

Line wrap

```

1 1<!DOCTYPE html>
2 <html lang="en-US">
3 <head>
4 <title>HTML Input Attributes</title>
5 <meta charset="utf-8">
6 <meta name="viewport" content="width=device-width, initial-scale=1">
7 <meta name="Keywords" content="HTML, Python, CSS, SQL, JavaScript, How to, PHP, Java, C, C++, C#, jQuery, Bootstrap, Colors, W3.CSS, XML, MySQL, Icons, NodeJS, React, Graphics, Angular, R, AI, Git, Data Sc
8 <meta name="Description" content="Well organized and easy to understand Web building tutorials with lots of examples of how to use HTML, CSS, JavaScript, SQL, Python, PHP, Bootstrap, Java, XML and more.">
9 <meta property="og:image" content="https://www.w3schools.com/images/w3schools_logo_436_2.png">
10 <meta property="og:image:type" content="image/png">
11 <meta property="og:image:width" content="436">
12 <meta property="og:image:height" content="228">
13 <meta property="og:description" content="W3Schools offers free online tutorials, references and exercises in all the major languages of the web. Covering popular subjects like HTML, CSS, JavaScript, Python
14 <link rel="icon" href="/favicon.ico" type="image/x-icon">
15 <link rel="preload" href="/lib/fonts/fontawesome.woff2?14663396" as="font" type="font/woff2" crossorigin>
16 <link rel="preload" href="/lib/fonts/source-code-pro-v14-latin-regular.woff2" as="font" type="font/woff2" crossorigin>
17 <link rel="preload" href="/lib/fonts/roboto-mono-v13-latin-500.woff2" as="font" type="font/woff2" crossorigin>
18 <link rel="preload" href="/lib/fonts/source-sans-pro-v14-latin-700.woff2" as="font" type="font/woff2" crossorigin>
19 <link rel="preload" href="/lib/fonts/source-sans-pro-v14-latin-600.woff2" as="font" type="font/woff2" crossorigin>
20 <link rel="preload" href="/lib/fonts/source-sansPro-Regular.woff2" as="font" type="font/woff2" crossorigin>
21 <link rel="preload" href="/lib/fonts/freckle-face-v9-latin-regular.woff2" as="font" type="font/woff2" crossorigin>
22 <link rel="stylesheet" href="/lib/w3schools32.css">
23
24
25 <!-- Google Tag Manager -->
26 <script>
27 (function(w,d,s,l,i){w[l]=w[l]||[];w[l].push({'gtm.start':
28 new Date().getTime(),event: 'gtm.js'})};var f=d.getElementsByTagName(s)[0],
29 j=d.createElement(s),dl=l!='dataLayer'?&l='+l:'';j.async=true;j.src=
30 'https://www.googletagmanager.com/gtm.js?id='+i+dl;f.parentNode.insertBefore(j,f);
31 })(window,document,'script','dataLayer','GTM-KTCFC3S');
32
33 var subjectFolder = location.pathname;
34 subjectFolder = subjectFolder.replace("/", " ");
35 if (subjectFolder.startsWith("python")) == true ) {
36   if (subjectFolder.includes("/numpy") == true ) {
37     subjectFolder = "numpy/"
38   } else if (subjectFolder.includes("/pandas") == true ) {
39     subjectFolder = "pandas/"
40   } else if (subjectFolder.includes("/scipy") == true ) {
41     subjectFolder = "scipy/"
42   }
43 }
44 subjectFolder = subjectFolder.substr(0, subjectFolder.indexOf("/"));
45 </script>
46 <!-- End Google Tag Manager -->
47
48 <script src="/lib/uic.js?v=1.0.5"></script>
49 <script data-cfasync="false" type="text/javascript">
50 var k42 = false;
51
52 k42 = true;
53
54 </script>
55 <script data-cfasync="false" type="text/javascript">
56   window.snigelPubConf = {
57     "adengine": {
58
59       "activeAdUnits": ["main_leaderboard", "sidebar_top", "bottom_left", "bottom_right"]
60
61     }
62   }
63 uic_r_a()
64 </script>
65 <script type='text/javascript'>
66 var stickyadstatus = "";
67 function fix_stickyad(){
68   document.getElementById("stickypos").style.position = "sticky";
69   var elem = document.getElementById("stickyadcontainer");
70   if (!elem) {return false;}
71   if (document.getElementById("skyscraper")) {
72     var skyWidth = Number(w3_getStyleValue(document.getElementById("skyscraper"), "width").replace("px", ""));

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73     }
74   else {
75     var skyWidth = Number(w3_getComputedStyle(document.getElementById("right"), "width").replace("px", ""));
76   }
77   elem.style.width = skyWidth + "px";
78   if (window.innerWidth <= 992) {
79     elem.style.position = "";
80     elem.style.top = stickypos + "px";
81     return false;
82   }
83   var stickypos = document.getElementById("stickypos").offsetTop;
84   var docTop = window.pageYOffset || document.documentElement.scrollTop || document.body.scrollTop;
85   var adHeight = Number(w3_getComputedStyle(elem, "height").replace("px", ""));
86   if (stickyadstatus == "") {
87     if ((stickypos - docTop) < 100) {
88       elem.style.position = "fixed";
89       elem.style.top = "100px";
90       stickyadstatus = "sticky";
91       document.getElementById("stickypos").style.position = "sticky";
92     }
93   } else {
94     if ((docTop + 100) - stickypos < 0) {
95       elem.style.position = "";
96       elem.style.top = stickypos + "px";
97       stickyadstatus = "";
98       document.getElementById("stickypos").style.position = "static";
99     }
100   }
101 }
102 if (stickyadstatus == "sticky") {
103   if ((docTop + adHeight + 100) > document.getElementById("footer").offsetTop) {
104     elem.style.position = "absolute";
105     elem.style.top = (document.getElementById("footer").offsetTop - adHeight) + "px";
106     document.getElementById("stickypos").style.position = "static";
107   } else {
108     elem.style.position = "fixed";
109     elem.style.top = "100px";
110     stickyadstatus = "sticky";
111     document.getElementById("stickypos").style.position = "sticky";
112   }
113 }
114 }
115 function w3_getComputedStyle(elmnt,style) {
116   if (window.getComputedStyle) {
117     return window.getComputedStyle(elmnt,null).getPropertyValue(style);
118   } else {
119     return elmnt.currentStyle[style];
120   }
121 }
122 </script>
123
124 <script async data-cfasync="false" src="https://cdn.snigelweb.com/adengine/w3schools.com/loader.js" type="text/javascript"></script>
125 <script src="/lib/common-deps.js?v=1.0.2"></script>
126 <script src="/lib/user-session.js?v=1.0.28"></script>
127 <script src="/lib/my-learning.js?v=1.0.20"></script>
128
129
130 </head>
131 <body>
132
133 <div id="pagetop" class="w3-bar notranslate w3-white" style="position:fixed;padding-left:1px;padding-right:16px">
134   <a href="https://www.w3schools.com" class="w3-bar-item w3-button w3-hover-none w3-left ga-top ga-top-w3home" title="Home" style="width:75px;">
135     <i class="fa fa-logo ws-hover-text-green" style="position:relative;z-index:1;color:#04AA6D;font-size:36px!important;"></i>
136   </a>
137
138   <a class="w3-bar-item w3-button w3-hide-small barex bar-item-hover w3-padding-16 ga-top ga-top-tut-and-ref" href="javascript:void(0)" onclick="w3_open_nav('tutorials')" id="navbtn_tutorials" title="Tutor">
139     <a class="w3-bar-item w3-button w3-hide-small barex bar-item-hover w3-padding-16 ga-top ga-top-exc-and-quz" href="javascript:void(0)" onclick="w3_open_nav('exercises')" id="navbtn_exercises" title="Exerc">
140     <a class="w3-bar-item w3-button w3-hide-small barex bar-item-hover w3-padding-16 ga-top ga-top-cert-and-course ws-hide-750" href="javascript:void(0)" onclick="w3_open_nav('certified')" id="navbtn_certifi">
141     <a class="w3-bar-item w3-button w3-hide-small barex bar-item-hover w3-padding-16 ga-top ga-top-services" href="javascript:void(0)" onclick="w3_open_nav('services')" id="navbtn_services" title="Our Servic">
142     <a class="w3-bar-item w3-button bar-item-hover w3-padding-16 ga-top ga-top-menu" href="javascript:void(0)" onclick="w3_open()" id="navbtn_menu" title="Menu" style="width:93px">Menu <i class="fa fa-caret->
143
144   <div id="loginactioncontainer" class="w3-right" style="padding-top:8px;padding-bottom:8px;margin-left:1px;width:55px">
145     <div id="mypagediv"></div>
146     <a id="w3loginbtn" title="Login to your account" class="w3-bar-item w3-btn bar-item-hover w3-right ws-light-green ga-top ga-top-login" href="https://profile.w3schools.com/log-in?redirect\_url=https%3A%2F%2Fwww.w3schools.com/html/html\_form\_attributes.asp">Login</a>

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221 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-html" href="/html/default.asp" title="HTML Tutorial">Tutorial</a>
222 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-html" href="/tags/default.asp" title="HTML Reference">Reference</a>
223 <br>
224 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-css" href="/css/default.asp" title="CSS Tutorial"><span class="learn-span">Learn</span> CSS</a>
225 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-css" href="/css/default.asp" title="CSS Tutorial">Tutorial</a>
226 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-css" href="/cssref/default.asp" title="CSS Reference">Reference</a>
227 <br>
228 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-rwd" href="/css/css_rwd_intro.asp" title="Responsive Web Design Tutorial"><span class="learn-span">Learn</span> RWD</a>
229 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-rwd" href="/css/css_rwd_intro.asp" title="Responsive Web Design Tutorial">Tutorial</a>
230 <br>
231 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-bs" href="/bootstrap/bootstrap_ver.asp" title="Bootstrap Tutorials"><span class="learn-span">Learn</span> Bootstrap</a>
232 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-bs" href="/bootstrap/bootstrap_ver.asp" title="Bootstrap Tutorials">Overview</a>
233 <br>
234 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-w3css" href="/w3css/default.asp" title="W3.CSS Tutorial"><span class="learn-span">Learn</span> W3.CSS</a>
235 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-w3css" href="/w3css/default.asp" title="W3.CSS Tutorial">Tutorial</a>
236 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-w3css" href="/w3css/w3css_references.asp" title="W3.CSS Reference">Reference</a>
237 <br>
238 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-sass" href="/sass/default.php" title="SASS Tutorial"><span class="learn-span">Learn</span> Sass</a>
239 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-sass" href="/sass/default.php" title="SASS Tutorial">Tutorial</a>
240 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-sass" href="/sass/sass_functions_string.php" title="SASS Reference">Reference</a>
241 <br>
242 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-colors" href="/colors/default.asp" title="Colors Tutorial"><span class="learn-span">Learn</span> Colors</a>
243 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-colors" href="/colors/default.asp" title="Colors Tutorial">Tutorial</a>
244 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-colors" href="/colors/colors_fs595.asp" title="Colors Reference">Reference</a>
245 <br>
