      <pre>
        {JSON.stringify(data, null, 2)}
      </pre>
    )
  }
}
```

```
React.render(<User />, document.getElementById('container'))
```

React props?

React props immutable top-down

?

```
input ref componentDidMount()
```

```

class App extends React.Component{
  componentDidMount() {
    this.nameInput.focus()
  }

  render() {
    return (
      <div>
        <input
          defaultValue={'Won\'t focus'}
        />
        <input
          ref={(input) => this.nameInput = input}
          defaultValue={'Will focus'}
        />
      </div>
    )
  }
}

ReactDOM.render(<App />, document.getElementById('app'))

```

?

- 1. setState()

- Object.assign()

```

const user = Object.assign({}, this.state.user, { age: 42 })
this.setState({ user })

```

-

```

const user = { ...this.state.user, age: 42 }
this.setState({ user })

```

- 2. setState()

```

this.setState(prevState => ({
  user: {
    ...prevState.user,
    age: 42
  }
}))

```

setState()?

React setState() this.props this.state

counter

```
// Wrong
this.setState({
  counter: this.state.counter + this.props.increment,
})
```

setState() props

```
// Correct
this.setState((prevState, props) => ({
  counter: prevState.counter + props.increment
}))
```

React ?

React.version

```
const REACT_VERSION = React.version

ReactDOM.render(
  <div>`React version: ${REACT_VERSION}`</div>,
  document.getElementById('app')
)
```

create-react-app polyfills ?

1. core-js :

polyfills.js index.js npm install core-js yarn add core-js

```
import 'core-js/fn/array/find'
import 'core-js/fn/array/includes'
import 'core-js/fn/number/is-nan'
```

2. Polyfill :

index.html polyfill

```
<script src='https://cdn.polyfill.io/v2/polyfill.min.js?
features=default,Array.prototype.includes'></script>
```

Array.prototype.includes

create-react-app https http?

HTTPS=true package.json scripts

```
"scripts": {
  "start": "set HTTPS=true && react-scripts start"
}
```

set HTTPS=true && npm start

create-react-app ?

.env

```
NODE_PATH=src/app
```

src/app

React Router Google Analytics?

history

```
history.listen(function (location) {
  window.ga('set', 'page', location.pathname + location.search)
  window.ga('send', 'pageview', location.pathname + location.search)
})
```

?

setInterval()

```
componentDidMount() {
  this.interval = setInterval(() => this.setState({ time: Date.now() }), 1000)
}

componentWillUnmount() {
  clearInterval(this.interval)
}
```

vendor prefixes React ?

React vendor prefixes vendor prefixes

```
<div style={{
  transform: 'rotate(90deg)',
  WebkitTransform: 'rotate(90deg)', // note the capital 'W' here
  msTransform: 'rotate(90deg)' // 'ms' is the only lowercase vendor prefix
}} />
```

React ES6 ?

```
import React from 'react'
import User from 'user'

export default class MyProfile extends React.Component {
  render(){
    return (
      <User type="customer">
        //...
      </User>
    )
  }
}
```

export MyProfile

React ?

JSX HTML

1. <component /> React.createElement('component') (i.e, HTML)
2. <obj.component /> React.createElement(obj.component)
3. <Component /> React.createElement(Component)

?

React

React ?

ES7 static

```
class MyComponent extends React.Component {
  static DEFAULT_PAGINATION = 10
}
```

React ?

ref HTMLInputElement HTMLInputElement.click

1. render ref

```
<input ref={input => this.inputElement = input} />
```

- 2.

```
this.inputElement.click()
```

React async/await?

React async/await Babel transform-async-to-generator

React ?

React

1. :

CSSJS

```
common/
└── Avatar.js
└── Avatar.css
└── APIUtils.js
└── APIUtils.test.js
feed/
└── index.js
└── Feed.js
└── Feed.css
└── FeedStory.js
└── FeedStory.test.js
└── FeedAPI.js
profile/
└── index.js
└── Profile.js
└── ProfileHeader.js
└── ProfileHeader.css
└── ProfileAPI.js
```

2. :

```
api/
└── APIUtils.js
└── APIUtils.test.js
└── ProfileAPI.js
└── UserAPI.js
components/
└── Avatar.js
└── Avatar.css
└── Feed.js
└── Feed.css
└── FeedStory.js
└── FeedStory.test.js
└── Profile.js
└── ProfileHeader.js
└── ProfileHeader.css
```

?

React Transition Group React Motion React

?

UI

```
export const colors = {
  white,
  black,
  blue
}

export const space = [
  0,
  8,
  16,
  32,
  64
]
```

```
import { space, colors } from './styles'
```

React linters?

ESLint JavaScript linter React eslint-plugin-react npm prop
eslint-plugin-javascript JSX HTML alt tabindex

AJAX AJAX ?

AJAX AxiosjQuery AJAX fetch API componentDidMount() setState()
API

```

class MyComponent extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      employees: [],
      error: null
    }
  }

  componentDidMount() {
    fetch('https://api.example.com/items')
      .then(res => res.json())
      .then(
        (result) => {
          this.setState({
            employees: result.employees
          })
        },
        (error) => {
          this.setState({ error })
        }
      )
  }

  render() {
    const { error, employees } = this.state
    if (error) {
      return <div>Error: {error.message}</div>;
    } else {
      return (
        <ul>
          {employees.map(item => (
            <li key={employee.name}>
              {employee.name}-{employees.experience}
            </li>
          )))
        </ul>
      )
    }
  }
}

```

?

Render Props prop React render

```

<DataProvider render={data => (
  <h1>`Hello ${data.target}`</h1>
)}>

```

React Router DownShift

React Router?

React Router React UI URL

React Router history ?

React Router history window.history React Native Node

React Router v4 <Router>?

React Router v4 <Router> :

1. <BrowserRouter>
2. <HashRouter>
3. <MemoryRouter>

browserhashmemory history React Router v4 routerhistory

history push() replace() ?

history

1. push()
2. replace()

history push() replace()

React Router v4 ?

/

1. withRouter()

withRouter() history proppush()replace()

```
import { withRouter } from 'react-router-dom' // this also works with 'react-router-native'

const Button = withRouter(({ history }) => (
  <button
    type='button'
    onClick={() => { history.push('/new-location') }}
  >
    {'Click Me!'}
  </button>
))
```

2. <Route>

<Route>withRouter() history

```

import { Route } from 'react-router-dom'

const Button = () => (
  <Route render={({ history }) => (
    <button
      type='button'
      onClick={() => { history.push('/new-location') }}
    >
      {'Click Me!'}
    </button>
  )} />
)

```

3. :

API

```

const Button = (props, context) => (
  <button
    type='button'
    onClick={() => {
      context.history.push('/new-location')
    }}
  >
    {'Click Me!'}
  </button>
)

Button.contextTypes = {
  history: React.PropTypes.shape({
    push: React.PropTypes.func.isRequired
  })
}

```

React Router v4 ?

React Router v4 query-string

```

const queryString = require('query-string');
const parsed = queryString.parse(props.location.search);

```

API URLSearchParams

```

const params = new URLSearchParams(props.location.search)
const foo = params.get('name')

```

URLSearchParams IE11 polyfill

"Router may have only one child element" ?

Router

Route <Switch> <Switch>

Switch

```
import { Switch, Router, Route } from 'react-router'
```

```
<Switch>
```

```
<Router>
  <Switch>
    <Route /* ... */ />
    <Route /* ... */ />
  </Switch>
</Router>
```

React Router v4 params history.push ?

props history

```
this.props.history.push({
  pathname: '/template',
  search: '?name=sudheer',
  state: { detail: response.data }
})
```

searchpush()

404 ?

```
<Switch><Route> <Route> path
```

```
<Switch>
  <Route exact path="/" component={Home}/>
  <Route path="/user" component={User}/>
  <Route component={NotFound} />
</Switch>
```

React Router v4 ?

1. history

history.js:

```
import { createBrowserHistory } from 'history'

export default createBrowserHistory({
  /* pass a configuration object here if needed */
})
```

2. <Router> index.jshistory.js

```
import { Router } from 'react-router-dom'
import history from './history'
import App from './App'

ReactDOM.render(
  <Router history={history}>
    <App />
  </Router>
), holder)
```

3. history.push

```
// some-other-file.js
import history from './history'

history.push('/go-here')
```

?

react-router React Router <Redirect> <Redirect>

```
import React, { Component } from 'react'
import { Redirect } from 'react-router'

export default class LoginComponent extends Component {
  render() {
    if (this.state.isLoggedIn === true) {
      return <Redirect to="/your/redirect/page" />
    } else {
      return <div>{'Login Please'}</div>
    }
  }
}
```

React Intl?

React Intl React API React Intl FormatJS API React

React Intl ?

- 1.
- 2.
3. ""
- 4.
5. 150
6. Node
- 7.

React Intl ?

React API

```
<FormattedMessage  
  id={'account'}  
  defaultMessage={'The amount is less than minimum balance.'}  
/>
```

```
const messages = defineMessages({  
  accountMessage: {  
    id: 'account',  
    defaultMessage: 'The amount is less than minimum balance.',  
  }  
})  
  
formatMessage(messages.accountMessage)
```

React Intl <FormattedMessage>?

react-intl<Formatted ... /> API formatMessage()injectIntl(intl)
formatMessage()

```
import React from 'react'  
import { injectIntl, intlShape } from 'react-intl'  
  
const MyComponent = ({ intl }) => {  
  const placeholder = intl.formatMessage({id: 'messageId'})  
  return <input placeholder={placeholder} />  
}  
  
MyComponent.propTypes = {  
  intl: intlShape.isRequired  
}  
  
export default injectIntl(MyComponent)
```

React Intl ?

injectIntl()

```
import { injectIntl, intlShape } from 'react-intl'  
  
const MyComponent = ({ intl }) => (  
  <div>`The current locale is ${intl.locale}`</div>  
)  
  
MyComponent.propTypes = {  
  intl: intlShape.isRequired  
}  
  
export default injectIntl(MyComponent)
```

React Intl ?

```
injectIntl() props formatDate() FormattedDate
```

```
import { injectIntl, intlShape } from 'react-intl'

const stringDate = this.props.intl.formatDate(date, {
  year: 'numeric',
  month: 'numeric',
  day: 'numeric'
})

const MyComponent = ({intl}) => (
  <div>`The formatted date is ${stringDate}`</div>
)

MyComponent.propTypes = {
  intl: intlShape.isRequired
}

export default injectIntl(MyComponent)
```

React Shallow Renderer?

React

```
function MyComponent() {
  return (
    <div>
      <span className={'heading'}>{'Title'}</span>
      <span className={'description'}>{'Description'}</span>
    </div>
  )
}
```

```
import ShallowRenderer from 'react-test-renderer/shallow'

// in your test
const renderer = new ShallowRenderer()
renderer.render(<MyComponent />

const result = renderer.getRenderOutput()

expect(result.type).toBe('div')
expect(result.props.children).toEqual([
  <span className={'heading'}>{'Title'}</span>,
  <span className={'description'}>{'Description'}</span>
])
```

React TestRenderer ?

JavaScript DOM ReactDOM React Native DOM jsdom

```
import TestRenderer from 'react-test-renderer'

const Link = ({page, children}) => <a href={page}>{children}</a>

const testRenderer = TestRenderer.create(
  <Link page='https://www.facebook.com/'>{'Facebook'}</Link>
)

console.log(testRenderer.toJSON())
// {
//   type: 'a',
//   props: { href: 'https://www.facebook.com/' },
//   children: [ 'Facebook' ]
// }
```

ReactTestUtils ?

ReactTestUtilswith-addons DOM

Jest?

Jest Facebook Jasmine JavaScript jsdom

Jest Jasmine ?

Jasmine

-
-
-
- jsdom DOM
-

Jest

sum.js

```
const sum = (a, b) => a + b

export default sum
```

sum.test.js

```
import sum from './sum'

test('adds 1 + 2 to equal 3', () => {
  expect(sum(1, 2)).toBe(3)
})
```

package.json

```
{  
  "scripts": {  
    "test": "jest"  
  }  
}
```

yarn testnpm testJest

```
$ yarn test  
PASS ./sum.test.js  
✓ adds 1 + 2 to equal 3 (2ms)
```

Flux?

Flux MVC React React Facebook

Redux?

Redux Flux JavaScript Redux React 2kB

Redux

Redux

- 1.
- 2.
3. reducersReducers

Flux Redux ?

Redux Flux

1. Flux Redux Redux dev-only redux-immutable-state-invariant
Immutable.js
2. Flux / Redux
3. **Flow** Flux Redux

mapStateToProps() mapDispatchToProps() ?

mapStateToProps()

```
const mapStateToProps = (state) => {  
  return {  
    todos: getVisibleTodos(state.todos, state.visibilityFilter)  
  }  
}
```

mapDispatchToProps()

```
const mapDispatchToProps = (dispatch) => {
  return {
    onTodoClick: (id) => {
      dispatch(toggleTodo(id))
    }
  }
}
```

reducer Action ?

reducer Action reducer Action reducer Action

Redux ?

createStore()

```
store = createStore(myReducer)

export default store
```

MVV ?

1. DOM
- 2.
3. Google Docs
- 4.

Redux RxJS ?

Redux UI Angular RxJS JavaScript Promise Redux Reactive
StoreStore ActionRxJS Reactive Observables

Action?

componentDidMount() Actionrender()

```

class App extends Component {
  componentDidMount() {
    this.props.fetchData()
  }

  render() {
    return this.props.isLoaded
      ? <div>{'Loaded'}</div>
      : <div>{'Not Loaded'}</div>
  }
}

const mapStateToProps = (state) => ({
  isLoaded: state.isLoaded
})

const mapDispatchToProps = { fetchData }

export default connect(mapStateToProps, mapDispatchToProps)(App)

```

React Redux connect() ?

Store

1. mapStateToProps() Store
2. mapStateToProps react-redux connect()

```

import React from 'react'
import { connect } from 'react-redux'

class App extends React.Component {
  render() {
    return <div>{this.props.containerData}</div>
  }
}

function mapStateToProps(state) {
  return { containerData: state.data }
}

export default connect(mapStateToProps)(App)

```

Redux ?

root reducer combineReducers() reducer

USER_LOGOUT rootReducer() Action undefined reducers

```
const appReducer = combineReducers({
  /* your app's top-level reducers */
})

const rootReducer = (state, action) => {
  if (action.type === 'USER_LOGOUT') {
    state = undefined
  }

  return appReducer(state, action)
}
```

redux-persist redux-persist storage storage undefined

```
const appReducer = combineReducers({
  /* your app's top-level reducers */
}

const rootReducer = (state, action) => {
  if (action.type === 'USER_LOGOUT') {
    Object.keys(state).forEach(key => {
      storage.removeItem(`persist:${key}`)
    })

    state = undefined
  }

  return appReducer(state, action)
}
```

Redux at ?

@ JavaScript

Redux

- :

```

import React from 'react'
import * as actionCreators from './actionCreators'
import { bindActionCreators } from 'redux'
import { connect } from 'react-redux'

function mapStateToProps(state) {
  return { todos: state.todos }
}

function mapDispatchToProps(dispatch) {
  return { actions: bindActionCreators(actionCreators, dispatch) }
}

class MyApp extends React.Component {
  // ...define your main app here
}

export default connect(mapStateToProps, mapDispatchToProps)(MyApp)

```

• :

```

import React from 'react'
import * as actionCreators from './actionCreators'
import { bindActionCreators } from 'redux'
import { connect } from 'react-redux'

function mapStateToProps(state) {
  return { todos: state.todos }
}

function mapDispatchToProps(dispatch) {
  return { actions: bindActionCreators(actionCreators, dispatch) }
}

@connect(mapStateToProps, mapDispatchToProps)
export default class MyApp extends React.Component {
  // ...define your main app here
}

```

JavaScript babel

React React Redux ?

Context Redux Context API React Redux API

Redux reducers ?

Reducers Action Reducer Redux reducer Action Action reduce
Store

Redux AJAX ?

redux-thunk

fetch API AJAX

```
export function fetchAccount(id) {
  return dispatch => {
    dispatch(setLoadingAccountState()) // Show a loading spinner
    fetch(`/account/${id}`, (response) => {
      dispatch(doneFetchingAccount()) // Hide loading spinner
      if (response.status === 200) {
        dispatch(setAccount(response.json)) // Use a normal function to set the
        received state
      } else {
        dispatch(someError)
      }
    })
  }
}

function setAccount(data) {
  return { type: 'SET_Account', data: data }
}
```

Redux Store ?

Redux UI

Redux Store ?

Store connect() React Action Store

connect <FilterLink>

```
import { connect } from 'react-redux'
import { setVisibilityFilter } from '../actions'
import Link from '../components/Link'

const mapStateToProps = (state, ownProps) => ({
  active: ownProps.filter === state.visibilityFilter
})

const mapDispatchToProps = (dispatch, ownProps) => ({
  onClick: () => dispatch(setVisibilityFilter(ownProps.filter))
})

const FilterLink = connect(
  mapStateToProps,
  mapDispatchToProps
)(Link)

export default FilterLink
```

Redux connect() StoreAPI

```
class MyComponent {
  someMethod() {
    doSomethingWith(this.context.store)
  }
}
```

React Redux ?

Redux Store Redux dispatch DOM

Redux ?

IDE ReferenceError

constants.js actionTypes.js

```
export const ADD_TODO = 'ADD_TODO'
export const DELETE_TODO = 'DELETE_TODO'
export const EDIT_TODO = 'EDIT_TODO'
export const COMPLETE_TODO = 'COMPLETE_TODO'
export const COMPLETE_ALL = 'COMPLETE_ALL'
export const CLEAR_COMPLETED = 'CLEAR_COMPLETED'
```

Redux

1. Action :

actions.js:

```
import { ADD_TODO } from './actionTypes';

export function addTodo(text) {
  return { type: ADD_TODO, text }
}
```

2. reducers :

reducer.js :

```

import { ADD_TODO } from './actionTypes'

export default (state = [], action) => {
  switch (action.type) {
    case ADD_TODO:
      return [
        ...state,
        {
          text: action.text,
          completed: false
        }
      ];
    default:
      return state
  }
}

```

mapDispatchToProps() ?

action creators mapDispatchToProps(dispatch)

```

const mapDispatchToProps = (dispatch) => ({
  action: () => dispatch(action())
})

```

```

const mapDispatchToProps = (dispatch) => ({
  action: bindActionCreators(action, dispatch)
})

```

```

const mapDispatchToProps = { action }

```

mapStateToProps() mapDispatchToProps() ownProps ?

ownProps React Redux props connect

```

import ConnectedComponent from './containers/ConnectedComponent';

<ConnectedComponent user={'john'} />

```

mapStateToProps() mapDispatchToProps()ownProps

```

{ user: 'john' }

```

Redux ?

- **Components:** dumbRedux
- **Containers:** Redux smart
- **Actions:** Action
- **Reducers:** reducerstate key
- **Store:** Store

redux-saga?

redux-saga React/Redux

NPM :

```
$ npm install --save redux-saga
```

redux-saga ?

Saga redux-saga redux Redux Redux Redux

redux-saga call() put() ?

call()put() Effect call() Effect promiseput() Effect Action Store

Effect

```
function* fetchUserSaga(action) {
  // `call` function accepts rest arguments, which will be passed to
  `api.fetchUser` function.
  // Instructing middleware to call promise, its resolved value will be assigned
  to `userData` variable
  const userData = yield call(api.fetchUser, action.userId)

  // Instructing middleware to dispatch corresponding action.
  yield put({
    type: 'FETCH_USER_SUCCESS',
    userData
  })
}
```

Redux Thunk?

Redux Thunk Action thunk Action Store dispatch()getState()

redux-saga redux-thunk ?

Redux ThunkRedux SagaThunk Promises Saga GeneratorsThunk Promise
Sagas/Generators Thunks Sagas

Redux DevTools?

Redux DevTools Redux Action UI Redux DevTools Chrome Firefox

Redux DevTools ?

1. action
- 2.
3. reducer Action
4. Reducers Action
5. persistState()

Redux ?

Redux

state

```
const getUserData = state => state.user.data
```

Redux Form?

Redux Form React Redux React Redux Form HTML5 UI
Material UI React Widgets React Bootstrap

Redux Form ?

1. Redux
2. /
- 3.

Redux ?

applyMiddleware()

redux-thunk logger applyMiddleware()

```
import { createStore, applyMiddleware } from 'redux'  
const createStoreWithMiddleware = applyMiddleware(ReduxThunk, logger)  
(createStore)
```

Redux ?

createStore

```

const rootReducer = combineReducers({
  todos: todos,
  visibilityFilter: visibilityFilter
})

const initialState = {
  todos: [{ id: 123, name: 'example', completed: false }]
}

const store = createStore(
  rootReducer,
  initialState
)

```

Relay Redux ?

Relay Redux Store relay GraphQLRelay

React Native React ?

React JavaScript Web Web

React Native JavaScript iOSAndroidWindows React

Reselect ?

Reselect Redux memoization Redux

Reselect / Reselect memoization

Flow?

Flow JavaScript Flow Flow null

Flow PropTypes ?

- Flow
- PropTypes React

Flow/TypeScript

React Font Awesome ?

React Font Awesome

1. font-awesome:

```
$ npm install --save font-awesome
```

2. index.js font-awesome:

```
import 'font-awesome/css/font-awesome.min.css'
```

3. className Font Awesome :

```
render() {
  return <div><i className={'fa fa-spinner'} /></div>
}
```

React ?

React Developer Tools Chrome Firefox SafariIE React Native

1. Chrome
2. Firefox
3. SafariReact Native

Chrome DevTools ?

HTML file://...Chrome Extensions“URL”

React Polymer?

1. Polymer

```
<link rel='import' href='../bower_components/polymer/polymer.html' />
Polymer({
  is: 'calender-element',
  ready: function() {
    this.textContent = 'I am a calender'
  }
})
```

2. HTML Polymer React index.html

```
<link rel='import' href='./src/polymer-components/calender-element.html'>
```

3. JSX

```
import React from 'react'

class MyComponent extends React.Component {
  render() {
    return (
      <calender-element />
    )
  }
}

export default MyComponent
```

Vue.js React ?

Vue.js React

- 1.
- 2.
- 3.
- 4.

React Angular ?

React	Angular
React View	Angular MVC
React	AngularJS Angular 2
React JS HTML JSX	Angular HTML
React Native React	IonicAngular app app
React	Angular

React DevTools ?

React DevTools **REACT_DEVTOOLS_GLOBAL_HOOK** React React React DevTools

Styled Components?

styled-components React JavaScript js CSS

Styled Components ?

<Title><Wrapper>

```
import React from 'react'
import styled from 'styled-components'

// Create a <Title> component that renders an <h1> which is centered, red and
// sized at 1.5em
const Title = styled.h1` 
  font-size: 1.5em;
  text-align: center;
  color: palevioletred;
` 

// Create a <Wrapper> component that renders a <section> with some padding and
// a papayawhip background
const Wrapper = styled.section` 
  padding: 4em;
  background: papayawhip;
`
```

TitleWrapper react

```
<Wrapper>
  <Title>{'Lets start first styled component!'}</Title>
</Wrapper>
```

Relay?

Relay JavaScript React Web

create-react-app TypeScript?

--scripts-versionreact-scripts-ts TypeScript

```
my-app/
├── .gitignore
├── images.d.ts
├── node_modules/
├── public/
├── src/
│   └── ...
├── package.json
└── tsconfig.json
    ├── tsconfig.json
    ├── tsconfig.prod.json
    ├── tsconfig.test.json
    └── tslint.json
```

Reselect ?

1. Redux
- 2.
- 3.

Reselect ?

Reselect

```

import { createSelector } from 'reselect'

const shopItemsSelector = state => state.shop.items
const taxPercentSelector = state => state.shop.taxPercent

const subtotalSelector = createSelector(
  shopItemsSelector,
  items => items.reduce((acc, item) => acc + item.value, 0)
)

const taxSelector = createSelector(
  subtotalSelector,
  taxPercentSelector,
  (subtotal, taxPercent) => subtotal * (taxPercent / 100)
)

export const totalSelector = createSelector(
  subtotalSelector,
  taxSelector,
  (subtotal, tax) => ({ total: subtotal + tax })
)

let exampleState = {
  shop: {
    taxPercent: 8,
    items: [
      { name: 'apple', value: 1.20 },
      { name: 'orange', value: 0.95 },
    ]
  }
}

console.log(subtotalSelector(exampleState)) // 2.15
console.log(taxSelector(exampleState)) // 0.172
console.log(totalSelector(exampleState)) // { total: 2.322 }

```

Redux Action ?

Actions JavaScript Store Store Action type

```
{
  type: ADD_TODO,
  text: 'Add todo item'
}
```

React statics ES6 ?

statics React.createClass()

```
someComponent= React.createClass({  
  statics: {  
    someMethod: function() {  
      // ..  
    }  
  }  
})
```

ES6+

```
class Component extends React.Component {  
  static propTypes = {  
    // ...  
  }  
  
  static someMethod() {  
    // ...  
  }  
}
```

Redux React ?

Redux UI React React Native bindings AngularJS Angular 2 Vue Mithril
Redux

Redux ?

Redux ES6 Webpack Babel ES5 JavaScript Redux UMD

Redux Form initialValues ?

enableReinitialize true

```
const InitializeFromStateForm = reduxForm({  
  form: 'initializeFromState',  
  enableReinitialize : true  
})(UserEdit)
```

initialValues

React ?

PropTypes oneOfType()

size string number

```
Component.PropTypes = {  
  size: PropTypes.oneOfType([  
    PropTypes.string,  
    PropTypes.number  
  ])  
}
```

SVG React ?

SVG react-scripts@2.0.0

```
import { ReactComponent as Logo } from './logo.svg'

const App = () => (
  <div>
    {/* Logo is an actual react component */}
    <Logo />
  </div>
)
```

?

ref null DOM React ref ref

```
class UserForm extends Component {
  handleSubmit = () => {
    console.log("Input Value is: ", this.input.value)
  }

  render () {
    return (
      <form onSubmit={this.handleSubmit}>
        <input
          type='text'
          ref={(input) => this.input = input} // Access DOM input in handle
submit
          <button type='submit'>Submit</button>
        </form>
    )
  }
}
```

ref ES7

```

class UserForm extends Component {
  handleSubmit = () => {
    console.log("Input Value is: ", this.input.value)
  }

  setSearchInput = (input) => {
    this.input = input
  }

  render () {
    return (
      <form onSubmit={this.handleSubmit}>
        <input
          type='text'
          ref={this.setSearchInput} // Access DOM input in handle submit
          <button type='submit'>Submit</button>
      </form>
    )
  }
}

```

React ?

HOC

HOC ?

React HOC

1. PP
2. II

WrappedComponent

HOC render WrappedComponent React HOC props

```

function ppHOC(WrappedComponent) {
  return class PP extends React.Component {
    render() {
      return <WrappedComponent {...this.props}/>
    }
  }
}

```

HOC Enhancer WrappedComponent Enhancer WrappedComponent
Enhancer

```
function iIHOC(WrappedComponent) {
  return class Enhancer extends WrappedComponent {
    render() {
      return super.render()
    }
  }
}
```

React ?

{}

```
React.render(<User age={30} department={"IT"} />,
document.getElementById('container'));
```

Redux react ?

Redux UI””

Redux

- 1.
- 2.
- 3.
- 4.
- 5.

React registerServiceWorker ?

React service workerService worker Web API/ Service worker

```
import React from 'react';
import ReactDOM from 'react-dom';
import App from './App';
import registerServiceWorker from './registerServiceWorker';

ReactDOM.render(<App />, document.getElementById('root'));
registerServiceWorker();
```

React memo ?

pureComponent shouldComponentUpdate React.memo

```
const MyComponent = React.memo(function MyComponent(props) {
  /* only rerenders if props change */
});
```

React lazy ?

React.lazy OtherComponent Promise Promise React

```

const OtherComponent = React.lazy(() => import('./OtherComponent'));

function MyComponent() {
  return (
    <div>
      <OtherComponent />
    </div>
  );
}

```

React.lazy Suspense React Loadable

setState ?

null

```

getUserProfile = user => {
  const latestAddress = user.address;
  this.setState(state => {
    if (state.address === latestAddress) {
      return null;
    } else {
      return { title: latestAddress };
    }
  });
}

```

React 16 ?

Arrays: React 16 render

```

const ReactJSDevs = () => {
  return [
    <li key="1">John</li>,
    <li key="2">Jackie</li>,
    <li key="3">Jordan</li>
  ];
}

```

```

const JSDevs = () => {
  return (
    <ul>
      <li>Brad</li>
      <li>Brodge</li>
      <ReactJSDevs/>
      <li>Brandon</li>
    </ul>
  );
}

```

Strings and Numbers: render

```
// String
render() {
  return 'Welcome to ReactJS questions';
}
// Number
render() {
  return 2018;
}
```

React ?

React counter

```
class Counter extends Component {
  state = { value: 0 };

  handleIncrement = () => {
    this.setState(prevState => ({
      value: prevState.value + 1
    }));
  };

  handleDecrement = () => {
    this.setState(prevState => ({
      value: prevState.value - 1
    }));
  };

  render() {
    return (
      <div>
        {this.state.value}

        <button onClick={this.handleIncrement}>+</button>
        <button onClick={this.handleDecrement}>-</button>
      </div>
    )
  }
}
```

hooks?

Hooks React useState

```
import { useState } from 'react';

function Example() {
  // Declare a new state variable, which we'll call "count"
  const [count, setCount] = useState(0);

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

Hooks ?

hooks

1. React hooks hooks hooks useState useEffect hooks
2. React hooks JavaScript hooks

?

React eslint-plugin-react-hooks ESLint

```
npm install eslint-plugin-react-hooks@next
```

ESLint

```
// Your ESLint configuration
{
  "plugins": [
    // ...
    "react-hooks"
  ],
  "rules": {
    // ...
    "react-hooks/rules-of-hooks": "error"
  }
}
```

Create React App

Flux Redux ?

Flux Redux

Flux **Redux**

Store

```
Store      Store
Store      reducers  Store
dispatcher  dispatcher
React      connect
Store
```

React Router V4 ?

React Router V4

1. React Router v4 API
- 2.
3. Webcore native

componentDidCatch ?

componentDidCatch

1. error: -
2. info: - componentStack

```
componentDidCatch(error, info)
```

?

- 1.
2. **setTimeout requestAnimationFrame**
- 3.
- 4.

?

render

JavaScript try/catch

```

class MyComponent extends React.Component {
  constructor(props) {
    super(props);
    this.state = { error: null };
  }

  handleClick = () => {
    try {
      // Do something that could throw
    } catch (error) {
      this.setState({ error });
    }
  }

  render() {
    if (this.state.error) {
      return <h1>Caught an error.</h1>
    }
    return <div onClick={this.handleClick}>Click Me</div>
  }
}

```

JavaScript try/catch

try catch ?

Try catch

try/catch

```

try {
  showButton();
} catch (error) {
  // ...
}

```

```

<ErrorBoundary>
  <MyComponent />
</ErrorBoundary>

```

componentDidUpdate setState

React 16 ?

React 16 React

?

1.

2.

?

JavaScript React 16

?

render() render()

render ?

render

1. React elements: React DOM HTML <div />
2. Arrays and fragments:
3. Portals: DOM
4. String and numbers: DOM
5. Booleans or null:

?

1. this.state
- 2.

```
constructor(props) {  
  super(props);  
  // Don't call this.setState() here!  
  this.state = { counter: 0 };  
  this.handleClick = this.handleClick.bind(this);  
}
```

React ?

React

?

defaultProps undefined null color

```
class MyButton extends React.Component {  
  // ...  
}
```

```
MyButton.defaultProps = {  
  color: 'red'  
};
```

props.color red color

```
render() {  
  return <MyButton /> ; // props.color will be set to red  
}
```

null null

componentWillUnmount setState()

componentWillUnmount() setState()

getDerivedStateFromError ?

```
static getDerivedStateFromError(error)
```

getDerivedStateFromError

```
class ErrorBoundary extends React.Component {  
  constructor(props) {  
    super(props);  
    this.state = { hasError: false };  
  }  
  
  static getDerivedStateFromError(error) {  
    // Update state so the next render will show the fallback UI.  
    return { hasError: true };  
  }  
  
  render() {  
    if (this.state.hasError) {  
      // You can render any custom fallback UI  
      return <h1>Something went wrong.</h1>;  
    }  
  
    return this.props.children;  
  }  
}
```

?

1. static getDerivedStateFromProps()
2. shouldComponentUpdate()
3. render()
4. getSnapshotBeforeUpdate()
5. componentDidUpdate()

?

1. static getDerivedStateFromError()
2. componentDidCatch()

displayName ?

displayName

withSubscription HOC

```
function withSubscription(WrappedComponent) {
  class WithSubscription extends React.Component {/* ... */}
  WithSubscription.displayName =
`WithSubscription(${getDisplayName(WrappedComponent)})`;
  return WithSubscription;
}

function getDisplayName(WrappedComponent) {
  return WrappedComponent.displayName || WrappedComponent.name || 'Component';
}
```

React ?

React Internet Explorer 9 IE 9 IE 10 polyfill
ES5

es5-shim and es5-sham polyfill

unmountComponentAtNode ?

react-dom DOM React true false

```
ReactDOM.unmountComponentAtNode(container)
```

?

