

debugging



by Park Jinyung

jh.park@theuber.co.kr

INDEX

- What is debugging?
- How to debugging?
- 🌎 Chrome Dev Tools
 - alert();
 - console
 - Network
 - Breakpoints
 - Blackboxing

What is debugging?

bug?

프로그램 내의 결함이나 문제점을 이야기하는 것으로
프로그래밍 언어 COBOL의 개발을 주도한
그레이스 호퍼가 1945년 Mark II의 오작동 원인을
찾다가 컴퓨터에 나방이 껴있는 걸 발견한 것

bug?

0800 Antran started
1000 " stopped - antran ✓
13" 00 (032) MP - MC
(033) PRO 2
coset

$\left\{ \begin{array}{l} 1.2700 \quad 9.037847025 \\ 9.037846795 \end{array} \right.$ coset
~~1.982147000~~
~~2.130476715(-3)~~ 4.615925059(-2)
2.130476415
2.130676415

Relays 6-2 in 033 failed special speed test
in relay

Relay
2145
Relay 3370

1100 Started Cosine Tape (Sine check)
1525 Started Multi Adder Test.

1545



Relay #70 Panel F
(moth) in relay.

1630 Antran started.
1700 closed down.

First actual case of bug being found.

debugging === **remove bug**

컴퓨터 프로그램의 정확성이나
논리적인 오류(버그)를 검출하여 제거하는 과정

How to debugging?



Chrome Dev Tools



Chrome Dev Tools

- `alert();`
- `console`
- Network
- Breakpoint
- Blackboxing

```
alert();
```

PASS 😊

console



Chrome Dev Tools > `console`

`console.log();`

`console.dir();`

`console.time();`

`console.group();`

`console.table();`



`console.log();` // 로그

`console.dir();` // 폴더화(객체)

`console.time();` // 경과시간

`console.group();` // 그룹지정

`console.table();` // 데이터 시각화

```
console.log();
```

 **Chrome Dev Tools > console > console.log()**

```
console.log(arr[2]);
```

```
console.log('이름: ' + obj.name);
```

```
if (goal === true) {  
    console.log('성공');  
} else {  
    console.log('실패');  
}
```

```
console.dir();
```



Chrome Dev Tools > `console` > `console.dir();`

```
var el = document.getElementById('name');

console.log(el);
console.dir(el);
```



Chrome Dev Tools > `console` > `console.dir();`

```
> console.log(el);
  ▼<div id="header">
    ►<div class="header_inner">...</div>
    ►<div id="gnb" style="height: 1259px;">...</div>
  </div>
```



Chrome Dev Tools > `console` > `console.dir();`

```
> console.dir(el);
  ▼div#header ⓘ
    accessKey: ""
    align: ""
    assignedSlot: null
  ►attributeStyleMap: StylePropertyMap {size: 0}
  ►attributes: NamedNodeMap {0: id, id: id, length: 1}
    autocapitalize: ""
    baseURI: "http://210.16.195.78:8040/converter/simulation-tool.do"
    childElementCount: 2
  ►childNodes: NodeList(5) [text, div.header_inner, text, div#gnb, text]
  ►children: HTMLCollection(2) [div.header_inner, div#gnb, gnb: div#gnb]
```

```
console.time();
```



Chrome Dev Tools > `console` > `console.time();`

```
console.time('반복문 경과 시간');

var arr = [];
for (var i = 1; i < 1000; i++) {
    for (var j = 1; j < 1000; j++) {
        arr.push(j);
    }
}

console.timeEnd('반복문 경과 시간');
```



Chrome Dev Tools > `console` > `console.time();`

```
> console.time('반복문 경과 시간');

var arr = [];
for (var i = 1; i < 1000; i++) {
    for (var j = 1; j < 1000; j++) {
        arr.push(j);
    }
}

console.timeEnd('반복문 경과 시간');
```

반복문 경과 시간: 20.490234375ms

VM167:10

```
console.group();
```

 **Chrome Dev Tools > console > console.group();**

```
var _name = ['박진형', '김혜인', '김웅진', '최지영'];
var _location = ['하남', '청주', '인천', '경기'];

console.group('이름');
console.log(_name);
console.groupEnd('이름');

console.group('지역');
console.log(_location);
console.groupEnd('지역');
```

 Chrome Dev Tools > `console` > `console.group();`

```
> var _name = ['박진형', '김혜인', '김웅진', '최지영'];
var _location = ['하남', '청주', '인천', '경기'];

console.group('이름');
console.log(_name);
console.groupEnd('이름');

console.group('지역');
console.log(_location);
console.groupEnd('지역');
```