246 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-icons" href="/icons/default.asp" title="Icons Tutorial"><span class="learn-span">Learn</span> Icons</a>
247 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-icons" href="/icons/default.asp" title="Icons Tutorial">Tutorial</a>
248 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-icons" href="/icons/icons_reference.asp" title="Icons Reference">Reference</a>
249 <br>
250 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-svg" href="/graphics/svg_intro.asp" title="SVG Tutorial"><span class="learn-span">Learn</span> SVG</a>
251 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-svg" href="/graphics/svg_intro.asp" title="SVG Tutorial">Tutorial</a>
252 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-svg" href="/graphics/svg_reference.asp" title="SVG Reference">Reference</a>
253 <br>
254 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-canvas" href="/graphics/canvas_intro.asp" title="Canvas Tutorial"><span class="learn-span">Learn</span> Canvas</a>
255 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-canvas" href="/graphics/canvas_intro.asp" title="Canvas Tutorial">Tutorial</a>
256 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-canvas" href="/jsref/api_canvas.asp" title="Canvas Reference">Reference</a>
257 <br>
258 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-graphics" href="/graphics/default.asp" title="Graphics Tutorial"><span class="learn-span">Learn</span> Graphics</a>
259 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-graphics" href="/graphics/default.asp" title="Graphics Tutorial">Tutorial</a>
260 <br>
261 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-howto" href="/howto/default.asp" title="How To - Code Snippets"><span class="learn-span">Learn</span> How To</a>
262 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-howto" href="/howto/default.asp" title="How To - Code Snippets">Tutorial</a>
263 <br>
264
265 <div class="w3-hide-small">
266   <h3 style="margin-top:35px;">Data Analytics</h3>
267   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ai" href="/ai/default.asp" title="Artificial Intelligence Tutorial"><span class="learn-span">Learn</span> AI</a>
268   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ai" href="/ai/default.asp" title="Artificial Intelligence Tutorial">Tutorial</a>
269   <br>
270   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-genai" href="/gen_ai/index.php" title="Generative AI Tutorial"><span class="learn-span">Learn</span> Generative AI</a>
271   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-genai" href="/gen_ai/index.php" title="Generative AI Tutorial">Tutorial</a>
272   <br>
273   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-chatgpt35" href="/gen_ai/chatgpt-3-5/index.php" title="ChatGPT-3.5 Tutorial"><span class="learn-span">Learn</span> ChatGPT-3.5</a>
274   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-chatgpt35" href="/gen_ai/chatgpt-3-5/index.php" title="ChatGPT-3.5 Tutorial">Tutorial</a>
275   <br>
276   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-chatgpt4" href="/gen_ai/chatgpt-4/index.php" title="ChatGPT-4 Tutorial"><span class="learn-span">Learn</span> ChatGPT-4</a>
277   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-chatgpt4" href="/gen_ai/chatgpt-4/index.php" title="ChatGPT-4 Tutorial">Tutorial</a>
278   <br>
279   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-bard" href="/gen_ai/bard/index.php" title="Google Bard Tutorial"><span class="learn-span">Learn</span> Google Bard</a>
280   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-bard" href="/gen_ai/bard/index.php" title="Google Bard Tutorial">Tutorial</a>
281   <br>
282   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ml" href="/python/python_ml_getting_started.asp" title="Machine Learning Tutorial"><span class="learn-span">Learn</span> Machine Learning</a>
283   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ml" href="/python/python_ml_getting_started.asp" title="Machine Learning Tutorial">Tutorial</a>
284   <br>
285   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ds" href="/datascience/default.asp" title="Data Science Tutorial"><span class="learn-span">Learn</span> Data Science</a>
286   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ds" href="/datascience/default.asp" title="Data Science Tutorial">Tutorial</a>
287   <br>
288   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-numpy" href="/python/numpy/default.asp" title="NumPy Tutorial"><span class="learn-span">Learn</span> NumPy</a>
289   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-numpy" href="/python/numpy/default.asp" title="NumPy Tutorial">Tutorial</a>
290   <br>
291   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-pandas" href="/python/pandas/default.asp" title="Pandas Tutorial"><span class="learn-span">Learn</span> Pandas</a>
292   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-pandas" href="/python/pandas/default.asp" title="Pandas Tutorial">Tutorial</a>
293   <br>
294   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-scipy" href="/python/scipy/index.php" title="SciPy Tutorial"><span class="learn-span">Learn</span> SciPy</a>

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295 <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-sci" href="/python/scipy/index.php" title="SciPy Tutorial">Tutorial</a>
296 <br>
297 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-matplotlib" href="/python/matplotlib_intro.asp" title="Matplotlib Tutorial"><span class="learn-span">Learn</span> Matplotlib</a>
298 <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-matplotlib" href="/python/matplotlib_intro.asp" title="Matplotlib Tutorial">Tutorial</a>
299 <br>
300 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-stat" href="/statistics/index.php" title="Statistics Tutorial"><span class="learn-span">Learn</span> Statistics</a>
301 <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-stat" href="/statistics/index.php" title="Statistics Tutorial">Tutorial</a>
302 <br>
303 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-excel" href="/excel/index.php" title="Excel Tutorial"><span class="learn-span">Learn</span> Excel</a>
304 <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-excel" href="/excel/index.php" title="Excel Tutorial">Tutorial</a>
305 <br>
306 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-sheets" href="/googlesheets/index.php" title="Google Sheets Tutorial"><span class="learn-span">Learn</span> Google Sheets</a>
307 <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-sheets" href="/googlesheets/index.php" title="Google Sheets Tutorial">Tutorial</a>
308 <br>
309 <div class="w3-hide-large">
310   <h3 style="margin-top:35px;">Web Building</h3>
311   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-spaces fixpaddingsmallmenu" href="/spaces/index.php" title="Get Your Own Website With W3schools Spaces">Create a Website <span class="ribbon-topnav" style="float:right">W3Schools</span></a>
312   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-server fixpaddingsmallmenu" href="/spaces/index.php" title="Get Your Own Server With W3schools Spaces">Create a Server <span class="ribbon-topnav" style="float:right">W3Schools</span></a>
313   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-wheretostart fixpaddingsmallmenu" href="/where_to_start.asp" title="Where To Start - Web Development">Where To Start</a>
314   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-templates fixpaddingsmallmenu" href="/w3css/w3css_templates.asp" title="Free Web Templates">Web Templates</a>
315   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-webstats fixpaddingsmallmenu" href="/browsers/default.asp" title="Web Statistics">Web Statistics</a>
316   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-certificates fixpaddingsmallmenu" href="https://campus.w3schools.com" target="_blank" title="Get Certified">Web Certificates</a>
317   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-web-development fixpaddingsmallmenu" href="/whatis/default.asp" title="Web Development Roadmaps">Web Development</a>
318   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-code-editor fixpaddingsmallmenu" href="/tryit/default.asp" title="Try it - Code Editor">Code Editor</a>
319   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-typingspeed fixpaddingsmallmenu" href="/typingspeed/default.asp" title="Test Your Typing Speed">Test Your Typing Speed</a>
320   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-codegame fixpaddingsmallmenu" href="/codegame/index.html" target="_blank" title="Play a Code Game">Play a Code Game</a>
321   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-cybersec fixpaddingsmallmenu" href="/cybersecurity/index.php" title="Cyber Security Tutorial">Cyber Security</a>
322   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-accessi fixpaddingsmallmenu" href="/accessibility/index.php" title="Accessibility Security Tutorial">Accessibility</a>
323   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-newsletter fixpaddingsmallmenu" href="https://campus.w3schools.com/pages/newsletter" target="_blank" title="W3Schools Newsletter">W3Schools Newsletter</a>
324 </div>
325 </div>
326 </div>
327 <br>
328 <div class="w3-col l4 m6">
329   <h3 class="w3-margin-top">JavaScript</h3>
330   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-js" href="/js/default.asp" title="JavaScript Tutorial"><span class="learn-span">Learn</span> JavaScript</a>
331   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-js" href="/js/default.asp" title="JavaScript Tutorial">Tutorial</a>
332   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-js" href="/jsref/default.asp" title="JavaScript Reference">Reference</a>
333   <br>
334   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-react" href="/react/default.asp" title="React Tutorial"><span class="learn-span">Learn</span> React</a>
335   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-react" href="/react/default.asp" title="React Tutorial">Tutorial</a>
336   <br>
337   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-jquery" href="/jquery/default.asp" title="jQuery Tutorial"><span class="learn-span">Learn</span> jQuery</a>
338   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-jquery" href="/jquery/default.asp" title="jQuery Tutorial">Tutorial</a>
339   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-jquery" href="/jquery/jquery_ref_overview.asp" title="jQuery Reference">Reference</a>
340   <br>
341   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-vue" href="/vue/index.php" title="Vue Tutorial"><span class="learn-span">Learn</span> Vue</a>
342   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-vue" href="/vue/index.php" title="Vue Tutorial">Tutorial</a>