Code-Splitting Webpack Browserify bundlesReact dynamic import()
moduleA.js 'Load'

moduleA.js

```
const moduleA = 'Hello';

export { moduleA };
```

App.js

```
import React, { Component } from 'react';

class App extends Component {
  handleClick = () => {
    import('./moduleA')
      .then(({ moduleA }) => {
        // Use moduleA
      })
      .catch(err => {
        // Handle failure
      });
  };

  render() {
    return (
      <div>
        <button onClick={this.handleClick}>Load</button>
      </div>
    );
  }
}

export default App;
```

?

1. **unsafe lifecycle methods**
2. **legacy string ref API**
3. **side effects**
4. **legacy context API**
5. **findDOMNode**

Keyed Fragments ?

<React.Fragment> key

```

function Glossary(props) {
  return (
    <dl>
      {props.items.map(item => (
        // Without the `key` , React will fire a key warning
        <React.Fragment key={item.id}>
          <dt>{item.term}</dt>
          <dd>{item.description}</dd>
        </React.Fragment>
      ))}
    </dl>
  );
}

```

Fragment

React HTML ?

React 16 DOM React DOM React DOM API camelCase HTML

```

<div tabIndex="-1" />      // Just like node.tabIndex DOM API
<div className="Button" /> // Just like node.className DOM API
<input readOnly={true} /> // Just like node.readOnly DOM API

```

HTML SVG

HOC ?

:

1. HOC HOC render

```

render() {
  // A new version of EnhancedComponent is created on every render
  // EnhancedComponent1 !== EnhancedComponent2
  const EnhancedComponent = enhance(MyComponent);
  // That causes the entire subtree to unmount/remount each time!
  return <EnhancedComponent />;
}

```

HOC

2. HOC

```

// Define a static method
WrappedComponent.staticMethod = function() {/*...*/}
// Now apply a HOC
const EnhancedComponent = enhance(WrappedComponent);

// The enhanced component has no static method
typeof EnhancedComponent.staticMethod === 'undefined' // true

```

```

function enhance(WrappedComponent) {
  class Enhance extends React.Component {/*...*/}
  // Must know exactly which method(s) to copy :(
  Enhance.staticMethod = WrappedComponent.staticMethod;
  return Enhance;
}

```

3. **Refs** HOC refs ref key React.forwardRef API

DevTools forwardRefs?

React.forwardRef DevTools ref displayName render DevTools
“ForwardRef”

```

const WrappedComponent = React.forwardRef((props, ref) => {
  return <LogProps {...props} forwardedRef={ref} />;
});

```

render “**ForwardRef(myFunction)**”

```

const WrappedComponent = React.forwardRef(
  function myFunction(props, ref) {
    return <LogProps {...props} forwardedRef={ref} />;
  }
);

```

forwardRef displayName

```

function logProps(Component) {
  class LogProps extends React.Component {
    // ...
  }

  function forwardRef(props, ref) {
    return <LogProps {...props} forwardedRef={ref} />;
  }

  // Give this component a more helpful display name in DevTools.
  // e.g. "ForwardRef(logProps(MyComponent))"
  const name = Component.displayName || Component.name;
  forwardRef.displayName = `logProps(${name})`;

  return React.forwardRef(forwardRef);
}

```

props true?

true HTML

```

<MyInput autocomplete />

<MyInput autocomplete={true} />

```

```
ES6 shorthand {name}{ name:name }
```

NextJS ?

Next.js React NextJS

- 1.
- 2.
3. ()
4. Webpack (HMR)
5. Express Node.js HTTP
6. Babel Webpack

?

```
<button onClick={this.handleClick}>
```

?

```
class Foo extends Component {
  handleClick() {
    console.log('Click happened');
  }
  render() {
    return <button onClick={() => this.handleClick()}>Click Me</button>;
  }
}
```

render

?

onClick or onScroll

1. **Throttling**: lodash _throttle
2. **Debouncing**: lodash _debounce
3. **RequestAnimationFrame throttling**: requestAnimationFrame raf-schd
_.debounce _throttle raf-schd cancel componentWillUnmount

JSX ?

React DOM JSX

```
const name = response.potentiallyMaliciousInput;
const element = <h1>{name}</h1>;
```

XSS

?

ReactDOM render UI render

```
function tick() {
  const element = (
    <div>
      <h1>Hello, world!</h1>
      <h2>It is {new Date().toLocaleTimeString()}</h2>
    </div>
  );
  ReactDOM.render(element, document.getElementById('root'));
}

setInterval(tick, 1000);
```

props ?

capital

```
function capital(amount, interest) {
  return amount + interest;
}
```

""React " React "

?

setState() React Facebook

```
constructor(props) {
  super(props);
  this.state = {
    posts: [],
    comments: []
  };
}
```

setState()

```
componentDidMount() {
  fetchPosts().then(response => {
    this.setState({
      posts: response.posts
    });
  });

  fetchComments().then(response => {
    this.setState({
      comments: response.comments
    });
  });
}
```

this.setState({comments}) comments posts

?

```
<button onClick={(e) => this.updateUser(userId, e)}>Update User
details</button>
<button onClick={this.updateUser.bind(this, userId)}>Update User
details</button>
```

e bind

?

null

```
function Greeting(props) {
  if (!props.loggedIn) {
    return null;
  }

  return (
    <div className="greeting">
      welcome, {props.name}
    </div>
  );
}
```

```
class User extends React.Component {
  constructor(props) {
    super(props);
    this.state = {loggedIn: false, name: 'John'};
  }

  render() {
    return (
      <div>
        {/* Prevent component render if it is not loggedIn */}
        <Greeting loggedIn={this.state.loggedIn} />
        <UserDetails name={this.state.name}>
      </div>
    );
  }
}
```

greeting

?

- 1.
2. ids
- 3.

keys ?

book

```

function Book(props) {
  const index = (
    <ul>
      {props.pages.map((page) =>
        <li key={page.id}>
          {page.title}
        </li>
      )}
    </ul>
  );
  const content = props.pages.map((page) =>
    <div key={page.id}>
      <h3>{page.title}</h3>
      <p>{page.content}</p>
      <p>{page.pageNumber}</p>
    </div>
  );
  return (
    <div>
      {index}
      <hr />
      {content}
    </div>
  );
}

```

?

Formik React

- 1.
- 2.
- 3.

API

formik redux ?

formik redux

1. reduxflux
2. Redux-Form Redux Reducer
3. gzip Redux-Form 22.5 kB Formik 12.7 kB

?

React UI JavaScript

React web components ?

React Web Components Web Components UI Vaadin Web Components

```
import React, { Component } from 'react';
import './App.css';
import '@vaadin/vaadin-date-picker';

class App extends Component {
  render() {
    return (
      <div className="App">
        <vaadin-date-picker label="When were you born?"></vaadin-date-picker>
      </div>
    );
  }
}

export default App;
```

?

ECMAScript

1. Normal Import

```
import { add } from './math';
console.log(add(10, 20));
```

2. Dynamic Import

```
import("./math").then(math => {
  console.log(math.add(10, 20));
});
```

loadable ?

Loadable React.lazy Suspense Loadable

```
import loadable from '@loadable/component'

const OtherComponent = loadable(() => import('./OtherComponent'))

function MyComponent() {
  return (
    <div>
      <OtherComponent />
    </div>
  )
}
```

suspense ?

dynamic import loading Suspense Suspense

```
const OtherComponent = React.lazy(() => import('./OtherComponent'));

function MyComponent() {
  return (
    <div>
      <Suspense fallback=<div>Loading...</div>>
        <OtherComponent />
      </Suspense>
    </div>
  );
}
```

Suspense

?

React Router React.lazy

```
import { BrowserRouter as Router, Route, Switch } from 'react-router-dom';
import React, { Suspense, lazy } from 'react';

const Home = lazy(() => import('./routes/Home'));
const About = lazy(() => import('./routes/About'));

const App = () => (
  <Router>
    <Suspense fallback=<div>Loading...</div>>
      <Switch>
        <Route exact path="/" component={Home}/>
        <Route path="/about" component={About}/>
      </Switch>
    </Suspense>
  </Router>
);
```

context?

Context React theme

```

// Lets create a context with a default theme value "luna"
const ThemeContext = React.createContext('luna');
// Create App component where it uses provider to pass theme value in the tree
class App extends React.Component {
  render() {
    return (
      <ThemeContext.Provider value="nova">
        <Toolbar />
      </ThemeContext.Provider>
    );
  }
}
// A middle component where you don't need to pass theme prop anymore
function Toolbar(props) {
  return (
    <div>
      <ThemedButton />
    </div>
  );
}
// Lets read theme value in the button component to use
class ThemedButton extends React.Component {
  static contextType = ThemeContext;
  render() {
    return <Button theme={this.context} />;
  }
}

```

context ?

Provider defaultValue Luna

```

const defaultTheme = "Luna";
const MyContext = React.createContext(defaultTheme);

```

contextType?

ContextType context ContextType

1. **contextType as property of class:** contextType React.createContext()

context render this.context

MyClass contextType

```

class MyClass extends React.Component {
  componentDidMount() {
    let value = this.context;
    /* perform a side-effect at mount using the value of MyContext */
  }
  componentDidUpdate() {
    let value = this.context;
    /* ... */
  }
  componentWillUnmount() {
    let value = this.context;
    /* ... */
  }
  render() {
    let value = this.context;
    /* render something based on the value of MyContext */
  }
}
MyClass.contextType = MyContext;

```

2. Static field contextType

```

class MyClass extends React.Component {
  static contextType = MyContext;
  render() {
    let value = this.context;
    /* render something based on the value */
  }
}

```

consumer?

Consumer React React value Provider value

```

<MyContext.Consumer>
  {value => /* render something based on the context value */}
</MyContext.Consumer>

```

context ?

Context Provider Consumers Provider Consumers Provider
value

```

class App extends React.Component {
  render() {
    return (
      <Provider value={{something: 'something'}}>
        <Toolbar />
      </Provider>
    );
  }
}

```

value

```
class App extends React.Component {
  constructor(props) {
    super(props);
    this.state = {
      value: {something: 'something'},
    };
  }

  render() {
    return (
      <Provider value={this.state.value}>
        <Toolbar />
      </Provider>
    );
  }
}
```

HOCs forward ref ?

ref Refs key React ref HOC ref Forward Ref API
React.forwardRef API refs FancyButton

HOC props

```
function LogProps(Component) {
  class LogProps extends React.Component {
    componentDidUpdate(prevProps) {
      console.log('old props:', prevProps);
      console.log('new props:', this.props);
    }

    render() {
      const {forwardedRef, ...rest} = this.props;

      // Assign the custom prop "forwardedRef" as a ref
      return <Component ref={forwardedRef} {...rest} />;
    }
  }

  return React.forwardRef((props, ref) => {
    return <LogProps {...props} forwardedRef={ref} />;
  });
}
```

HOC “fancy button”

```
class FancyButton extends React.Component {
  focus() {
    // ...
  }

  // ...
}

export default logProps(FancyButton);
```

ref FancyButton button

```
import FancyButton from './FancyButton';

const ref = React.createRef();
ref.current.focus();
<FancyButton
  label="Click Me"
  handleClick={handleClick}
  ref={ref}
/>;
```

ref ?

ref ref props React.forwardRef ref

forward refs ?

forwardRef

ES6 React

ES6 create-react-class getDefaultProps() getInitialState

```
var Greeting = createReactClass({
  getDefaultProps: function() {
    return {
      name: 'Jhohn'
    };
  },
  getInitialState: function() {
    return {message: this.props.message};
  },
  handleClick: function() {
    console.log(this.state.message);
  },
  render: function() {
    return <h1>Hello, {this.props.name}</h1>;
  }
});
```

createReactClass .bind(this)

JSX React?

React JSX JSX React.createElement(component, props, ...children)
JSX greeting

```
class Greeting extends React.Component {
  render() {
    return <div>Hello {this.props.message}</div>;
  }
}

ReactDOM.render(
  <Greeting message="World" />,
  document.getElementById('root')
);
```

JSX

```
class Greeting extends React.Component {
  render() {
    return React.createElement('div', null, `Hello ${this.props.message}`);
  }
}

ReactDOM.render(
  React.createElement(Greeting, {message: 'World'}, null),
  document.getElementById('root')
);
```

?

React UI O(n³) n 1000 10 React O(n)

- 1.
2. key

?

React

- 1.

React

2. **DOM**

React DOM React DOM DOM className

```
<div className="show" title="ReactJS" />

<div className="hide" title="ReactJS" />
```

- 3.

React props componentWillMount() componentWillUpdate()
render() diff

4.

DOM React

```
<ul>
  <li>first</li>
  <li>second</li>
</ul>

<ul>
  <li>first</li>
  <li>second</li>
  <li>third</li>
</ul>
```

5. Key

React key key React key key

```
<ul>
  <li key="2015">Duke</li>
  <li key="2016">Villanova</li>
</ul>

<ul>
  <li key="2014">Connecticut</li>
  <li key="2015">Duke</li>
  <li key="2016">Villanova</li>
</ul>
```

refs?

refs

- 1.
- 2.
3. DOM

prop render?

render props render render props children

```
<Mouse children={mouse => (
  <p>The mouse position is {mouse.x}, {mouse.y}</p>
)} />
```

children JSX attributes

```
<Mouse>
  {mouse => (
    <p>The mouse position is {mouse.x}, {mouse.y}</p>
  )}
</Mouse>
```

propTypes children

```
Mouse.propTypes = {
  children: PropTypes.func.isRequired
};
```

Pure Component ?

false

HOC?

HOC withMouse HOC <Mouse> <Mouse> HOC

```
function withMouse(Component) {
  return class extends React.Component {
    render() {
      return (
        <Mouse render={mouse => (
          <Component {...this.props} mouse={mouse} />
        )}/>
      );
    }
  }
}
```

windowing ?

Windowing DOM react-window react-virtualized windowing

JSX falsy ?

Falsy falsenullundefined

```
<div>
  My JavaScript variable is {String(myVariable)}.
</div>
```

portals ?

overflow: hidden z-index position opacity React portal

?

React DOM

defaultValue **value**

```
render() {
  return (
    <form onSubmit={this.handleSubmit}>
      <label>
        User Name:
        <input
          defaultValue="John"
          type="text"
          ref={this.input} />
      </label>
      <input type="submit" value="Submit" />
    </form>
  );
}
```

select textArea checkbox radio **defaultChecked**

React ?

React boilerplate redux redux saga react-router styled-components
React axios REST api webpackreseselectesnextbabel

<https://github.com/react-boilerplate/react-boilerplate> React

Real DOM Virtual DOM ?

Real DOMVirtual DOM

Real DOM Virtual DOM

DOM DOM
HTML HTML

DOM JSX

React bootstrap?

Bootstrap React

1. Bootstrap CDN: bootstrap head bootstrap CSS JS
2. Bootstrap Webpack React bootstrap

```
npm install bootstrap
```

3. React Bootstrap : Bootstrap React React Bootstrap
 - react-bootstrap
 - reactstrap

React ?

React 10

1. Facebook
2. Uber
3. Instagram
4. WhatsApp
5. Khan Academy
6. Airbnb
7. Dropbox
8. Flipboard
9. Netflix
10. PayPal

React CSS In JS ?

React *.css React JSCSS styled-components

hooks ?

hooks ReactJS classes

React Hooks ?

useEffect effect hook axios API useState API react

```
import React, { useState, useEffect } from 'react';
import axios from 'axios';

function App() {
  const [data, setData] = useState({ hits: [] });

  useEffect(async () => {
    const result = await axios(
      'http://hn.algolia.com/api/v1/search?query=react',
    );

    setData(result.data);
  }, []);

  return (
    <ul>
      {data.hits.map(item => (
        <li key={item.objectID}>
          <a href={item.url}>{item.title}</a>
        </li>
      ))}
    </ul>
  );
}

export default App;
```

effect hook

Hooks ?

Hooks `getSnapshotBeforeUpdate` `componentDidCatch`

mvvm

MVVM Model-View-ViewModel mvvmModel ModelView UI UI
ViewModel View Model

- MVVMView Model ViewModelModel ViewModel View ModelModel View
 - ViewModel View Model View Model DOM, MVVM

vue

- ViewModelView
 - ViewModelview
 - ViewModel

vue

8///

- / beforeCreatevueeldataundefinedcreatedvuedatael
- /beforeMountvue\$eldatadomdata.messagemountedvuedata.message
- /databeforeUpdateupdated
- /destroydatavuedomdom

```
//  
<template>  
  <Main :obj="data"></Main>  
</template>  
<script>  
  //  
  import Main from "./main"  
  
  export default{  
    name:"parent",  
    data(){  
      return {  
        data:""  
      }  
    },  
    //  
    components:{  
      Main  
    }  
  }  
</script>
```

```
//props  
  
<template>  
  <div>{{data}}</div>  
</template>  
<script>  
  export default{  
    name:"son",  
    //  
    props:["data"]  
  }  
</script>
```

```
//$emit
<template>
  <div v-on:click="events"></div>
</template>
<script>
  //
  import Main from "./main"

  export default{
    methods:{
      events:function(){
        }
      }
    }
</script>
```

```
//
<template>
  <div>{{data}}</div>
</template>
<script>
  export default{
    name:"son",
    //
    props:["data"]
  }
</script>
```

```
<router-link :to="index">
```

js

```
router.push('index')
```

vuex

```
vuemain.jsstore      store..... export
```

Vue SSR



- app.js Vue entry entry entry DOM entry
- webpack Client Bundle Server Bundle
- url Server Bundle BundleRenderer html
- DOM DOM DOM store DOM store
- window.__INITIAL_STATE__

Vue SSR Vue HTML, vue-server-renderer

- Vue SSR HTML complier -> vnode HTMLhydration
- ejs, jade

Vue data

- Vue
- data data

Vue computed

- data Store
-

-
- data Object.defineProperty getter/setter
 - computed, computed computed watch getter
 - Object.defineProperty
 - Object.defineProperty getter
 - computed computed

Vue complier

- html mv*
- Vue complier template render

-
- parse template AST
 - optimize diff
 - generate render

timeline timeline

MVVM

MVVM

- View
 - Model
 - ViewModel View Model
- JQuery UI DOM UI
 - MVVM UI UIUI ViewModel View View Model ViewModel View ViewModel

- MVVM Angular Vue
 - \$digest \$watch \$digest
 - Vue UI DOM
-
- Vue Object.defineProperty() set get

```

var data = { name: 'yck' }
observe(data)
let name = data.name // -> get value
data.name = 'yyy' // -> change value

function observe(obj) {
  //
  if (!obj || typeof obj !== 'object') {
    return
  }
  Object.keys(data).forEach(key => {
    defineReactive(data, key, data[key])
  })
}

function defineReactive(obj, key, val) {
  //
  observe(val)
  Object.defineProperty(obj, key, {
    enumerable: true,
    configurable: true,
    get: function reactiveGetter() {
      console.log('get value')
      return val
    },
    set: function reactiveSetter(newVal) {
      console.log('change value')
      val = newVal
    }
  })
}

```

set get

```

<div>
  {{name}}
</div>

```

 {{name}} name

```
// Dep
class Dep {
  constructor() {
    this.subs = []
  }
  addSub(sub) {
    // sub Watcher
    this.subs.push(sub)
  }
  notify() {
    this.subs.forEach(sub => {
      sub.update()
    })
  }
}

// Watcher
Dep.target = null

function update(value) {
  document.querySelector('div').innerText = value
}

class Watcher {
  constructor(obj, key, cb) {
    // Dep.target
    // getter
    // Dep.target
    Dep.target = this
    this.cb = cb
    this.obj = obj
    this.key = key
    // obj[key], getwatcherDepsubs
    this.value = obj[key]
    Dep.target = null
  }
  update() {
    //
    this.value = this.obj[this.key]
    // update Dom
    this.cb(this.value)
  }
}
var data = { name: 'yck' }
observe(data)
// `{{name}}`
new Watcher(data, 'name', update)
// update Dom innerText
data.name = 'yyy'
```

```
, defineReactive
```

```
function defineReactive(obj, key, val) {
  // observe(val)
  let dp = new Dep()
  Object.defineProperty(obj, key, {
    enumerable: true,
    configurable: true,
    get: function reactiveGetter() {
      console.log('get value')
      // Watcher
      if (Dep.target) {
        dp.addSub(Dep.target)
      }
      return val
    },
    set: function reactiveSetter(newVal) {
      console.log('change value')
      val = newVal
      // watcher update
      dp.notify()
    }
  })
}
```

```
getter
```

Proxy Obeject.defineProperty

- Obeject.defineProperty
 -
 -

```
Vue     hack
```

vue

1

- data data getter setter watcher
- v-if v-for
- v-for
- SPA keep-alive
- v-if v-show
- key
-

-
-
-
-

2

-
- PWAWEB
- ()gzip

3 SEO

-
- SSR

4

-
- Tree Shaking/Scope Hoisting
- cdn
- happypack
- splitChunks
- sourceMap

Vue

1. beforeCreate
2. created
3. beforeMount
4. mounted el vm. \$el
5. beforeUpdate
6. updated DOM
7. beforeDestory
8. destroyed

Vue2 Vue3

()

beforeCreate()	setup()
created()	setup()
beforeMount()	onBeforeMount()
mounted()	onMounted()
beforeUpdate(DOM)	onBeforeUpdate(DOM)
updated(DOM)	onUpdated(DOM)

```
beforeDestroy()          onBeforeUnmount()
destroyed()              onUnmounted()
```

Vue

VUE Object.defineProperty() (get)(set)

Vue3.0 Proxy Object.defineProperty

Object.definePropertyProxy defineProperty

1. Vue Object.defineProperty
2. Object.defineProperty, Vue 2.x + data ,

Proxy:

-
- 13

ProxyProxies6vue2.xvue2.xProxy

Proxies6polyfill

Proxy

Proxy ES6 " " " " " Proxy

Proxy " "

Proxy

- ```
let p = new Proxy(target, handler);
```
- target Proxy
  - handler target
  - p p handler Proxy13

handler

```
get
set
has
construct
```

Proxygetsetdemo

```

let obj = {};
let handler = {
 get(target, property) {
 console.log(` ${property} `);
 return property in target ? target[property] : 3;
 },
 set(target, property, value) {
 console.log(` ${property} ${value}`);
 target[property] = value;
 }
}

let p = new Proxy(obj, handler);
p.name = 'tom' //name tom
p.age; //age 3

```

p handler.get() obj

p handler.set() obj

Proxy [Proxy \(https://developer.mozilla.org/zh-CN/docs/Web/JavaScript/Reference/Global\\_Objects/Proxy\)](https://developer.mozilla.org/zh-CN/docs/Web/JavaScript/Reference/Global_Objects/Proxy)

## v-if v-for

Vue v-for v-if v-if v-for v-if v-if v-for

1. /()
2. (vue.js.vuejs)  
()
- 3.

## vue slot?

# Vue

1 vue jQuery

2 Angular

3 OO(Object-Oriented )

Vue

- 1 vue js form
- 2 boss dom Vue v-for DOM
- 3: webapp vue

1-3 js

## **vue.js**

### **v-if v-show**

v-show display CSS

v-if DOM

## **vue**

vuev-on(.)

### **.stop**

JavaScriptevent.stopPropagation()

```
<a v-on:click.stop="doThis">
<a @click.stop="doThis">
```

1

```
<div id="app">
 <div class="outeer" @click.stop="outer">
 <div class="middle" @click.stop="middle">
 <button @click.stop="inner">(^_^)</button>
 </div>
 </div>
</div>
```

.stop

### **.prevent**

JavaScriptevent.preventDefault() prevent JavaScriptevent.preventDefault()

```
<a v-on:submit.prevent="doThis">
```

## .capture

,

```
<a v-on:click.capture="doThis">
```

```
<div id="app">
 <div class="outeer" @click.capture="outer">
 <div class="middle" @click.capture="middle">
 <button @click.capture="inner">(^_^\</button>
 </div>
 </div>
</div>
```

## .self

```
<a v-on:click.self="doThat">
```

```
<div id="app">
 <div class="outeer" @click.self="outer">
 <div class="middle" @click.self="middle">
 <button @click.stop="inner">(^_^\</button>
 </div>
 </div>
</div>
```

## .once

@click.once

```
<a @click.once="doThis">
```

## .passive

Vue addEventListener passive .passive

```
<! -- () -->
<! -- `onScroll` -->
<! -- `event.preventDefault()` -->
<div v-on:scroll.passive="onScroll">...</div>
```

.passive .passive .prevent .prevent .passive

```
<a v-on:click.stop.prevent="doThis">
```

v-on:click.prevent.self v-on:click.self.prevent

JavaScriptVuev-onkeyCodeVue

```
.enter
.tab
.deletedeletebackspace
.esc
.space:
.up
.down
.left
.right
```

```
<!-- `keyCode` 13 `vm.submit()` -->
<input v-on:keyup.13="submit">
```

keyCode Vue

```
<!-- -->
<input v-on:keyup.enter="submit">
<!-- -->
<input @keyup.enter="submit">
```

config.keyCode

```
// `v-on:keyup.f1`
Vue.config.keyCode.f1 = 112
```

### 3.

```
.ctrl
.alt
.shift
.meta
```

Mac meta command (⌘) Windows meta Windows (⊞) Sun meta  
(◆) MIT Lisp Knight space-cadet meta “META” Symbolics meta  
“META”“Meta”

```
<!-- Alt + C -->
<input @keyup.alt.67="clear">
<!-- Ctrl + Click -->
<div @click.ctrl="doSomething">Do something</div>
```

keyup ctrl keyup.ctrl ctrl ctrl keyCodekeyup.17

**.exact**

.exact

```
<!-- Alt Shift -->
<button @click.ctrl="onClick">A</button>

<!-- Ctrl -->
<button @click.ctrl.exact="onCtrlClick">A</button>

<!-- -->
<button @click.exact="onClick">A</button>
```

.left

.right

.middle

Vueconfig.keyCode 116F5f5F5promptalert

```
<template>
 <div class="main">
 <input type="text" @keyup.f5="prompt()" />
 </div>
</template>
<script>
export default {
 data() {
 return {
 };
 },
 methods:{
 prompt(){
 alert("aaaaa")
 }
 }
};
</script>
```

f5prompt

4.

.lazy

input

```
<input v-model.lazy="msg" />
```

## .number

Number·typenumberstring

```
<input v-model.number="msg" />
```

## .trim

```
<input v-model.trim="msg" />
```

## v-on

```
<input type="text" :value="name" @input="onInput" @focus="onFocus"
@blur="onBlur" />
```

## vue key

key Diff key DOM

## vue-cli vue

```
npm upgrade vue vue-template-compiler build node_modules npm i vue
vue-template-compiler
```

## vue event

v-on @

1. event
2. \$event event

## event

### event

event event jquery event chrome

```
event.preventDefault();
```

IE

```
event.returnValue = false;
```

jquery

```
event.preventDefault();
```

jquery addEventListener / attachEvent \$('xxx'). bind(... )

## vue event

jqueryvue v-on @ \$('xxx'). bind jquery event

```
$("body").bind("click" , function(event) {
 console.log(typeof event); // object
});
```

event vue

```
<div id="app">
 <button v-on:click="click">click me</button>
</div>
...
var app = new Vue({
 el: '#app',
 methods: {
 click(event) {
 console.log(typeof event); // object
 }
 }
});
```

jquery vue jquery jquery v-on addEventListener jquery bind  
vue v-on v-on:click="click(233)"

```
<div id="app">
 <button v-on:click="click()">click me</button>
</div>
...
var app = new Vue({
 el: '#app',
 methods: {
 click(event) {
 console.log(typeof event); // undefined
 }
 }
});
```

event arguments.length 0T\_T event

## \$event

vue \$event

```
<div id="app">
 <button v-on:click="click($event, 233)">click me</button>
</div>
...
var app = new Vue({
 el: '#app',
 methods: {
 click(event, val) {
 console.log(typeof event); // object
 }
 }
});
```

event

\$event event

```
<div id="app">
 <button v-on:click="click(233)">click me</button>
</div>
...
var app = new Vue({
 el: '#app',
 methods: {
 click(val) {
 console.log(typeof event); // object
 }
 }
});
```

chrome arguments.length 1 event  
window.event MDN window.eventie chrome window

Firefox event undefined

## \$nextTick

### 1 Vue.nextTick()

DOM DOM

DOM Vue Vue.nextTick() DOM js

nextTick() dom dom

```

<template>
 <div class="hello">
 <div>
 <button id="firstBtn" @click="testClick()" ref="aa">{{testMsg}}</button>
 </div>
 </div>
</template>

<script>
export default {
 name: 'HelloWorld',
 data () {
 return {
 testMsg:"",
 }
 },
 methods:{
 testClick:function(){
 let that=this;
 that.testMsg="";
 console.log(that.$refs.aa.innerText); //that.$refs.aaDOM
 }
 }
}
</script>

```

this. \$nextTick()

```

methods: {
 testClick: function() {
 let that = this;
 that.testMsg = "";
 that.$nextTick(function() {
 console.log(that.$refs.aa.innerText); //
 });
 }
}

```

Vue DOM DOM \$nextTick DOM \$nextTick DOM

## 2 Vue. nextTick()

1. Vue created() DOM Vue. nextTick() created() DOM DOM DOM  
js Vue. nextTick() mounted DOM

```

created() {
 let that = this;
 that.$nextTick(function() { //this. $nextTick()
 that.$refs.aa.innerHTML = "created" ; //DOM
 });
}

```

2. DOM dom DOM js Vue. nextTick() js

```

<template>
 <div class="hello">
 <h3 id="h">{{testMsg}}</h3>
 </div>
</template>

<script>
export default {
 name: 'HelloWorld',
 data () {
 return {
 testMsg:"",
 }
 },
 methods:{
 changeTxt:function(){
 let that=this;
 that.testMsg="" ; //vuedom
 let domTxt=document.getElementById('h').innerText; //jsdom
 console.log(domTxt); //vueDOMdom
 if(domTxt==""){
 console.log("datadom");
 }else{
 console.log("datadom");
 }
 },
 }
}
</script>

```

vue dom vue.\$nextTick() dom

```

changeTxt: function() {
 let that = this;
 that.testMsg = "" ; //dom

 that.$nextTick(function() { //vue.$nextTick()dom
 let domTxt = document.getElementById('h').innerText;
 console.log(domTxt); //vueDOM
 if (domTxt == "") {
 console.log("datadom");
 } else {
 console.log("datadom");
 }
 });
}

```

3. vue dom \$nextTick

Vue.nextTick(callback)

```
Vue dom Vue (event loop) watcher watcher DOM Vue
DOM vm. someData = 'new value' DOM DOM DOM DOM Vue
DOM Vue. nextTick(callback) DOM
```

## Vue data

new Vue() data component data Vue JavaScript JavaScript

```
var Component = function() {};
Component.prototype.data = {
 message: "Love"
};
var component1 = new Component(),
 component2 = new Component();
component1.data.message = "Peace";
console.log(component2.data.message); // Peace
```

```
var Component = function() {
 this.data = this.data();
};
Component.prototype.data = function() {
 return {
 message: "Love"
 };
};
var component1 = new Component(),
 component2 = new Component();
component1.data.message = "Peace";
console.log(component2.data.message); // Love
```

## v-for v-if

v-for v-if

1. v-forv-if
- 2.
3. templatev-ifv-for
- 4.