▼ 이름

VM737:

```
▶ (4) ["박진형", "김혜인", "김웅진", "최지영"]
```

VM737:

▼ 지역

VM737:

```
▶ (4) ["하남", "청주", "인천", "경기"]
```

VM737:

```
console.table();
```



Chrome Dev Tools > `console` > `console.table();`

```
var data = [
  {
    "name": "박진형",
    "location": "하남",
    "tel": "4989"
  },
  {
    "name": "정혜윤",
    "location": "남양주",
    "tel": "4987"
  },
  {
    "name": "김웅진",
    "location": "일산",
    "tel": "4978"
  }
];
```



Chrome Dev Tools > `console` > `console.table();`

```
> console.table(data);
```

VM9116:1

(index)	name	location	tel
0	"박진형"	"하남"	"4989"
1	"정혜윤"	"남양주"	"4987"
2	"김웅진"	"일산"	"4978"

▶ Array(3)

Network



Chrome Dev Tools > Network

The screenshot shows the Network tab in the Chrome Dev Tools interface. At the top, there are tabs for Elements, Console, Sources, Network (which is selected), Memory, Performance, Application, Security, Audits, and Adblock Plus. Below the tabs is a toolbar with icons for play, stop, and search, followed by a 'View' section containing 'Group by frame', 'Preserve log', 'Disable cache', and 'Offline' checkboxes. A dropdown menu labeled 'No throttling' is open, showing options: Disabled (selected), No throttling (highlighted in blue), Presets, Fast 3G, Slow 3G, Offline, Custom, test_loading, and Add... . The main area displays a timeline from 10 ms to 50 ms with various network requests listed below it. The columns in the list are Status, Type, and several other columns that are mostly empty or have placeholder text like 'Status'.

 Chrome Dev Tools > Network 

network example

Breakpoints





Chrome Dev Tools > Breakpoints ⏱

The screenshot shows the Chrome DevTools interface with the following details:

- Sources Tab:** The "Sources" tab is active. The left sidebar shows the file structure: top, 210.16.195.78:8040, converter, simulation-tool.do, resources, www.google-analytics.com, and www.googletagmanager.com. The file "simulation-tool.do" is currently selected.
- Code View:** The main area displays the code for "common_chart.js". A red arrow points to line 673, column 75, where a breakpoint is set. The code includes comments in Korean and English, such as "/* Frequency */" and "/* 범위를 벗어난 항목이 한개라도 존재하면 팝업내 목록에 표시 */".
- Call Stack:** The right sidebar shows the "Call Stack" section, which is currently empty and labeled "Not paused".
- Breakpoints:** The "Breakpoints" section shows "No breakpoints". It includes sections for XHR/fetch Breakpoints, DOM Breakpoints, Global Listeners, and Event Listener Breakpoints.
- Console Tab:** The "Console" tab is active. It shows the message "Console was cleared" and has a "top" button. The status bar at the bottom right indicates "VM849:1".



Chrome Dev Tools > Breakpoints ⏱

The screenshot shows the Chrome DevTools interface with the following details:

- DevTools - 210.16.195.78:8040/converter/simulation-tool.do**: The active tab.
- Sources Tab**: The current tab, showing the file structure and code for `simulation-tool.do`.
- File Navigation**: A blue box highlights the `simulation-tool.do` file in the left sidebar.
- Code View**: The main area displays the source code for `common_chart.js`. A red arrow points to line 673, column 75, where a breakpoint is set. The code includes comments in Korean and English, such as `/* Frequency * 유도값: min 0 이상, max 0 이하 */`.
- Breakpoints Panel**: Located on the right side, it shows the following sections:
 - Watch**: No watch expressions.
 - Call Stack**: Not paused.
 - Scope**: Not paused.
 - Breakpoints**: No breakpoints.
- Console Tab**: Shows the console output with the message "Console was cleared".
- Network Tab**: Shows network activity with entries for `top`, `210.16.195.78:8040`, `converter`, `simulation-tool.do`, `resources`, `www.google-analytics.com`, and `www.googletagmanager.com`.



Chrome Dev Tools > Breakpoints



The screenshot shows the Chrome DevTools interface with the Sources tab selected. The left sidebar lists the project structure, including files like simulation-tool.do, polyfill.js, common.js, and common_chart.js. The common_chart.js file is currently open in the Source Editor, showing code related to frequency calculations and HTML generation. A blue callout box highlights the "Source Editor" label. The right panel contains the Breakpoints sidebar, which is currently empty, indicating no breakpoints have been set.