343   <br>
344   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-angularjs" href="/angular/default.asp" title="Angular Tutorial"><span class="learn-span">Learn</span> AngularJS</a>
345   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-angularjs" href="/angular/default.asp" title="Angular Tutorial">Tutorial</a>
346   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-angularjs" href="/angular/angular_ref_directives.asp" title="Angular Reference">Reference</a>
347   <br>
348   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-json" href="/js/js_json_intro.asp" title="JSON Tutorial"><span class="learn-span">Learn</span> JSON</a>
349   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-json" href="/js/js_json_intro.asp" title="JSON Tutorial">Tutorial</a>
350   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-json" href="/jsref/jsref_obj_json.asp" title="JSON Reference">Reference</a>
351   <br>
352   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ajax" href="/js/js_ajax_intro.asp" title="AJAX Tutorial"><span class="learn-span">Learn</span> AJAX</a>
353   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-ajax" href="/js/js_ajax_intro.asp" title="AJAX Tutorial">Tutorial</a>
354   <br>
355   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-appml" href="/appml/default.asp" title="AppML Tutorial"><span class="learn-span">Learn</span> AppML</a>
356   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-appml" href="/appml/default.asp" title="AppML Tutorial">Tutorial</a>
357   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-appml" href="/appml/appml_reference.asp" title="AppML Reference">Reference</a>
358   <br>
359   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-w3js" href="/w3js/default.asp" title="W3.JS Tutorial"><span class="learn-span">Learn</span> W3.JS</a>
360   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-tut-w3js" href="/w3js/default.asp" title="W3.JS Tutorial">Tutorial</a>
361   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ref-w3js" href="/w3js/w3js_references.asp" title="W3.JS Reference">Reference</a>
362   <br>
363   <div class="w3-hide-medium w3-hide-small">
364     <h3 style="margin-top:35px;">Web Building</h3>
365     <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-spaces" href="/spaces/index.php" title="Get Your Own Website With W3schools Spaces">Create a Website <span class="ribbon-topnav" style="float:right">W3Schools</span></a>
366     <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-server" href="/spaces/index.php" title="Get Your Own Server With W3schools Spaces">Create a Server <span class="ribbon-topnav" style="float:right">W3Schools</span></a>
367     <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-wheretostart" href="/where_to_start.asp" title="Where To Start - Web Development">Where To Start</a>
368   </div>

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369 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-templates" href="/w3css/w3css_templates.asp" title="Free Web Templates">Web Templates</a>
370 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-webstats" href="/browsers/default.asp" title="Web Statistics">Web Statistics</a>
371 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-certificates" href="https://campus.w3schools.com" target="_blank" title="Get Certified">Web Certificates</a>
372 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-web-development" href="/whatis/default.asp" title="Web Development Roadmaps">Web Development</a>
373 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-code-editor" href="/tryit/default.asp" title="Try it - Code Editor">Code Editor</a>
374 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-typingspeed" href="/typingspeed/default.asp" title="Test Your Typing Speed">Test Your Typing Speed</a>
375 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-codegame" href="/codegame/index.html" target="_blank" title="Play a Code Game">Play a Code Game</a>
376 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-cybersec" href="/cybersecurity/index.php" title="Cyber Security Tutorial">Cyber Security</a>
377 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-accessi" href="/accessibility/index.php" title="Accessibility Security Tutorial">Accessibility</a>
378 <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-newsletter" href="https://campus.w3schools.com/pages/newsletter" target="_blank" title="W3Schools Newsletter">Join our Newsletter</a>
379 </div>
380 </div>
381
382 <div class="w3-col l4 m6"><br class="w3-hide-large w3-hide-small">
383 <h3 class="w3-margin-top">Backend</h3>
384 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-python" href="/python/default.asp" title="Python Tutorial"><span class="learn-span">Learn</span> Python</a>
385 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-python" href="/python/default.asp" title="Python Tutorial">Tutorial</a>
386 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-python" href="/python/python_reference.asp" title="Python Reference">Reference</a>
387 <br>
388 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-sql" href="/sql/default.asp" title="SQL Tutorial"><span class="learn-span">Learn</span> SQL</a>
389 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-sql" href="/sql/default.asp" title="SQL Tutorial">Tutorial</a>
390 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-sql" href="/sql/sql_ref_keywords.asp" title="SQL Reference">Reference</a>
391 <br>
392 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-mysql" href="/mysql/default.asp" title="MySQL Tutorial"><span class="learn-span">Learn</span> MySQL</a>
393 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-mysql" href="/mysql/default.asp" title="MySQL Tutorial">Tutorial</a>
394 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-mysql" href="/mysql/mysql_datatypes.asp" title="MySQL Reference">Reference</a>
395 <br>
396 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-php" href="/php/default.asp" title="PHP Tutorial"><span class="learn-span">Learn</span> PHP</a>
397 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-php" href="/php/default.asp" title="PHP Tutorial">Tutorial</a>
398 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-php" href="/php/php_ref_overview.asp" title="PHP Reference">Reference</a>
399 <br>
400 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-java" href="/java/default.asp" title="Java Tutorial"><span class="learn-span">Learn</span> Java</a>
401 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-java" href="/java/default.asp" title="Java Tutorial">Tutorial</a>
402 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-java" href="/java/java_ref_keywords.asp" title="Java Reference">Reference</a>
403 <br>
404 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-c" href="/c/index.php" title="C Tutorial"><span class="learn-span">Learn</span> C</a>
405 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-c" href="/c/index.php" title="C Tutorial">Tutorial</a>
406 <br>
407 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-cpp" href="/cpp/default.asp" title="C++ Tutorial"><span class="learn-span">Learn</span> C++</a>
408 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-cpp" href="/cpp/default.asp" title="C++ Tutorial">Tutorial</a>
409 <br>
410 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-cs" href="/cs/index.php" title="C# Tutorial"><span class="learn-span">Learn</span> C#</a>
411 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-cs" href="/cs/index.php" title="C# Tutorial">Tutorial</a>
412 <br>
413 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-r" href="/r/default.asp" title="R Tutorial"><span class="learn-span">Learn</span> R</a>
414 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-r" href="/r/default.asp" title="R Tutorial">Tutorial</a>
415 <br>
416 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-kotlin" href="/kotlin/index.php" title="Kotlin Tutorial"><span class="learn-span">Learn</span> Kotlin</a>
417 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-kotlin" href="/kotlin/index.php" title="Kotlin Tutorial">Tutorial</a>
418 <br>
419 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-go" href="/go/index.php" title="Go Tutorial"><span class="learn-span">Learn</span> Go</a>
420 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-go" href="/go/index.php" title="Go Tutorial">Tutorial</a>
421 <br>
422 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-django" href="/django/index.php" title="Django Tutorial"><span class="learn-span">Learn</span> Django</a>
423 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-django" href="/django/index.php" title="Django Tutorial">Tutorial</a>
424 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-django" href="/django/django_ref_template_tags.php" title="Django Reference">Reference</a>
425 <br>
426 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-typescript" href="/typescript/index.php" title="TypeScript Tutorial"><span class="learn-span">Learn</span> TypeScript</a>
427 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-typescript" href="/typescript/index.php" title="TypeScript Reference">Tutorial</a>
428 <br>
429 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-asp" href="/asp/default.asp" title="ASP Tutorial"><span class="learn-span">Learn</span> ASP</a>
430 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-asp" href="/asp/default.asp" title="ASP Tutorial">Tutorial</a>
431 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-asp" href="/asp/asp_ref_vbscript_functions.asp" title="ASP Reference">Reference</a>
432 <br>
433 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-nodejs" href="/nodejs/default.asp" title="Node.js Tutorial"><span class="learn-span">Learn</span> Node.js</a>
434 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-nodejs" href="/nodejs/default.asp" title="Node.js Tutorial">Tutorial</a>
435 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-nodejs" href="/nodejs/ref_modules.asp" title="Node.js Reference">Reference</a>
436 <br>
437 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-rpi" href="/nodejs/nodejs_raspberry_pi.asp" title="Raspberry Pi Tutorial"><span class="learn-span">Learn</span> Raspberry Pi</a>
438 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-rpi" href="/nodejs/nodejs_raspberry_pi.asp" title="Raspberry Pi Tutorial">Tutorial</a>
439 <br>
440 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-git" href="/git/default.asp" title="Git Tutorial"><span class="learn-span">Learn</span> Git</a>
441 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-git" href="/git/default.asp" title="Git Tutorial">Tutorial</a>
442 <br>