## vue

- this.\$parent.eventHandler
- \$emit
- 

## this.\$parent.eventHandler

```
<template>
<div>
 <child></child>
</div>
</template>
<script>
 import child from '~/components/dam/child';
 export default {
 components: {
 child
 },
 methods: {
 fatherMethod() {
 console.log(' ');
 }
 }
 };
</script>
```

```
<template>
<div>
 <button @click="childMethod()"> </button>
</div>
</template>
<script>
 export default {
 methods: {
 childMethod() {
 this.$parent.fatherMethod();
 }
 }
 };
</script>
```

\$emit

```
<template>
 <div>
 <child @fatherMethod="fatherMethod"></child>
 </div>
</template>
<script>
 import child from "~/components/dam/child";
 export default {
 components: {
 child
 },
 methods: {
 fatherMethod() {
 console.log("");
 }
 };
</script>
```

```
<template>
 <div>
 <button @click="childMethod()"> </button>
 </div>
</template>
<script>
 export default {
 methods: {
 childMethod() {
 this.$emit("fatherMethod");
 }
 };
</script>
```

```
<template>
 <div>
 <child :fatherMethod="fatherMethod"></child>
 </div>
</template>
<script>
 import child from "~/components/dam/child";
 export default {
 components: {
 child
 },
 methods: {
 fatherMethod() {
 console.log("");
 }
 };
</script>
```

```
<template>
 <div>
 <button @click="childMethod()"> </button>
 </div>
</template>
<script>
 export default {
 props: {
 fatherMethod: {
 type: Function,
 default: null
 }
 },
 methods: {
 childMethod() {
 if (this.fatherMethod) {
 this.fatherMethod();
 }
 }
 };
</script>
```

## vue

\$refs

```

<template>
 <div>
 <button @click="clickParent"> </button>
 <child ref="mychild"></child>
 </div>
</template>

<script>
 import Child from "./child";
 export default {
 name: "parent",
 components: {
 child: Child
 },
 methods: {
 clickParent() {
 this.$refs.mychild.parentHandleclick("") //
 }
 }
 };
</script>

```

```

<template>
 <div>
 child
 </div>
</template>

<script>
 export default {
 name: "child",
 props: "someprops",
 methods: {
 parentHandleclick(e) {
 console.log(e);
 }
 }
 };
</script>

```

## vue keep-alive

keep-alive Vue

```
<keep-alive>
 <component>
 <!-- -->
 </component>
</keep-alive>
```

props \_ include - \_ exclude -

```
// a
export default {
 name: "a",
 data() {
 return {};
 }
};
```

```
<keep-alive include="a">
 <component>
 <!-- name a -->
 </component>
</keep-alive><!-- -->
```

```
<keep-alive exclude="a">
 <component>
 <!-- name a -->
 </component>
</keep-alive><!-- -->
```

, vue-router .

router-view keep-alive

```
<keep-alive>
 <router-view>
 <!-- -->
 </router-view>
</keep-alive>
```

router-view

router. meta

```
// routes
export default [
 {
 path: "/",
 name: "home",
 component: Home,
 meta: {
 keepAlive: true //
 }
 },
 {
 path: "/:id",
 name: "edit",
 component: Edit,
 meta: {
 keepAlive: false //
 }
 }
];
```

```
<keep-alive>
 <router-view v-if="$route.meta.keepAlive">
 <!-- Home -->
 </router-view>
</keep-alive>

<router-view v-if="!$route.meta.keepAlive">
 <!-- Edit -->
</router-view>
```

## vue

props \$emit, slot

## vue

vue vue

## vue

(onkeydown)(onkeyup)jsjQuerye.keyCodekeyCode

### keyCode

4857	09
6590	azAZ
112135	F1F24
8	BackSpace
9	Tab
13	Enter

```
20 Caps_Lock
32 Space
37 Left
38 Up
39 Right
40 Down
```

## VuekeyCode

```
<input @keyup.enter="function">
```

```
.delete delete/BackSpace
.tab Tab
.enter Enter
.esc Esc
.space Space
.left Left
.up Up
.right Right
.down Down
.ctrl Ctrl
.alt Alt
.shift Shift
.meta (windowwindowmaccommand)
```

## Vue

```
@keyup.alt.67="function" Alt + C
@click.ctrl="function" Ctrl + Click
```

```
UI .native
```

```
<el-input
 v-model="inputName"
 placeholder=""
 @keyup.enter.native="searchFile(params)"
>
</el-input>
```

```
.native $listeners
```

## vue

```
Vue.set key
```

```
//

Vue.set(array, indexOfItem, newValue)
this.array.$set(indexOfItem, newValue)

//

Vue.set(obj, keyOfItem, newValue)
this.obj.$set(keyOfItem, newValue)
```

## Vue.delete key

```
//

Vue.delete(array, indexOfItem)
this.array.$delete(indexOfItem)

//

Vue.delete(obj, keyOfItem)
this.obj.$delete(keyOfItem)
```

```
this.array[0].show = true;
this.array.forEach(function(item){
 item.show = true;
});
```

## splice

```
this.array.splice(indexOfItem, 1, newElement)
```

```
var tempArray = this.array;
tempArray[0].show = true;
this.array = tempArray;
```

## Object.assign lodash.assign

```
//Object.assign
this.obj = Object.assign({}, this.obj, {a:1, b:2})

//assignObject.assign
this.obj = _.assign({}, this.obj, {a:1, b:2})

//merge
this.obj = _.merge({}, this.obj, {a:1, b:2})
```

## Vue

```
push()
pop()
shift()
unshift()
splice()
sort()
reverse()
```

## **vue**

### **v-for active**

### **v-model**

## **vue**

- 1.
2. viewmodel
- 3.

1. SEO
- 2.
- 3.

## **vue**

vue

## **vue**

props

## **vue**

## **vue**

vue-router beforeEach cookie token

## **\$route\$router**

**\$route** pathparamshashqueryfullPathmatchedname

**\$router**

## **watch**

watch

watch

watchwatchwatchwatch

## **vueangular**

## **vue**

## **vue**

```
npm run build
```

## **vue**

## **vue**

## **vue**

**vue npm run dev**

## **Virtual DOM**

javascript DOM

DOMreactfacebookreactvue2.0DOMvue2.0snabbdomDOM

## **DOM**

snabbdom

1DOM

vdomjavascriptDOMDOM

```
<ul id="list">
 <li class="item">item1
 <li class="item">item2

```

```
{
 tag: "ul",
 attrs: {
 id: "list"
 },
 children: [
 {
 tag: "li",
 attrs: {
 class: "item"
 },
 children: ["item1"]
 },
 {
 tag: "li",
 attrs: {
 class: "item"
 },
 children: ["item2"]
 }
]
}
```

DOM

DOM

jsjqueryDOMDOMjsjsinput

DOMDOMvdomDOMjsDOM

3vdom

snabbdomvdom

## **snabbdom**

snabbdomgithubsnabbdom <https://github.com/snabbdom/snabbdom>

example

```
var container = document.getElementById("container");

var vnode = h('div#container1.two.classes', {on: {click: someFn}}, [
 h('span', {style: {fontWeight: 'bold'}}), 'This is bold'),
 ' and this is just normal text',
 h('a', {props: {href: '/foo'}}), 'I\'ll take you places!')
]);
// Patch into empty DOM element - this modifies the DOM as a side effect
patch(container, vnode);

var newVnode = h('div#container2.two.classes', {on: {click: anotherEventHandler}}, [
 h('span', {style: {fontWeight: 'normal', fontStyle: 'italic'}}), 'This is new
italic type'),
 ' and this is still just normal text',
 h('a', {props: {href: '/bar'}}), 'I\'ll take you places too!')
]);
// Second `patch` invocation
patch(vnode, newVnode); // Snabbdom efficiently updates the old view to the new
state
```

h()patch()h()

**h**

```
var vnode = h('ul#list', {} [
 h('li.item', {}, ["item1"]),
 h('li.item', {}, ["item12"]),
]);
```

```
{
 tag: "ul",
 attrs: {
 id: "list"
 },
 children: [
 {
 tag: "li",
 attrs: {
 class: "item"
 },
 children: ["item1"]
 },
 {
 tag: "li",
 attrs: {
 class: "item"
 },
 children: ["item2"]
 }
]
}
```

DOMvnodeDOMsnabdomh()DOMvnode newVnodeDOMvnode

patch()

## patch

patch

domDOMcontainervnodepatchDOMcontainer

vnode newVnodepatchdiffDOM

hpatchcnabdomvdomDOMpatchvnodeDOMsnabdomdiff

## diff

diffsvnsvnBeyond Compare

vnode

```

function updateChildren(vnode, newVnode) { //
 var children = vnode.children || []
 var newChildren = newVnode.children || []

 children.forEach(function(childrenVnode, index) {
 var newChildVnode = newChildren[index] //
 if (childrenVnode.tag === newChildVnode.tag) { //
 updateChilren(childrenVnode, newChildVnode) //
 } else {
 repleaseNode(childrenVnode, newChildVnode) //
 }
 })
}

function repleaseNode(vnode, newVnode) { //
 var elem = vnode.elem
 var newEle = createElement(newVnode)
}

```

diffvnode

vuevuedatavueObject.definePropertygettersetterwatchersetterwatcehr

## Vue.js

### template

1. vue
2. vuemount
3. mountcompiletemplatehtml
4. parsehtmllast() Vue JS DOM

```

html: "<div id='test">texttext</div>"
// htmlast
ast: {
 //
 type: 1,
 //
 tag: "div",
 //
 attrsList: [{name: "id", value: "test"}],
 //
 attrsMap: {id: "test"},
 //
 parent: undefined,
 //
 children: [
 {
 type: 3,
 text: 'texttext'
 }
],
 plain: true,
 attrs: [{name: "id", value: "'test'"}]
}

```

5. optimize parseast()

6. generate ast

```

<template>
 <div id="test">
 {{val}}

 </div>
</template>
//
// {render: "with(this){return _c('div',{attrs:{'id':'test'}},
 [_v(_s(val))),_v(" "),_m(0)]}"}

```

7. complierender new watcherrender vnode render mount

Vnode Vnode Vnode diff DOM

## diff

## nextTick

## Vue proxy

webpack devServer http-proxy-middleware devServer proxy

```
proxyTable: {
 '/api': {
 target: 'http://192.168.149.90:8080/' , //
 changeOrigin: true, //
 pathRewrite: {
 '^/api': '/'
 }
 }
}
```

**vue tab**

**vue keep-alive**

**vue**

**vue**

**vue**

**vue**

v-for arr[0].xx =xx vue vm. arr.length = newLength

**vue**

View Model ViewModel "View" View Model Model View

ViewModel view

ViewModel

ViewModel

**vue webpack**

```
webpack require.ensure() import const
import home from '../common/home.vue'
const home = r => require.ensure([], () => r (require('../common/home.vue')))
```

app

```
const Recommend = (resolve) => {
 import('components/recommend/recommend').then((module) => {
 resolve(module)
 })
}

const Singer = (resolve) => {
 import('components/singer/singer').then((module) => {
 resolve(module)
 })
}
```

## CSS

```
<style> <style scoped>
```

## v-el ?

DOM Vue . CSS HTMLElement

## vue-loader

vue-loader .vue template/js/style js  
js es6style scss less template jade

## vueangular?

## vuejscss

## vue

## vuex

vuex flux, vue vue Property set get vuex vuex store template  
vue  
vuex vuexstorestore storestorestore

## vuex

vue main.js store store.... . export  
main.js:

```
import store from './store'

new Vue({
el:'#app',
store
})
```

## **vuex**

State GetterMutation Action Module

vuexState

1. VuexstateVuedata
2. stateVuestorestore
3. mapState state getters computed

vuexGetter

1. getters StateStore
2. getters
3. getters

vuexMutation

1. Action mutationAction mutationAction

## **Vuex**

Vue Component

## **vue-router**

### **vue-router**

### **vue-router**

- : , router.beforeEach(to, from, next)

```
router.beforeEach((to, from, next) => {
 // TODO
});
```

-

```
{
 path: '/home',
 name: 'home',
 component: Home,
 beforeEnter(to, from, next) {
 // TODO
 }
}
```

•

```
beforeRouteEnter(to, from, next) {
 // do someting
 // confirm
},
beforeRouteUpdate(to, from, next) {
 // do someting
 //
},
beforeRouteLeave(to, from, next) {
 // do someting
 //
}
```

## vue-router

### vue-router

router index.js path /:id router params.id

## vue-router

<router-link></router-link>

## vue-router

vue3vueesimport()webpackrequire.ensure()

## vue

- vue-router vue

js

```
{
 path: '/promisedemo',
 name: 'PromiseDemo',
 component: resolve => require(['../components/PromiseDemo'], resolve)
}
```

## esimport()

- (webpack > 2.4)
- webpackwebpackimport()

vue <https://router.vuejs.org/zh/guide/advanced/lazy-loading.html#%E6%8A%8A%E7%BB%84%E4%BB%B6%E6%8C%89%E7%BB%84%E5%88%86>

- vue-router

```
// 2webpackChunkNamejs
const ImportFuncDemo1 = () => import('../components/ImportFuncDemo1')
const ImportFuncDemo2 = () => import('../components/ImportFuncDemo2')
// 2webpackChunkNamejs
// const ImportFuncDemo = () => import(/* webpackChunkName: 'ImportFuncDemo' */ '../components/ImportFuncDemo')
// const ImportFuncDemo2 = () => import(/* webpackChunkName: 'ImportFuncDemo' */ '../components/ImportFuncDemo2')
export default new Router({
 routes: [
 {
 path: '/importfuncdemo1',
 name: 'ImportFuncDemo1',
 component: ImportFuncDemo1
 },
 {
 path: '/importfuncdemo2',
 name: 'ImportFuncDemo2',
 component: ImportFuncDemo2
 }
]
})
```

## webpackrequire.ensure()

- vue-routerwebpackrequire.ensure

chunkNamejs

```
{
 path: '/promisedemo',
 name: 'PromiseDemo',
 component: resolve => require.ensure([], () =>
resolve(require('../components/PromiseDemo')), 'demo')
},
{
 path: '/hello',
 name: 'Hello',
 // component: Hello
 component: resolve => require.ensure([], () =>
resolve(require('../components/Hello')), 'demo')
}
```

## **vue-router**

hash history

## **history**

## **vue? vue-router?**

vue-router URL URL hash history

## **MVVM**

1. MVVM
2. Model View Model

MVVM Model-View-ViewModel MVVM Model Model View UI UI  
ViewModel View Model

MVVM View Model ViewModel Model ViewModel View Model  
Model View

ViewModel View Model View Model DOM, MVVM

## **MVC MVP MVVM**

### **MVC**

View Controller

Controller Model

Model View

### **MVP**

View Model Presenter

View ""Passive View Presenter

## MVVM

MVVM Presenter ViewModel MVP

data-binding View ViewModel

## MVVM

### **Object.defineProperty()**

js ES6 VUE

```
Object.defineProperty(object, attribute, descriptor)
```

- 
- 
- 
- 

#### **descriptor**

descriptor

- value:
- writable: false
- configurable: false, false false
- enumerable: false
- get:
- set:

```
var a = {};
Object.defineProperty(a, "b", {
 value: 123
});
console.log(a.b); //123
a.b = 456;
console.log(a.b); //123
a.c = 110;
for (item in a) {
 console.log(item, a[item]); //c 110
}
```

writable enumerable false, a.b

## configurable

false

```
var a = {};
Object.defineProperty(a, "b", {
 configurable: false
});
Object.defineProperty(a, "b", {
 configurable: true
});

//error: Uncaught TypeError: Cannot redefine property: b
```

## writable

```
var a = {};
Object.defineProperty(a, "b", {
 value: 123,
 writable: false
});
console.log(a.b); // 123
a.b = 25; //
console.log(a.b); // 123
```

## enumerable

enumerable for... in Object.keys()

```
var a = {};
Object.defineProperty(a, "b", {
 value: 3445,
 enumerable: true
});
console.log(Object.keys(a)); // ["b"]
```

enumerable false

```
var a = {};
Object.defineProperty(a, "b", {
 value: 3445,
 enumerable: false //
});
console.log(Object.keys(a)); // []
```

## set get

set get, writable value

```

var a = {};
Object.defineProperty(a, "abc", {
 value: 123,
 get: function() {
 return value;
 }
});
//Uncaught TypeError: Invalid property descriptor. Cannot both specify
accessors and a value or writable attribute, #<Object> at
Function.defineProperty

```

set get

```

var a = {};
var b = 1;
Object.defineProperty(a, "b", {
 set: function(newValue) {
 b = newValue;
 console.log(" " + newValue);
 },
 get: function() {
 console.log("");
 return b; //2
 }
});
a.b = 1; // ,1
console.log(b); // 99
console.log(a.b); //
// 2

```

a.b b a.b set set b vue

## MVVM

name

## Obj.keys() Obj.defineProperty

-

## MVVM

## mvvm mvc jquery

mvc mvvm mvc Controller mvvm viewModelmvvm mvc DOM

vue

## **vue-cli**

1. vue.js
2. vue-router
3. vuex
4. axios fetch ajax GET POST http Promise
5. vux vue UI
6. emit.js
7. webpack

## **vue-cli npm**

```
npm install
npm run dev
npm run build --report
```

```
node_modules
npm install
```

```
vue-cli
npm run dev
```

```
vue-cli
npm run build
```

```
vue-cli
npm run build --report
```

```
vue-cli
app.js
manifest.js
vendor.js
vue-cli
```

## **vue-cli**

```
vue-cli
```

```
build webpack webpack.base.conf.js lesssasscss UI
config config.js gzipnpm run build
dist npm run build
node_modulesnpm
src:
srcassetscssjsimages
srccomponentsvueheader.vuefooter.vue
srcemitvue
srcroutervue-router vue
srcservicevue
srcpagevue
srcutilvue.js
srcvuex vuex vue
srcapp.vue<route-view></router-view>.vue
srcmain.jsvue-cli
index.htmlmeta<div id="app"></div> vue
package.json node_modules npm
```

## config index.js

```
build

index.html
assetsRoot
assetsPublicPath .html "./"
productionGzip gzip

dev

port
autoOpenBrowser
proxyTablevue
```

## package.json

```
scriptsnpm run xxx node .js
dependencies JS
devDependencies js
```

## vue-cli

1. sass:
2. axios:
3. mock:
4. lib-flexible: --
5. sass-resources-loader

## **vue-cli**

```
components indexPage. vuescript export default {}
import indexPage from '@/components/indexPage. vue'
vue components , components:{indexPage}
template view
indexPage index-page
```

## **vue-cli**

1. webpack-simple
2. webpack

## **vue-cli**

## **vue-cli**

## **vue-cli**

## **vue pushpopsplice**

## **vue**

- 1.
- 2.
- 3.
- 4.

## **nextTick**

- DOM
- nextTick
- Promise MutationObserver setImmediate

setTimeoutnextTick

## **Vue computed**

## **vue vue**

## **vue**

-

- ui
- gzip

## vue

- 

configindex.jsbulidindex.htmlscript

- mode

router/index.jshashhistoryhash historyURLIndex.htmlapp

modemodehashOK

- es6es6

npm install --save-dev babel-preset-es2015

npm install --save-dev babel-preset-stage-3

.babelrc

```
{
 //
 "presets": [
 // envbabel-preset-envbabeles6,es7,es8amd,commonjs
 ["env", {
 "modules": false
 }],
 // es
 "stage-2"
],
 // transform-runtimebabel
 "plugins": ["transform-runtime"],
 //
 "comments": false,
 // test
 "env": {
 // test BABEL_ENVNODE_ENVdevelopment
 "test": {
 "presets": ["env", "stage-2"],
 // istanbul
 "plugins": ["istanbul"]
 }
 }
}
```

## Vue

-

- beforeCreate->created->beforeMount->beforeCreate->created->beforeMount->mounted->mounted
- 
- beforeUpdate->beforeUpdate->updated->updated
- 
- beforeUpdate->updated
- 
- beforeDestroy->beforeDestroy->destroyed->destroyed

## **Vue PropVue**

### **1: props**

- 1.
- 2.
3. :

### **2: vue**

1. vue, props
  - : <MyComp @eventName="callback"
  - (): this.\$emit("eventName", data)
2. :

### **3:**

1. ,,: pubsub-js
  - : PubSub.subscribe('msg', (msg, data)=>{})
  - : PubSub.publish('msg', data)
2. :

### **4: vuex**

1. : vuexvuevuevue
2. :, pubsub,

### **5: slot**

1. :
- 
-

2. :

## VueMVVM

- 1. VueMVVM2
  - 
  -
- 2. :
  - 
  -
- 3. :
  -

## axios

1. Axios promise HTTP promiseAPI
- 2.
3. JSON
4. CSRF

## axios

1. axios.get(url[, config]) //get
2. axios.delete(url[, config]) //
3. axios.post(url[, data[, config]]) //post
4. axios.put(url[, data[, config]]) //

## axios

url URL

method ,get

baseURL url url URL baseURL axiosURL

transformRequest 'PUT','POST'"PATCH"

headers

```
headers:{'X-Requested-With':'XMLHttpRequest'},
```

params URL(plainobject)URLSearchParams

```
params:{
 ID:12345
},
```

auth HTTP

    Authorization     headers    Authorization

```
auth:{
 username:'janedoe',
 password:'s00pers3cret'
},
```

'proxy'  
auth HTTP  
    Proxy-Authorization     header   Proxy-Authorization

```
proxy:{
 host:'127.0.0.1',
 port:9000,
 auth:{
 username:'mikeymike',
 password:'rapunz3l'
 }
},
```

## Vue.use

vue.use

- 1.
- 2. this
- 3. install install function
  - install vueVue.use args.unshift(this)
    - install typeof plugin.install === 'function'
    - plugin.apply(null, args)
    - installedPlugins.push(plugin)

```

export function toArray (list: any, start?: number): Array<any> {
 start = start || 0
 let i = list.length - start
 const ret: Array<any> = new Array(i)
 while (i--) {
 ret[i] = list[i + start]
 }
 return ret
}

export function initUse (Vue: GlobalAPI) {
 Vue.use = function (plugin: Function | Object) {
 const installedPlugins = (this._installedPlugins || (this._installedPlugins = []))
 if (installedPlugins.indexOf(plugin) > -1) {
 return this
 }

 // additional parameters
 const args = toArray(arguments, 1)
 args.unshift(this)
 if (typeof plugin.install === 'function') {
 plugin.install.apply(plugin, args)
 } else if (typeof plugin === 'function') {
 plugin.apply(null, args)
 }
 installedPlugins.push(plugin)
 return this
 }
}

```

## new Vue()

1. new Vue()Vue
- 2.

\$children\$refs\$slots\$createElement

beforecreate created

3. new Vue()

1. defineReactiveObject. defineProperty() get set
2. 7 ( push/pop/shift/unshift/splice/reverse/sort )

vue3 proxy

dep watcher watcher

1. defineReactive
2. depwatcher
- 3.

dep.depend() // get

dep.notify() // set

- 1.
2. data
3. object.freeze()

## Vue

defineProperty 7 ob.dep.notify() Watcher

push/pop/shift/unshift/splice/reverse/sort

Vue.set() = splice

```
//

const arrayProto = Array.prototype

//

export const arrayMethods = Object.create(arrayProto)

//

def(arrayMethods, method, function mutator (... args) { }

ob.dep.notify() //
```

## Vue.set

\$setdepwatcherssplice

Vue.set(object, key, value)

splice

target.splice(key, 1, val)

defineReactive(ob, key, val)

ob.dep.notify()

## Vue

Vuetemplaterender

1. AST
- 2.
3. codegen
  - AST(JavaScript)
  - VueDOM
  - AST()
  - AST

## Vue3.x

Vue3.xProxyObject.definePropertyProxy13

## Vue3.xProxyVue3

Reflect.getObjectreactive

## Vue3.xget/set

keytargettrigger

## vue2.x

- Vuedata
- api
- 

## ComputedWatch

- Computedwatcher
- Watch deeptrue immediate: true

## Vue2.xVue3.xdiff

diff

- 
- (children)
- (diff)
- 
- DiffO( $n^3$ ) DOMVueDiffO( $n^3$ ) -> O(n)childrenDiff

Vue2DiffchildrenkeyReactDiff

Vue3.x ivi inferno

VNodemount/patchVNodeDiffVue2.x(Vue3.x)

## SSR

- SSRVueHTMLhtml
- SSRSEO
- beforeCreatecreatedNode.js
- 

## name

- 
- name (keep-alive)
- name

```
Vue.extend = function () {
 if(name) {
 Sub.options.components[name] = Sub
 }
}
```

## 1.1

- document
- 
- document

```
//
node.addEventListener('click',(event) =>{
 console.log(' ')
},false);
node.addEventListener('click',(event) =>{
 console.log(' ')
},true)
```

## 1.2

- addEventListener        useCapture    false useCapture
- stopPropagation    stopPropagation    stopImmediatePropagation

```
node.addEventListener('click',(event) =>{
 event.stopImmediatePropagation()
 console.log(' ')
},false);
// node
node.addEventListener('click',(event) => {
 console.log(' ')
},true)
```

## 1.3

```

<ul id="ul">
 1
 2
 3
 4
 5

<script>
 let ul = document.querySelector('##ul')
 ul.addEventListener('click', (event) => {
 console.log(event.target);
 })
</script>

```

- 
- 

Ajax

## 2.1 JSONP

JSONP    <script>    <script>

```

<script src="http://domain/api?param1=a¶m2=b&callback=jsonp"></script>
<script>
 function jsonp(data) {
 console.log(data)
 }
</script>

```

- JSONP get

## 2.2 CORS

- CORS
- CORS CORS      CORS
- Access-Control-Allow-Origin    CORS

## 2.3 document.domain

- a.test.com b.test.com
- document.domain = 'test.com'

## 2.4 postMessage

```
//
window.parent.postMessage('message', 'http://test.com');

//
var mc = new MessageChannel();
mc.addEventListener('message', (event) => {
 var origin = event.origin || event.originalEvent.origin;
 if (origin === 'http://test.com') {
 console.log('')
 }
});
```

## Event loop

### 3.1 JS event loop

```
JS JS JS DOM
```

- JS Task task Event Loop Task JS

```
console.log('script start');

setTimeout(function() {
 console.log('setTimeout');
}, 0);

console.log('script end');
```

```
Task microtask macrotask ES6 microtask jobs
macrotask task
```

```

console.log('script start');

setTimeout(function() {
 console.log('setTimeout');
}, 0);

new Promise((resolve) => {
 console.log('Promise')
 resolve()
}).then(function() {
 console.log('promise1');
}).then(function() {
 console.log('promise2');
});

console.log('script end');
// script start => Promise => script end => promise1 => promise2 => setTimeout

```

setTimeout    Promise    Promise    setTimeout

- process.nextTick
- promise
- Object.observe
- MutationObserver

- script
- setTimeout
- setInterval
- setImmediate
- I/O
- UI rendering

script

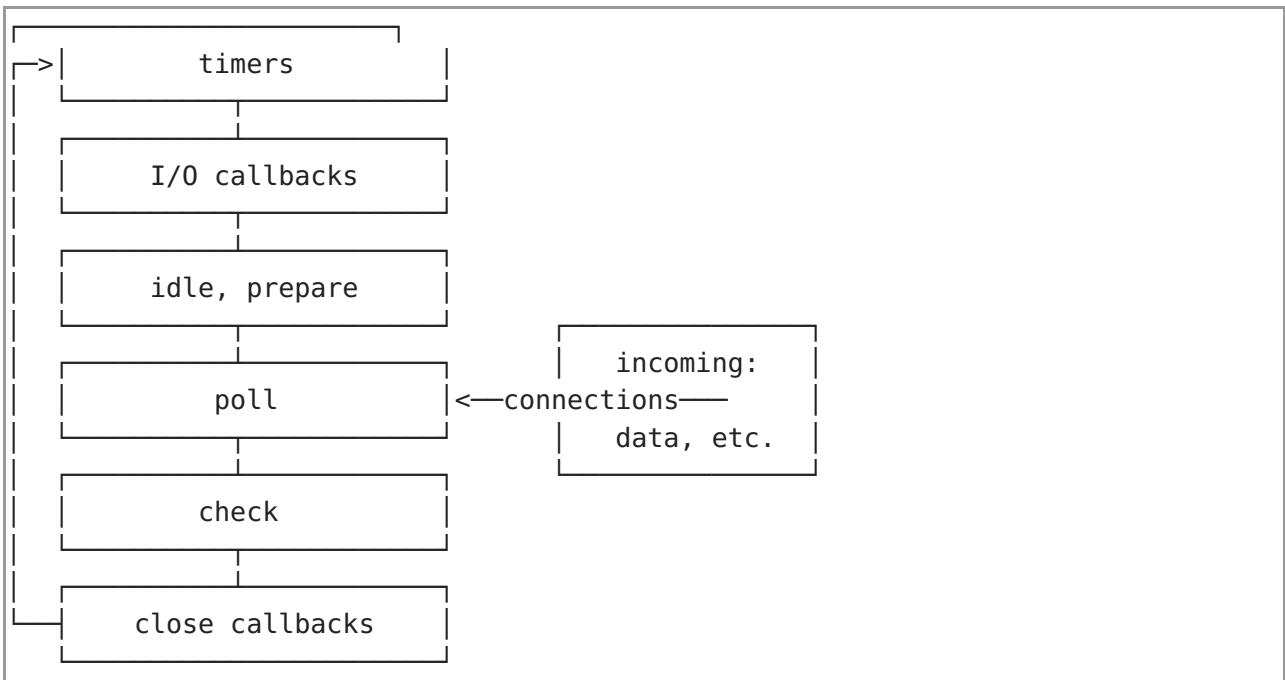
## Event loop

- 
- 
- 
- UI
- Event loop

Event loop    DOM    DOM

## 3.2 Node Event loop

- Node Event loop
- Node Event loop 6



## **timer**

- timers setTimeout setInterval
- timer

## **I/O**

- I/O close setImmediate

idle, prepare  
idle, prepare

## **poll**

- poll
  - 
  - poll
- poll
  - poll
  - poll
  - setImmediate poll check setImmediate
  - setImmediate
  - timer

## **check**

- check setImmediate

## **close callbacks**

- close callbacks close

- Node

```
setTimeout(() => {
 console.log('setTimeout');
}, 0);
setImmediate(() => {
 console.log('setImmediate');
})
// setTimeout setImmediate
//
// event loop 1 setImmediate
// setTimeout
```

macrotask microtask

```
setTimeout(()=>{
 console.log('timer1')

 Promise.resolve().then(function() {
 console.log('promise1')
 })
}, 0)

setTimeout(()=>{
 console.log('timer2')

 Promise.resolve().then(function() {
 console.log('promise2')
 })
}, 0)

// node
// timer1, promise1, timer2, promise2
// node timer1, timer2, promise1, promise2
// timer1, promise1, timer2, promise2
```

Node process.nextTick microtask

```
setTimeout(() => {
 console.log("timer1");

 Promise.resolve().then(function() {
 console.log("promise1");
 });
}, 0);

process.nextTick(() => {
 console.log("nextTick");
});
// nextTick, timer1, promise1
```

## Service Worker

Service workers WebAPI

```

// index.js
if (navigator.serviceWorker) {
 navigator.serviceWorker
 .register("sw.js")
 .then(function(registration) {
 console.log("service worker ");
 })
 .catch(function(err) {
 console.log("servcie worker ");
 });
}

// sw.js
// `install`
self.addEventListener("install", e => {
 e.waitUntil(
 caches.open("my-cache").then(function(cache) {
 return cache.addAll(["./index.html", "./index.js"]);
 })
);
});

//
//
self.addEventListener("fetch", e => {
 e.respondWith(
 caches.match(e.request).then(function(response) {
 if (response) {
 return response;
 }
 console.log("fetch source");
 })
);
});
}

```

Application Service Worker



Cache



Service Worker

- HTML DOM

- CSS CSSOM
- DOM CSSOM
- GPU



- CSSOM CSSOM CSSOM CSS
- HTML script DOM JS CSS JS JSCSS DOM

## 5.1

- 3D translate3dtranslateZ
- will-change
- videoiframe
- opacity
- position: fixed

## 5.2 RepaintReflow

- color
- 

- window
- 
- 
- 
- 
- 

## Event loop

- Event loop Microtasks document 60Hz 16ms
- resize scroll resize scroll 16ms
- media query
- 
- 
- requestAnimationFrame
- IntersectionObserver
- 
- requestIdleCallback

- translate top
- visibility display: none
- table table
- requestAnimationFrame
- CSS DOM
- video

## 1.1 DNS

- DNS IP

```
<link rel="dns-prefetch" href="//yuchengkai.cn">
```

## 1.2

- 
- 

```
Expires Cache-Control state code 200
```

```
Expires: Wed, 22 Oct 2018 08:41:00 GMT
```

```
Expires HTTP / 1.0 Wed, 22 Oct 2018 08:41:00 GMT
Expires
```

```
Cache-control: max-age=30
```

```
Cache-Control HTTP / 1.1 Expires 30
```

- 304
- 

Last-Modified If-Modified-Since

- Last-Modified If-Modified-Since Last-Modified
- Last-Modified HTTP / 1.1 ETag

ETag If-None-Match

- ETag If-None-Match ETag ETag ETag Last-Modified

- Cache-control: no-store
- Cache-Control: no-cache ETag
- Cache-Control: max-age=31536000

### 1.3 HTTP / 2.0

- HTTP / 1.1 RTT TCP
- HTTP / 2.0 TCP Header

### 1.4

- 
- fetch onload

```
<link rel="preload" href="http://example.com">
```

### 1.5

```
<link rel="prerender" href="http://example.com">
```

- 

### 2.1

- 

### 2.2

- 

```
src src
```

- 

## CSRF/XSS

### 1

- CSRF
- XSS

SQL

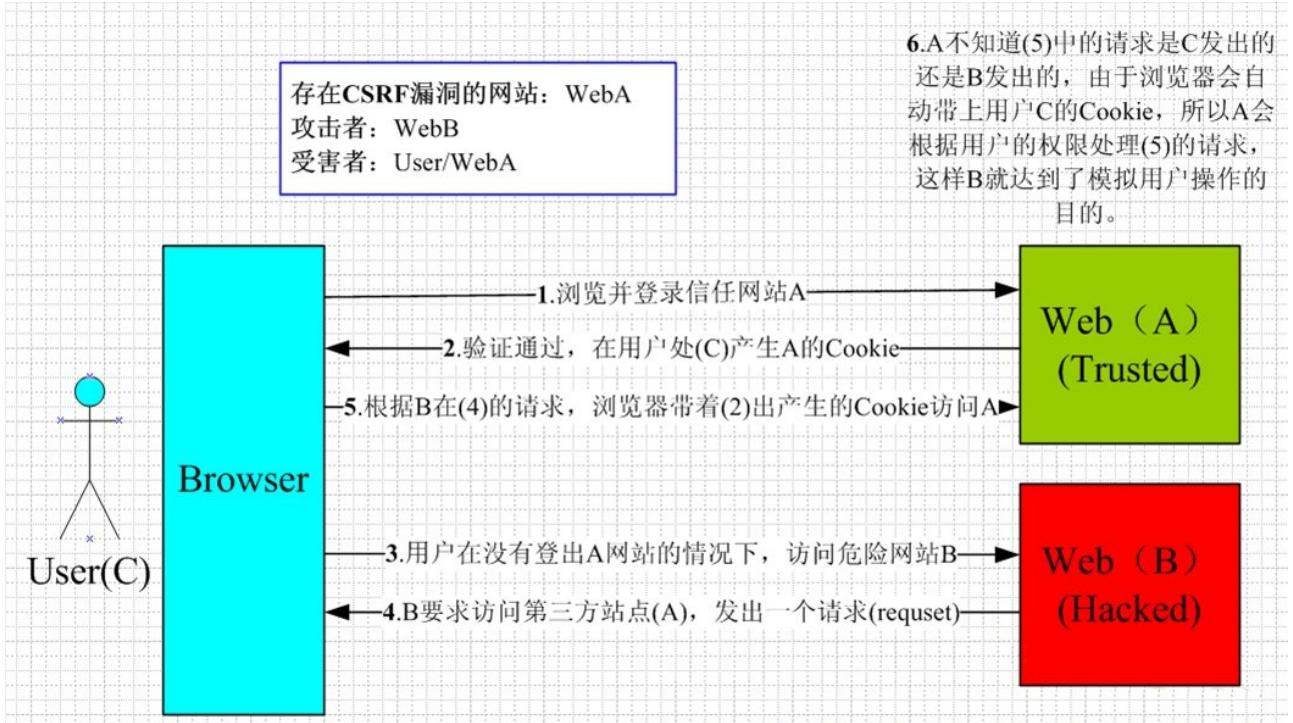
## 2 CSRF

- CSRF
- 
- 

CSRF Cross-site request forgery

PS

### 2.2 CSRF



AA cookie

CSRF

1. ACookie AB Aapi
2. A B A

CSRF

cookie B cookie

api

## 2.3 CSRF

### Token

1. token
  2. token
  3. token
- token http head

## Referer

Referer

## 3 XSS

### 3.1 XSS

``XSSCross Site Scripting``

- XSS

HTTPCookieAjax

### 3.2 XSS

XSS      url      jshmtl

- Cookie
- 
- D-doss

### 3.3 XSS

1.