DevTools - 210.16.195.78:8040/converter/simulation-tool.do

Elements Console Sources Network Memory Performance Application Security Audits Adblock Plus HTML validator

Page Filesystem Overrides »

top
210.16.195.78:8040
converter
simulation-tool.do
resources
www.google-analytics.com
www.googletagmanager.com

simulation-tool.do polyfill.js common.js common_chart.js »

650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670

/*
 * Frequency
 * min 이하, max 이하
 */
freqMin = 0.01;
freqMax = 10;
if (freqMin > frequency || frequency > freqMax) { // 이하,
 _htmlItem.push(' Freq.');
 _listAddFlag = false;
}

_htmlItem = _htmlItem.join('');
_html.push('');
_html.push(' <div class="partname">' + _partsName + '</div>');
_html.push(' <div class="condition">');
_html.push(' <input type="checkbox" value="1" checked="checked"/> 100%');
_html.push(' <input type="checkbox" value="2" checked="checked"/> 200%');
_html.push(' <input type="checkbox" value="3" checked="checked"/> 300%');
_html.push(' <input type="checkbox" value="4" checked="checked"/> 400%');
_html.push(' <input type="checkbox" value="5" checked="checked"/> 500%');
_html.push(' <input type="checkbox" value="6" checked="checked"/> 600%');
_html.push(' <input type="checkbox" value="7" checked="checked"/> 700%');
_html.push(' <input type="checkbox" value="8" checked="checked"/> 800%');
_html.push(' <input type="checkbox" value="9" checked="checked"/> 900%');
_html.push(' <input type="checkbox" value="10" checked="checked"/> 1000%');
_html.push('</div>');

Source Editor [업데이트 표시]
Line 673, Column 75

Console What's New Search

Console was cleared
top Default levels ▾ VM849:1

Console was cleared
undefined
>

Watch No watch expressions
Call Stack Not paused
Scope Not paused
Breakpoints No breakpoints
XHR/fetch Breakpoints
DOM Breakpoints
Global Listeners
Event Listener Breakpoints



Chrome Dev Tools > Breakpoints



The screenshot shows the Chrome DevTools interface with the Sources tab selected. The left sidebar displays the file structure, and the main pane shows the code for `common_chart.js`. A red arrow points to line 673, which contains a conditional statement. A blue box labeled "Debug Info" covers the right sidebar, which includes sections for Watch, Call Stack, Scope, and Breakpoints.

DevTools - 210.16.195.78:8040/converter/simulation-tool.do

Elements Console Sources Network Memory Performance Application Security Audits Adblock Plus HTML validator

Page Filesystem Overrides »

top
210.16.195.78:8040
converter
resources
www.google-analytics.com
www.googletagmanager.com

simulation-tool.do polyfill.js common.js common_chart.js

650 `/*`
651 `* Frequency`
652 `* 유도값: min 0 이상, max 0.8`
653 `*/`
654 `freqMin = 0.01;`
655 `freqMax = 10;`
656 `if (freqMin > frequency || frequency > freqMax) { // 이상,`
657 `_htmlItem.push(''Freq.'`
658 `_listAddFlag = false;`
659 }
660
661 `_htmlItem = _htmlItem.join('\n');`
662
663 `/* 범위를 벗어난 항목이 한개라도 존재하면 팝업내 목록에 표시 */`
664 `if (!_listAddFlag) {`
665 `_html.push('');`
666 `_html.push(''<div class="partname">' + _partsName + '`
667 `_html.push(''<div class="condition">');`
668 `_html.push('');`
669 }

{ } Line 673, Column 75

Console What's New Search

Default levels ▾

Console was cleared

< undefined

>

Watch No watch expressions

Call Stack Not paused

Scope Not paused

Breakpoints

XHR/fetch Breakpoints

DOM Breakpoints

Global Listeners

Event Listener Breakpoints

VM849:1



Chrome Dev Tools > Breakpoints



The screenshot shows the Chrome DevTools interface with the Sources tab selected. The left sidebar displays the file structure: top, 210.16.195.78:8040, converter, simulation-tool.do, resources, www.google-analytics.com, and www.googletagmanager.com. The main pane shows the code for `common_chart.js`, specifically lines 650 through 673. A red arrow points to line 665, which contains the condition for adding an item to the list. The right sidebar contains sections for Watch, Call Stack, Scope, and Breakpoints, all currently empty. The bottom pane shows the Console tab with the message "Console was cleared" and a single entry: "`< undefined`". The status bar at the bottom right indicates "VM849:1".

```
650      /**
651       * Frequency
652       * 允許範囲: min 0 이상, max 10
653       */
654       freqMin = 0.01;
655       freqMax = 10;
656       if (freqMin > frequency || frequency > freqMax) { // 이상,
657           _htmlItem.push('      <span class="item">Freq.</span>');
658           _listAddFlag = false;
659       }
660
661       _htmlItem = _htmlItem.join('\n');
662
663       /* 범위를 벗어난 항목이 한개라도 존재하면 팝업내 목록에 표시 */
664       if (!_listAddFlag) {
665           _html.push('<li>');
666           _html.push('      <div class="partname">' + _partsName +
667           _html.push('      <div class="condition">');
668           _html.push('          <input type="checkbox" checked="checked" /> ' + name);
669       }
670   }
```