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443 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-mongodb" href="/mongodb/index.php" title="MongoDB Tutorial"><span class="learn-span">Learn</span> MongoDB</a>
444 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-mongodb" href="/mongodb/index.php" title="MongoDB Tutorial">Tutorial</a>
445 <br>
446 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-aws-cloud" href="/aws/index.php" title="AWS Cloud Tutorial"><span class="learn-span">Learn</span> AWS Cloud</a>
447 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-aws-cloud" href="/aws/index.php" title="AWS Cloud Tutorial">Tutorial</a>
448 <br>
449 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-xml" href="/xml/default.asp" title="XML Tutorial"><span class="learn-span">Learn</span> XML</a>
450 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-xml" href="/xml/default.asp" title="XML Tutorial">Tutorial</a>
451 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ref-xml" href="/xml/dom_nodetype.asp" title="XML Reference">Reference</a>
452 <br>
453 <div style="padding:4px 12px; border:2px solid #777; border-radius:5px; margin-top:33px; width:225px;" class="w3-hide-small">
454   <h6 style="font-size:18px; margin:8px 0 0; font-family: 'Source Sans Pro Topnav', sans-serif!important;">Next Bootcamp:</h6>
455   <h6 style="font-size:17px; font-family: 'Source Sans Pro Topnav', sans-serif!important;">June 19th</h6>
456   <a class="w3-bar-item ws-btn w3-margin-bottom w3-round w3-center ga-top-drop ga-top-drop-next-bootcamp" href="/bootcamp/index.php" style="font-family: 'Source Sans Pro', sans-serif!important; m
457 </div>
458 <br>
459 <div class="w3-hide-large w3-hide-medium">
460   <h3 style="margin-top:20px;">Data Analytics</h3>
461   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ai" href="/ai/default.asp" title="Artificial Intelligence Tutorial"><span class="learn-span">Learn</span> AI</a>
462   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ai" href="/ai/default.asp" title="Artificial Intelligence Tutorial">Tutorial</a>
463   <br>
464   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-genai" href="/gen_ai/index.php" title="Generative AI Tutorial"><span class="learn-span">Learn</span> Generative AI</a>
465   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-genai" href="/gen_ai/index.php" title="Generative AI Tutorial">Tutorial</a>
466   <br>
467   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-chatgpt35" href="/gen_ai/chatgpt-3-5/index.php" title="ChatGPT-3.5 Tutorial"><span class="learn-span">Learn</span> Chat
468   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-chatgpt35" href="/gen_ai/chatgpt-3-5/index.php" title="ChatGPT-3.5 Tutorial">Tutorial</a>
469   <br>
470   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-chatgpt4" href="/gen_ai/chatgpt-4/index.php" title="ChatGPT-4 Tutorial"><span class="learn-span">Learn</span> ChatGPT-4
471   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-chatgpt4" href="/gen_ai/chatgpt-4/index.php" title="ChatGPT-4 Tutorial">Tutorial</a>
472   <br>
473   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-bard" href="/gen_ai/bard/index.php" title="Google Bard Tutorial"><span class="learn-span">Learn</span> Google Bard</a>
474   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-bard" href="/gen_ai/bard/index.php" title="Google Bard Tutorial">Tutorial</a>
475   <br>
476   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ml" href="/python/python_ml_getting_started.asp" title="Machine Learning Tutorial"><span class="learn-span">Learn</span> Data Science</a>
477   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ml" href="/python/python_ml_getting_started.asp" title="Machine Learning Tutorial">Tutorial</a>
478   <br>
479   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-ds" href="/datascience/default.asp" title="Data Science Tutorial"><span class="learn-span">Learn</span> Data Science</a>
480   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-ds" href="/datascience/default.asp" title="Data Science Tutorial">Tutorial</a>
481   <br>
482   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-numpy" href="/python/numpy/default.asp" title="NumPy Tutorial"><span class="learn-span">Learn</span> NumPy</a>
483   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-numpy" href="/python/numpy/default.asp" title="NumPy Tutorial">Tutorial</a>
484   <br>
485   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-pandas" href="/python/pandas/default.asp" title="Pandas Tutorial"><span class="learn-span">Learn</span> Pandas</a>
486   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-pandas" href="/python/pandas/default.asp" title="Pandas Tutorial">Tutorial</a>
487   <br>
488   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-sciipy" href="/python/scipy/index.php" title="SciPy Tutorial"><span class="learn-span">Learn</span> SciPy</a>
489   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-sciipy" href="/python/scipy/index.php" title="SciPy Tutorial">Tutorial</a>
490   <br>
491   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-matplotlib" href="/python/matplotlib_intro.asp" title="Matplotlib Tutorial"><span class="learn-span">Learn</span> Matpl
492   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-matplotlib" href="/python/matplotlib_intro.asp" title="Matplotlib Tutorial">Tutorial</a>
493   <br>
494   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-stat" href="/statistics/index.php" title="Statistics Tutorial"><span class="learn-span">Learn</span> Statistics</a>
495   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-stat" href="/statistics/index.php" title="Statistics Tutorial">Tutorial</a>
496   <br>
497   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-excel" href="/excel/index.php" title="Excel Tutorial"><span class="learn-span">Learn</span> Excel</a>
498   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-excel" href="/excel/index.php" title="Excel Tutorial">Tutorial</a>
499   <br>
500   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-tut-sheets" href="/googlesheets/index.php" title="Google Sheets Tutorial"><span class="learn-span">Learn</span> Google Shee
501   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-tut-sheets" href="/googlesheets/index.php" title="Google Sheets Tutorial">Tutorial</a>
502 <br>
503 <div class="w3-hide-large">
504   <h3 style="margin-top:20px;">Web Building</h3>
505   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-spaces fixpaddingsmallmenu" href="/spaces/index.php" title="Get Your Own Website With W3shools Spaces">Create a Website <span cla
506   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-server fixpaddingsmallmenu" href="/spaces/index.php" title="Get Your Own Server With W3shools Spaces">Create a Server <span class
507   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-wherestart fixpaddingsmallmenu" href="/where_to_start.asp" title="Where To Start - Web Development">Where To Start</a>
508   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-templates fixpaddingsmallmenu" href="/w3css/w3css_templates.asp" title="Free Web Templates">Web Templates</a>
509   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-webstats fixpaddingsmallmenu" href="/browsers/default.asp" title="Web Statistics">Web Statistics</a>
510   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-certificates fixpaddingsmallmenu" href="https://campus.w3schools.com" target="_blank" title="Get Certified">Web Certificates</a>
511   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-web-development fixpaddingsmallmenu" href="/whatis/default.asp" title="Web Development Roadmaps">Web Development</a>
512   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-code-editor fixpaddingsmallmenu" href="/tryit/default.asp" title="Try It - Code Editor">Code Editor</a>
513   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-typingspeed fixpaddingsmallmenu" href="/typingspeed/default.asp" title="Test Your Typing Speed">Test Your Typing Speed</a>
514   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-codegame fixpaddingsmallmenu" href="/codegame/index.html" target="_blank" title="Play a Code Game">Play a Code Game</a>
515   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-cybersec fixpaddingsmallmenu" href="/cybersecurity/index.php" target="_blank" title="Cyber Security Tutorial">Cyber Security</a>
516   <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-accesssi fixpaddingsmallmenu" href="/accessibility/index.php" title="Accessibility Security Tutorial">Accessibility</a>

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518     <a class="w3-bar-item w3-button ga-top-drop ga-top-drop-tut-newsletter fixpaddingsmallmenu" href="https://campus.w3schools.com/pages/newsletter" target="_blank" title="W3Schools Newsletter">
519     </div>
520   </div>
521   </div>
522   <br>
523 </nav>
524
525 <nav id="nav_exercises" class="w3-hide-small navex" style="position:fixed;bottom:0;top:56px;overflow-y:scroll;background-color:#282A35;color:white;padding-bottom:60px;">
526   <div class="w3-content" style="max-width:1100px;font-size:18px;padding-left:3%">
527     <span onclick="w3_close_nav('exercises')" class="w3-button w3-xxxlarge w3-display-topright closeaccbtn w3-hide-small">&times;</span><br>
528     <div class="w3-row-padding w3-bar-block">
529       <div class="w3-container" style="padding-left:13px;position:relative;margin-bottom:25px;">
530         <h2 style="color:#FFF4A3;"><b>Exercises and Quizzes</b></h2>
531       </div>
532
533       <div class="w3-col l4 m6">
534         <h3 class="w3-margin-top">HTML and CSS</h3>
535         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-html" href="/html/html_exercises.asp" title="HTML Exercises">HTML</a>
536         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-html" href="/html/html_exercises.asp" title="HTML Exercises">Exercise</a>
537         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-html" href="/html/html_quiz.asp" title="HTML Quizzes">Quiz</a>
538         <br>
539         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-css" href="/css/css_exercises.asp" title="CSS Exercises">CSS</a>
540         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-css" href="/css/css_exercises.asp" title="CSS Exercises">Exercise</a>
541         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-css" href="/css/css_quiz.asp" title="CSS Quizzes">Quiz</a>
542         <br>
543         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-bs" href="/bootstrap/bootstrap_exercises.asp" title="Bootstrap Exercises">Bootstrap</a>
544         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-bs" href="/bootstrap/bootstrap_exercises.asp" title="Bootstrap Exercises">Exercise</a>