XSSurl      XSS    XSS      XSS

2.

XSSXSSXSS

### 3.4 XSSencode +

## XSS

1.

HTML Entity

Encode\$var

<script>alert(1)</script>

alertjsXSS

L <script>alert(1)</script>``\$varJ avaScript`

2

- onerror onclick
- Style Script Iframe Script

3

- HTML Entity
- DOM Parse DOM

DOM Parse DOM

DOM

encode

## 4 CSRF XSS

- CSRFA cookie
- XSS

- CSRFA Aapi
- XSS A JS JS A

# 1

## 1.1

- 
- 
- 

## 1.2

- 
- 
- instanceof
- new

# 2

## 2.1

```
var obj11 = {name: 'smyh'};
var obj12 = new Object(name: `smyh`); //
```

obj11object

- 
- 

## 2.2

```
var M = function (name) {
 this.name = name;
}
var obj3 = new M('smyhvae');
```

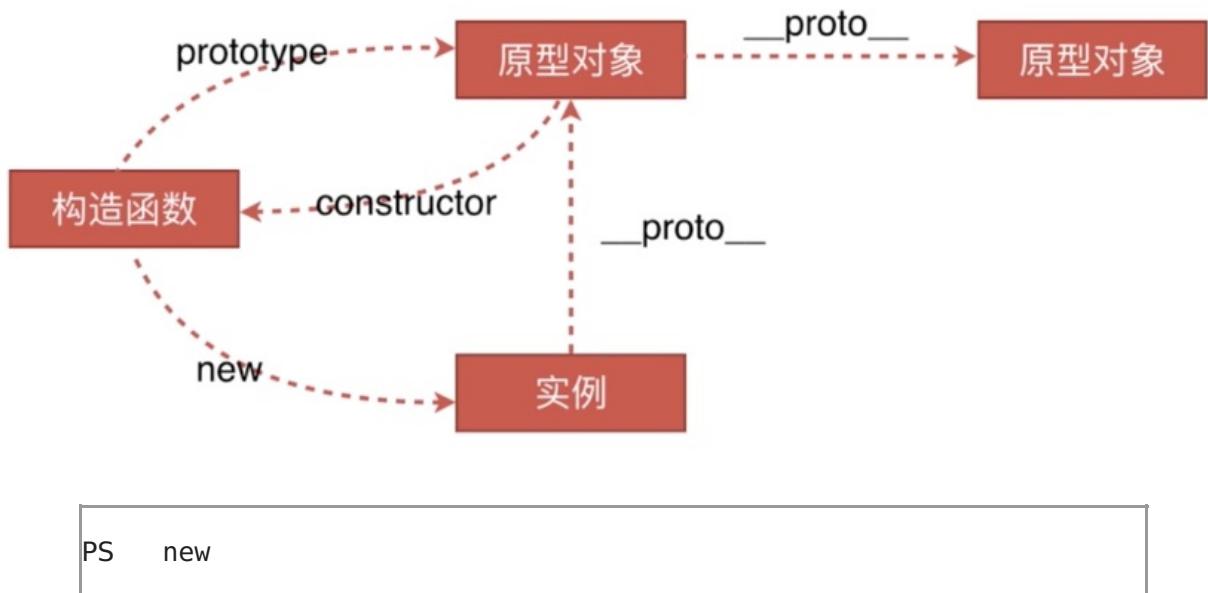
## 2.3 Object.create

```
var p = {name: 'smyhvae'};
var obj3 = Object.create(p); //
```

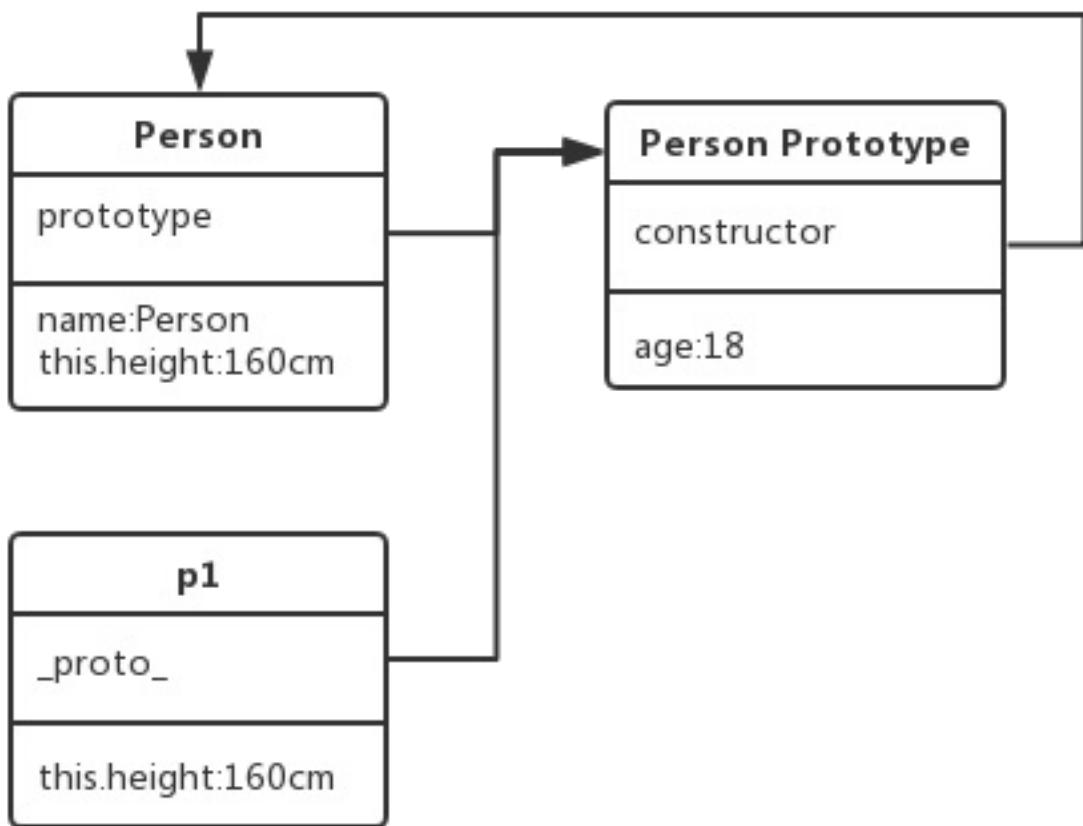
obj3    pobj3``namep    Objecet`

- `var a = {}` 其实是 `var a = new Object()` 的语法糖
- `var a = []` 其实是 `var a = new Array()` 的语法糖
- `function Foo(){...}` 其实是 `var Foo = new Function(...)`
- 使用 `instanceof` 判断一个函数是否是一个变量的构造函数

3



3.1



1. new
2. prototype    prototype    prototype
3. constructor

```
var Foo = function (name) {
 this.name = name;
}
```

```
var fn = new Foo('smyhvae');
```

```
Foo.prototype.constructor === Foo
```

```
Foo
< f Foo(name) {
 this.name = name;
}

> Foo.prototype
< ▼ {constructor: f} ⓘ
 ► constructor: f Foo(name)
 ► __proto__: Object

> Foo.prototype.constructor === Foo
< true

> |
```

4. \_\_proto\_\_    Foo.\_\_proto\_\_ === M.prototype

    \_\_proto\_\_

Foo.\_\_proto\_\_ === Function.prototype  
true    Foo    Function

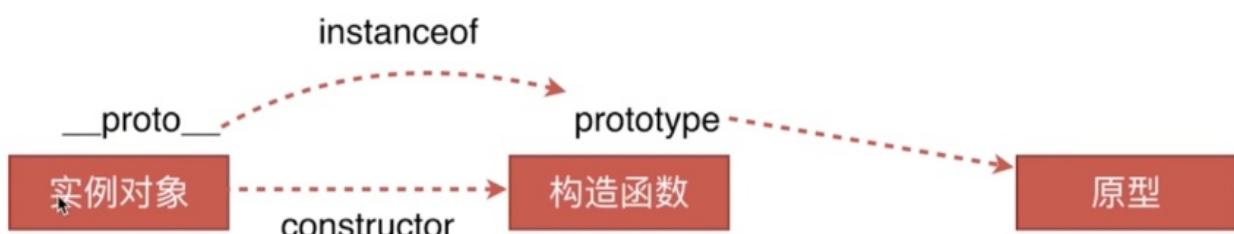
### 3.2

Object

•

```
//Foo say
Foo.prototype.say = function () {
 console.log(' ');
}
```

### 3.3 instanceof



- instanceof

- instanceof \_\_proto\_\_ prototype

- 1 new \_\_proto\_\_ prototype \_\_proto\_\_
- 2 \_\_proto\_\_ instanceof true

- foo instanceof Foo true foo.\_\_proto\_\_ === M.prototype true
- **foo instanceof Object** true Foo.prototype.\_\_proto\_\_ === Object.prototype true

foo Object`

### 3.4

ABBC a A BC

constructor

- foo.\_\_proto\_\_.constructor === M true foo.\_\_proto\_\_.constructor === Object false
- consturctor instanceof

### 4 new

new Foo()

- 
- 
- this
- 1

### 1

1.

2.

ajax

### 3. Ajax

Ajax      vue    jQuery    js

4.



2

MDN

1.        http80

2.

- CookieLocalStorageIndexDB
- DOM
- Ajax      Ajax

3

- Ajax
- WebSocket
- CORS      **Ajax**

## 4 Ajax

Ajax

1. XMLHttpRequest

2.

XMLHttpRequest

3.

4.

XMLHttpRequest

#### 4.1 Ajax XMLHttpRequest

1. XMLHttpRequest
2. open`open(method, url, )``
- 3.
4. onreadystatechange

5. UI

#### 4.2 get post

get

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
</head>
<body>
<h1>Ajax get </h1>
<input type="button" value="get_ajax" id='btnAjax'>

<script type="text/javascript">
 //
 document.querySelector('#btnAjax').onclick = function () {
 // ajax

 // 1
 var ajaxObj = new XMLHttpRequest();

 // 2url
 ajaxObj.open('get', '02-ajax.php');

 // 3
 ajaxObj.send();

 //4 onreadystatechange
 //
 ajaxObj.onreadystatechange = function () {
 //
 if (ajaxObj.readyState == 4 && ajaxObj.status == 200) {
 //
 // 5.
 console.log('');
 //

 console.log(ajaxObj.responseText);

 //
 document.querySelector('h1').innerHTML = ajaxObj.responseText;
 }
 }
 }
</script>
</body>
</html>
```

post

```

<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
</head>
<body>
<h1>Ajax get </h1>
<input type="button" value="put_ajax" id='btnAjax'>
<script type="text/javascript">

 //
 var xhr = new XMLHttpRequest();

 //
 xhr.open('post', '02.post.php');

 // post,
 xhr.setRequestHeader("Content-type", "application/x-www-form-urlencoded");

 // send
 xhr.send('name=fox&age=18');

 //
 xhr.onreadystatechange = function () {
 //
 if (xhr.readyState == 4 && xhr.status == 200) {
 alert(xhr.responseText);
 }
 };
</script>
</body>
</html>

```

#### 4.3 onreadystatechange

onreadystatechange	readyState	onreadystatechange
--------------------	------------	--------------------

readyState	XMLHttpRequest	0 4
------------	----------------	-----

- 0:
- 1:
- 2:
- 3:
- 4:

#### 4.4

事件	触发条件
<code>onreadystatechange</code>	每当 <code>xhr.readyState</code> 改变时触发；但 <code>xhr.readyState</code> 由非 <code>0</code> 值变为 <code>0</code> 时不触发。
<code>onloadstart</code>	调用 <code>xhr.send()</code> 方法后立即触发，若 <code>xhr.send()</code> 未被调用则不会触发此事件。
<code>onprogress</code>	<code>xhr.upload.onprogress</code> 在上传阶段(即 <code>xhr.send()</code> 之后， <code>xhr.readyState=2</code> 之前)触发，每50ms触发一次； <code>xhr.onprogress</code> 在下载阶段（即 <code>xhr.readyState=3</code> 时）触发，每50ms触发一次。
<code>onload</code>	当请求成功完成时触发，此时 <code>xhr.readyState=4</code>
<code>onloadend</code>	当请求结束（包括请求成功和请求失败）时触发
<code>onabort</code>	当调用 <code>xhr.abort()</code> 后触发
<code>ontimeout</code>	<code>xhr.timeout</code> 不等于 <code>0</code> ，由请求开始即 <code>onloadstart</code> 开始算起，当到达 <code>xhr.timeout</code> 所设置时间请求还未结束即 <code>onloadend</code> ，则触发此事件。
<code>onerror</code>	在请求过程中，若发生 <code>Network error</code> 则会触发此事件（若发生 <code>Network error</code> 时，上传还没有结束，则会先触发 <code>xhr.upload.onerror</code> ，再触发 <code>xhr.onerror</code> ；若发生 <code>Network error</code> 时，上传已经结束，则只会触发 <code>xhr.onerror</code> ）。注意，只有发生了网络级别的异常才会触发此事件，对于应用级别的异常，如响应返回的 <code>xhr.statusCode</code> 是 <code>4xx</code> 时，并不属于 <code>Network error</code> ，所以不会触发 <code>onerror</code> 事件，而是会触发 <code>onload</code> 事件。

## 4.5

当请求一切正常时，相关的事件触发顺序如下：

1. 触发 `xhr.onreadystatechange` (之后每次 `readyState` 变化时，都会触发一次)
2. 触发 `xhr.onloadstart`  
//上传阶段开始：
3. 触发 `xhr.upload.onloadstart`
4. 触发 `xhr.upload.onprogress`
5. 触发 `xhr.upload.onload`
6. 触发 `xhr.upload.onloadend`  
//上传结束，下载阶段开始：
7. 触发 `xhr.onprogress`
8. 触发 `xhr.onload`
9. 触发 `xhr.onloadend`

## 4.6 Ajax

```
var util = {};

// ajax json
util.json = function (options) {

 var opt = {
 url: '',
 type: 'get',
 data: {},
 success: function () {
 },
 error: function () {
 }
 };

 if (options.url) {
 opt.url = options.url;
 }

 if (options.type) {
 opt.type = options.type;
 }

 if (options.data) {
 opt.data = options.data;
 }

 if (options.success) {
 opt.success = options.success;
 }

 if (options.error) {
 opt.error = options.error;
 }

 return opt;
}
```

```
 error: function () {
 },

};

util.extend(opt, options);
if (opt.url) {
 //IEXMLHttpRequestapiIEapi
 var xhr = XMLHttpRequest ? new XMLHttpRequest() : new
window.ActiveXObject('Microsoft.XMLHTTP');

 var data = opt.data,
 url = opt.url,
 type = opt.type.toUpperCase();
 dataArr = [];
}

for (var key in data) {
 dataArr.push(key + '=' + data[key]);
}

if (type === 'GET') {
 url = url + '?' + dataArr.join('&');
 xhr.open(type, url.replace(/\?$/g, ''), true);
 xhr.send();
}

if (type === 'POST') {
 xhr.open(type, url, true);
 // post,
 xhr.setRequestHeader("Content-type", "application/x-www-form-
urlencoded");
 xhr.send(dataArr.join('&'));
}

xhr.onload = function () {
 if (xhr.status === 200 || xhr.status === 304) { //304206
 var res;
 if (opt.success && opt.success instanceof Function) {
 res = xhr.responseText;
 if (typeof res === 'string') {
 res = JSON.parse(res); //json
 opt.success.call(xhr, res);
 }
 }
 } else {
 if (opt.error && opt.error instanceof Function) {
 opt.error.call(xhr, res);
 }
 }
};

};
```

## 5

1. JSONP
2. WebSocket
3. CORS
4. Hash
5. postMessage

### JSONP

- CORSpostMessage JSONP

```
JSONP<script> head <script>srcurl JSONP
```

### JSONP

```
<script src="http://www.smyhvae.com/?data=name&callback=myjsonp"></script>
```

```
src data=nameget myjsonp
```

```
myjsonp({
 data: {}
})
```

```
myjsonp
```

### JSONP

```
<script>

var util = {};
```

```

// script
/***
 * [function js]
 * @param {[type]} url [description]
 * @param {[type]} charset [description]
 * @return {[type]} [description]
 */
util.createScript = function (url, charset) {
 var script = document.createElement('script');
 script.setAttribute('type', 'text/javascript');
 charset && script.setAttribute('charset', charset);
 script.setAttribute('src', url);
 script.async = true;
 return script;
};

/***
 * [function jsonp]
 * @param {[type]} url [description]
 * @param {[type]} onsuccess [description]
 * @param {[type]} onerror [description]
 * @param {[type]} charset [description]
 * @return {[type]} [description]
 */
util.jsonp = function (url, onsuccess, onerror, charset) {
 var callbackName = util.getName('tt_player'); //
 window[callbackName] = function () { //
 if (onsuccess && util.isFunction(onsuccess)) {
 onsuccess(arguments[0]);
 }
 };
 var script = util.createScript(url + '&callback=' + callbackName,
charset); //script
 script.onload = script.onreadystatechange = function () { //
 if (!script.readyState ||
/loaded|complete/.test(script.readyState)) {
 script.onload = script.onreadystatechange = null;
 // script DOM
 if (script.parentNode) {
 script.parentNode.removeChild(script);
 }
 //
 window[callbackName] = null; //
 }
 };
 script.onerror = function () {
 if (onerror && util.isFunction(onerror)) {
 onerror();
 }
 };
 document.getElementsByTagName('head')[0].appendChild(script); //html
}

```

```
};

</script>
```

## 5.2 WebSocket

WebSocket

```
//

var ws = new WebSocket('wss://echo.websocket.org'); //WebSocket ws
wss

//
ws.onopen = function (evt) {
 console.log('Connection open ...');
 ws.send('Hello WebSockets!');
};

//
ws.onmessage = function (evt) {
 console.log('Received Message: ', evt.data);
 ws.close();
};

//
ws.onclose = function (evt) {
 console.log('Connection closed.');
};
```

WebSocket

## 5.3 CORS

CORS Ajax

- fetchAPICORS`

```
// urloptions
fetch('/some/url/', {
 method: 'get',
}).then(function (response) { // ES6promise

}).catch(function (err) {
 // then
});
```

“CORS”

Ajax httpOrigin

#### 5.4 Hash

- url#HashHash Hash

url?SearchSearch

A iframeframe B

AB

1. A

```
//
var B = document.getElementsByTagName('iframe');
B.src = B.src + '#' + 'jsonString'; //JS JSON.stringify() json B
```

2. B

```
// B
window.onhashchange = function () { //onhashchangeurl hash
 var data = window.location.hash;
};
```

#### 5.5 postMessage()

H5`postMessage()``H5

A ( http://A.com) B ( http://B.com)

1. A B

```
// A(http://A.com)B(http://B.com)
Bwindow.postMessage('data', 'http://B.com'); //Bwindow
```

2. B

```
// B message
Awindow.addEventListener('message', function (event) { //Awindow
 console.log(event.origin); // urlhttp://A.com
 console.log(event.source); //A window
 console.log(event.data); //
}, false);
```

1

- 
- 

- 
- 

2

2.1 /

```
function Animal1() {
 this.name = 'smyhvae'; //this
}
```

class ES6

```
class Animal2 {
 constructor() { //
 this.name = name;
 }
}
```

```
▶ Animal1
 ◀ f Animal1() {
 this.name = 'smyhvae'; //通过this, 表明这是一个构造函数
 }
▶ Animal2
 ◀ class Animal2 {
 constructor() { //可以在构造函数里写属性
 this.name = name;
 }
 }
▶
```

## 2.2

new

```
console.log(new Animal1(), new Animal2()); //
```

```
▶ top
 ▶ Filter
 ▶ Animal1 {name: "smyhvae"} ⓘ
 name: "smyhvae"
 ▶ __proto__:
 ► constructor: f Animal1()
 ► __proto__: Object
 ▶ Animal2 {name: ""} ⓘ
 name: ""
 ▶ __proto__:
 ► constructor: class Animal2
 ► __proto__: Object
 ▶ | __proto__.__proto__
```

## 3

### 3.1

```
function Parent1() {
 this.name = 'parent1' ;
}

function Child1() {
 Parent1.call(this); // call apply this
 this.type = 'child1' ;
}

console.log(new Child1);
```

Parent1.call(this); Parentchild thisparent --> child  
parentchild

---

▼ Child1 {name: "parent1 的属性", type: "child1 的属性"} ⓘ  
  name: "parent1 的属性"  
  type: "child1 的属性"  
▶ \_\_proto\_\_: Object

---

➤ |

child parent child

this Child1 Parent1 Parent1

```
Parent1.prototype.say = function () {
};
```

Child1

The screenshot shows a code editor on the left and a browser developer tools console on the right. The code editor contains a file named 'box.html' with the following content:

```

1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4 <meta charset="UTF-8">
5 <title>Document</title>
6 </head>
7 <body>
8 <script>
9
10
11 function Parent1() {
12 this.name = 'parent1 的属性';
13 }
14
15 //给 Parent1 的原型添加属性和方法
16 Parent1.prototype.hehe = "smyhvae";
17 Parent1.prototype.say = function () {
18 };
19
20 function Child1() {
21 Parent1.call(this); //【重要】
22 this.type = 'child1 的属性';
23 }
24
25 console.log(new Child1());
26 // Child1 无法获取到 Parent1 的原型里的内容
27 console.log(new Child1().hehe);
28 console.log(new Child1().say());
29
30 </body>
31 </html>

```

The browser developer tools console shows the output of the code execution. It includes the properties of the `Child1` constructor function and an error message:

- Properties of `Child1`:
  - name: "parent1 的属性"
  - type: "child1 的属性"
  - \_\_proto\_\_: Object
- Error message:
  - Uncaught TypeError: (intermediate value).say is not a function  
at box.html?\_ijt=4svcae5ev4r:39

### 3.2

```

/*
 */

function Parent() {
 this.name = 'Parent' ;
}

function Child() {
 this.type = 'Child' ;
}

Child.prototype = new Parent(); //

console.log(new Child());

```

top

Filter

▼ Child {type: "Child 的属性"} ⓘ  
  type: "Child 的属性"  
▼ \_\_proto\_\_: Parent  
  name: "Parent 的属性"  
► \_\_proto\_\_: Object

> |

prototype	Parent	Child	prototype	Child	Parent
Child					

- new Child.\_\_proto\_\_ === new Parent() true

- **Child Parent**

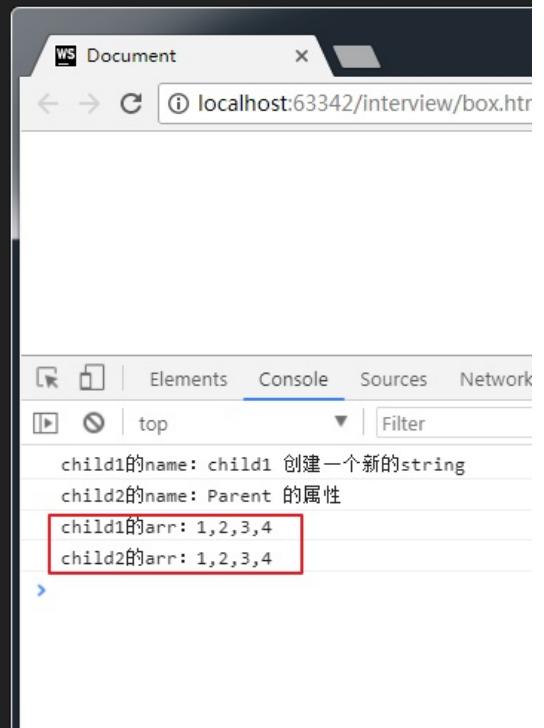
child1name	child2name
------------	------------

box.html

```

1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4 <meta charset="UTF-8">
5 <title>Document</title>
6 </head>
7 <body>
8 <script>
9
10 /*
11 * 通过原型链实现继承
12 */
13 function Parent() {
14 this.name = 'Parent 的属性';
15 this.arr = [1, 2, 3];
16 }
17
18 function Child() {
19 this.type = 'Child 的属性';
20 }
21
22 Child.prototype = new Parent(); //【重要】
23
24 var child1 = new Child();
25 var child2 = new Child();
26
27 child1.name = "child1 创建一个新的string";
28
29 console.log('child1的name: ' + child1.name);
30 console.log('child2的name: ' + child2.name);
31
32 // child1.arr.push(4); //【重要】通过 child1 往原来的 arr数组中增加一个元素
33 // child1.arr = [1,2,3,4] //这种方式是重新创建一个新的数组，和上面一行的代码，意思完全不同。
34 console.log('child1的arr: ' + child1.arr);
35 console.log('child2的arr: ' + child2.arr);
36
37 </script>
38 </body>
39 </html>

```



child1arr child2arr

child1child2 child1.\_\_proto\_\_ === child2.\_\_proto\_\_ arr  
Parent Child

3.3 +

```
/*
 */
function Parent3() {
 this.name = 'Parent' ;
 this.arr = [1, 2, 3];
}

function Child3() {
 Parent3.call(this); //1 parent
 this.type = 'Child' ;
}
Child3.prototype = new Parent3(); //2parent

var child = new Child3();
```

- 
- Parent
- ES6     ES5

**1**

- 
- 
- 

- js
- 

**2**

- 
- 

**3**

**3.1**

**1**try ... catch

## 2 window.onerror

```
window.onerror = function(msg, url, row, col, error) { ... }
```

- msg
- sourceJavascripturl
- row

```
window.onerrorDOM0DOM2 window.addEventListener("error", fn);
```

## 1

window.onerrorjs

Bb.js

1. b.js response header b.js response header

```
Access-Control-Allow-Origin: *
```

2. b.js <script>crossorigin

## 2

```
window.onerror msg
```

## 3.2

```
window.onerror object.onerror window window.onerror
```

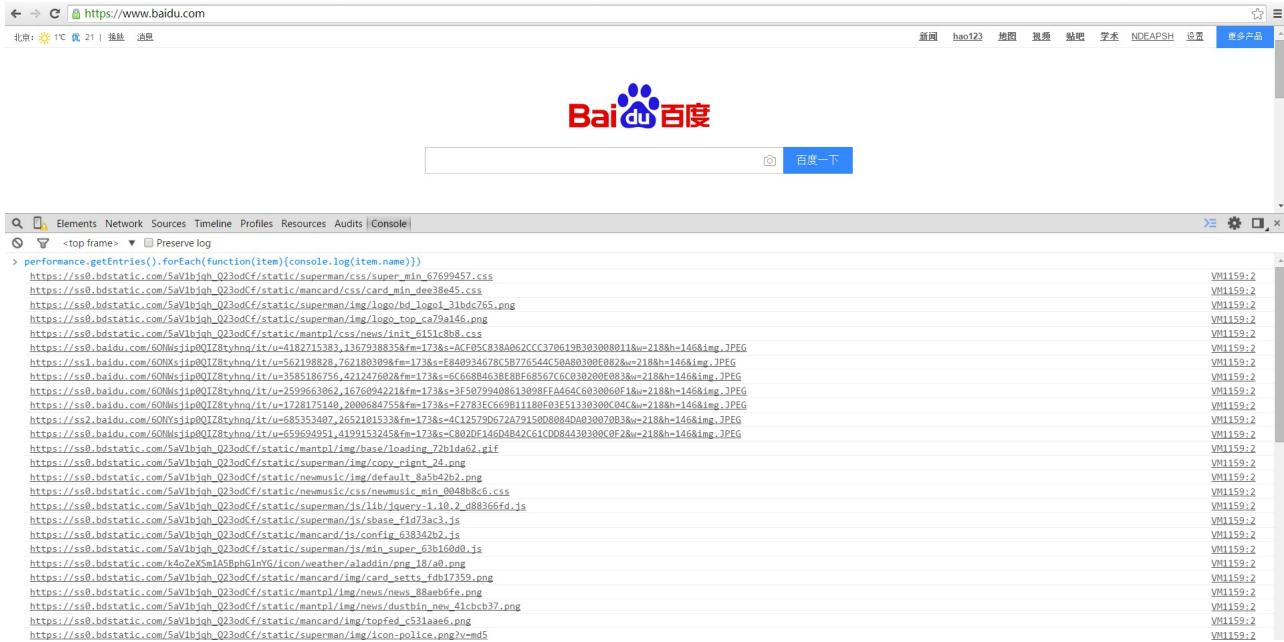
- 1object.onerrorimg scriptonerror
- 2performance.getEntries

Console

```
performance.getEntries().forEach(function(item){console.log(item.name)})
```

```
performance.getEntries().forEach(item=>{console.log(item.name)})
```

api      forEach



document.getElementsByTagName('img')img

document.getElementsByTagName('img')performance.getEntries()

### 3 Error

error

```
test1.html
1 <!DOCTYPE html>
2 <html>
3 <head>
4 <meta charset="UTF-8">
5 <title>错误监控</title>
6 <script type="text/javascript">
7 window.addEventListener('error',function(e){
8 console.log('捕获',e);
9 },true);
10 </script>
11 </head>
12 <body>
13 <!--test.js是不存在的-->
14 <script src="//123.com/test.js" charset="uft-8"></script>
15 </body>
16 </html>
17
```

#### 4

- Ajax
- Image

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Title</title>
</head>
<body>

<script>
 //Image
 (new Image()).src = 'http://smyhvae.com/myPath?badjs=msg'; // myPath

</script>
</body>
</html>
```

Network															
View:		Group by frame		Preserve log		Disable cache		Offline		Online					
Filter		Hide data URLs		All		XHR	JS	CSS	Img	Media	Font	Doc	WS	Manifest	Other
10 ms	20 ms	30 ms	40 ms	50 ms	60 ms	70 ms	80 ms	90 ms	100 ms	110 ms	120 ms				
Name	Status	Type	Initiator									Time	W		
index.html?_j... 200	document	Other										540 B	26 ms		
myPath?badjs=msg (failed)			index.html?_j... 10									0 B	151 ms		

Network

Network															
View:		Group by frame		Preserve log		Disable cache		Offline		Online					
Filter		Hide data URLs		All		XHR	JS	CSS	Img	Media	Font	Doc	WS	Manifest	Other
10 ms	20 ms	30 ms	40 ms	50 ms	60 ms	70 ms	80 ms	90 ms	100 ms	110 ms	120 ms	130 n			
Name	x	Headers	Preview	Response	Timing										
index.html?_j... 200															
myPath?badjs=msg															
<span>▼ General</span> <b>Request URL:</b> http://smyhvae.com/myPath?badjs=msg <b>Referrer Policy:</b> no-referrer-when-downgrade															
<span>▼ Request Headers</span> <b>⚠ Provisional headers are shown</b> <b>Referer:</b> http://localhost:63342/interview/index.html?_j...=abdti1sl905e2v3joufii24dok <b>User-Agent:</b> Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/64.0.3282.186 Safari/537.36															
<span>▼ Query String Parameters</span> <a href="#">view source</a> <a href="#">view URL encoded</a> badjs: msg															