{ } Line 673, Column 75

Console What's New Search

Console was cleared

< undefined

Default levels ▾

VM849:1



Chrome Dev Tools > Breakpoints

The screenshot shows the Chrome Dev Tools interface with the 'Sources' tab selected. The left sidebar displays the file structure of 'simulation-tool.do'. The main pane shows the code for 'common_chart.js', specifically line 2293, which contains a breakpoint. The right sidebar contains the 'Breakpoints' section, where a checkbox for line 2293 is checked, indicating it is active. Other sections like 'Watch', 'Call Stack', and 'Scope' are also visible.

```
2283     'TCCbyDC': 'TCCDC',
2284     'LCurrent': 'Itemp_Isat',
2285     'TempRise': 'Itemp_Isat',
2286     'InductorVoltage': 'SimpleRipple',
2287     'InductorCurrent': 'SimpleRipple',
2288     'RippleVoltage': 'SimpleRipple',
2289     'Efficiency': 'EfficiencyLoss',
2290     'InductorLoss': 'EfficiencyLoss'
2291   };
2292
2293   info.graphType = typeObj.chartType;
2294   if (simulationType.hasOwnProperty(typeObj.chartType)) {
2295     info.simulationType = simulationType[typeObj.chartType];
2296   }
2297   if (typeObj.circuitType) {
2298     info.sParamCircuit = typeObj.circuitType;
2299   }
2300
2301   if (!targetObj) return info;
2302
2303   if (targetObj.hasOwnProperty('selectedPartId')) {
2304     var infoPart = semChart.getInfoPartList(targetObj.selectedPartId); // Selected Parts 정보
2305     if (infoPart) {
2306       info.paramList = infoPart;
2307     }
2308   }
2309   if (targetObj.hasOwnProperty('modelModeName')) {
2310     var modelModeChecked = getCheckedValue(targetObj.modelModeName); // Selected Model Mode 정보
2311   }

```

Line 2273, Column 31

Console What's New Search

Default levels ▾ 2 hidden



Chrome Dev Tools > Breakpoints



 **Chrome Dev Tools > Breakpoints** 

Resume script execution

Step over next function call

Step into next function call

Step out of current function

Step

Deactivate breakpoints

Pause on exceptions

Blackboxing



Chrome Dev Tools > Blackboxing

The screenshot shows the Chrome DevTools interface with the Sources tab selected. The left sidebar lists files: top, 210.16.195.78:8040, converter (with simulation-tool.do selected), resources, www.google-analytics.com, and www.googletagmanager.com. The main pane displays code from common_chart.js, specifically lines 650 to 673. The right sidebar has a context menu open, with the 'Dock side' option highlighted.

DevTools - 210.16.195.78:8040/converter/simulation-tool.do

Sources

simulation-tool.do polyfill.js common.js common_chart.js

650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669

```
/*
 * Frequency
 * 允許範囲: min 0 이상, max 0 이하
 */
freqMin = 0.01;
freqMax = 10;
if (freqMin > frequency || frequency > freqMax) { // 이상,
    _htmlItem.push('      <span class="item">Freq.</span>');
    _listAddFlag = false;
}

_htmlItem = _htmlItem.join('\n');

/* 범위를 벗어난 항목이 한개라도 존재하면 팝업내 목록에 표시 */
if (!_listAddFlag) {
    _html.push('<li>');
    _html.push('      <div class="partname">' + _partsName);
    _html.push('      <div class="condition">');
    _html.push('        <input type="checkbox" checked="checked" /> ' + name);
    _html.push('</div>');
    _html.push('</li>');
}
```