545         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-bs" href="/bootstrap/bootstrap_quiz.asp" title="Bootstrap Quizzes">Quiz</a>
546         <br>
547         <div class="w3-hide-small">
548           <h3 style="margin-top:35px;">Data Analytics</h3>
549           <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-numpy" href="/python/numpy/numpy_exercises.asp" title="NumPy Exercises">NumPy</a>
550           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-numpy" href="/python/numpy/numpy_exercises.asp" title="NumPy Exercises">Exercise</a>
551           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-numpy" href="/python/numpy/numpy_quiz.asp" title="NumPy Quizzes">Quiz</a>
552           <br>
553           <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-pandas" href="/python/pandas/pandas_exercises.asp" title="Pandas Exercises">Pandas</a>
554           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-pandas" href="/python/pandas/pandas_exercises.asp" title="Pandas Exercises">Exercise</a>
555           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-pandas" href="/python/pandas/pandas_quiz.asp" title="Pandas Quizzes">Quiz</a>
556           <br>
557           <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-sci" href="/python/scipy/scipy_exercises.php" title="SciPy Exercises">SciPy</a>
558           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-sci" href="/python/scipy/scipy_exercises.php" title="SciPy Exercises">Exercise</a>
559           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-sci" href="/python/scipy/scipy_quiz.php" title="SciPy Quizzes">Quiz</a>
560           <br>
561           <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-excel" href="/excel/excel_exercises.php" title="Excel Exercises">Excel</a>
562           <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-excel" href="/excel/excel_exercises.php" title="Excel Exercises">Exercise</a>
563           <div style="margin-top:35px;">
564             <a class="w3-bar-item w3-button w3-center w3-round ga-top-drop-exercises" href="/exercises/index.php" title="W3Schools Exercises" style="display:block;background-color:#21232c;bor
565               <a class="w3-bar-item w3-button w3-center w3-round ga-top-drop-quiztest" href="/quittest/default.asp" title="W3Schools Quizzes" style="display:block;background-color:#21232c;bor
566             </div>
567             <br>
568           </div>
569         </div>
570
571       <div class="w3-col l4 m6">
572         <h3 class="w3-margin-top">JavaScript</h3>
573         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-js" href="/js/js_exercises.asp" title="JavaScript Exercises">JavaScript</a>
574         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-js" href="/js/js_exercises.asp" title="JavaScript Exercises">Exercise</a>
575         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-js" href="/js/js_quiz.asp" title="JavaScript Quizzes">Quiz</a>
576         <br>
577         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-react" href="/react/react_exercises.asp" title="React Exercises">React</a>
578         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-react" href="/react/react_exercises.asp" title="React Exercises">Exercise</a>
579         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-react" href="/react/react_quiz.asp" title="React Quizzes">Quiz</a>
580         <br>
581         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-jquery" href="/jquery/jquery_exercises.asp" title="jQuery Exercises">jQuery</a>
582         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-jquery" href="/jquery/jquery_exercises.asp" title="jQuery Exercises">Exercise</a>
583         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-jquery" href="/jquery/jquery_quiz.asp" title="jQuery Quizzes">Quiz</a>
584         <br>
585         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-vue" href="/vue/vue_exercises.php" title="Vue Exercises">Vue</a>
586         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-vue" href="/vue/vue_exercises.php" title="Vue Exercises">Exercise</a>
587         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-vue" href="/vue/vue_quiz.php" title="Vue Quizzes">Quiz</a>
588         <br>
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591     </div>
592
593 <div class="w3-col l4 m6"><br class="w3-hide-large w3-hide-small">
594     <h3 class="w3-margin-top">Backend</h3>
595     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-python" href="/python/python_exercises.asp" title="Python Exercises">Python </a>
596     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-python" href="/python/python_exercises.asp" title="Python Exercises">Exercise</a>
597     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-python" href="/python/python_quiz.asp" title="Python Quizzes">Quiz</a>
598     <br>
599     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-sql" href="/sql/sql_exercises.asp" title="SQL Exercises">SQL </a>
600     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-sql" href="/sql/sql_exercises.asp" title="SQL Exercises">Exercise</a>
601     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-sql" href="/sql/sql_quiz.asp" title="SQL Quizzes">Quiz</a>
602     <br>
603     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-mysql" href="/mysql/mysql_exercises.asp" title="MySQL Exercises">MySQL </a>
604     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-mysql" href="/mysql/mysql_exercises.asp" title="MySQL Exercises">Exercise</a>
605     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-mysql" href="/mysql/mysql_quiz.asp" title="MySQL Quizzes">Quiz</a>
606     <br>
607     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-php" href="/php/php_exercises.asp" title="PHP Exercises">PHP </a>
608     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-php" href="/php/php_exercises.asp" title="PHP Exercises">Exercise</a>
609     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-php" href="/php/php_quiz.asp" title="PHP Quizzes">Quiz</a>
610     <br>
611     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-java" href="/java/java_exercises.asp" title="Java Exercises">Java </a>
612     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-java" href="/java/java_exercises.asp" title="Java Exercises">Exercise</a>
613     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-java" href="/java/java_quiz.asp" title="Java Quizzes">Quiz</a>
614     <br>
615     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-c" href="/c/c_exercises.php" title="C Exercises">C </a>
616     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-c" href="/c/c_exercises.php" title="C Exercises">Exercise</a>
617     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-c" href="/c/c_quiz.php" title="C Quizzes">Quiz</a>
618     <br>
619     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-cpp" href="/cpp/cpp_exercises.asp" title="C++ Exercises">C++ </a>
620     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-cpp" href="/cpp/cpp_exercises.asp" title="C++ Exercises">Exercise</a>
621     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-cpp" href="/cpp/cpp_quiz.asp" title="C++ Quizzes">Quiz</a>
622     <br>
623     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-cs" href="/cs/cs_exercises.php" title="C# Exercises">C# </a>
624     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-cs" href="/cs/cs_exercises.php" title="C# Exercises">Exercise</a>
625     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-cs" href="/cs/cs_quiz.php" title="C# Quizzes">Quiz</a>
626     <br>
627     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-r" href="/r/r_exercises.asp" title="R Exercises">R </a>
628     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-r" href="/r/r_exercises.asp" title="R Exercises">Exercise</a>
629     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-r" href="/r/r_quiz.asp" title="R Quizzes">Quiz</a>
630     <br>
631     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-kotlin" href="/kotlin/kotlin_exercises.php" title="Kotlin Exercises">Kotlin </a>
632     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-kotlin" href="/kotlin/kotlin_exercises.php" title="Kotlin Exercises">Exercise</a>
633     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-kotlin" href="/kotlin/kotlin_quiz.php" title="Kotlin Quizzes">Quiz</a>
634     <br>
635     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-django" href="/django/django_exercises.php" title="Django Exercises">Django </a>
636     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-django" href="/django/django_exercises.php" title="Django Exercises">Exercise</a>
637     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-django" href="/django/django_quiz.php" title="Django Quizzes">Quiz</a>
638     <br>
639     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-typescript" href="/typescript/typescript_exercises.php" title="TypeScript Exercises">TypeScript </a>
640     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-typescript" href="/typescript/typescript_exercises.php" title="TypeScript Exercises">Exercise</a>
641     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-typescript" href="/typescript/typescript_quiz.php" title="TypeScript Quizzes">Quiz</a>
642     <br>
643     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-git" href="/git/git_exercises.asp" title="Git Exercises">Git </a>
644     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-git" href="/git/git_exercises.asp" title="Git Exercises">Exercise</a>
645     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-git" href="/git/git_quiz.asp" title="Git Quizzes">Quiz</a>
646     <br>
647     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-go" href="/go/go_exercises.php" title="Go Exercises">Go </a>
648     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-go" href="/go/go_exercises.php" title="Go Exercises">Exercise</a>
649     <br>
650     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-mongodb" href="/mongodb/mongodb_exercises.php" title="MongoDB Exercises">MongoDB </a>
651     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-mongodb" href="/mongodb/mongodb_exercises.php" title="MongoDB Exercises">Exercise</a>
652     <br>
653     <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-aws-cloud" href="/aws/aws_exercises.php" title="AWS Cloud Exercises">AWS Cloud </a>
654     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-aws-cloud" href="/aws/aws_exercises.php" title="AWS Cloud Exercises">Exercise</a>
655     <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-aws-cloud" href="/aws/aws_quiz.php" title="AWS Cloud Quizzes">Quiz</a>