100px      300px



- 1
- 2

- 3 flexbox
- 4 table
- 5 grid

1

2

```
left0px right0px leftright 300px
```

```
article
```

```
1 2
```

```
<!DOCTYPE html>
<html lang="en">
```

```
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>
 html * {
 padding: 0px;
 margin: 0px;
 }

 .layout {
 margin-bottom: 150px;
 }

 .layout article div { /*100px*/
 height: 100px;
 }

 /* start */

 .layout.float .left {
 float: left;
 width: 300px;
 background: red;
 }

 .layout.float .right {
 float: right;
 width: 300px;
 background: blue;
 }

 .layout.float .center {
 background: green;
 }

 /* end */

 /* start */

 .layout.absolute .left-center-right {
 position: relative;
 }

 .layout.absolute .left {
 position: absolute;
 left: 0;
 width: 300px;
 background: red;
 }
```

```
/* 300px300px */
.layout.absolute .center {
 position: absolute;
 left: 300px;
 right: 300px;
 background: green;
}

.layout.absolute .right {
 position: absolute;
 right: 0;
 width: 300px;
 background: blue;
}

/* end */
</style>
</head>

<body>

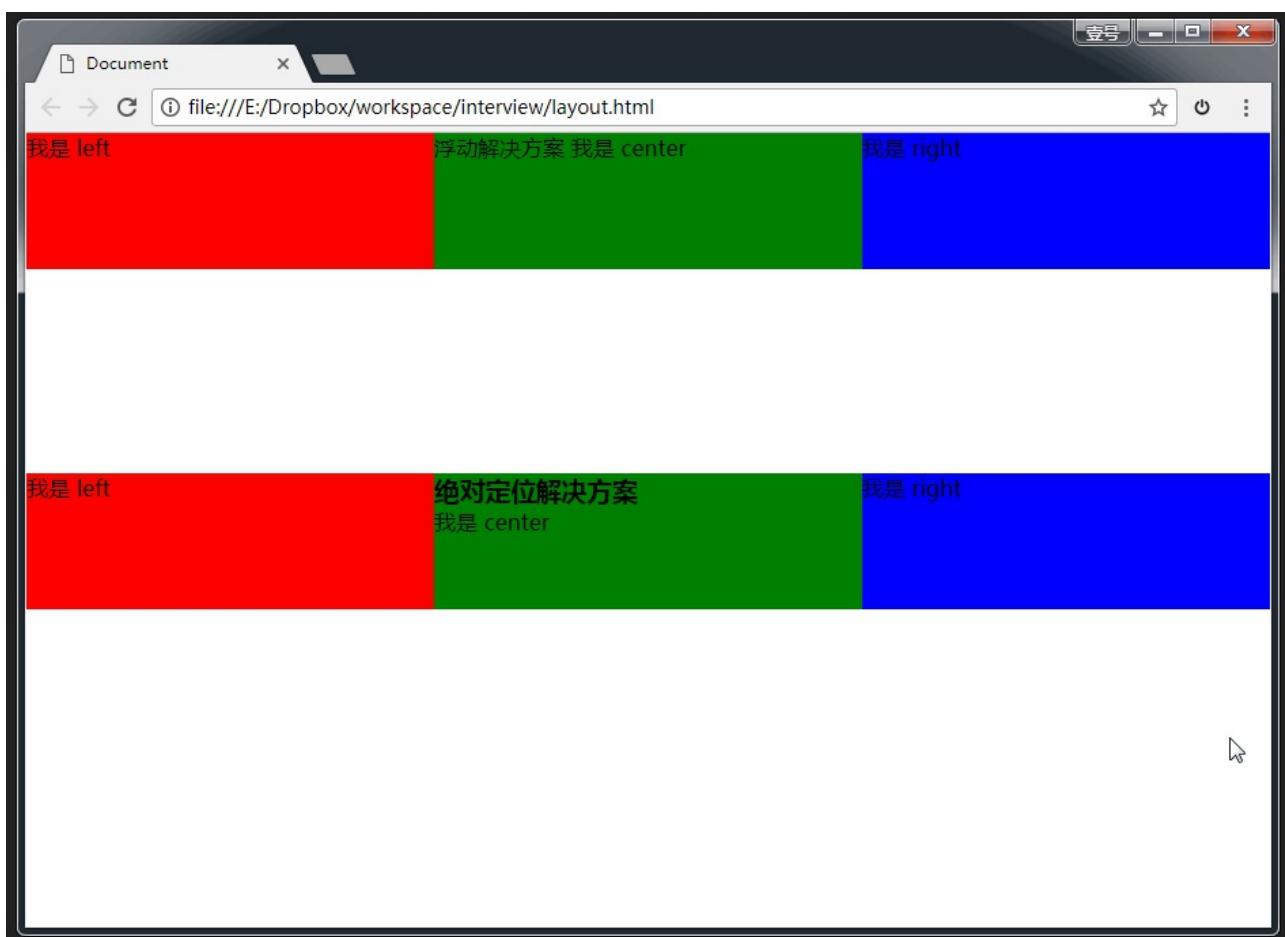
<!-- start -->
<!-- section.layout.float -->
<section class="layout float">
 <!-- article -->
 <article class="left-right-center">
 <!-- div.left+div.right+div.center -->
 <div class="left">
 left
 </div>
 <div class="right">
 right
 </div>
 <div class="center">

 center
 </div>

 </article>
</section>
<!-- end -->

<section class="layout absolute">
 <article class="left-center-right">
 <div class="left">
 left
 </div>
 <div class="right">
 right
 </div>
 </article>
</section>
```

```
</div>
<div class="center">
 <h1> </h1>
 center
</div>
</article>
</section>
</body>
</html>
```



### 3flexbox

```
display: flex flex = 1
```

```
<!DOCTYPE html>
<html lang="en">

<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>
 html * {
```

```
 padding: 0;
 margin: 0;
 }

.layout article div {
 height: 100px;
}

.left-center-right {
 display: flex;
}

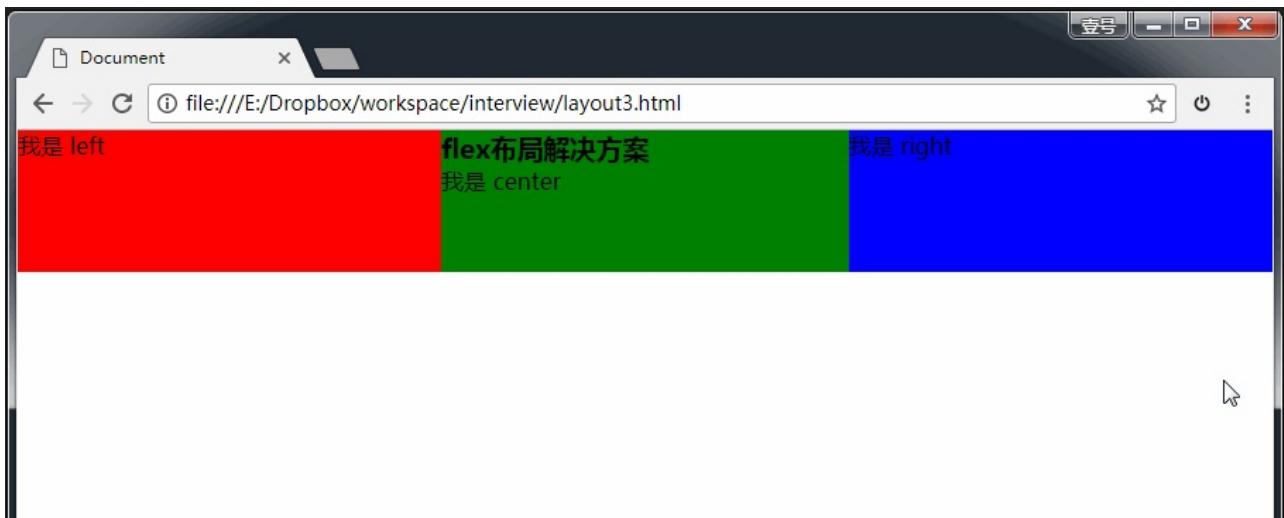
.layout.flex .left {
 width: 300px;
 background: red;
}

.layout.flex .center {
 flex: 1;
 background: green;
}

.layout.flex .right {
 width: 300px;
 background: blue;
}
</style>

</head>

<body>
 <section class="layout flex">
 <article class="left-center-right">
 <div class="left">
 left
 </div>
 <div class="center">
 <h1>flex </h1>
 center
 </div>
 <div class="right">
 right
 </div>
 </article>
 </section>
</body>
</html>
```



#### 4 table

100%    300px  300px

```
<!DOCTYPE html>
<html lang="en">

<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>
 html * {
 padding: 0;
 margin: 0;
 }

 .layout.table div {
 height: 100px;
 }

 /* 100% */
 .layout.table .left-center-right {
 width: 100%;
 display: table;
 height: 100px;
 }

 .layout.table .left-center-right div {
 display: table-cell; /* */
 }

 .layout.table .left {
 width: 300px;
 }
 </style>
</head>
<body>
 <div class="left">我是 left</div>
 <div class="center">我是 center
flex布局解决方案</div>
 <div class="right">我是 right</div>
</body>
</html>
```

```
 background: red;
 }

.layout.table .center {
 background: green;
}

.layout.table .right {
 width: 300px;
 background: blue;
}
</style>

</head>

<body>
 <section class="layout table">
 <article class="left-center-right">
 <div class="left">
 left
 </div>
 <div class="center">
 <h1> </h1>
 center
 </div>
 <div class="right">
 right
 </div>
 </article>
 </section>
</body>
</html>
```



## 5 grid

```
<!DOCTYPE html>
<html lang="en">

<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>
 html * {
 padding: 0;
 margin: 0;
 }

 /* 100% */
 .layout.grid .left-center-right {
 display: grid;
 width: 100%;
 grid-template-rows: 100px;
 grid-template-columns: 300px auto 300px; /* */
 }

 .layout.grid .left {
 background: red;
 }

 .layout.grid .center {
 background: green;
 }

 .layout.grid .right {
 background: blue;
 }
 </style>

</head>

<body>
 <section class="layout grid">
 <article class="left-center-right">
 <div class="left">
 left
 </div>
 <div class="center">
 <h1> </h1>
 center
 </div>
 <div class="right">
 right
 </div>
 </article>
 </section>
</body>
```

```
</article>
</section>

</body>

</html>
```



- 
- 

1

- 
- 

:2

- 
- 

3flex CSS3

- flex flex

4

- IE8 flex
- 



flex or

- CSS3

PS

flex

- section article div div
- 
- CSS
- 
- 

## CSS

CSS

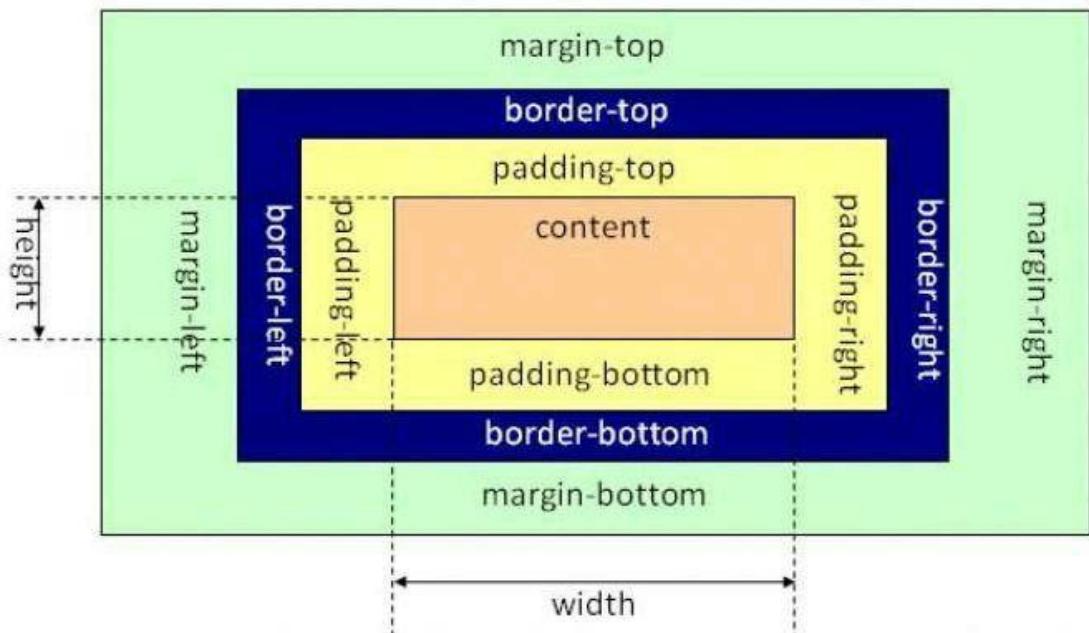
1. content padding margin
2. IE IE
3. CSS
4. JS
- 5.

6. BFC IFC

BFC

CSS JS CSS

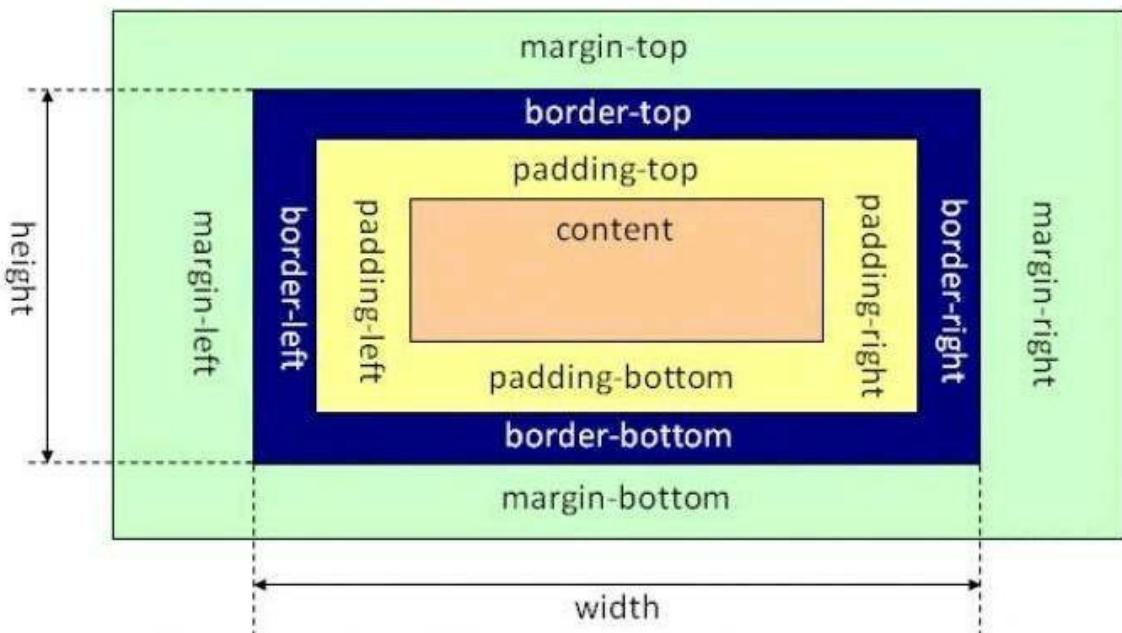
## ■ 标准盒子模型



从上图可以看到标准 W3C 盒子模型的范围包括 margin、border、padding、content，并且 content 部分不包含其他部分

IE

## ■ IE 盒子模型



从上图可以看到 IE 盒子模型的范围也包括 margin、border、padding、content，和标准 W3C 盒子模型不同的是：IE 盒子模型的 content 部分包含了 border 和 padding

## CSS ( Box Model)

- width height
- padding
- border
- margin

## CSSIE

- **width height**
- **IE width height +border+padding**

## CSS

```
/* */
box-sizing: content-box;

/* IE */
box-sizing: border-box;
```



## JS

```
DOM style
```

```
element.style.width/height;
```



```
window.getComputedStyle(element).width/height;
```

```
Chrome
```



```
element.currentStyle.width/height;
```

IEcss

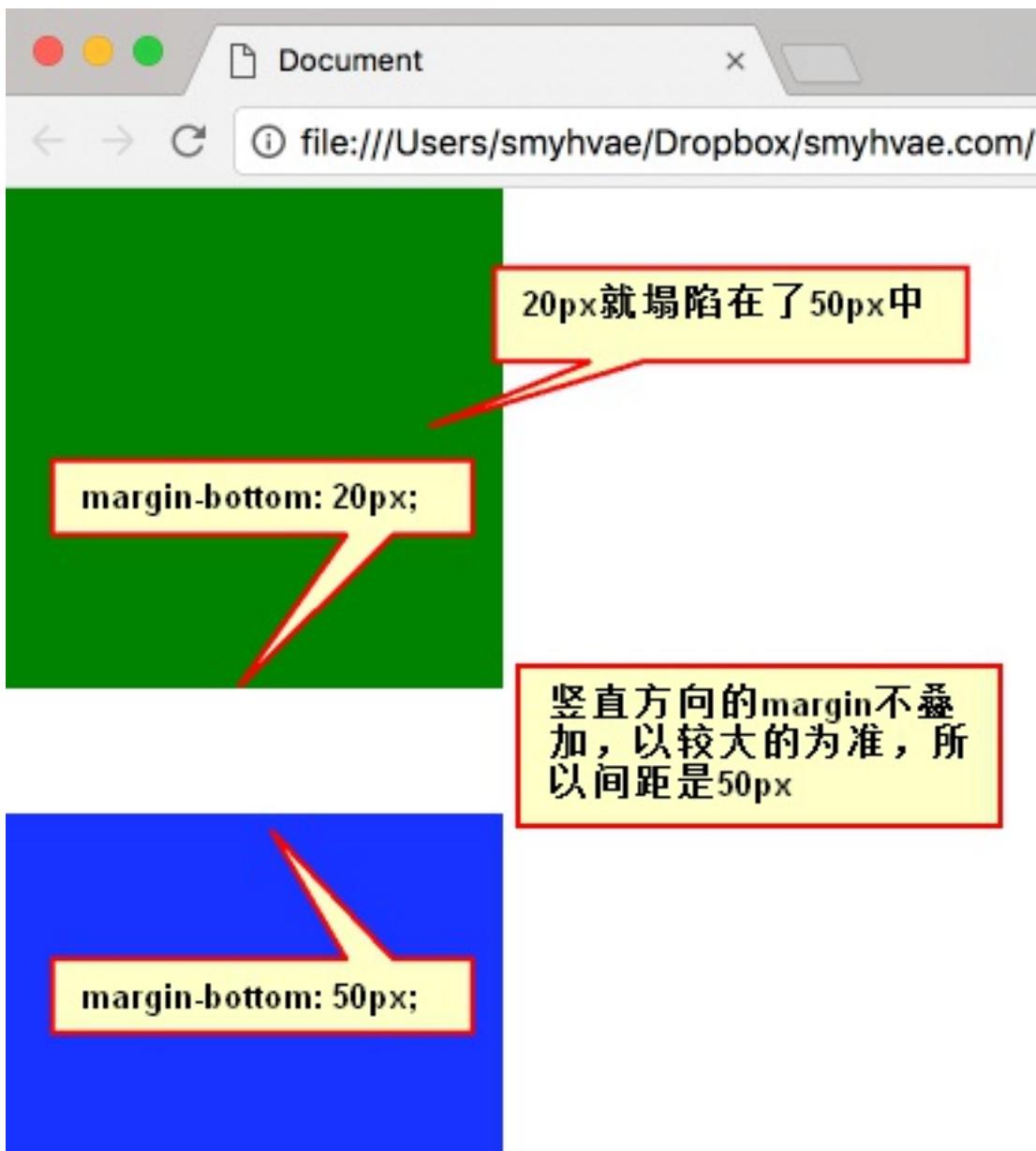
element.getBoundingClientRect().width/height;

api      viewport      api    lefttopwidthheight

## **margin/margin**

**marginmargin** ( margin)

PS      margin



```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>

 * {
 margin: 0;
 padding: 0;
 }

 .father {
 background: green;
 }

 /* margin-top10 */
 .son {
 height: 100px;
 margin-top: 10px;
 background: red;
 }

 </style>
</head>
<body>
<div class="father">
 <div class="son"></div>
</div>
</body>
</html>
```

height 100px magin-top 10px      height 100110 margin

WS Document

localhost:63342/interview/box.html?\_jtt=js3h6uq4d6uhr06brla0o3mnt

938px x 150px

Elements Console Sources Network Performance Memory Application Security Audits

Styles Computed Event Listeners DOM Breakpoints Properties Accessibility

margin 10  
border -  
padding- 938 x 100  
-  
-  
-  
-

Filter Show all

WS Document

localhost:63342/interview/box.html?\_jtt=js3h6uq4d6uhr06brla0o3mnt

938px x 150px

Elements Console Sources Network Performance Memory Application Security Audits

Styles Computed Event Listeners DOM Breakpoints Properties Accessibility

margin -  
border -  
padding- 938 x 100  
-  
-  
-

Filter Show all

overflow: hidden  
110pxBFC

## paddingmargin

margin

divp

```
<div>
 <p></p>
</div>
```

pmargin-top:50px;50px

```
test.html *
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style type="text/css">
 *{
 margin: 0px;
 padding: 0px;
 }
 div{
 width: 200px;
 height: 200px;
 background-color: orange;
 }
 p{
 width: 100px;
 height: 100px;
 background-color: green;
 margin-top: 50px;
 }
 </style>
</head>
<body>
 <div>
 <p></p>
 </div>
</body>
</html>
```



divborder

test.html

```

<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style type="text/css">
 *{
 margin: 0px;
 padding: 0px;
 }
 div{
 width: 200px;
 height: 200px;
 background-color: orange;
 border: 2px solid red;
 }
 p{
 width: 100px;
 height: 100px;
 background-color: green;
 margin-top: 50px;
 }
 </style>
</head>
<body>
 <div>
 <p></p>
 </div>
</body>
</html>

```

给父亲div加一个border属性，达到了我们的目的。

bordermargin“”“”

## margin margin

padding` margin

## BFC

BFCBlock Formatting Context

IFC BFC

## BFC /BFC

BFC BFC

1. BFC
2. BFC 1
3. **BFCfloat box** 2
4. BFC 3

## BFC



- 1 overflow: visible hidden auto
- 2 float: none BFC
- 3 position: static relative absolute fixed BFC
- 4 display: inline-block, table-cell, table-caption, flex, inline-flex

## BFC

### 1 margin

```
margin BFC
```

div

```
<div class="father">
 <p class="son">
 </p>
</div>
```

```
div margin BFC
```

```
<div class="father">
 <p class="son" style="overflow: hidden">
 </p>
</div>
```

```
BFC
```

### 2 BFC float

div

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>

 .father-layout {
 background: pink;
 }

 .father-layout .left {
 float: left;
 width: 100px;
 height: 100px;
 background: green;
 }

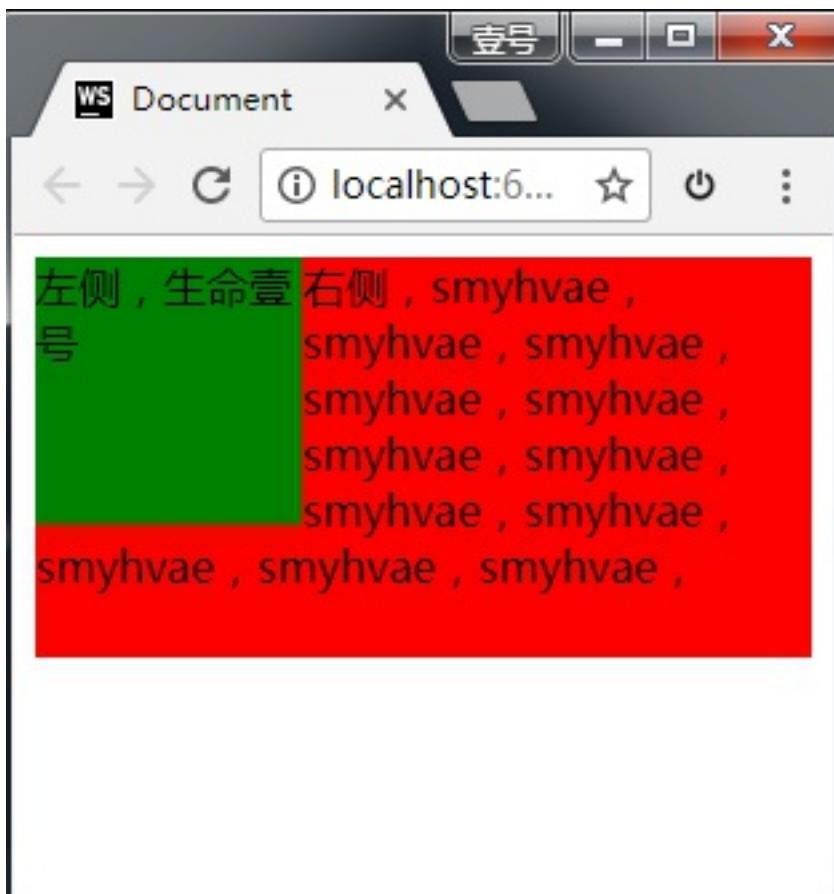
 .father-layout .right {
 height: 150px; /**
 background: red;
 }

 </style>
</head>
<body>

<section class="father-layout">
 <div class="left">

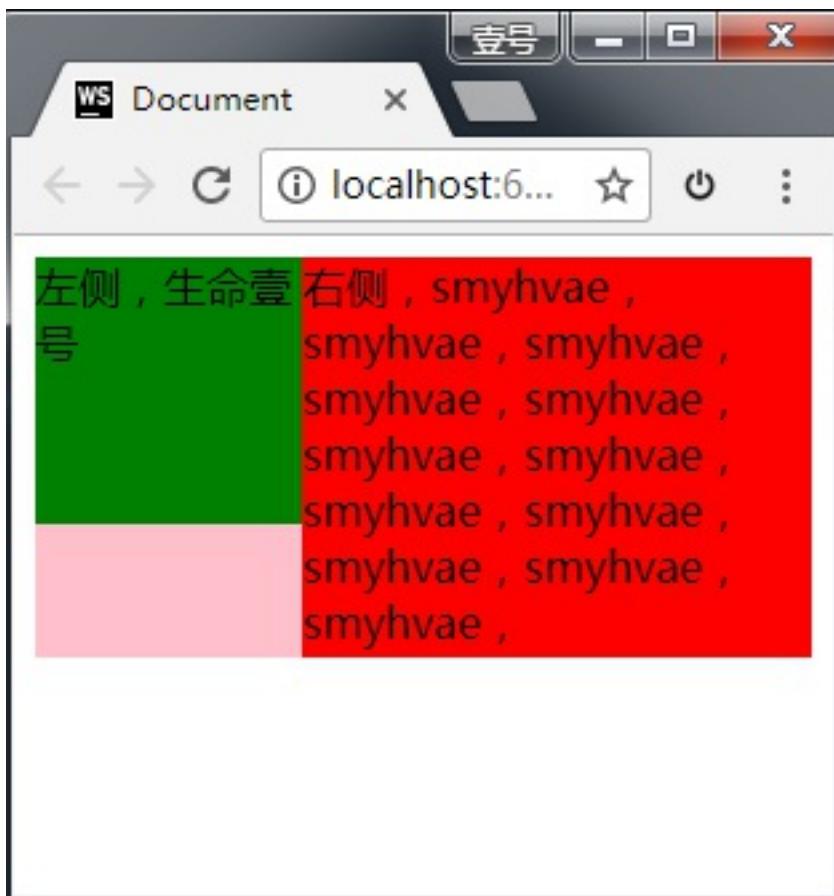
 </div>
 <div class="right">
 smyhvaeemyhvaeesmyhvaeesmyhvaeesmyhvaeesmyhvaeesmyhvae
 smyhvaeesmyhvaeesmyhvaeesmyhvae
 </div>
</section>

</body>
</html>
```



### BFC BFC float boxrightoverflow

```
<div class="right" style="overflow: hidden">
 smyhvae smyhvae smyhvae smyhvae smyhvae smyhvae smyhvae
 smyhvae smyhvae smyhvae smyhvae
</div>
```



## father-layout

3

```
<!DOCTYPE html>
<html lang="en">
<head>
 <meta charset="UTF-8">
 <title>Document</title>
 <style>

 .father {
 background: pink;
 }

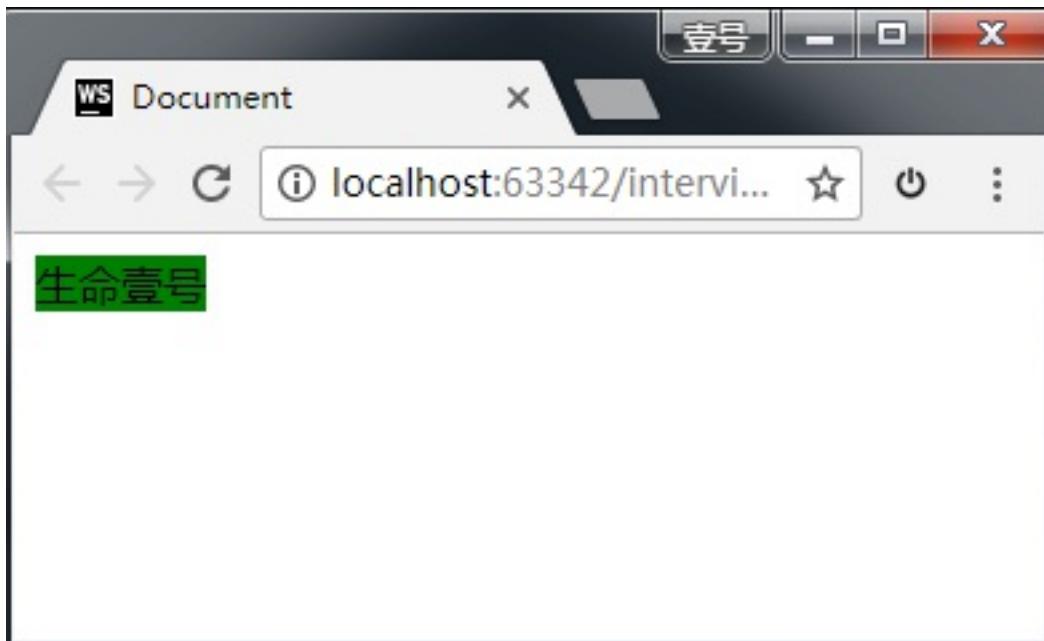
 .son {
 float: left;
 background: green;
 }

 </style>
</head>
<body>

<section class="father">
 <div class="son">

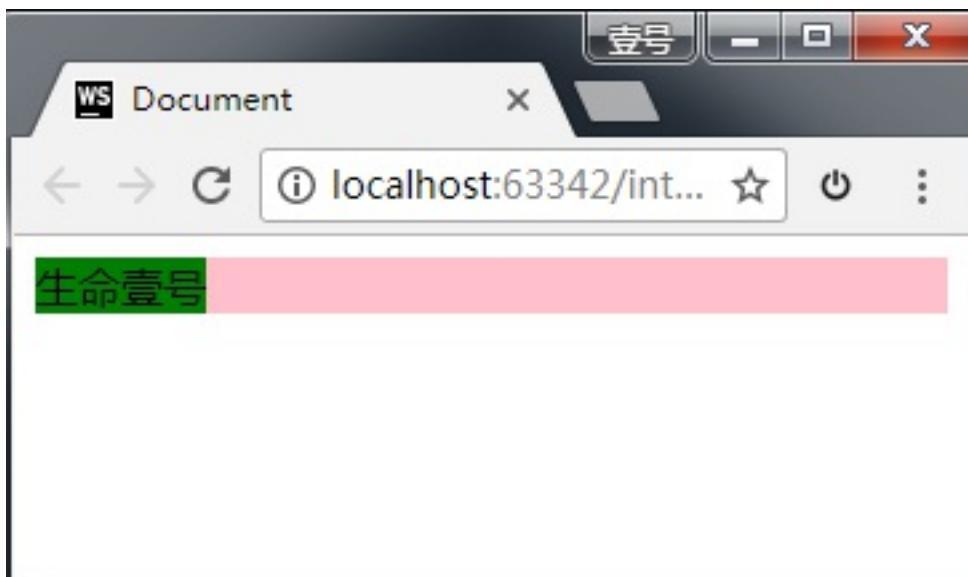
 </div>

</section>
</body>
</html>
```



BFC

overflow=hidden



BFC

BFC

BFCfloat box

## DOM

- DOM

DOM“

DOM2 ....”

- DOM DOM

“ DOM”

## DOM

- DOM

false

true

- EventEventapi

DOM

Event

**DOM**

DOM DOM

**DOM0**

```
element.onclick = function () {
}
```

js html onclick js

**DOM2**

```
element.addEventListener('click', function () {
}, false);
```

true falsefalse

**DOM3**