{ } Line 673, Column 75

Console What's New Search

Default levels ▾

Console was cleared

undefined

VM849:1

Dock side

Focus debugger

Hide console drawer Esc

Search Ctrl+Shift+F

Run command Ctrl+Shift+P

Open file Ctrl+P

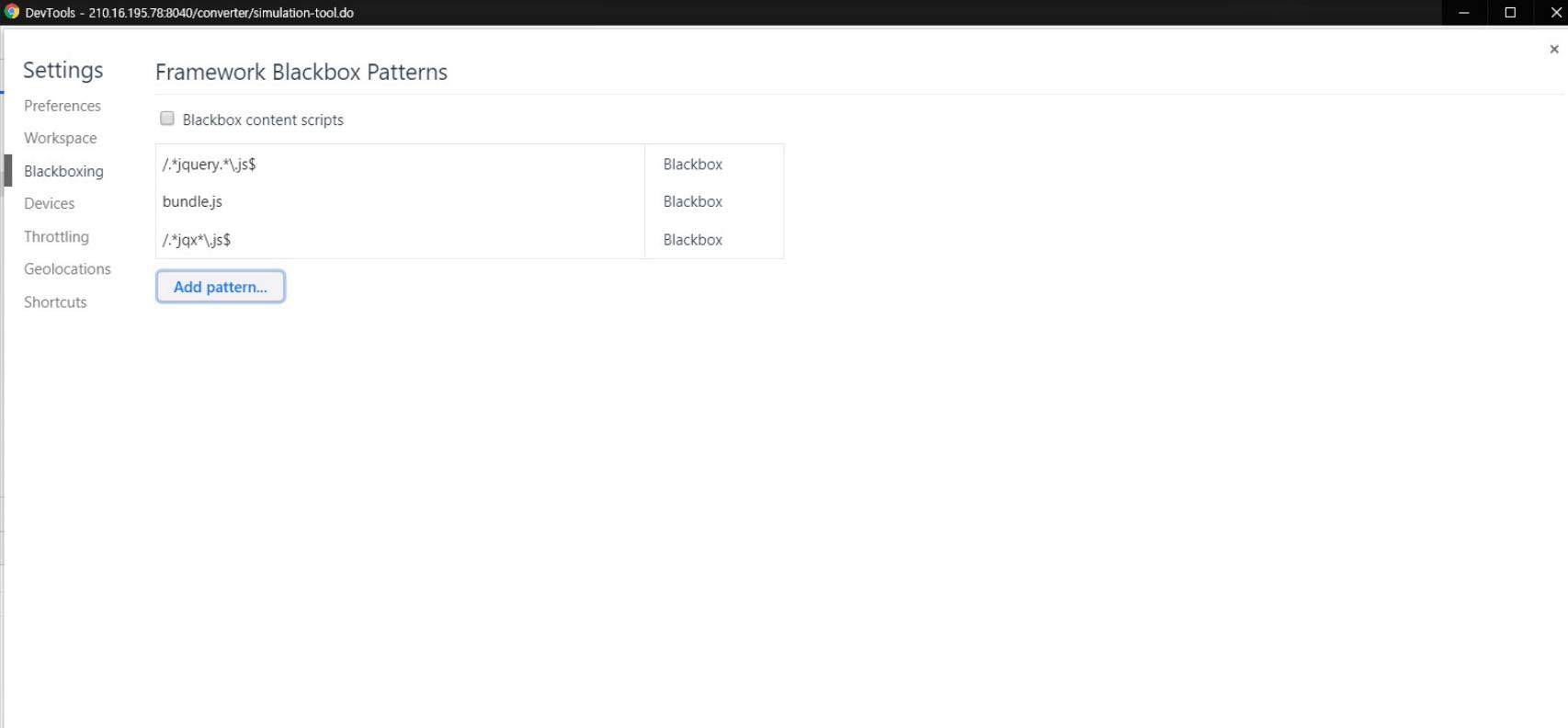
More tools

Shortcuts

Settings F1

Help

Chrome Dev Tools > Blackboxing



The screenshot shows the 'Blackboxing' section of the Chrome DevTools settings. The left sidebar has 'Blackboxing' selected. The main area is titled 'Framework Blackbox Patterns' and contains a table with three rows:

Pattern	Action
./jquery.*\.js\$	Blackbox
bundle.js	Blackbox
./jqx*.js\$	Blackbox

An 'Add pattern...' button is located at the bottom left of the table.

arctan started

" stopped - arctan ✓

{ 1.2700 9.037 847 025
9.037 846 795 com

example (console)

(033) PRO 2

~~1.682147000
1.3476715(-2)~~ 4.615925059(-2)

com ct

2.130476415

2.130676415

=====

Relays 6-2 in 033 failed special sped test

in relay

" 10.000 test

example1

Started Cosine Tape (Sine check)
example2 Mult + Adder Test.



Relay #70 Panel F
(moth) in relay.

First actual case of bug being found.

arctangent started.

closed down.

참고

git블로그

github

END