656     <br>
657
658     <div class="w3-hide-large w3-hide-medium">
659         <h3 style="margin-top:20px">Data Analytics</h3>
660         <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-numpy" href="/python/numpy/numpy_exercises.asp" title="NumPy Exercises">NumPy </a>
661         <a class="ws-btn acclink-text ga-top-drop ga-top-drop-ex-numpy" href="/python/numpy/numpy_exercises.asp" title="NumPy Exercises">Exercise</a>
662         <a class="ws-btn acclink-text ga-top-drop ga-top-drop-qz-numpy" href="/python/numpy/numpy_quiz.asp" title="NumPy Quizzes">Quiz</a>
663         <br>
664         <a class="w3-bar-item w3-button acclink-text ga-top-drop ga-top-drop-ex-pandas" href="/python/pandas/pandas_exercises.asp" title="Pandas Exercises">Pandas </a>
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665 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-pandas" href="/python/pandas/pandas_exercises.asp" title="Pandas Exercises">Exercise</a>
666 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-pandas" href="/python/pandas/pandas_quiz.asp" title="Pandas Quizzes">Quiz</a>
667 <br>
668 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-sciipy" href="/python/scipy/scipy_exercises.php" title="SciPy Exercises">SciPy</a>
669 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-sciipy" href="/python/scipy/scipy_exercises.php" title="SciPy Exercises">Exercise</a>
670 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-qz-sciipy" href="/python/scipy/scipy_quiz.php" title="SciPy Quizzes">Quiz</a>
671 <br>
672 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-ex-excel" href="/excel/excel_exercises.php" title="Excel Exercises">Excel</a>
673 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-ex-excel" href="/excel/excel_exercises.php" title="Excel Exercises">Exercise</a>
674 <div style="margin-top:25px;">
675   <a class="w3-bar-item w3-button ga-top-drop w3-round ga-top-drop-exercises" href="/exercises/index.php" title="W3Schools Exercises" style="display:block;background-color:#21232c;b
676   <a class="w3-bar-item w3-button ga-top-drop w3-center w3-round ga-top-drop-quizztest" href="/quiztest/default.asp" title="W3Schools Quizzes" style="display:block;background-color:#21232c;bor
677 </div>
678   </div>
679 </div>
680 <br>
681 </div>
682 </div>
683 </nav>
684
685 <nav id="nav_certified" class="w3-hide-small navex" style="position:fixed;bottom:0;top:56px;overflow-y:scroll;background-color:#282A35;color:white;padding-bottom:60px;">
686   <div class="w3-content" style="max-width:1100px;font-size:18px;padding-left:3%">
687     <span onclick="w3_close_nav('certified')" class="w3-button w3-xxxlarge w3-display-topright closeacbtn w3-hide-small">&times;</span><br>
688     <div class="w3-row-padding w3-bar-block">
689       <div class="w3-container" style="padding-left:13px;position:relative;margin-bottom:25px;">
690         <h2 style="color:#FFF4A3;"><b>Get Certified</b></h2>
691         <a href="https://campus.w3schools.com/collections/certifications" target="_blank" style="position:absolute;left:240px;top:3px">
692           <svg class="w3-hide-small" style="width:79px;transform: rotate(10deg); " xmlns="http://www.w3.org/2000/svg" viewBox="0 0 300 300">
693             <defs>
694               <style>
695                 .cls-1 {
696                   fill: #04aa6b;
697                 }
698
699                 .cls-2 {
700                   font-size: 23px;
701                 }
702
703                 .cls-2,
704                 .cls-3,
705                 .cls-4 {
706                   fill: #fff;
707                 }
708
709                 .cls-2,
710                 .cls-3 {
711                   font-family: RobotoMono-Medium, Roboto Mono;
712                   font-weight: 500;
713                 }
714
715                 .cls-3 {
716                   font-size: 20.08px;
717                 }
718
719               </style>
720             </defs>
721             <circle class="cls-1" cx="150" cy="150" r="146.47" transform="translate(-62.13 150) rotate(-45)"></circle><text class="cls-2" transform="translate(93.54 63.89) rotate(-29.5)">w</text><text
722               <path class="cls-4" d="M196.64,136.31s3.53,3.8,8.5,3.8c3.9,0,6.75-2.37,6.75-5.59,0-4-3.64-5.81-8-5.81h-2.59l-1.53-3.48,6.86-8.13a34.07,34.07,0,0,1,2.7-2.85s-1.11,0-3.33,0H194.79v-5.86H217.7
723               <path class="cls-4" d="M152,144.24130.24,53.86,14.94-26.61L168.6,120.63H135.36l-13.78,24.53-13.77-24.53H77.93l43.5,77.46.15-.28.16.28Z"></path>
724           </svg>
725         </a>
726       </div>
727
728       <div class="w3-col l4 m6">
729         <h3 class="w3-margin-top">HTML and CSS</h3>
730         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-html" href="https://campus.w3schools.com/collections/certifications/products/html-certificate" title="HTML Certification
731         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-html" href="https://campus.w3schools.com/collections/certifications/products/html-certificate" title="HTML Certification Exam" target=
732         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-html" href="https://campus.w3schools.com/collections/course-catalog/products/html-course" title="Paid HTML Course" target="_blank">C
733         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-html" href="/bootcamp/bootcamp_htmlcss.php" title="HTML and CSS Bootcamp">Bootcamp</a>
734         <br>
735         <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-css" href="https://campus.w3schools.com/collections/certifications/products/css-certificate" title="CSS Certification Ex
736         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-css" href="https://campus.w3schools.com/collections/certifications/products/css-certificate" title="CSS Certification Exam" target="_b
737         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-css" href="https://campus.w3schools.com/collections/course-catalog/products/css-course" title="Paid CSS Course" target="_blank">Cour
738         <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-css" href="/bootcamp/bootcamp_htmlcss.php" title="HTML and CSS Bootcamp">Bootcamp</a>

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739 <br>
740 <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-bs3" href="https://campus.w3schools.com/collections/certifications/products/bootstrap-3-certificate" title="Bootstrap Ce
741 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-bs3" href="https://campus.w3schools.com/collections/certifications/products/bootstrap-3-certificate" title="Bootstrap Certification Ex
742 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-bs" href="https://campus.w3schools.com/collections/single-courses/products/bootstrap-course" title="Paid Bootstrap Course" target="_
743 <br>
744 <div class="w3-hide-small">
745   <h3 style="margin-top:35px;">Data Analytics</h3>
746   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-data-analytics" href="https://campus.w3schools.com/products/data-analytics-program" title="Paid Data Analytics Cours
747   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-data-analytics" href="https://campus.w3schools.com/products/data-analytics-program" title="Paid Data Analytics Course" target="_blank"
748   <br>
749   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-numpy" href="https://campus.w3schools.com/products/numpy-course" title="Paid NumPy Course" target="_blank">NumPy</a>
750   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-numpy" href="https://campus.w3schools.com/products/numpy-course" title="Paid NumPy Course" target="_blank">Course</a>
751   <br>
752   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-sciipy" href="https://campus.w3schools.com/products/pandas-course" title="Paid SciPy Course" target="_blank">Pandas</a>
753   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-sciipy" href="https://campus.w3schools.com/products/pandas-course" title="Paid SciPy Course" target="_blank">Course</a>
754   <br>
755   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-excel" href="https://campus.w3schools.com/products/excel-certificate" title="Excel Certification Exam" target="_blank"
756   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-excel" href="https://campus.w3schools.com/products/excel-certificate" title="Excel Certification Exam" target="_blank">Certificate</a>
757   <br>
758   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-some" href="https://campus.w3schools.com/collections/course-best-sellers/products/social-media-marketing-course" tit
759   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-some" href="https://campus.w3schools.com/collections/course-best-sellers/products/social-media-marketing-course" title="Paid Socia
760   <br>
761   <div class="w3-hide-large">
762     <h3 class="w3-hide-large w3-hide-small" style="margin-top:30px">Programs</h3>
763     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-fullaccess" href="https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course" tit
764     <br>
765     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-front-end" href="https://campus.w3schools.com/collections/certifications/products/front-end-certificate" title="Front
766     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-front-end" href="https://campus.w3schools.com/collections/certifications/products/front-end-certificate" title="Front End Certificat
767     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-front-end" href="https://campus.w3schools.com/collections/course-catalog/products/front-end-course" title="Paid Front End Developm
768     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-front-end" href="/bootcamp/bootcamp_frontend.php" title="Front End Bootcamp">Bootcamp</a>
769     <br>
770     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-web-dev" href="https://campus.w3schools.com/collections/certifications/products/modern-web-development-certification"
771     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-dev" href="https://campus.w3schools.com/collections/certifications/products/modern-web-development-certification" title="Web Dev
772     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-dev" href="https://campus.w3schools.com/collections/course-best-sellers/products/learn-modern-web-development" title="Paid Web
773     <br>
774     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-web-app" href="https://campus.w3schools.com/collections/certifications/products/web-application-development-certificat
775     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-app" href="https://campus.w3schools.com/collections/certifications/products/web-application-development-certificates" title="Web