```
element.addEventListener('keyup', function () {
}, false);
```

DOM3

PS DOM1 DOM1

“DOM”

**DOM**

DOM

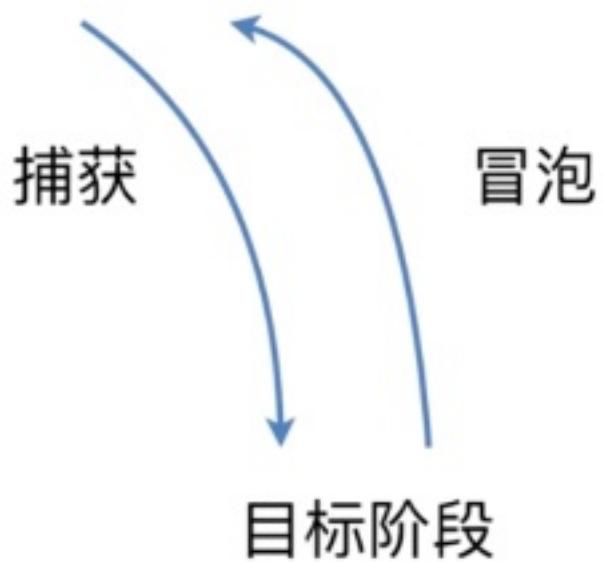
- 
- 

**DOM**

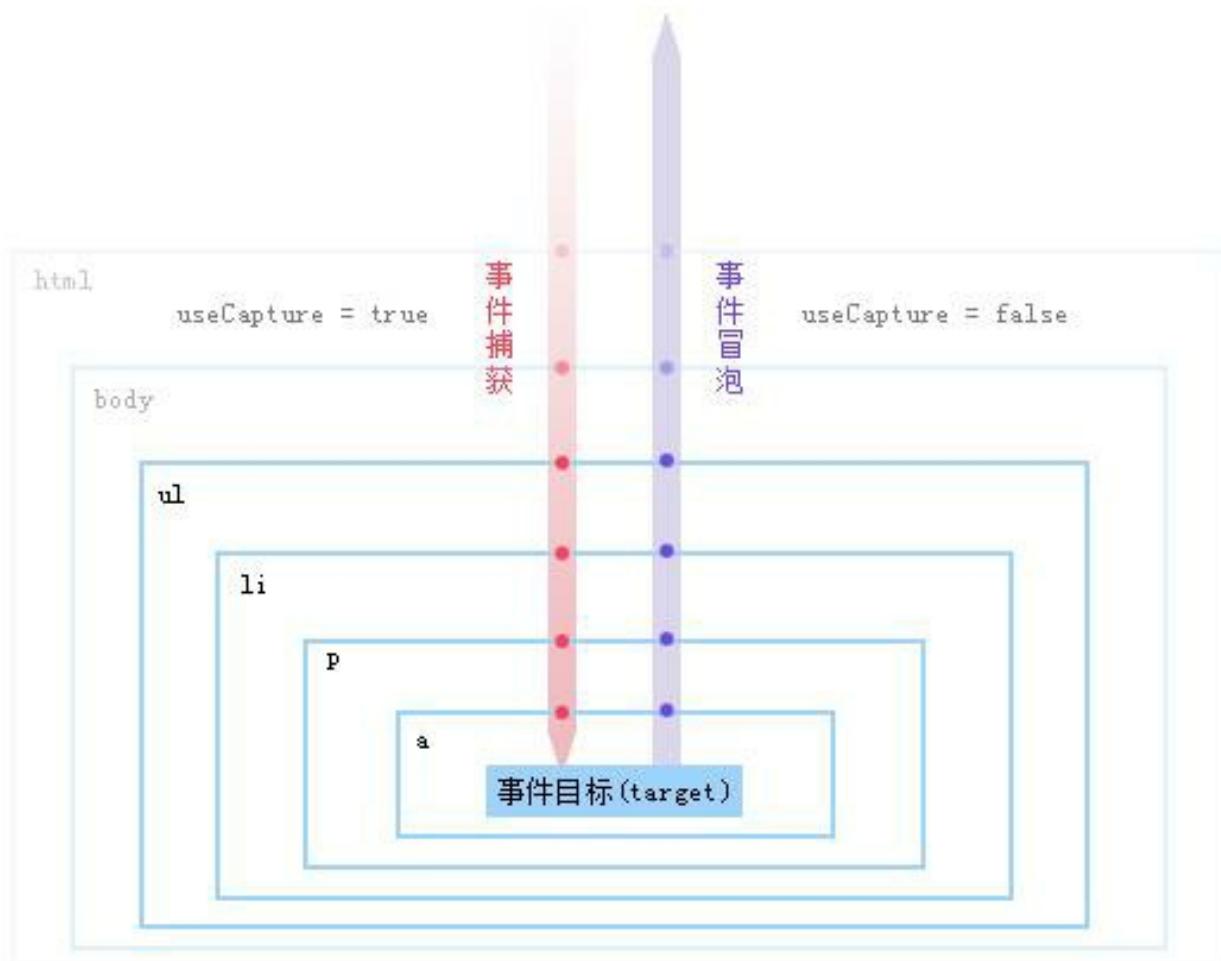
DOM

1. window
- 2.
3. Window

## 事件流

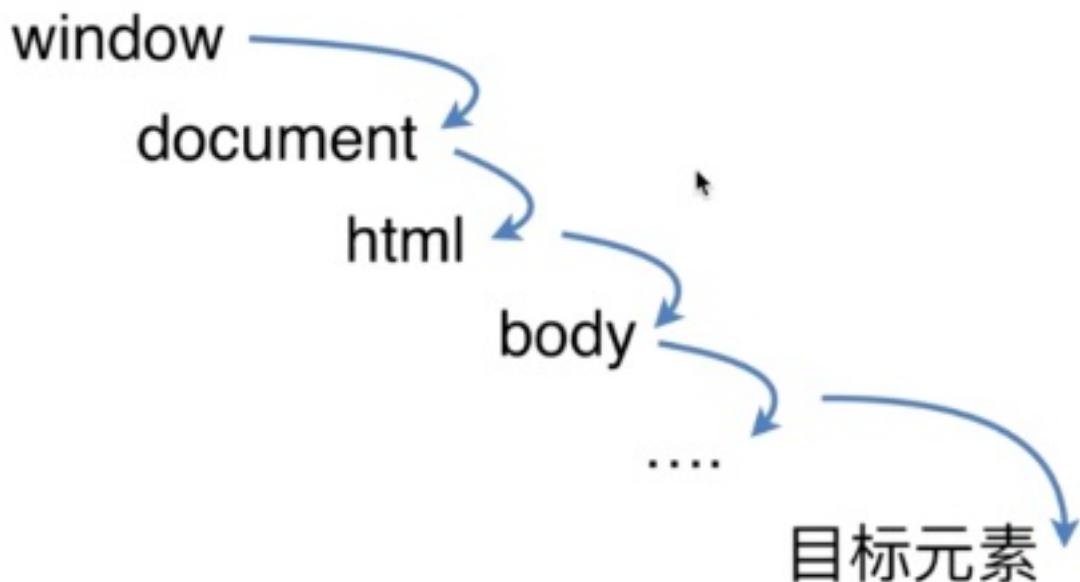


## JS事件捕获与事件冒泡原型图



DOM





window --> document --> html--> body -->

- PS1 **window** bodyhtml
- PS2 JSDOM windowdocument

```

window.addEventListener("click", function () {
 alert(" window");
}, true);

document.addEventListener("click", function () {
 alert(" document");
}, true);

document.documentElement.addEventListener("click", function () {
 alert(" html");
}, true);

document.body.addEventListener("click", function () {
 alert(" body");
}, true);

fatherBox.addEventListener("click", function () {
 alert(" father");
}, true);

childBox.addEventListener("click", function () {
 alert(" child");
}, true);

```

```
js
```

- body document.body
- html document.documentElement

```
Event
```

```
event.preventDefault();
```

- 
- <a>click <a>

```
AB A
```

```
w3c IE11
```

```
event.stopPropagation();
```

```
IE10
```

```
event.cancelBubble = true;
```

```
box3.onclick = function (event) {

 alert("child");

 //
 event = event || window.event;

 if (event && event.stopPropagation) {
 event.stopPropagation();
 } else {
 event.cancelBubble = true;
 }
}
```

box3      fathergrandfatherbody

```
event.stopImmediatePropagation();
```

A      addEventListenerABA      BA      B      stopImmediatePropagation

event

45

```
event.currentTarget //

event.target //
```

```
var myEvent = new Event('clickTest');
element.addEventListener('clickTest', function () {
 console.log('smyhvae');
});

//
element.dispatchEvent(myEvent); // myEvent clickTest
```

```
var myEvent = new Event('clickTest');

element.addEventListener('clickTest', function () {
 console.log('smyhvae');
});

setTimeout(function () {
 element.dispatchEvent(myEvent); // myEvent clickTest
}, 1000);
```

## HTTP

HTTP

1.

- HTTP
- HTTP
- HTTP
- get post
- HTTP
- 
- 
- 
- CSRF
- TSL

2. HTTP

- 
- 
- 
-

2.1

url	httpurl
-----	---------

2.2

httphttp
----------

2.3

2.4

session http
--------------

### 3 HTTP



- http
- 
- 

3.1



图 15-4 HTTP 请求报文

- urlhttp
- 
- 
- 

### 3.2



- http
- 
- 
- 

## 4 HTTP

- GET
- POST
- put
- DELETE
- HEAD

HTTP

- get post`
- put delete
- head

## 5 get post

### POST和GET的区别

- GET在浏览器回退时是无害的，而POST会再次提交请求
- GET产生的URL地址可以被收藏，而POST不可以
- GET请求会被浏览器主动缓存，而POST不会，除非手动设置
- GET请求只能进行url编码，而POST支持多种编码方式
- GET请求参数会被完整保留在浏览器历史记录里，而POST中的参数不会被保留
- GET请求在URL中传送的参数是有长度限制的，而POST没有限制
- 对参数的数据类型，GET只接受ASCII字符，而POST没有限制
- GET比POST更不安全，因为参数直接暴露在URL上，所以不能用来传递敏感信息
- GET参数通过URL传递，POST放在Request body中
- 
- **getpost**

1. get post
2. getpost
3. get post CSRF getpost
4. geturl 2kb`post
5. geturl post

## 6 http

http

1xx: 指示信息 – 表示请求已接收，继续处理

2xx: 成功 – 表示请求已被成功接收

3xx: 重定向 – 要完成请求必须进行更进一步的操作

4xx: 客户端错误 – 请求有语法错误或请求无法实现

5xx: 服务器错误 – 服务器未能实现合法的请求

http

200 OK: 客户端请求成功

206 Partial Content: 客户发送了一个带有Range头的GET请求，服务器完成了它

301 Moved Permanently: 所请求的页面已经转移至新的url

302 Found: 所请求的页面已经临时转移至新的url

304 Not Modified: 客户端有缓冲的文档并发出一个条件性的请求，服务器告诉客户，原来缓冲的文档还可以继续使用

- 206 range 206
- 301
- 302
- 304

400 Bad Request: 客户端请求有语法错误，不能被服务器所理解

401 Unauthorized: 请求未经授权，这个状态代码必须和WWW-Authenticate报头域一起使用

403 Forbidden: 对被请求页面的访问被禁止

404 Not Found: 请求资源不存在

500 Internal Server Error: 服务器发生不可预期的错误原来缓冲的文档还可以继续使用

503 Server Unavailable: 请求未完成，服务器临时过载或当机，一段时间后可能恢复正常

- 400 401, 403 404

- http1.0 1
- HTTP1.1 Connection:keep-alive

HTTP 1.1 TCP HTTP **header** Keep-Alive Apache

## 8



### 8.1



1 --> 1 --> 2 --> 2 --> 3 --> 3



### 8.2



## 9 TSL

Transport Layer Security (TLS) TLS

TLS

- Client hello
- Server hello
- Server hello done
- 
- Pre-Master Pre-Master
- Pre-Master Pre-Master
- Change cipher spec Client finished
- Change cipher spec Server finished
- 

## HTML

- HTMLh1-h6
- csshtmlclass
- - 
  - 
  - 
  -

## **HTML**

- 
- html;
- CSS;
- HTMLSEO;
- 

## **Doctype?**

- <!DOCTYPE>HTML      <html>      DOCTYPE
- JS,

## **HTML5 <!DOCTYPE HTML>**

- HTML5 SGMLDTDdoctype
- HTML4.01SGML,DTD

## **(void)**

- a b span img input select strong
- div ul ol li dl dt dd h1 h2 h3 h4...p
- : <br> <hr> <img> <input> <link> <meta>

## **link@import**

- linkXHTML CSS RSS,rel @importCSS CSS
- link @importCSS
- importCSS2.1 IE5 linkXHTML

- ( layout engineerRendering Engine)JS
- HTMLXMLCSS
- JSjavascript
- JSJS

- Trident IE,MaxThon,TT,The World,360,[MSHTML]
- Gecko Netscape6 FF,MozillaSuite/SeaMonkey
- Presto Opera7 [OperaPresto Blink;]
- Webkit Safari,Chrome [ ChromeBlinkWebKit]

## html5HTML5 HTML HTML5

- HTML5 SGML
  - canvas
  - video audio
  - localStorage
  - sessionStorage
  - article footer header nav section
  - calendar date time email url search
  - web worker, websocket, Geolocation
- 
- base font big center font, s strikettu
- frame frameset no frames
- HTML5
  - IE8/IE7/IE6 document.createElement
  - HTML5
  -
- html5shim

```
<!--[if lt IE 9]>
<script> src="http://html5shim.googlecode.com
/svn/trunk/html5.js"</script><![endif]-->
```

- HTML5 DOCTYPE\\

## HTML5

- 
- HTML5.appcache() cookie
- - manifest
  - cache.manifest
  - window.applicationCache

### CACHE MANIFEST

```
#v0.11
CACHE:
js/app.js
css/style.css
NETWORK:
resource/logo.png
FALLBACK:
/ /offline.html
```

## HTML5

- htmlmanifestmanifestappmanifestappmanifestmanifest

- 

## **cookiessessionStorage localStorage**

- cookieClient Side
- cookiehttp
- sessionStoragelocalStorage
- - cookie4k
  - sessionStoragelocalStoragecookie5M
- - localStorage
  - sessionStorage
  - cookie cookie

## **iframe**

- iframeOnload
- SEO
- iframe
- iframe iframejavascriptiframesrc

## **Label**

- label,

## **HTML5form**

- form input autocomplete=off

## **? ()**

- WebSocketSharedWorker
- localstorgecookies

## **webSocket()**

- Adobe Flash Socket
- ActiveX HTMLFile (IE)
- multipart XHR
- XHR

## **Page Visibility API**

- visibilityState ;
- 

- map+areasvg

- border-radius
- js

## **border 1px**

```
<div style="height:1px;overflow:hidden;background:red"></div>
```

- 
- 

## **titleh1bstrongiem**

- titleH1
- strong <strong> <B>
- iem

## **link @import**

- link HTMLCSS RSS@import CSS
- link @import CSS
- @import IE5 link HTML

- (layout engineer Rendering Engine) JS
- 
- JSJS
- JSJS

- Blink Chrome Opera
- WebkitSafariChrome
- GeckoFireFoxNetscape6
- TridentMSHTMLIE
- PrestoOpera7

## **HTML5**

- document.querySelectordocument.querySelectorAll
- (Drag and drop) API
- video audio
- localStorage sessionStorage
- manifest
- Notifications
- articlefooterheadernavsection
- calendardatetimeemailurlsearch
- Geolocation
- webworker
- websocket
- history
- (CORS) Access-Control-Allow-Origin
- visibilitychange

- PostMessage
- Form Data
- canvas

## **HTML5**

- basefontbigcenterfontsstriketu
- frameframesetnoframes

## **HTML5**

- document.createElement
- html5shim.js

## **HTML HTML5**

- DOCTYPE

## **HTML5**

- HTML5
  -
- HTML5
  - html manifest manifest="/offline.appcache"
  - manifest manifest xxx.appcache
  - web MIME-type text/cache-manifest

## **HTML5**

- html manifest manifest
- app manifest
- app manifest manifest
- 

## **iframe**

- - 
  - 
  - 
  -
- - iframe onload
  - 
  -

## **label**

- label
  - labellabel
- 1

- <label for="mobile">Number:</label>
- <input type="text" id="mobile"/>
- 2
  - <label>Date:<input type="text"/></label>
- iframe + contentWindow
- postMessage
- SharedWorker(Web Worker API)
- storage (localStorage API)
- WebSocket

## **webSocket**

- Adobe Flash Socket
- ActiveX HTMLFile (IE)
- multipart XHR
- XHR

## **Page Visibility API**

- 
- 
- 

## **title h1 b strong i em**

- title h1
- strong        <strong> <B>
- iem

- i em
- b, i, u, s, pre
- strong, em, ins, del, code
- ,

## **CSS**

### **display: none; visibility: hidden;**

- 
- - display:none; visibility: hidden;
  - display: none; visibility:hidden; hiddenvisibility: visible;
  - display visibility
  - display: none; visibility: hidden

### **css hackhack**

- CSS
- hack
  - hack
  - hack
  - IE

### **link @import**

- link HTML @import CSS
- link @import FOUC
- link rel="alternate stylesheet"
- link @import @import
- @import css
- link@import

### **CSS**

- - font
    - word-break
    - letter-spacing
    - text-align
    - text-rendering
    - word-spacing
    - white-space
    - text-indent
    - text-transform
    - text-shadow
  - line-height
  - color
  - visibility
  - cursor

### **display, float, position**

- display none position float
- position absolute fixed float none display
- float none display
- display
- display display

Specified value	Computed value
inline-table	table
inline, table-row-group, table-column, table-column-group, table-header-group, table-footer-group, table-row, table-cell, table-caption, inline-block	block
others	same as specified

### (collapsing margins)

- margin margin
  - margin
  - inline-blockmarginmargin
  - margin
  - margin-bottommargin-top

### CSSIE

- IE W3C
- (content)(padding)(margin) (border)
- !Econtent border padding;

### CSS

- id # myid
- .myclassname
- div, h1, p
- h1 + p
- ul > li
- li a
- \*
- a[rel = "external"]
- a:hover, li:nth-child
- font-size font-family color, UL LI DL DD DT
- border padding margin width height

### CSS

- 
- 
- : !important > id > class > tag important

### CSS3

```
p:first-of-type < p> < p>
p:last-of-type < p> < p>
p:only-of-type < p> < p>
p:only-child < p>
p:nth-child(2) < p>

:after
:before
:enabled
:disabled
:checked
```

## divdiv

- div margin:0 auto

```
div{
 width:200px;
 margin:0 auto;
}
```

- 

```
// 500 300
//

.div {
 width:500px ; height:300px;//
 margin: -150px 0 0 -250px;
 position:relative; //
 background-color:pink; //
 left:50%;
 top:50%;
}
```

- div

```
position: absolute;
width: 1200px;
background: none;
margin: 0 auto;
top: 0;
left: 0;
bottom: 0;
right: 0;
```

## display

- block
- none
- inline-block
- list-item
- table
- inherit display

## **positionrelativeabsolute**

- absolute
  - static
- fixed IE
  -
- relative
  -
- static
  - top, bottom, left, right - z-index
- inherit
  - position

## **CSS3**

- CSS : not(.input) class “input”
- border-radius:8px
- multi-column layout
- Shadow\Reflect
- text-shadow
- Text-decoration
- gradient
- transform
- ....
- transform:\scale(0.85,0.90)\ translate(0px,-30px)\ skew(-9deg,0deg)\Animation:

## **CSS**

```
// transparent
#demo {
 width: 0;
 height: 0;
 border-width: 20px;
 border-style: solid;
 border-color: transparent transparent red transparent;
}
```

?

- - div100%
  - div50%
  - floatinline

## **hack**

- png24iE6PNG8.
- marginpadding\*{margin:0;padding:0;}
- IE,,getAttribute();
- Firefox,getAttribute()
  - :getAttribute()
- IE,evenx,y,pageX,pageY
- Firefox,eventpageX,pageY,x,y

## **lili**

- \,0

## **CSS**

- CSS

## **BFC(block formatting context)**

- Box , display , Box
- Box, Formatting Context,Box,BFC

## **css**

```
// 1class10id100///

/*1*/
div{
}
/*10*/
.class1{
}
/*100*/
#id1{
}
/*100+1=101*/
#id1 div{
}
/*10+1=11*/
.class1 div{
}
/*10+10+1=21*/
.class1 .class2 div{
}

//
```

## **display:inline-block ()**

- marginfont-size:0letter-spacingword-spacing

- 

## **CSSIE**

- (content)(padding) (border)(margin)
- IE8 DOCTYPE(IE)
- (W3C) = width + padding + border + margin
- (IE) = width + margin
- css3 box-sizing: border-box ""

## **box-sizing**

- box-sizing: content-box; // (W3C)
- box-sizing: border-box; // (IE)
- box-sizing: inherit; // box-sizing

## **CSS**

- id #id
- .class
- div, h1, p
- h1 + p
- ul > li
- li a
- \*
- a[rel='external']
- a:hover, li:nth-child

## **CSS**

- font-sizefont-familycolorlist-stylecursor
- widthheightborderpaddingmarginbackground

## **CSS**

- > >
- 
- : [1000] > id[100] > class[10] > Tag[1]
- !important

## **CSS3**

- :root html
- :empty
- :target
- :not(selector) selector
- :enabled
- :disabled
- :checked

- :after
- :before
- :nth-child(n) n
- :nth-last-child(n) n
- :nth-child(odd)
- :nth-child(even)
- :nth-child(3n+1)
- :first-child
- :last-child
- :only-child
- :nth-of-type(n) n
- :nth-last-of-type(n) n
- :nth-of-type(odd)
- :nth-of-type(even)
- :nth-of-type(3n+1)
- :first-of-type
- :last-of-type
- :only-of-type
- ::selection
- :first-line
- :first-letter
  
- visibility: hidden;
- opacity: 0; CSS30
- position: absolute; left
- display: none;
- transform: scale(0);
- <div hidden="hidden"> HTML5,display:none;
- height: 0; 0
- filter: blur(0); CSS30“”

## **rgba() opacity**

- opacity
- rgba()

## **css content**

- content before/after

## CSS3

- p:nth-child(n){color: rgba(255, 0, 0, 0.75)}
- display: flex;
- column-count: 5;
- @media (max-width: 480px) { .box: {column-count: 1;}}
- @font-face{font-family: BorderWeb; src:url(BORDERW0.eot);}
- color: rgba(255, 0, 0, 0.75);
- border-radius: 5px;
- background: linear-gradient(red, green, blue);
- box-shadow: 3px 3px 3px rgba(0, 64, 128, 0.3);
- box-reflect: below 2px;
- text-stroke-color: red;
- text-overflow: ellipsis;
- background-size: 100px 100px;
- border-image: url(bt\_blue.png) 0 10;
- - transform: rotate(20deg);
  - transform: skew(150deg, -10deg);
  - transform: translate(20px, 20px);
  - transform: scale(.5);
- transition: all .3s ease-in .1s;
- @keyframes anim-1 {50% {border-radius: 50%;}} animation: anim-1 1s;

## CSS3 Flexbox

- Flexbox

## JS

- getComputedStyle(el, null) VS el.currentStyle
- e VS window.event
- e.pageX, e.pageY VS window.event.x, window.event.y
- e.which VS event.keyCode
- el.textContent VS el.innerText

## lli

- li(/)
- ul font-size=0, li
- margin-collapse
- - 
  -
-

◦

- Y
- ie6-7
- css3 flexbox .container{display: flex; align-items: stretch;}

## css

- , line-height height

```
.vertical {
 height: 100px;
 line-height: 100px;
}
```

•

```
.container {
 position: relative;
}
.vertical {
 height: 300px; /* */
 position: absolute;
 top: 50%; /* 50% */
 margin-top: -150px; /* */
}
```

- 
- IE67 overflowhidden

```
.container {
 display: table;
}
.content {
 display: table-cell;
 vertical-align: middle;
}
```

- inline-block vertical-align

◦ IE67

```
.container {
 height: 100%;/**/
}
.extra .vertical{
 display: inline-block; /**/
 vertical-align: middle; /**/
}
.extra {
 height: 100%; /*100%*/
}
```

- CSS3

```
.vertical {
 position: absolute;
 top:50%; /*50%*/
 transform:translateY(-50%, -50%);
}
```

- CSS3

```
.container {
 display:flex;
 justify-content: center; /**/
 align-items: center; /**/
}
```

- 

- 
-

```
.container {
 padding-left: 150px;
 padding-right: 190px;
}
.main {
 float: left;
 width: 100%;
}
.left {
 float: left;
 width: 190px;
 margin-left: -100%;
 position: relative;
 left: -150px;
}
.right {
 float: left;
 width: 190px;
 margin-left: -190px;
 position: relative;
 right: -190px;
}
```

•  
•

```

.container {
 /*padding-left:150px;*/
 /*padding-right:190px;*/
}
.main-wrap {
 width: 100%;
 float: left;
}
.main {
 margin-left: 150px;
 margin-right: 190px;
}
.left {
 float: left;
 width: 150px;
 margin-left: -100%;
 /*position: relative;*/
 /*left:-150px;*/
}
.right {
 float: left;
 width: 190px;
 margin-left: -190px;
 /*position: relative;*/
 /*right:-190px;*/
}

```

## CSS pxem

- px
- em em = / font-size

## CSS

- 
- CSS
- reset.css Normalize.css CSS
  
  
  
  
  
- IE
- - ""
  -
  
  
  
  
  
- 
- 
  
  
  
  
  
- <div style="clear:both"></div>

- br clear <br clear="all" />
- overflowhidden; IE6 hasLayoutzoom1;
- 
- :after IE6-7 :after zoom:1 hasLayout

## after

```
.clearfix:after{
 content: "\200B";
 display: table;
 height: 0;
 clear: both;
}
.clearfix{
 *zoom: 1;
}
```

## FOUC(Flash of Unstyled Content) FOUC

- @import CSS IE
- ""FOUC
- html
- 
- link head

## CSS

- CSS CSS
- Web CSS
- CSS CSS
- CSS SassSCSS LESS

## CSS

- cssHTTP
- CSS
- CSS
- CSS
- 
- CSS
- 
- 0
- 10
- CSS

## CSS

- CSS

- ""

- web
-

- 12 14

## **marginpadding**

- border margin
- border padding

- CSS2CSS CSS

- CSSCSS
- CSSCSS

- 

## **CSS**

- 
- CSSoverflow:hidden; transform:translate(100%, 100%); display:none;

## **IE**

- 
- CSS3
- IEJSresize

```
$(window).resize(function () {
 screenRespond();
});
screenRespond();
function screenRespond(){
var screenWidth = $(window).width();
if(screenWidth <= 1800){
 $("body").attr("class", "w1800");
}
if(screenWidth <= 1400){
 $("body").attr("class", "w1400");
}
if(screenWidth > 1800){
 $("body").attr("class", "");
}
}
```

- 
- 
- - “” “”
  - “” “”

- mousewheel “”

## a

link > visited > hover > active

- L-V-H-A love hate

- --
- “”

```
p::before {content:"" ;}
p::after {content:"Hot!" ;}
p::first-line {background:red;}
p::first-letter {font-size:30px;}
```

- --

```
a:hover {color: #FF00FF}
p:first-child {color: red}
```

## ::before :after

- CSS : :hover, :active
- CSS1 : :before :after
- CSS3 :: ::before ::after
- IE :after
- ::before CSS3 :after CSS1 IE

## Chrome

- Chromeinput input:-webkit-autofill
- 1formautocomplete="off"
- 2input:-webkit-autofill { background-color: transparent; }

## input [type=search]

```
input[type="search"]::-webkit-search-cancel-button{
-webkit-appearance: none;
height: 15px;
width: 15px;
border-radius: 8px;
background:url("images/searchicon.png") no-repeat 0 0;
background-size: 15px 15px;
}
```

<a href="logo.jpg" download></a>  
<a href="logo.jpg" download="LOGO" ></a>

## iOS safari “”

```
$(document).ready(function(){
 var stopScrolling = function(event) {
 event.preventDefault();
 }
 document.addEventListener('touchstart', stopScrolling, false);
 document.addEventListener('touchmove', stopScrolling, false);
});
```

## line-height

- line-height
- height line-height
- line-height
- line-height height
- line-height height height haslayout line-height

## line-height

- px em font-size
- $1.5 \text{ em} * 18 = 27\text{px}$
- 

## display

- display block

## Chrome12px

```
.shrink{
 -webkit-transform:scale(0.8);
 -o-transform:scale(1);
 display:inline-block;
}
```

## CSSIOS

```
-webkit-font-smoothing: antialiased;
```

## font-style oblique

- font-style: oblique; italic
- $16.7\text{ms} / 60\text{Hz} = 1\text{s} / 60 * 1000 = 16.7\text{ms}$

## display:inline-block

- inline-block
- inline-block inline-block
- vertical-align:top;
- font-size0;
- li

## overflow: scroll

- jquery animate

## **divdiv100px**

- 1  
.sub { height: calc(100%-100px); }
- 2  
.container { position: relative; }  
.sub { position: absolute; top: 100px; bottom: 0; }
- 3  
.container { display: flex; flex-direction: column; }  
.sub { flex: 1; }

# **JavaScript**

## **JavaScript**

- JavaScript
  - ECMAScript
  - JavaScript
  - DOM
  - HTML
  - XML
  - BOM

## **JS**

- undefined
- null
- boolean
- number
- string
- symbol
- object
- array
- function
- navigator.userAgent // UA.toLowerCase().indexOf('chrome')
- window // 'ActiveXObject' in window

## **JS**

- Object
- Array
- Boolean
- Number
- String
- Function
- Arguments
- Math
- Date
- RegExp
- Error
- ES6Symbol
- Map
- Set
- Promises
- Proxy
- Reflect

## **JavaScript**

- ""
- {}
- ;
- ,
- .
- JSON
- {}[]

## **JavaScript**

- "use strict";
- js
- js
- js

- 
- 
- window window
- 
- DOM
- eval() Function()
- setTimeout() setInterval()
- 
- (repaint)(reflow)

## **DOM**

- 
- HTML DOM(DOM) css/image/js
- CSS CSSOM(CSS)
- CSSOM DOM Render Tree()
- (Layout)
- (Painting)
- DOM
  - DOMHTMLhead
  - headcss
- 
- /
- JSLayoutoffsetLeftscrollTopgetComputedStyle
- 

## **(repaint)(reflow)**

- (display:"none")
- DOMDocumentFragmentdocument
- Layoutvar left = elem.offsetLeft; left
- tabletabletable
- css(expression)
- css border border-width, border-style, border-color
- elem.className elem.style.cssText elem.style.xxx

## **script**

- HTML DOM js DOM script script
- HTML script HTML
- script DomContentLoaded

## **JavaScript**

- JavaScript
  - JavaCforif{}
  - JavaScript function(){}
- JavaScript

- JavaScript
- 
- 
- 

## JavaScript

- - JavaScript [\_\_proto\_\_]
  - JavaScript [\_\_proto\_\_] prototype
  - prototype [\_\_proto\_\_]
- - / [\_\_proto\_\_] prototype
  - prototype [\_\_proto\_\_] prototype / undefined ""
- - JavaScript

## JavaScript

- UndefinedNullBooleanNumberString--
- --
- 
- (stack)
- (heap)
- 
- 

## JavaScript

- this + prototype -- new
  - this prototype

```
function Mobile(name, price){
 this.name = name;
 this.price = price;
}
Mobile.prototype.sell = function(){
 alert(this.name + " {{content}}quot; + this.price);
}
var iPhone7 = new Mobile("iPhone7", 1000);
iPhone7.sell();
```

- Object.create -- Object.create()
-

```

var Person = {
 firstname: "Mark",
 lastname: "Yun",
 age: 25,
 introduce: function(){
 alert('I am ' + Person.firstname + ' ' + Person.lastname);
 }
};

var person = Object.create(Person);
person.introduce();

// Object.create IE9+
if (!Object.create) {
 Object.create = function (o) {
 function F() {}
 F.prototype = o;
 return new F();
 };
}

```

- this prototype -- createNew()

- ""

```

var Cat = {
 age: 3, // -- createNew()
 createNew: function () {
 var cat = {};
 // var cat = Animal.createNew(); // Animal
 cat.name = "";
 var sound = ""; // -- createNew()
 cat.makeSound = function () {
 alert(sound); //
 };
 cat.changeAge = function(num){
 Cat.age = num; //
 };
 return cat; //
 }
};

var cat = Cat.createNew();
cat.makeSound();

```

- ES6 class -- new

```

class Point {
 constructor(x, y) {
 this.x = x;
 this.y = y;
 }
 toString() {
 return '(' + this.x + ', ' + this.y + ')';
 }
}

var point = new Point(2, 3);

```

## Javascript

- call apply

```

function Cat(name,color){
 Animal.apply(this, arguments);
 this.name = name;
 this.color = color;
}

```

- prototype

```

Cat.prototype = new Animal();
Cat.prototype.constructor = Cat;

```

- 

```

function extend(Child, Parent) {
 var p = Parent.prototype;
 var c = Child.prototype;
 for (var i in p) {
 c[i] = p[i];
 }
 c.uber = p;
}

```

- prototype prototype

```

function extend(Child, Parent) {
 var F = function(){};
 F.prototype = Parent.prototype;
 Child.prototype = new F();
 Child.prototype.constructor = Child;
 Child.uber = Parent.prototype;
}

```

- ES6 extends

```
class ColorPoint extends Point {}
```

```

class ColorPoint extends Point {
 constructor(x, y, color) {
 super(x, y); // constructor(x, y)
 this.color = color;
 }
 toString() {
 return this.color + ' ' + super.toString(); // toString()
 }
}

```

## Javascript?

- 
- 

### this

- this
- new this new
- this
- IE attachEvent thisWindow

### eval

### evalJS

- evaljs
- JSONJSON eval('('+ str +')');

## Window ? Document ?

- Window JavaScript
- Window
- Window
- Document HTML ,
- Document HTML
- Document Window window.document

## DOM

- DOMDocument Object ModelHTMLXML
- DOM0WebAPIdocument.forms['login']
- DOM1W3CDOMJavaScriptDocument
- DOM2DOMCSSgetComputedStyle(elem, pseudo)
- DOM3XPathLoad and SaveXPathEvaluator

## DOM0DOM2DOM3

- DOM0
  - btn.onclick = func;
  - btn.onclick = null;
- DOM2
  - btn.addEventListener('click', func, false);

- btn.removeEventListener('click', func, false);
- btn.attachEvent("onclick", func);
- btn.detachEvent("onclick", func);

- DOM3

- eventUtil.addEventListener(input, "textInput", func);
- eventUtil   textInput DOM3

- 

*"nun"*

- W3C
- DOM2-addEventListener

- 1
- 2""

- 

- W3C->->
- 
- ->1->2->->->
- ""

## DOM

- DOM
- DOM/
- DOM

/

- 

- 

- 

- 

- 

- 

```
ulEl.addEventListener('click', function(e){
 var target = event.target || event.srcElement;
 if(!target && target.nodeName.toUpperCase() === "LI"){
 console.log(target.innerHTML);
 }
}, false);
```

## IE

- IE

## IEW3C

- - W3C: targetEl.addEventListener('click', handler, false);
  - IE: targetEl.attachEvent('onclick', handler);
- - W3C: targetEl.removeEventListener('click', handler, false);
  - IE: targetEl.detachEvent(event, handler);
- - W3C: var e = arguments.callee.caller.arguments[0]
  - IE: window.event
- - W3C: e.target
  - IE: window.event.srcElement
- - W3C: e.preventDefault()
  - IE: window.event.returnValue = false
- - W3C: e.stopPropagation()
  - IE: window.event.cancelBubble = true

## W3C target currentTarget

- target
- currentTarget
- 
- currentTarget ()

## (dispatchEvent)

- W3C: dispatchEvent
- IE: fireEvent

```
var fireEvent = function(element, event){
 if (document.createEventObject){
 var mockEvent = document.createEventObject();
 return element.fireEvent('on' + event, mockEvent)
 }else{
 var mockEvent = document.createEvent('HTMLEvents');
 mockEvent.initEvent(event, true, true);
 return !element.dispatchEvent(mockEvent);
 }
}
```

- (throttle)
- onresize, onscroll
- - setTimout
  - clearTimeout
  - setTimeout
- 

```
function throttle(method, context) {
 clearTimeout(methor.tId);
 method.tId = setTimeout(function(){
 method.call(context);
 } 100); // 100ms
}
//
window.onresize = function(){
 throttle(myFunc, window);
}
```

\*\*\*\*\*

- (clientX)(clientY)
- (pageX)(pageY)
- (screenX)(screenY)

## DOM

- elem.offsetLeft
- elem.offsetTop
- elem.getBoundingClientRect()DOMRect

**['1', '2', '3'].map(parseInt)**

- :[1, NaN, NaN]
- parseInt(string, radix) 2 radix radix = 0
- map parseInt 3(elem, index, array) index
- map ["1", "2", "3"] parseInt

```
parseInt('1', 0); // 1
parseInt('2', 1); // NaN
parseInt('3', 2); // NaN
```

- parseInt radix NaN

## new

- this
- this
- this this

## JavaScript

- API

```
[].forEach.call($(".*"), function(el){
 el.style.outline = "1px solid #" + (~Math.random()*(
1<<24)).toString(16);
})
```

- 1(outline)
  - 1. \$(sel) // \$ document.querySelectorAll(sel)
  - 2. [].forEach.call(NodeLists) // call forEach
  - 3. el.style.outline = "1px solid #333" // outline
  - 4. (1<<24) // parseInt("fffff", 16) == 16777215 == 2^24 - 1 // 1<<24 == 2^24 == 16777216
  - 5. Math.random()\*(1<<24) // 0 16777216
  - 6. ~~Math.random()\*(1<<24) // ~~ parseInt
  - 7. (~Math.random()\*(1<<24))).toString(16) // -

\*\* JavaScript\*\*

- 
- 
- /
- Promises
- Async[ES7]

## web

- cookie
- session
- url
- input
- ip

## js

- UndefinedNullBooleanNumberString

## js

- Object JavaScript
- ObjectArrayBooleanNumber String
- FunctionArgumentsMathDateRegExpError

## JavaScript

-

- ===/!==true/false
- new Array
- 
- Switchdefault
- 
- If
- for-in var

## JavaScript ?

- prototype()
- prototypeprototypeprototype
- instance.constructor.prototype = instance.\_\_proto\_\_
- - JavaScript
- Javascript
- Prototype Object

## JavaScript

- UndefinedNullBooleanNumberString
- 
- 
- (stack)
- (heap),,
- 



## Javascript

- 
- 
- 
- 
- 
- prototypeapplycall

```

function Parent(){
 this.name = 'wang';
}

function Child(){
 this.age = 28;
}
Child.prototype = new Parent();//Parent

var demo = new Child();
alert(demo.age);
alert(demo.name);//
}

```

## javascript

javascript,JSON

- 

```
person={firstname:"Mark",lastname:"Yun",age:25,eyecolor:"black"};
```

- function

```

function Person(){}
 var person=new Person();// function new"" , function Class
 person.name="Mark";
 person.age="25";
 person.work=function(){
 alert(person.name+" hello...");}
 }
person.work();

```

- functionthis

```

function Pet(name,age,hobby){
 this.name=name;//this
 this.age=age;
 this.hobby=hobby;
 this.eat=function(){
 alert(" "+this.name+", "+this.hobby+",");
 }
var maidou =new Pet("",25,"coding");//
maidou.eat();//eat

```

-

```

var wcDog =new Object();
wcDog.name="";
wcDog.age=3;
wcDog.work=function(){
 alert(""+wcDog.name+",.....");
}
wcDog.work();

```

- 

```

function Dog(){
}

Dog.prototype.name="";
Dog.prototype.eat=function(){
 alert(this.name+"");
}
var wangcai =new Dog();
wangcai.eat();

```

- 

```

function Car(name,price){
 this.name=name;
 this.price=price;
}
Car.prototype.sell=function(){
 alert(" "+this.name+" "+this.price+" ");
}
var camry =new Car(" ",27);
camry.sell();

```

## Javascript?

- 
- 
- 

## This

- this
- newthisnew
- thisIEattachEventthisWindow

## eval

- JS
- eval2js
- JSONJSONevalvar obj =eval('('+ str +')')

## nullundefined

- undefined

- undefined :"""" undefined
- undefined
- null ""
- null :(, )
- 
- null==== == null undefined

```
// event()github.com/markyun
markyun.Event = {
 //
 readyEvent : function(fn) {
 if (fn==null) {
 fn=document;
 }
 var oldonload = window.onload;
 if (typeof window.onload != 'function') {
 window.onload = fn;
 } else {
 window.onload = function() {
 oldonload();
 fn();
 };
 }
 },
 // dom0|dom2|IE
 // , ,
 addEvent : function(element, type, handler) {
 if (element.addEventListener) {
 //
 element.addEventListener(type, handler, false);
 } else if (element.attachEvent) {
 element.attachEvent('on' + type, function() {
 handler.call(element);
 });
 } else {
 element['on' + type] = handler;
 }
 },
 //
 removeEvent : function(element, type, handler) {
 if (element.removeEventListener) {
 element.removeEventListener(type, handler, false);
 } else if (element.detachEvent) {
 element.detachEvent('on' + type, handler);
 } else {
 element['on' + type] = null;
 }
 }
}
```

```

 }
 },
 // (IE)
 stopPropagation : function(ev) {
 if (ev.stopPropagation) {
 ev.stopPropagation();
 } else {
 ev.cancelBubble = true;
 }
 },
 //
 preventDefault : function(event) {
 if (event.preventDefault) {
 event.preventDefault();
 } else {
 event.returnValue = false;
 }
 },
 //
 getTarget : function(event) {
 return event.target || event.srcElement;
 },
 // event.event
 getEvent : function(e) {
 var ev = e || window.event;
 if (!ev) {
 var c = this.getEvent.caller;
 while (c) {
 ev = c.arguments[0];
 if (ev && Event == ev.constructor) {
 break;
 }
 c = c.caller;
 }
 }
 return ev;
 }
};

```

**["1", "2", "3"].map(parseInt)**

- [1, NaN, NaN] parseInt (val, radix) radix
- map 3 (element, index, array) radix

## IE

- JavaScript
- IEFirefox
- ev.stopPropagation();ie ev.cancelBubble = true;

## closure

- ,

- - 
  - 
  -

### **javascript "use strict"; ?**

- use strictECMA 5 , Javascript .JS, Javascript

```
// instanceof
if(a instanceof Person){
 alert('yes');
}
```

### **new?**

- this
- this
- this this

```
var obj = {};
obj.__proto__ = Base.prototype;
Base.call(obj);
```

### **js**

- deferasyncDOMjs

### **Ajax ? Ajax**

ajaxAsynchronous Javascript And XML

- +js+xml
- 
- XMLHttpRequest,
- HTTP,HTTPURL
- HTTP
- HTTP
- 
- JavaScriptDOM

### **?**

- ..
-

## JS

- deferIE
- async
- scriptDOMcallBack

## document.write innerHTML

- document.write
- innerHTML

## DOM---?

- 1
  - createDocumentFragment() //DOM
  - createElement() //
  - createTextNode() //
- 2
  - appendChild()
  - removeChild()
  - replaceChild()
  - insertBefore() //
- 3
  - getElementsByTagName() //
  - getElementsByName() // Name(IEidname)
  - getElementById() //Id

- 
- 0
- setTimeout
- 

•

•

## Javascript

- mark and sweep

- JavaScript“”“”
- 

## (reference counting)

IE 110 0

## js

- -
- - +
- -

## deferasync

- deferjsscriptasyncjsscript

- - new
  - ,

```
function createObject(name,age,profession){//var obj = new Object();
 obj.name = name;
 obj.age = age;
 obj.profession = profession;
 obj.move = function () {
 return this.name + ' at ' + this.age + ' engaged in ' +
this.profession;
 };
 return obj;
}
var test1 = createObject('trigkit4',22,'programmer');//var test2 =
createObject('mike',25,'engineer');//
```

- -
  - (new Object());
  - this ;
  - renturn
- 
- js

- 1.
- 2.
- 3.

## **JavaScript**

- :JavascriptNetscape Navigator2.0
- 
- 
- IframeJavascriptinput
- 
- JS merge

## **cloneJavaScrip5NumberStringObjectArrayBoolean**

```
Object.prototype.clone = function(){
 var o = this.constructor === Array ? [] : {};
 for(var e in this){
 o[e] = typeof this[e] === "object" ? this[e].clone() :
this[e];
 }
 return o;
}
```

- 
- 
- 
- with
- 
- 0
- 
- delete propdelete global[prop]
- eval
- evalarguments

- arguments
- arguments.callee
- arguments.caller
- this
- fn.callerfn.arguments
- protectedstaticinterface

## **cookie**

- 

```
var date = new Date();
date.setDate(date.getDate() - 1); //
```

setDate()

- expires

```
document.cookie = 'user=' + encodeURIComponent('name') + ';expires = ' + new Date(0)
```

- 

```
function GetBytes(str){
 var len = str.length;
 var bytes = len;
 for(var i=0; i<len; i++){
 if (str.charCodeAt(i) > 255) bytes++;
 }
 return bytes;
}
alert(GetBytes(",as"));
```

- Event Delegation JavaScript “DOM

## **attributeproperty**

- attributedomhtml
- propertydomjs
- htmlattributeproperty
- 

- charset
- <meta> charset

### <script></body>

- HTML </body><script>
- HTML </body>
- <script></body><script> body </body></html>HTML

### JS

- <script> defer="defer"
- script DOMdocument.createElement('script');
- XMLHttpRequest
- LazyLoad

### JS

- <script> async="async"
- script DOMdocument.createElement('script');
- XMLHttpRequest
- LABjs
- Sea.js

### JavaScript

- Foo.foo(arg1, arg2);
- foo(arg1, arg2);
- (new Foo())(arg1, arg2);
- call/applay Foo.foo.call(that, arg1, arg2);
- bind Foo.foo.bind(that)(arg1, arg2)();

### Function.bind

```

if (!Function.prototype.bind) {
 Function.prototype.bind = function(that) {
 var func = this, args = arguments;
 return function() {
 return func.apply(that, Array.prototype.slice.call(args, 1));
 }
 }
}
// bind
func.bind(that, arg1, arg2)();

//
func.bind(that)(arg1, arg2);

```

\*\* JavaScript\*\*

- - arr.concat(arr1, arr2, arrn);
  - arr.join(",");
  - arr.sort(func);
  - arr.pop();
  - arr.push(e1, e2, en);
  - arr.shift();
  - unshift(e1, e2, en);
  - arr.reverse();
  - arr.slice(start, end);
  - arr.splice(index, count, e1, e2, en);
  - arr.indexOf(el);
  - arr.includes(el); // ES6
- - object.hasOwnProperty(prop);
  - object.propertyIsEnumerable(prop);
  - object.valueOf();
  - object.toString();
  - object.toLocaleString();
  - Class.prototype.isPrototypeOf(object);

## **Array.slice() Array.splice()**

- slice -- ""
  - arr.slice(start, end)
  - start
  - end
- splice
  - ""
  - arr.splice(index, count, [insert Elements])
  - index
  - count = 0 count > 0

- [insert Elements]

## JavaScript

- JavaScript
- 
- 0

- JavaScript
- var
- (Closures)
- ()
- (console.log)
- DOM(IE)

## JQuery

### jQueryzepto

- jquerywindowwindowjquerywindowwindowundefinedundefined

```
(function(window, undefined) {

 //
 //var
 //
 //
 //

 window.jQuery = window.$ = jQuery;

})(window);
```

- jqueryjquery.prototypejquery.fn
- jQuery
- jquery

### jQuery

- (function(window, undefined) {})(window);
- jQuery JS
- window.jQuery = window.\$ = jQuery;
- jQuery \$ window jQuery \$

## **jQuery.fn init this this**

- jQuery.fn init this jQuery
- jQuery() \$() jQuery init

## **jQuery.extend jQuery.fn.extend**

- \$.fn.extend() \$.extend() jQuery
- \$.extend(object); //jQuery""

```
$.extend({
 min: function(a, b) { return a < b ? a : b; },
 max: function(a, b) { return a > b ? a : b; }
});
$.min(2,3); // 2
$.max(4,5); // 5
```

- \$.extend([true,] targetObject, object1[, object2]); // targt

```
var settings = {validate:false, limit:5};
var options = {validate:true, name:"bar"};
$.extend(settings, options); // false
// settings == {validate:true, limit:5, name:"bar"}
```

- \$.fn.extend(json); //jQuery""

```
$.fn.extend({
 alertValue: function() {
 $(this).click(function(){
 alert($(this).val());
 });
 }
});

$("#email").alertValue();
```

## **jQuery (extend)**

- var newObject = \$.extend({}, oldObject);
- var newObject = \$.extend(true, {}, oldObject);

## **jQuery**

- jQuery queue()/dequeue()/clearQueue()
- animate() ajax

```

var func1 = function(){alert('1')};
var func2 = function(){alert('2')};
var func3 = function(){alert('3')};
var func4 = function(){alert('4')};

//
$('#box').queue("queue1", func1); // push func1 to queue1
$('#box').queue("queue1", func2); // push func2 to queue1

//
$('#box').queue("queue1", []); // delete queue1 with empty array
$('#box').queue("queue1", [func3, func4]); // replace queue1

//
$('#box').queue("queue1"); // [func3(), func4()]

//
$('#box').dequeue("queue1"); // return func3 and do func3
$('#box').dequeue("queue1"); // return func4 and do func4

//
$('#box').clearQueue("queue1"); // delete queue1 with clearQueue

```

### **jQuery bind(), live(), delegate(), on()**

- bind
- live document
- delegate live
- on 1.9

### **jQuery fire**

- “/”“”“”
- JS

```

document.createEvent(type); //
event.initEvent(eventType, canBubble, prevent); //
target.addEventListener('dataavailable', handler, false); //
target.dispatchEvent(e); //

```

- jQuery fire jQuery

### **jQuery Sizzle**

- Sizzle Right To Left
- jQuery \$(selecter).find(selecter); Sizzle

### **jQuery JSON**

```
// JSON.stringify/JSON.parse jQuery
$.array2json = function(array) {
 return JSON.stringify(array);
}

$.json2array = function(array) {
 // $.parseJSON(array); // 3.0
 return JSON.parse(array);
}

//

var json = $.array2json(['a', 'b', 'c']);
var array = $.json2array(json);
```

## **jQuery**

```
$("#btn").on("mouseover mouseout", func);

$("#btn").on({
 mouseover: func1,
 mouseout: func2,
 click: func3
});
```

## **jQuery**

- DOM
- idclass
- #id
- 
- on
- jQuerydata()
- jQuery

## **jQuery slideUp , ?**

- JS setTimeout
- \$('.tab').stop().slideUp();

## **jQuery UI**

- \$.widget()
- \$.widget("ns.widgetName", [baseWidget], widgetPrototype);

## **jQuery jQuery UIjQuery Mobile**

- jQuery JS PC DOMAJAX
- jQuery UI jQuery
- jQuery Mobile jQuery “Web”

## **jQuery Zepto**

- jQuery PC jQuery Mobile

- Zepto API jQueryPC

## Ajax

- Ajax? Ajax
- AJAX(Asynchronous Javascript And XML)= JavaScript + XML
- ajax
  - 1. XMLHttpRequest
  - 2. HTTP      HTTP
  - 3. HTTP
  - 4. HTTP
  - 5.
  - 6. JavaScript   DOM

```
var xhr = new XMLHttpRequest();
xhr.open("POST", url, true);
xhr.setRequestHeader("Content-type", "application/x-www-form-urlencoded");
xhr.onreadystatechange = function () {
 if (xhr.readyState == 4 && (xhr.status == 200 || xhr.status == 304)) {
 fn.call(this, xhr.responseText);
 }
};
xhr.send(data);
```

## HTTP

### http

```
[
 100 Continue posthttp header
 200 OK
 201 Created
 202 Accepted
 301 Moved Permanently
 302 Found
 303 See Other GET URI
 304 Not Modified

 400 Bad Request
 401 Unauthorized
 403 Forbidden
 404 Not Found URI

 500 Internal Server Error
 503 Service Unavailable
]
```

### URL

- 
- URLHTTPDNSCDN
- CSSlayoutpaintonload/domreadyJSJS API
- - URL http Web ;
  - WebView loadUrl ;
  - DNSIP UA GET;
  - HTTP();
  - web Web Server ApacheTomcatNode.JS ;
  - PHPJavaJavaScriptPython ;
  - 304;
  - html(200);
  - MIMEcssjs,cookie;
  - DOMJSDOM APIDOM,
- - URLDNSIP
  - HTMLJSCSS
  - HTMLJSCSSHTMLDOM
  -

## **TCP**

- TCPTCPTCP TCPSYNACK
- SYNSYN/ACK ACK"" TCP

## **TCP""**

- FIN (finack)
- FINACK+1SYNFIN
- FIN
- FINACK+1

## **TCPUDP**

- TCPTransmission Control ProtocolTCP""
- UDPUser Data ProtocolTCP UDP

## **HTTPHTTPS**

- HTTPTCPHTTPPTCPSSLTLSHTTPS
- HTTP80HTTPS443

## **HTTPS**

- HTTPShttpshttps://tlsrefer

## **Http 2.0**

- HTTP/2 “server push”
- HTTP/2
- HTTP/2
- header compression header

## **GET POST**

- GET URL 2000
- POST
- GETRequest.QueryString POST Request.Form GetPost
- POST
  - 
  - POST
  - POST GET

- HTTP FTPS MTP PDNS
- TCP UDP
- IP
- 
- - , Bit Frame
  - PackeT
  - Segment
  - SPDU
  - PPDU
  - OSIAPDU

## **304**

- ETag
- 304 HTTP
- A AAE Tag ETag AETag ETag 304 — Not Modified

## **HTTP/2 HTTP/1.x**

- 
- 
- 
- 

## **URL**

- 01. IP(DNS ->->->ISP DNS ->)
- 02. Web HTTP TCP

- 03. 301 http://example.com http://www.example.com
- 04. www
- 05.
- 06. HTTP Content-type 'text/html'
- 07. DOM
- 08. HTML CSSJS
- 09.
- 10.

## (SPA)

- (SPA)HTML
- APP
- REST API JSON
- Web Socket API RPC()
- 
- SEO

“”? “”? ?

- URL History
- “”(SPA)
- 
- “”“”
- --
- (IIFE) -- JS
- -- require.js, sea.js, EC6

## Javascript

- CommonJS -- node.js

```
var math = require('./math');
math.add(2,3);
```

- AMD() -- require.js

```
require(['./math'], function (math) {
 math.add(2, 3);
});
```

- CMD() -- sea.js

```
var math = require('./math');
math.add(2,3);
```

- ES6

```
import {math} from './math';
math.add(2, 3);
```

## AMD CMD

- - AMD RequireJS
  - CMD SeaJS
- :
  - AMD
  - CMD
- API :
  - AMD API require require
  - CMD API require
- - AMD
- CMD

```
define(['./a', './b'], function(a, b) {
 a.doSomething();
 b.doSomething();
});
```

```
define(function(require, exports, module) {
 var a = require('./a');
 a.doSomething();
 var b = require('./b');
 b.doSomething();
})
```

## requireJS

- 

### Node.js Node.js

- Node.jsI/O
- Node.jsI/O
- Node.jsCPU CPU
- Node.js
  - RESTful API
  - 
  - (npm, gulp)
  -

## node

- Global window window

## npm

- npm Node.js

## WebKit

- WebKit (WebCore)JS(JSCore)
- WebKit WebKit(WebCore) HTML/CSS
- WebKit Safari Chrome() Chrome Blink

## ? Unit TestBDD, TDD ? (mocha, jasmin..)?

- (Unit Test)
- Unit Test
- BDD --
- TDD --
- 

```
// mocha
describe('Test add', function() {
 it('1 + 2 = 3', function() {
 expect(add(1, 2)).to.be.equal(3);
 });
});

// jasmin
describe('Test add', function () {
 it('1 + 2 = 3', function () {
 expect(add(1, 2)).toEqual(3);
 });
});
```

- artTemplate, underscore, handlebars

## Modernizr Modernizr

- Modernizr JavaScript HTML5 CSS3

- 44 \* 44 px

- click 300ms "“”"
- - (safari)
  - (IE10+)
  - Zepto tap (BUG)

- FastClick ([8k])
- ...
- var result = subtract(multiply(add(1,2), 3), 4);
- - ...
  - ....
  - ..
  - ..
- - ...
  - ..
  - ..
  - ..

## **Currying)**

- - ...
  - ..
  - ..
- - DOM
- IOC
- 

## **singleton, factory, strategy, decorator**

- Singleton()
- Factory ()
- Strategy()
- Observer()
- Prototype()
- Adapter()
- Proxy()
- Iterator()
- Chain of Responsibility()

- 
-

- yeoman, FIS
  - bower, npm
  - npm, browserify, Webpack
  - babel, sass, less
  - (/)Gulp, Grunt
  - JSHint, ESLint
  - Mocha
- Gulp, Grunt, npm + Webpack

## **Yeoman**

- Yeoman --
- Yeoman
  - yo --- Yeoman
  - Gruntgulp --- gruntgulp
  - Bowernpm --- bowernpm

## **WebPack**

- WebPack [][]js/css/image
- WebPack
  - WebPack commonJS AMD/CMD
  - JS CSSImage
  - grunt/gulp base64
  - React
- WEB
- WEB

## **MVC/MVP/MVVM/Flux**

- MVC(Model-View-Controller)
  - V->C, C->M, M->V
  - CV
  - Backbone
- MVP(Model-View-Presenter)
  - V<->P, P<->M
  - VM(P)VP
  - Riot.js
- MVVM(Model-View-ViewModel)
  - V->VM, VM<->M
  - View ViewModel
  - Angular
- Flux(Dispatcher-Store-View)
  - Action->Dispatcher->Store->View, View->Action

- Facebook MVC
- 
- React(Flux View)

## **Backbone**

- Backbone jquery underscore (MVC)

## **AngularJS**

- AngularJS MVVM
- AngularJS Google

## **React**

- React MV\* JavaScript View
- React
  - DOM + diff -> DOM
  - Components -> Virtual DOM
  - State ->
  - React React + Redux + react-router + Fetch + webpack

## **react-router**

- location components
- UI URL
- react-router URL Location UI react components
- react-router location components

## **Meteor**

- Meteor Node.JS + MongoDB
- Meteor

# **JSONXML**

## **XMLJSON**

- - JSONXML
- - JSONJavaScript
- - JSONXML
- - JSONXML

## **JSON**

- JSON(JavaScript Object Notation)
- JavaScript, ,
- JSONJSON:

```
var obj =eval('('+ str +')');
var obj = str.parseJSON();
var obj = JSON.parse(str);
```

- JSONJSON

```
var last=obj.toJSONString();
var last=JSON.stringify(obj);
```

## localStorage

- jssessionStorageglobalStorageHTML5localStorageglobalStorage
- html5Web StoragesessionStoragelocalStorage
- sessionStoragesessionsessionStorage
- localStorage

### web storagecookie

- Web StoragecookieCookieCookiecookie
- WebStoragesetItem,getItem,removeItem,clearcookiesetCookiegetCookie
- cookiecookieHTTP Web Storage“”
- IE(ieFFweb)IEIE7IE6userDatajavascriptweb storage
- localStoragesessionStoragesetItemgetItemremoveItem

### cookie session

- 1cookiesession
- 2cookieCOOKIECOOKIE
  - session
- 3session
  - COOKIE
- 4cookie4K20cookie
- 5
  - SESSION
  - COOKIE

### cookiessessionStorage localStorage

- - cookie

- cookie http
  - sessionStorage localStorage
  - 
  - cookie 4k
  - sessionStorage localStorage cookie5M
  - 
  - - localStorage
    - sessionStorage
    - cookie cookie

Android iOS?

- (X)HTML “”
  - CSS “”
  - JS “”

AMDCommonjs

- CommonJSNode.jsCommonJSAMD
  - AMDCommonJSmodule.exportsexports

,

```

var module1 = (function(){
 var _count = 0;
 var m1 = function(){
 //...
 };
 var m2 = function(){
 //...
 };
 return {
 m1 : m1,
 m2 : m2
 };
})();

```

## AMDModules/Asynchronous-DefinitionCMDCommon Module Definition

- Asynchronous Module Definition

```

// CMD
define(function(require, exports, module) {
 var a = require('./a')
 a.doSomething()
 // 100
 var b = require('./b') //
 b.doSomething()
 // ...
})

// AMD
define(['./a', './b'], function(a, b) { //
 a.doSomething()
 // 100
 b.doSomething()
 // ...
})

```

- AMD RequireJS
- CMD SeaJS
- AMD CMD
- AMDCommonJS module.exports exports

- content

- HTTPCSSinline Image
- DNSDNSDNSDNS
- 
- Ajax

- - 
  - DOM
  - 
  - iframe
  - 404
- Server
    - CDN
    - ExpiresCache-Control
    - Gzip
    - ETag
    - Flush Buffer Early
    - AjaxGET
    - srcimg
  - Cookie
    - cookie
    - cookie
  - CSS
    - 
    - CSS
    - IEFilter
  - Javascript
    - 
    - javascriptcss
    - javascriptcss
    - 
    - DOM
    -
  - - 
    - CSS
    - HTML
    - favicon.ico
  - - 25k
    - Pack Components into a Multipart Document
- 
- httpCSS Sprites, JSCSSGzipCDNdata
  - JS+HTMLAJAX
  - innerHTMLDOMDOMJavascript
  - classNamestyle
  - DOMIO

- CSS Expression
- css)Dynamic properties()
- 
- tablebasediv+css

- CSS
- AjaxCDNjsCSSExpiresETagDNS
- CSS
- GZIP

- hash-table
- 
- innerHTMLDOMDOMjavascript
- setTimeout
- DOM
- CSS Expression
- 
- with(with)
- 
- iFrameSrcSrc
- HTMLStyle

- PageSpeed YSlow
- HTTP Expires Cache-control
- Gzip
- CSS3 base64
- (defer)/(async)
- Cookie
- localStorage
- CDN
- HTTP/2
- gulp/webpack

## PNG,GIF,JPG

- GIF
  - 8256
  -

- 
- boolean
- 
- JPEG
  - 256
  - 
  - 
  - 
  -
- PNG
  - PNG8truecolor PNG
  - PNG8GIF256alpha
  -

## SEO

### SEO

- title description keyword s title 2 title description description keywords
- HTML W3C
- HTML HTML
- js js
- iframe iframe
- alt
- 

### SEO?

- 
- 
- 
- ""
- 
- "Alt"
- 
- 
- 
- 
- 
- 
-

- 
- (CNZZ)SEO

## ES6

### 1 ES5 ES6 ES2015?

ES2015	2015JS	ES6JS	ES2015	ES2016	ES2017	ES2018	ES2015	ES6	ES5
			ES2015	ES5	ES6				

### 2 babel?

babel	ES6	ES6	ES5	ES6
-------	-----	-----	-----	-----

### 3 let var let

ES6	var var	ES5	for var	let	var
-----	---------	-----	---------	-----	-----

### 4 ES6 String?

ES6	( )`
-----	------

ES6	String includes()	indexOf(indexOf - 1 includes false),
	startsWith(), endsWith(), padStart(), padEnd(), repeat()	

### 5 ES6 Array

- ES6 let [a,b,c] = [1,2,3]      let(var),
- ES6(...)( ),      arguments apply      ES5 arguments      let a = [2,3,4];  
let b = [...a]

ES6	Array find()	indexOf, indexOfNaN bug([NaN].indexOf(NaN) === -1).
	copyWithin(), includes(), fill(), flat(),	

### 6 ES6 Number

```
ES6Number.isFinite(), isNaN() isFinite(), isNaN() NaNES5isFinite(),
isNaN()Number sNaN('NaN') === true--'NaN' isNaNNaN
Number.isFinite()Number.isnan()(Number.isnan('NaN') === false)
isFinite()
```

```
ES6MathMath.cbrt()trunc()hypot()
```

## 7ES6Object?()

```
ES6
```

```
let [apple, orange] = ['red apple', 'yellow orange'];
let myFruits = {apple, orange}; // let myFruits = {apple: 'red apple',
orange: 'yellow orange'};
```

```
(b.)
```

```
let {keys, values, entries} = Object;
let MyOwnMethods = {keys, values, entries}; // let MyOwnMethods = {keys: keys,
values: values, entries: entries}
```

```
let es5Fun = {
 method: function(){}
};
let es6Fun = {
 method(){}
}
```

```
ES6
```

```
let {apple, orange} = {apple: 'red apple', orange: 'yellow orange'};
```

```
(...) ES6
```

```

let {apple, orange, ...otherFruits} = {apple: 'red apple', orange: 'yellow
orange', grape: 'purple grape', peach: 'sweet peach'};
// otherFruits {grape: 'purple grape', peach: 'sweet peach'}
// : (otherFruits)
let moreFruits = {watermelon: 'nice watermelon'};
let allFruits = {apple, orange, ...otherFruits, ...moreFruits};

```

super ES6Class this super this super

```

ES6Object.is() '===' '===' NaN === NaN // false Object.is
bug(Object.is(NaN, NaN) // true)

```

ES6Object.assign()

```

const target = { a: 1 };
const source1 = { b: 2 };
const source2 = { c: 3 };
Object.assign(target, source1, source2);
target // {a:1, b:2, c:3}

```

: assign target source1 source2 source1 source2 getset get/set  
return

- ES6Object.getOwnPropertyDescriptors() ES5getOwnPropertyDescriptor()  
defineProperties() getset
- ES6Object.getPrototypeOf() setPrototypeOf() prototype ES5prototype  
\_\_proto\_\_ \_\_proto\_\_ ES6 prototypeES6
- ES6Object.keys() Object.values() Object.entries()

## 8ES6Function?

() ES6 this, JS this

- this ES5 this this this bug ES6 this, this this this this
- this
- this, arguments
- ES6 ES6

```

function es6Fuc (x, y = 'default') {
 console.log(x, y);
}
es6Fuc(4) // 4, default

```

ES6 bindcall,apply( Babel)

```
foo::bar;
//
bar.bind(foo);

foo::bar(...arguments);
//
bar.apply(foo, arguments);
```

## 9Symbol

Symbol ES6 Object Symbol()

Symbol() for...in

## 10Set

Set ES6 Array Set item Set

## 11Map

Map ES6 Object Map Object key Object

## 12Proxy

Proxy ES6 JS JS get/set JS get/set key value myOwnObj key,`

```

function createMyOwnObj() {
 //keyPromise,anything
 return new Proxy({}, {
 get(target, propKey, receiver) {
 return new Promise((resolve, reject) => {
 setTimeout(() => {
 let randomBoolean = Math.random() > 0.5;
 let Message;
 if (randomBoolean) {
 Message = `${propKey}`;
 resolve(Message);
 } else {
 Message = `${propKey}`;
 reject(Message);
 }
 }, 1000);
 });
 }
 });
}

let myOwnObj = createMyOwnObj();

myOwnObj.hahaha.then(result => {
 console.log(result) //hahaha
}).catch(error => {
 console.log(error) //hahaha
})

myOwnObj.wuwuwu.then(result => {
 console.log(result) //wuwuwu
}).catch(error => {
 console.log(error) //wuwuwu
})

```

## 13 Reflect

ReflectES6	ObjectFunction( applydeletegetset)	Reflect API	Proxy API
API	API	ReflectAPI	API API

## 14 Promise

PromiseES6JS"	API
---------------	-----

## 15 Iterator()

- IteratorES6      ES6SetMap    ArrayObject    ArrayObject    SetMapfor    SetMap  
API SetMapArrayObject API      ES6      Iterator
- JavaScriptECMAScript    IteratorIterator    Iterator    key[Symbol.iterator]

```

[Symbol.iterator]valueIterator(Iterator: next next()value/done
Iterator) next()IteratorIterator

//objIterator[Symbol.iterator]Iterator
//obj.[Symbol.iterator]() Iterator
let obj = {
 data: ['hello', 'world'],
 [Symbol.iterator]() {
 const self = this;
 let index = 0;
 return {
 next() {
 if (index < self.data.length) {
 return {
 value: self.data[index++],
 done: false
 };
 } else {
 return { value: undefined, done: true };
 }
 }
 };
 }
};

```

ES6SetMapArrayString[Symbol.iterator] [Symbol.iterator]Iterator  
SetMapArrayString

```

//Array
let array = ['red', 'green', 'blue'];
array[Symbol.iterator]() //Iterator
array[Symbol.iterator]().next() //{value: "red", done: false}