776     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-app" href="https://campus.w3schools.com/collections/course-best-sellers/products/web-application-development-course" title="Paid Web
777     <br>
778     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-web-design" href="https://campus.w3schools.com/collections/certifications/products/web-design-certification" title="We
779     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-design" href="https://campus.w3schools.com/collections/certifications/products/web-design-certification" title="Web Design Certi
780     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-design" href="https://campus.w3schools.com/collections/course-best-sellers/products/learn-web-design" title="Paid Web Design C
781     <br>
782   </div>
783 </div>
784 </div>
785 <div class="w3-col l4 m6">
786   <h3 class="w3-margin-top">JavaScript</h3>
787   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-js" href="https://campus.w3schools.com/collections/certifications/products/javascript-certificate" title="JavaScript Cer
788   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-js" href="https://campus.w3schools.com/collections/certifications/products/javascript-certificate" title="JavaScript Certification Exam
789   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-js" href="https://campus.w3schools.com/collections/course-catalog/products/javascript-course" title="Paid JavaScript Course" target=
790   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-js" href="/bootcamp/bootcamp_js.php" title="JavaScript Fundamentals Bootcamp">Bootcamp</a>
791   <br>
792   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-react" href="https://campus.w3schools.com/collections/certifications/products/react-js-certificate" title="React.js Cert
793   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-react" href="https://campus.w3schools.com/collections/certifications/products/react-js-certificate" title="React.js Certification Exam
794   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-react" href="https://campus.w3schools.com/collections/course-catalog/products/react-js-course" title="Paid React.js Course" target=
795   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-front-end" href="/bootcamp/bootcamp_frontend.php" title="Frontend With ReactJS Bootcamp">Bootcamp</a>
796   <br>
797   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-jquery" href="https://campus.w3schools.com/collections/certifications/products/jquery-certificate" title="jQuery Certifi
798   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-jquery" href="https://campus.w3schools.com/collections/certifications/products/jquery-certificate" title="jQuery Certification Exam" t
799   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-jquery" href="https://campus.w3schools.com/collections/course-catalog/products/jquery-course" title="Paid jQuery Course" target="_blank"
800   <br>
801   <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-vue" href="https://campus.w3schools.com/products/vue-js-certification-exam" title="Vue Certification Exam" target="_blank">Certi
802   <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-vue" href="https://campus.w3schools.com/products/vue-js-certification-exam" title="Vue Certification Exam" target="_blank">Certificate
803   <br>
804   <div class="w3-hide-medium">
805     <h3 style="margin-top:25px">Programs</h3>
806     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-course-fullaccess" href="https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course" tit
807     <br>
808     <a class="w3-bar-item w3-button acktop-link ga-top-drop ga-top-drop-cert-front-end" href="https://campus.w3schools.com/collections/certifications/products/front-end-certificate" title="Front
809     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-front-end" href="https://campus.w3schools.com/collections/certifications/products/front-end-certificate" title="Front End Certificat
810     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-front-end" href="https://campus.w3schools.com/collections/course-catalog/products/front-end-course" title="Paid Front End Developm
811     <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-front-end" href="/bootcamp/bootcamp_frontend.php" title="Front End Bootcamp">Bootcamp</a>
812   </div>

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813 <br>
814 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-web-dev" href="https://campus.w3schools.com/collections/certifications/products/modern-web-development-certification">
815 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-dev" href="https://campus.w3schools.com/collections/certifications/products/modern-web-development-certification" title="Web Dev">
816 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-dev" href="https://campus.w3schools.com/collections/course-best-sellers/products/learn-modern-web-development" title="Paid Web">
817 <br>
818 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-web-app" href="https://campus.w3schools.com/collections/certifications/products/web-application-development-certificat">
819 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-app" href="https://campus.w3schools.com/collections/certifications/products/web-application-development-certificates" title="Web">
820 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-app" href="https://campus.w3schools.com/collections/course-best-sellers/products/web-application-development-course" title="Paid Web">
821 <br>
822 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-web-design" href="https://campus.w3schools.com/collections/certifications/products/web-design-certification" title="We">
823 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-web-design" href="https://campus.w3schools.com/collections/certifications/products/web-design-certification" title="Web Design Certi">
824 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-web-design" href="https://campus.w3schools.com/collections/course-best-sellers/products/learn-web-design" title="Paid Web Design C">
825 <br>
826 </div>
827 </div>
828
829 <div class="w3-col l4 m6"><br class="w3-hide-large w3-hide-small">
830 <h3 class="w3-margin-top">Backend</h3>
831 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-python" href="https://campus.w3schools.com/collections/certifications/products/python-certificate" title="Python Certifi">
832 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-python" href="https://campus.w3schools.com/collections/certifications/products/python-certificate" title="Python Certification Exam" target="_blank">
833 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-python" href="https://campus.w3schools.com/collections/course-catalog/products/python-course" title="Paid Python Course" target="_blank">
834 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-python" href="/bootcamp/bootcamp_python.php" title="Python Fundamentals Bootcamp">Bootcamp</a>
835 <br>
836 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-sql" href="https://campus.w3schools.com/collections/certifications/products/sql-certificate" title="SQL Certification Ex">
837 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-sql" href="https://campus.w3schools.com/collections/certifications/products/sql-certificate" title="SQL Certification Exam" target="_blank">
838 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-sql" href="https://campus.w3schools.com/collections/course-catalog/products/sql-course" title="SQL Python Course" target="_blank">Co
839 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-bootcamp-sql" href="/bootcamp/bootcamp_sql.php" title="SQL Fundamentals Bootcamp">Bootcamp</a>
840 <br>
841 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-mysql" href="https://campus.w3schools.com/collections/certifications/products/mysql-certificate" title="MySQL Certificat">
842 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-mysql" href="https://campus.w3schools.com/collections/certifications/products/mysql-certificate" title="MySQL Certification Exam" targ
843 <br>
844 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-php" href="https://campus.w3schools.com/collections/certifications/products/php-certificate" title="PHP Certification Ex">
845 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-php" href="https://campus.w3schools.com/collections/certifications/products/php-certificate" title="PHP Certification Exam" target="_blank">
846 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-php" href="https://campus.w3schools.com/collections/course-catalog/products/php-course" title="Paid PHP Course" target="_blank">Cour
847 <br>
848 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-java" href="https://campus.w3schools.com/collections/certifications/products/java-certificate" title="Java Certification">
849 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-java" href="https://campus.w3schools.com/collections/certifications/products/java-certificate" title="Java Certification Exam" target=
850 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-java" href="https://campus.w3schools.com/collections/course-catalog/products/java-course" title="Paid Java Course" target="_blank">C
851 <br>
852 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-cpp" href="https://campus.w3schools.com/collections/certifications/products/c-certificate" title="C++ Certification Exam">
853 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-cpp" href="https://campus.w3schools.com/collections/certifications/products/c-certificate" title="C++ Certification Exam" target="_blank">
854 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-cpp" href="https://campus.w3schools.com/collections/course-catalog/products/c-course-1" title="Paid C++ Course" target="_blank">Cour
855 <br>
856 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-cs" href="https://campus.w3schools.com/collections/certifications/products/c-certificate-1" title="C# Certification Exam">
857 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-cs" href="https://campus.w3schools.com/collections/certifications/products/c-certificate-1" title="C# Certification Exam" target="_blank">
858 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-cs" href="https://campus.w3schools.com/collections/course-catalog/products/c-course" title="Paid C# Course" target="_blank">Course</
859 <br>
860 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-r" href="https://campus.w3schools.com/collections/course-catalog/products/r-course" title="Paid R Course" target="_blank">
861 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-r" href="https://campus.w3schools.com/collections/course-catalog/products/r-course" title="Paid R Course" target="_blank">Course</a>