//String
let string = '1122334455';
string[Symbol.iterator]() //Iterator
string[Symbol.iterator]().next() //{value: "1", done: false}

//set
let set = new Set(['red', 'green', 'blue']);
set[Symbol.iterator]() //Iterator
set[Symbol.iterator]().next() //{value: "red", done: false}

//Map
let map = new Map();
let obj= {map: 'map'};
map.set(obj, 'mapValue');
map[Symbol.iterator]().next() {value: Array(2), done: false}

```

## 16for...in for...of

ES6            for...ofES6 Iterator()    for...of    for..in

- for...of    for..in

## 17Generator

- JavaScriptECMAScript    IteratorIterator    GeneratorIterator
- Generator    Generatoryieldnext()    next(value)value,Generator
- GeneratorThunk

## 18async

asyncGenerator    ES6Promise

## 19Classextends

ES6 classES5    java            ClassextendsES5

```
///ES5
function ES5Fun (x, y) {
 this.x = x;
 this.y = y;
}
ES5Fun.prototype.toString = function () {
 return '(' + this.x + ', ' + this.y + ')';
}
var p = new ES5Fun(1, 3);
p.toString();
Object.keys(ES5Fun.prototype); //['toString']

//ES6
class ES6Fun {
 constructor (x, y) {
 this.x = x;
 this.y = y;
 }
 toString () {
 return '(' + this.x + ', ' + this.y + ')';
 }
}
Object.keys(ES6Fun.prototype); //[]
```

- ES6classnew    ES5new
- ES6class    class    ES5
- ES5    thisthis    ES6        this    super    this

## 20 moduleexportimport

- moduleexportimportES6 exportimport/ AMD/CMDrequireJSseaJScommonJS JS
- import
- importexport

## 21 ES6

- var self = this;
- letvar
- /
- •
- Class
- module importexport

## 22 ES6

JavaScriptInputs=>outputsfor-of—argumentsES6  
promisePromiseletconstletES6varfunctionletconst  
classmodule

## 23 Promise

- Promise/A+ Promise
  - pending: , fulfilled rejected.
  - fulfilled: .
  - rejected: .
  - settled: Promisefulfilledrejectedpending
- fulfilled rejected settled
- Promise (deferred) (asynchronous )

## 24 Promise

- Promise

```

var promise = new Promise(function(resolve, reject) {

 if (...) { // succeed

 resolve(result);

 } else { // fails

 reject(Error(errorMessage));

 }
});

```

- Promise then then thenenable

```
promise.then(onFulfilled, onRejected)
```

- fulfilled rejected futureonFulfilled resolve, onRejected reject

## Promise

- Promise
- Promise then
- Promise ""

## 25ECMAScript6

- let a = 1;
- const PI = 3.141592654;
- var [a, b, c] = [1, 2, 3];
- () var sum = \${a + b};
- () Array.from(\$('li'));
- () [1, 2].push(...[3, 4, 5]);
- () Object.is(NaN, NaN);
- (Symbol) let uid = Symbol('uid');
- (Map) let set = new Set([1, 2, 2, 3]);
- for...of for(let val of arr){};
- Promise var promise = new Promise(func);
- Generator function\* foo(x){yield x; return x\*x;}
- Class() class Foo {}
- export default func;
- async[ES7]

```

async function asyncPrint(value, ms) {
 await timeout(ms);
 console.log(value)
}

```

## 26Object.is() =====

- ==
- ===

- Object.is === 0 NaN

```
+0 === -0 //true
NaN === NaN // false

Object.is(+0, -0) // false
Object.is(NaN, NaN) // true
```

## 27 Babel

- Babel JS ES6 JS  
JS(ES6/ES7)
- Babel JS (syntax)API

## JSONP

- script scriptjs jsurl json
- XMLHttpRequest script JSON
- GET
- JSONP json+padding JSON

```
function createJs(sUrl){

 var oScript = document.createElement('script');
 oScript.type = 'text/javascript';
 oScript.src = sUrl;
 document.getElementsByTagName('head')[0].appendChild(oScript);
}

createJs('jsonp.js');

box({
 'name': 'test'
});

function box(json){
 alert(json.name);
}
```

## CORS

- CORS Access-Control-Allow-Origin Ajax

## document.domain

- document.domain! document.domain document.domain

## window.name

- window.name( window), window.name window.name window.name

## HTML5 window.postMessage

- flash window.name
- ?
- jsonp iframewindow.namewindow.postMessage
- ?
  - document.domain + iframe //
  - JSONP(JSON with Padding)`` response: callback(data)`` // GET
  - CORS(XHR2)`` Access-Control-Allow` // IE10+
  - (HTML5) postMessage + onmessage // IE8+
  - WebSocket(HTML5) new WebSocket(url) + onmessage // IE10+
  -

## Cookie

### Cookie

- cookie
- 20cookie
- 1.IE620cookie
- 2.IE750cookie
- 3.Firefox50cookie
- 4.chromeSafari

### Cookie

- cookie
- IE Opera cookieFirefox cookie
- cookie 4096 4095
- cookie session

## MVC

### MVCMVVM

- MVC
  - View Controller
  - Controller Model
  - Model View

## Git

**git fetchgit pull**

- git pullmerge
- git fetchmerge

?

- 
- 
- 

- stack—
- heap — OS
- 
- 

...

- 1
- 2
- 3

```
function quickSort(arr){
 if(arr.length<=1){
 return arr;//
 }

 var num = Math.floor(arr.length/2);/

 var numValue = arr.splice(num,1);/
 var left = [];
 var right = [];

 for(var i=0;i<arr.length;i++){
 if(arr[i]<numValue){
 left.push(arr[i]);/
 }
 else{
 right.push(arr[i]);/
 }
 }

 return quickSort(left).concat([numValue],quickSort(right));//
}

alert(quickSort([32,45,37,16,2,87]));//"2,16,32,37,45,87"
```

## mongoDBMySQL

- MySQLMongoDB
- mongodbBSON
- ,NoSQLMongoDB ① ②

```
var eventUtil = {
 getEvent: function(event) {
 return event || window.event;
 },

 getTarget: function(event) {
 return event.target || event.srcElement;
 },

 addListener: function(element, type, hander) {
 if (element.addEventListener) {
 element.addEventListener(type, hander, false);
 } else if (element.attachEvent) {
 element.attachEvent('on' + type, hander);
 } else {
 element['on' + type] = hander;
 }
 },

 removeListener: function(element, type, hander) {
 if (element.removeEventListener) {
 element.removeEventListener(type, hander, false);
 } else if (element.detachEvent) {
 element.detachEvent(type, hander);
 } else {
 element['on' + type] = null;
 }
 },

 preventDefault: function(event) {
 if (event.preventDefault) {
 event.preventDefault();
 } else {
 event.returnValue = false;
 }
 },

 stopPropagation: function(event) {
 if (event.stopPropagation) {
 event.stopPropagation();
 } else {
 event.cancelBubble = true;
 }
 }
};
```

```
 }
 });
}

//

(function() {
 var btn = document.getElementById("btn");
 var link = document.getElementsByTagName("a")[0];

 eventUtil.addListener(btn, "click", function(event) {
 var event = eventUtil.getEvent(event);
 var target = eventUtil.getTarget(event);
 alert(event.type);
 alert(target);
 eventUtil.stopPropagation(event);
 });

 eventUtil.addListener(link, "click", function(event) {
 alert("prevent default event");
 var event = eventUtil.getEvent(event);
 eventUtil.preventDefault(event);
 });

 eventUtil.addListener(document.body, "click", function() {
 alert("click body");
 });
})();
```

```

var Event = (function () {
 var list = {}, bind, trigger, remove;
 bind = function (key, fn) {
 if (!list[key]) {
 list[key] = [];
 }
 list[key].push(fn);
 };
 trigger = function () {
 var key = Array.prototype.shift.call(arguments);
 var fns = list[key];
 if (!fns || fns.length === 0) {
 return false;
 }
 for (var i = 0, fn; fn = fns[i++];) {
 fn.apply(this, arguments);
 }
 };
 remove = function (key, fn) {
 var fns = list[key];
 if (!fns) {
 return false;
 }
 if (!fn) {
 fns & (fns.length = 0);
 } else {
 for (var i = fns.length - 1; i >= 0; i--) {
 var _fn = fns[i];
 if (_fn === fn) {
 fns.splice(i, 1);
 }
 }
 }
 };
 return {
 bind: bind,
 trigger: trigger,
 remove: remove
 }
})();

//
Event.bind('Hit', function(){ console.log('bind event'); }); //
Event.trigger("Hit", function(){ console.log('trigger event'); }); //

```

```

function delegateEvent(parentEl, selector, type, fn) {
 var handler = function(e){
 var e = e || window.event;
 var target = e.target || e.srcElement;
 if (matchSelector(target, selector)) {
 if(fn) {
 fn.call(target, e);
 }
 }
 };
 if(parentEl.addEventListener){
 parentEl.addEventListener(type, handler);
 }else{
 parentEl.attachEvent("on" + type, handler);
 }
}
/**
 * support #id, tagName, .className
 */
function matchSelector(ele, selector) {
 // if use id
 if (selector.charAt(0) === "#") {
 return ele.id === selector.slice(1);
 }
 // if use class
 if (selector.charAt(0) === ".") {
 return (" " + ele.className + " ").indexOf(" " + selector.slice(1) + " ") != -1;
 }
 // if use tagName
 return ele.tagName.toLowerCase() === selector.toLowerCase();
}

//
var box = document.getElementById("box");
delegateEvent(box, "a", "click", function(){
 console.log(this.href);
})

```

```

var fireEvent = function(element, event){
 if (document.createEventObject){
 var mockEvent = document.createEventObject();
 return element.fireEvent('on' + event, mockEvent)
 }else{
 var mockEvent = document.createEvent('HTMLEvents');
 mockEvent.initEvent(event, true, true);
 return element.dispatchEvent(mockEvent);
 }
}

```

## Function.bind

```
if (!Function.prototype.bind) {
 Function.prototype.bind = function (oThis) {
 if (typeof this !== "function") {
 throw new TypeError("'this' is not function");
 }

 // bind's default arguments, array without first element
 // first part arguments for the function
 var aBindArgs = Array.prototype.slice.call(arguments, 1);
 var fToBind = this; // the function will be binding
 var fNOP = function () {};
 var fBound = function () {
 // target this will be binding
 var oThis = this instanceof fNOP ? this : oThis || this;
 // last part arguments for the function
 var aCallArgs = Array.prototype.slice.call(arguments);
 // complete arguments for the function
 var aFuncArgs = aBindArgs.concat(aCallArgs);
 return fToBind.apply(oThis, aFuncArgs);
 };

 // fBound extends fToBind
 fNOP.prototype = this.prototype;
 fBound.prototype = new fNOP();

 return fBound;
 };
}

//
var add = function(a, b, c){ return a + b + c;};
var newAdd = add.bind(null, 1, 2);
var result = newAdd(3);
```

```
var quickSort = function(arr) {
 if (arr.length <= 1) { return arr; }
 var pivotIndex = Math.floor(arr.length / 2);
 var pivot = arr.splice(pivotIndex, 1)[0];
 var left = [];
 var right = [];
 for (var i = 0, len = arr.length; i < len; i++){
 if (arr[i] < pivot) {
 left.push(arr[i]);
 } else {
 right.push(arr[i]);
 }
 }
 return quickSort(left).concat([pivot], quickSort(right));
};

// quickSort([9, 4, 2, 8, 1, 5, 3, 7]);
```

```
var bubble = function(arr){
 var maxIndex = arr.length - 1, temp, flag;
 for (var i = maxIndex; i > 0; i--) {
 flag = true
 for (var j = 0; j < i; j++) {
 if (arr[j] > arr[j + 1]) {
 temp = arr[j];
 arr[j] = arr[j + 1];
 arr[j + 1] = temp;
 flag = false;
 }
 }
 if(! flag){
 break;
 }
 }
 return arr;
};

// var arr = bubble([13, 69, 28, 93, 55, 75, 34]);
```

```

Array.prototype.unique = function() { return [...new Set(this)];};

// [1, 2, 3, 3, 2, 1].unique();

function unique1(arr){
 var hash = {}, result = [];
 for(var i=0, len=arr.length; i<len; i++){
 if(! hash[arr[i]]){
 result.push(arr[i]);
 hash[arr[i]] = true;
 }
 }
 return result;
}
// unique1([1, 2, 3, 3, 2, 1]);

Array.prototype.unique2 = function(){
 this.sort();
 var result = [this[0]];
 var len = this.length;
 for(var i = 0; i < len; i++){
 if(this[i] !== result[result.length - 1]){
 result.push(this[i]);
 }
 }
 return result;
}
// [1, 2, 3, 3, 2, 1].unique2();

function unique3(arr){
 var result = [];
 for(var i=0; i<arr.length; i++){
 if(result.indexOf(arr[i]) == -1){
 result.push(arr[i]);
 }
 }
 return result;
}

// unique3([1, 2, 3, 3, 2, 1]);

```

**url**

```

function parseQuery(url) {
 url = url == null ? window.location.href : url;
 var search = url.substring(url.lastIndexOf("?") + 1);
 var hash = {};
 var reg = /([?&=]+)=([?&=]*)/g;
 search.replace(reg, function (match, $1, $2) {
 var name = decodeURIComponent($1);
 var val = decodeURIComponent($2);
 hash[name] = String(val);
 return match;
 });
 return hash;
}

```

```

var throttle = function(fn, delay, mustRunDelay){
 var timer = null;
 var t_start;
 return function(){
 var context = this, args = arguments, t_curr = +new Date();
 clearTimeout(timer);
 if(!t_start){
 t_start = t_curr;
 }
 if(t_curr - t_start >= mustRunDelay){
 fn.apply(context, args);
 t_start = t_curr;
 } else {
 timer = setTimeout(function(){
 fn.apply(context, args);
 }, delay);
 }
 };
};

// 50ms100ms
window.onresize = throttle(myFunc, 50, 100);

```

JS

```

function test1(num){
 var str = (+ num) + '';
 var len = str.length;
 if(len <= 3) return str;
 num = '';
 while(len > 3){
 len -= 3;
 num = ',' + str.substr(len, 3) + num;
 }
 return str.substr(0, len) + num;
}

function test2(num){
 // ?= :
 // ?! :
 var str = (+num).toString();
 var reg = /(?(?!\\b)(\\d{3})+$)/g;
 return str.replace(reg, ',');
}

```

- 
- 
- 
- 

## AngularJS BackboneJS

- backboneunderscore.jsBackbone + Underscore + jQuery(or Zepto)AngularJS 2 HTTP.
- BackboneModelUIViewDOMUIAngularJSModelUIModelUIdirectiveAngularJS directiveModelUIModelUI
- AngularJSdirectiveUIMVW Angular
  
- UI UI
  - (table)DIV+CSS
  - (CSSIE6)
  - 
  - SEO
  -

- 
- 

## webpack

WebPack WebPackWebHTMLJavascriptCSSwebpack  
webpack

- UIUI
- - 
  - HTML5CSS3ES6
  - 
  - 
  - 
  - /
  - 
  - CDN
  - JS DOM
  - HTTP

## IE

- IE Trident W3C
- JS /
- CSS IE

- 
- 

## WEBData

- AJAX
- html5
 

```
(new EventSource(SERVER_URL)).addEventListener("message", func);
```
- html5 Websocket
- (new WebSocket(SERVER\_URL)).addEventListener("message", func);

## Web App/hybrid App/Native App Web

- Web App(HTML5)HTML5
  -

- GPS
- Hybrid App()UI WebView
  - Native App
  -
- Native App()
  - 
  -

## Web

- meta viewport
- box-sizing: border-box;
- rem rem html
- css3
- 

## Web APP

- //
- 
- 
- Loading
- 
- (html/js/css)
- 
- Git
- (NoSQL)
- ()
- 
- ES6NodeReactWebpack

- - 
  - 
  - Node.js
- 90 100
- 1px

- UI
- 
- hack
- 
  
- globe.css( utf-8)
- 
- 
- 
- 
- CSSHTML style.css
- JS JS
- images.png png8
- 
  
- 
- 
- 
- 
- 
  
- 
- 
- 
- webkit
- 

[\(https://time.geekbang.org/column/126\)](https://time.geekbang.org/column/126)

- 
- 

O asymptotic time complexity

1.  $n \ O(n)$
2.  $O(n) \ O(n^2) \ O(n^2)$
3.  $T1(n) = O(n)T2(n) = O(n^2) \ T1(n) * T2(n) = O(n^3)$

**1**

$O(2^n) \ O(n!)$

1.  $O(1)O(1)$
2.  $O(\log n)O(n \log n) 2^x = nx = x = \log 2^n O(\log 2^n)$
3.  $O(m+n)O(m*n) m n$

**2**

x

x

**1**

Array

1. Linear List
- 2.

" O(1) O(1)"

$O(1) O(\log n)$

$O(1)$

**2**

1. ""
2.  $O(1) O(n)$

1. "" next
- 2.
3. next prev

- 1.
- 2.
- 3.
- 4.

**5**

- 1.
- 2.
- 3.
4. n
- 5.

**3**

aaaaa

{[] ()[{}]}{{()}{[]}}{[]()}{()}

**4**

“”

head tail

- 1.
- 2.
3. enqueue()dequeue()

**5**

Skip ListRed-black Tree

O(n) O(logn) O(n)

**6**

Hash Table“”Hash ” O(1)

hash(key) key hash(key)

- 1.
2. key1 = key2 hash(key1) == hash(key2)
3. key1 ≠ key2 hash(key1) ≠ hash(key2)

open addressingchaining

- 1.
2. “bucket”“slot”

**7**

TreeHeightDepthLevel

O(n)

- 1.
- 2.
- 3.

Binary Search TreeBST

O(n)

**8**

1

“Red-Black Tree” R-B Tree

- 1.
2. NIL
- 3.
- 4.

**9**

Heap

- 1.
- 2.

i i        2 i     2+1 2/i

heapify

Top K

**10**

Graph

vertexedgedegree

""""In-degreeOut-degree

**11 Trie**

Trie “”

Trie

k k

Trie O(k)k

**1**

- 1.
- 2.
- 3.

**2**

1.
  - 
  - 
  -
2. Sorted in place  $O(1)$
- 3.

1. Bubble Sort
2. Insertion Sort
3. Selection Sort
4. Merge Sort
5. Quick Sort p r p r pivot p r pivot pivot pivot

- $O(n \log n)$
  -
6. Bucket Sort
  7. Counting Sort n k k
  8. n

**3**

Binary Search 0

3

1.  $\text{low} \leq \text{high}$  low
2. mid low high  $\text{low} + ((\text{high} - \text{low}) >> 1)$
3. low high  $\text{low} = \text{mid} + 1$   $\text{high} = \text{mid} - 1$  -1

$O(\log n)$

- 1.
- 2.
- 3.
- 4.

- 1.
- 2.
- 3.
- 4.

**4**

MD5SHA

- 1.
2. Bit
- 3.
- 4.

**5**

1. BF Brute Force A B A B n m
2. RK Rabin-Karp n-m+1
3. BM Boyer-Moore KMP 3 4
4. KMP BM a b
5. Trie AC

**6**

greedy algorithm Huffman Coding Prim Kruskal Dijkstra

- 1.
- 2.
- 3.

**7**

divide and conquer n

- 1.
- 2.
- 3.

- 1.
- 2.
- 3.
- 4.

**8**

0-1

**9**

## Dynamic Programming

.....

- 1.
- 2.
- 3.

- 1.
- 2.

## TSESTS

### SPA

- TSVSCodeWebStormIDEbugTSTSKOP(dva)
- IDE
- SPAbugTSbugIDEbug

### TSJavaScriptJavaScript that scalesTSbug

- IDEbug
- ++/bug
- VSCodeIDE
- 

## TypeScript

### TypeScript JavaScript ES6 JavaScriptTS

- 1
- 2js ts ts js ts
- 3 ts es6

- 1InterfacesGenericsclassEnums
- 2
- 3ts
- 4

## TypeScriptvoidnullundefined

### tsnullundefined

```
// 1
let a: number = null;
// 2
let a: number = undefind;
// 3
let a: null;
let b: number = a;
//4
let a: undefined;
let b: number = a;
```

void:

```
let a: void;
//
let b: number = a;
```

tsconfig.json

```
{
 "compilerOptions": { // ,
 "strictNullChecks": true, // nullnullundefinedvoid
 }
}
```

undefinednull

```
let a: null = null;
let b: undefined = undefined;
```

undefinedvoid

```
let c: void = undefined;
```

## TypeScript

TypeScript Type Inference

```
let myFavoriteNumber = 'seven';
myFavoriteNumber = 7;

// index.ts(2,1): error TS2322: Type 'number' is not assignable to type
'string'.
```

```
let myFavoriteNumber: string = 'seven';
myFavoriteNumber = 7;

// index.ts(2,1): error TS2322: Type 'number' is not assignable to type
'string'.
```

TypeScript

any

```
let myFavoriteNumber;
myFavoriteNumber = 'seven';
myFavoriteNumber = 7;
```

## TypeScript readonlyconst

readonlyconst

1. constreadonly
2. conststaticstatic constreadonlystaticstatic readonly
3. constreadonly
4. constreadonly

```
function send<T>(data: T): T {
 return data;
}
```

TTTKey TValue

```
send<number>(10); //
send(10); //
```

T

```
function send<T>(data: T[]): T[] {
 return data;
}

send<number>([1, 2, 3]);
```

```
let func: (<U>(data: U) => U) = send;
```

TU

```
function send<T, U>(data: [T, U]): [T, U] {
 return data;
}
send<number, string>([1, "a"]);
```

```
interface Func {
 <T>(str: T): T;
}
function send<T>(str: T): T {
 return str;
}
let fn: Func = send;
```

```
interface Func<T> {
 (str: T): T;
}
function send<T>(str: T): T {
 return str;
}
let fn: Func<string> = send;
```

Funcstring

send“=>”

```
class Person<T> {
 name: T;
 send: (data: T) => T;
}
```

```
let person = new Person<string>();
person.send = function(data) {
 return data;
}
```

data.length

```
function send<T>(data: T) {
 console.log(data.length);
 return data;
}
```

TypeScript extends T

```
function send<T extends string>(data: T) {
 console.log(data.length);
 return data;
}
```

send()

```
send("10"); //
send(10); //
```

1

T

```
class Programmer {}
function create<T>(ctor: {new(): T}): T {
 return new ctor();
}
create(Programmer);
```

"{new(): T}" new T

```
function create<T>(ctor: new()=>T): T {
 return new ctor();
}
```

2

TypeScript Person Programmer create() TU

```
class Person {}
class Programmer extends Person {}
function create<T extends U, U>(target: T, source: U): T {
 return target;
}
```

create()

```
create(Programmer, Person); //
create(Programmer, 10); //
```

## TypeScript

TypeScript

(nominal)

TypeScriptJavaScriptJavaScript

1.

```
//
//
// TypeScript undefined
// undefined js
interface Named {
 name: string;
}
class Person {
 name: string;
 age: number;
}
let p: Named;
// PersonNamed
//
p = new Person();
p.name = '' ;
console.info(p);
```

1.

```
//
//
// 12
let x = (a: number) => 0;
let y = (b: number, s: string) => 0;
x = y; // xs
y = x;
```

2.

```
//
// 1,2
let x = () => ({name:'Alice'});
let y = () => ({name:'Alice',location:'Seattle'});
y = x; // x.location
x = y;
```

3.

undefined

```
//
// .
enum Status {
 Ready,
 Warting
}
enum Color {
 Red,
 Blue,
 Green
}
console.log(Status.Ready == 0); // true
let status = Status.Ready; // 0
console.log(status);
status = 2;
console.log(status); // 2
//status = Color.Blue; / /
```

```
class Animal {
 feet: number;
 constructor(name: string, numFeet: number) { }
}

class Size {
 feet: number;
 constructor(numFeet: number) { }
}

let a: Animal;
let s: Size;

a = s; // OK
s = a; // OK
```

TypeScript

```
interface Empty<T> {
}
let x: Empty<number>;
let y: Empty<string>;

x = y; // okay, y matches structure of x
```

TypeScript                   **any any**  
                              **implements extends**

## interfacetype

interfacetype

```
interface IPerson<T> {
 age: T;
 name: string
};

const hank1: IPerson<number> = {
 age: 18,
 name: 'hank',
};

type TPerson<T> = {
 age: T;
 name: string
};

const hank2: TPerson<number> = {
 age: 18,
 name: 'hank',
};
```

()

typeinterface

```
type Name = string | number;

const name = 'hank';
```

interfacetype

```
interface ISetPerson {
 (age: number, name: string) => void;
}

const setPerson1: ISetPerson = (age: number, name: string): void => {};
type TSetPerson = (age: number, name: string) => void;

const setPerson2: TSetPerson = (age: number, name: string): void => {};
```

interface(implements)

```
interface ISetPerson {
 setPerson(age: number, name: string) => void;
}

class Person implements ISetPerson {
 setPerson(age: number, name: string): void => {
 }
}
```

**(extends)**

interface(extends)(extends)extends

```
interface ICommon {
 sex: string
};

interface IPerson<T> extends ICommon {
 age: T;
 name: string
};

const hank1: IPerson<number> = {
 sex: 'Man',
 age: 18,
 name: 'hank',
};

type TCommon = {
 sex: string,
};

type TPerso<T> = {
 age: T;
 name: string
} & TCommon; //

const hank2: TPerso<number> = {
 sex: 'Man',
 age: 18,
 name: 'hank',
};
```

type

```
interface ICommon {
 sex: string
};

interface IPerson<T> extends ICommon {
 age: T;
 name: string
};

type TCommon = {
 sex: string,
};

type TPerso<T> = {
 age: T;
 name: string
} & TCommon; //

//
type P1 = IPerson<number> | TPerso<number>;
//
type P2 = [IPerson<number>, TPerso<number>];
```

## **typeof**

`typeof`

```
class Person {
 setPerson(age: number, name: string) {}

}

type TPerson = typeof Person;

const CPerson: TPerson = class {
 setPerson(age: number, name: string) {}

}
```

## TypeScript d.ts

TypeScript JavaScript

d.ts

# TypeScript

TypeScript 1.5

\*\*\*\*\*

"\*\*\*\*\*ECMAScript 2015module X {namespace X {

JavaScript

--outFile  
WebHTML<script>

CommonJs/Require.js  
JS

Node.js

ECMAScript 2015

/// <reference>-ing a module

/// <reference ... />import  
...,import x from "...";const x = require("...");

.ts.tsx.d.ts

.d.ts

myModules.d.ts

// In a .d.ts file or .ts file that is not a module:  
**declare module "SomeModule" {**  
  **export function fn(): string;**  
**}**

myOtherModule.ts

/// <reference path="myModules.d.ts" />  
**import \* as m from "SomeModule";**

TypeScriptnode.d.ts

shapes.ts

```
export namespace Shapes {
 export class Triangle { /* ... */ }
 export class Square { /* ... */ }
}
```

ShapesTriangleSquare

shapeConsumer.ts

```
import * as shapes from "./shapes";
let t = new shapes.Shapes.Triangle(); // shapes.Shapes?
```

TypeScript

shapes.ts

```
export class Triangle { /* ... */ }
export class Square { /* ... */ }
```

shapeConsumer.ts

```
import * as shapes from "./shapes";
let t = new shapes.Triangle();
```

JSTypeScriptJS

commonjsumdoutFileTypeScript 1.8amdsystemoutFile

## TypeScript

Decorator@expressionexpression@sealedsealed()

```
function sealed(target) {
 //...
}
```

--experimentalDecorators--target“ES5”

```
tsc default.ts --target ES5 --experimentalDecorators
```

tsconfig.jsonexperimentalDecoratorstarget

```
{
 "compilerOptions": {
 "target": "ES5",
 "experimentalDecorators": true
 }
}
```

undefined@sealed

```
@sealed
class Person {
 name: string;
 constructor(name: string) {
 this.name = name;
 }
}
function sealed(constructor: Function) {
 Object.seal(constructor);
 Object.seal(constructor.prototype);
}
```

TypeScript\_decorated()Person

```
var Person = /** @class */ (function() {
 function Person(name) {
 this.name = name;
 }
 Person = __decorate([sealed], Person);
 return Person;
})();
```

.d.ts

- 1
- 2
- 3ES5undefined

Person.prototype“cover”getName()“freedom”“strick”

```

class Person {
 @cover
 getName(name) {
 return name;
 }
}
function cover(target: any, key: string, descriptor: PropertyDescriptor) {
 descriptor.value = function() {
 return "freedom";
 };
 return descriptor;
}
let person = new Person();
person.getName("strick"); // "freedom"

```

TypeScript get set

Person.name "freedom" "strick"

```

class Person {
 private _name: string;
 @access
 get name() {
 return this._name;
 }
 set name(name) {
 this._name = name;
 }
}
function access(target: any, key: string, descriptor: PropertyDescriptor) {
 descriptor.get = function() {
 return "freedom";
 };
 return descriptor;
}
let person = new Person();
person.name = "strick";
console.log(person.name); // "freedom"

```

Person.name @property

```

class Person {
 @property
 name: string;
}

function property(target: any, key: string) {
 Object.defineProperty(target, key, {
 value: "freedom"
 });
}

let person = new Person();
person.name = "strick";
console.log(person.name); // "freedom"

```

```

let params = [];
class Person {
 @func
 getName(@required name) {
 return name;
 }
}

```

@func getName() params @required

```

function func(target: any, key: string, descriptor: PropertyDescriptor) {
 const method = descriptor.value;
 descriptor.value = function () {
 return method.apply(this, params);
 };
 return descriptor;
}

function required(target: any, key: string, index: number) {
 params[index] = "freedom";
}

```

Person.getName() "freedom"

```

let person = new Person();
person.getName("strick"); // "freedom"

```

cover() value

```
function cover(value: string) {
 return function(target: any, key: string, descriptor: PropertyDescriptor) {
 descriptor.value = function() {
 return value;
 };
 return descriptor;
 };
}
```

@cover

```
class Person {
 @cover("freedom")
 getName(name) {
 return name;
}
}
```

```
***** *****/
@first @second desc
***** *****/
@first
@second
desc
```

```
function first() {
 console.log(1);
 return function(target: any, key: string, descriptor: PropertyDescriptor) {
 console.log(2);
 };
}
function second() {
 console.log(3);
 return function(target: any, key: string, descriptor: PropertyDescriptor) {
 console.log(4);
 };
}
```

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```
class Person {
 @first()
 @second()
 getName(name) {
 return name;
}
}
```

- 1. WXML WeiXin Markup Language.
- 2. WXSS (WeiXin Style Sheets) WXML
- 3. js
- 4. json tabBar

- 1. js
- 2. app. js
- 3.

- 1. HTMLdata-\*e. currentTarget. datasetonloadparamdata-
- 2. id e. currentTarget. idid,
- 3. navigator

- 1.
- 2.
- 3. data
- 4.

## App

JavaScript. WXML. WXSS

JavaScriptJavaScriptAppH5AppAPIH5H5H5APIH5

WXMLWXMLXMLHTML

WXSSWXSSCSS

UI

webviewappServicewebViewUlappService. JSBridgeUI.

- 1.
- 2.
3. App
4. App
- 5.

1. 1M5
2. .
- 3.
- 4.

## H5

- 1.

HTML5webview

- 2.

BUG

- 3.

- 4.

HTML5

app.js

```
success: function(info) {
 that.apirtnCallback(info)
}
```

index.js

```
onLoad: function() {
 app.apirtnCallback = res => {
 console.log(res)
 }
}
```

## vue

this. data

```
this.setData({
 noBind: true
})
```

## WXSSCSS

1. wxss
2. Body, import

## webview

jweixin-1.3.2.js

```
wx.miniProgram.navigateTo({
 url: '/pages/login/login' + '$params'
})
```

wx.getUserInfoWithCredentials true encryptedData union\_id

view scroll-view, , onPullDownRefresh

## webview

- 1.
2. h5jweixin-1.3.2.js
3. 1.7.1
4. h5appidappidopenid

- 1.
2. html html lpdiv view

## webview

switchTab success

```
success: function(e) {
 var page = getCurrentPages().pop();
 if (page == undefined || page == null) return;
 page.onLoad();
}
```

webview

```
wx.miniProgram.switchTab({
 url: '/pages/index/index'
})
```

## Vue

1. wx:for="list" v-for="(item, index) in list"
2. data this.data.uinfoVuethis.uinfothis.setData({uinfo:1})Vuethis.uinfo=1

```
// app.js
App({
 onLaunch(options) {
 // Do something initial when launch.
 },
 onShow(options) {
 // Do something when show.
 },
 onHide() {
 // Do something when hide.
 },
 onError(msg) {
 console.log(msg)
 },
 globalData: 'I am global data'
})
```

```
//index.js
Page({
 data: {
 text: "This is page data."
 },
 onLoad: function(options) {
 //
 },
 onShow: function() {
 //
 }
})
```

```
},
onReady: function() {
 //
},
onHide: function() {
 //
},
onUnload: function() {
 //
},
onPullDownRefresh: function() {
 //
},
onReachBottom: function() {
 //
},
onShareAppMessage: function () {
 //
},
onPageScroll: function() {
 //
},
onResize: function() {
 //
},
onTabItemTap(item) {
 // tab
 console.log(item.index)
 console.log(item.pagePath)
 console.log(item.text)
},
//

viewTap: function() {
 this.setData({
 text: 'Set some data for updating view.'
 }, function() {
 // this is setData callback
 })
},
//

customData: {
 hi: 'MINA'
}
})
```