862 <br>
863 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-django" href="https://campus.w3schools.com/products/django-certification-exam" title="Django Certification Exam" target=
864 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-django" href="https://campus.w3schools.com/products/django-certification-exam" title="Django Certification Exam" target="_blank">Certifi
865 <br>
866 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-typescript" href="https://campus.w3schools.com/collections/certifications/products/typescript-certificate" title="TypeSc
867 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-typescript" href="https://campus.w3schools.com/collections/certifications/products/typescript-certificate" title="TypeScript Certifica
868 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-typescript" href="https://campus.w3schools.com/products/learn-typescript" title="Paid TypeScript Course" target="_blank">Course</a>
869 <br>
870 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-xml" href="https://campus.w3schools.com/collections/certifications/products/xml-certificate" title="XML Certification Ex">
871 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-xml" href="https://campus.w3schools.com/collections/certifications/products/xml-certificate" title="XML Certification Exam" target="_blank">
872 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-xml" href="https://campus.w3schools.com/collections/course-catalog/products/xml-course" title="Paid XML Course" target="_blank">Cour
873 <br>
874 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-cyber-sec" href="https://campus.w3schools.com/collections/certifications/products/cyber-security-certificate" title="Cyb
875 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-cyber-sec" href="https://campus.w3schools.com/collections/certifications/products/cyber-security-certificate" title="Cyber Security Ce
876 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-cyber-sec" href="https://campus.w3schools.com/products/cyber-security-course" title="Paid Cyber Security Course" target="_blank">Cou
877 <br>
878 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-accessi" href="https://campus.w3schools.com/collections/certifications/products/accessibility-certificate" title="Access
879 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-cert-accessi" href="https://campus.w3schools.com/collections/certifications/products/accessibility-certificate" title="Accessibility Certif
880 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-accessi" href="https://campus.w3schools.com/products/accessibility-course" title="Paid Accessibility Course" target="_blank">Course<
881 <br>
882 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-python-apps-aws" href="https://campus.w3schools.com/collections/course-best-sellers/products/building-modern-python-ap
883 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-python-apps-aws" href="https://campus.w3schools.com/collections/course-best-sellers/products/building-modern-python-apps-on-aws" tit
884 <br>
885 <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-aws-training" href="/training/aws/home/" title="AWS Training" target="_blank">AWS Training</a>
886 <a class="ws-btn acalink-text ga-top-drop ga-top-drop-course-aws-training" href="/training/aws/home/" title="AWS Training" target="_blank">Courses</a>

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887 <br>
888
889 <div class="w3-hide-large w3-hide-medium" style="margin-top:20px">
890   <h3>Data Analytics</h3>
891   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-data-analytics" href="https://campus.w3schools.com/products/data-analytics-program" title="Paid Data Analytics Course" target="_blank">Paid Data Analytics Course</a>
892   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-course-data-analytics" href="https://campus.w3schools.com/products/data-analytics-program" title="Paid Data Analytics Course" target="_blank">Course</a>
893   <br>
894   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-numpy" href="https://campus.w3schools.com/products/numpy-course" title="Paid NumPy Course" target="_blank">NumPy</a>
895   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-course-numpy" href="https://campus.w3schools.com/products/numpy-course" title="Paid NumPy Course" target="_blank">Course</a>
896   <br>
897   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-sciipy" href="https://campus.w3schools.com/products/pandas-course" title="Paid SciPy Course" target="_blank">Pandas</a>
898   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-course-sciipy" href="https://campus.w3schools.com/products/pandas-course" title="Paid SciPy Course" target="_blank">Course</a>
899   <br>
900   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-cert-excel" href="https://campus.w3schools.com/products/excel-certificate" title="Excel Certification Exam" target="_blank">Excel Certification Exam</a>
901   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-cert-excel" href="https://campus.w3schools.com/products/excel-certificate" title="Excel Certification Exam" target="_blank">Certificate</a>
902   <br>
903   <a class="w3-bar-item w3-button acctop-link ga-top-drop ga-top-drop-course-some" href="https://campus.w3schools.com/collections/course-best-sellers/products/social-media-marketing-course" title="Paid Social Media Marketing Course" target="_blank">Social Media Marketing Course</a>
904   <a class="ws-btn acclink-text ga-top-drop ga-top-drop-course-some" href="https://campus.w3schools.com/collections/course-best-sellers/products/social-media-marketing-course" title="Paid Social Media Marketing Course" target="_blank">Course</a>
905   <br class="w3-hide-small">
906 </div>
907   <br>
908 </div>
909 </div>
910 <style>
911 .whatis-buttons-getcert {
912   position: absolute;
913   margin-top: -130px;
914   margin-left: 16px
915 }
916
917 @media screen and (max-width: 992px) {
918   .whatis-buttons-getcert {
919     margin-top: -110px;
920   }
921 }
922
923 @media screen and (max-width: 600px) {
924   .whatis-buttons-getcert {
925     position: relative;
926     margin-top: 4px;
927     margin-bottom: 16px
928   }
929 }
930 </style>
931 <div class="whatis-buttons-getcert">
932   <a class="w3-bar-item w3-button ga-top-drop w3-center w3-round ga-top-drop-campus" href="https://campus.w3schools.com/" title="W3Schools Campus" target="_blank" style="display:block;background-color:#21232c;color:white;padding:10px;outline:none;transition:background-color 0.3s ease-in-out">W3Schools Campus</a>
933   <a class="w3-bar-item w3-button ga-top-drop w3-center w3-round ga-top-drop-bootcamps" href="https://bootcamp.w3schools.com/index.php" title="W3Schools Bootcamps" style="display:block;background-color:#21232c;color:white;padding:10px;outline:none;transition:background-color 0.3s ease-in-out">W3Schools Bootcamps</a>
934 </div>
935   <br>
936 </div>
937 </nav>
938
939 <nav id="nav_services" class="w3-hide-small navex" style="position:fixed;bottom:0;top:56px;overflow-y:scroll;background-color:#282A35;color:white;padding-bottom:60px;">
940   <div class="w3-content" style="max-width:1100px;font-size:18px;padding-left:3%">
941     <span onclick="w3_close_nav('services')" class="w3-button w3-xxxlarge w3-display-topright closeaccbt w3-hide-small">&times;</span>
942     <div class="w3-row-padding serviceboxes">
943       <div class="w3-container" style="padding-left:13px;position:relative;margin-bottom:25px;">
944         <h2 style="color:#FFF4A3;"><b>All Our Services</b></h2>
945         <p style="font-size:17px;">W3Schools offers a wide range of services and products for beginners and professionals,<br class="w3-hide-medium w3-hide-small"> helping millions of people everyday to learn new skills and advance their careers.</p>
946       </div>
947
948       <div class="w3-col m4 s12">
949         <a href="https://www.w3schools.com/" class="serviceslink ga-top-drop ga-top-drop-services-tut" title="Tutorials">
950           <div class="w3-padding services w3-round">
951             <h4>Free Tutorials</h4>
952             <p>Enjoy our free tutorials like millions of other internet users since 1999</p>
953           </div>
954         </a>
955       </div>
956
957       <div class="w3-col m4 s12">
958         <a href="https://www.w3schools.com/" class="serviceslink ga-top-drop ga-top-drop-services-ref" title="References">
959           <div class="w3-padding services w3-round">
960             <h4>References</h4>
```



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1035 <path d="M2.79434 1.14824C2.86023 0.950586 3.1398 0.950587 3.20569 1.14824L3.59297 2.3101C3.7656 2.828 4.172 3.2344 4.6899 3.40703L5.85177 3.79432C6.04942 3.86021 6.04942 4.13978 5.85177
1036 <path d="M9.8629 0.0988265C9.90682 -0.032943 10.0932 -0.0329419 10.1371 0.098828L10.3953 0.873401C10.5104 1.21867 10.7813 1.4896 11.1266 1.60469L11.9012 1.86288C12.0329 1.9068 12.0329 2.0
1037 </svg>
1038 </div>
1039 </a>
1040 </div>
1041 </div>
1042 <div class="w3-row-padding serviceboxes" style="margin-top:30px">
1043 <div class="w3-col m4 s12">
1044 <a href="/where_to_start.asp" class="serviceslink ga-top-drop ga-top-drop-services-wheretostart" title="Where To Start">
1045 <div class="w3-padding services w3-round">
1046 <h4>Where To Start</h4>
1047 <p>Not sure where you want to start? Follow our guided path</p>
1048 </div>
1049 </a>
1050 </div>
1051
1052 <div class="w3-col m4 s12">
1053 <a href="/tryit/default.asp" class="serviceslink ga-top-drop ga-top-drop-services-code-editor" title="W3Schools Code Editor">
1054 <div class="w3-padding services w3-round">
1055 <h4>Code Editor (Try it)</h4>
1056 <p>With our online code editor, you can edit code and view the result in your browser</p>
1057 </div>
1058 </a>
1059 </div>
1060
1061 <div class="w3-col m4 s12">
1062 <a href="/bootcamp/index.php" class="serviceslink ga-top-drop ga-top-drop-services-bootcamps" title="Explore W3Schools Bootcamps">
1063 <div class="w3-padding services w3-round" style="position:relative">
1064 <h4>Bootcamps</h4>
1065 <p>Join one of our online bootcamps and learn from experienced instructors</p>
1066 <svg style="position:absolute;top:15px;right:25px;" width="15" height="36" viewBox="0 0 12 16" fill="none" xmlns="http://www.w3.org/2000/svg">
1067 <path d="M6.65723 6.24707C6.76704 5.91764 7.233 5.91765 7.34281 6.24707L7.98828 8.1835C8.276 9.04666 8.95332 9.72399 9.81648 10.0117L11.7529 10.6572C12.0824 10.767 12.0824 11.233 11.7529
1068 <path d="M2.79434 1.14824C2.86023 0.950586 3.1398 0.950587 3.20569 1.14824L3.59297 2.3101C3.7656 2.828 4.172 3.2344 4.6899 3.40703L5.85177 3.79432C6.04942 3.86021 6.04942 4.13978 5.85177
1069 <path d="M9.8629 0.0988265C9.90682 -0.032943 10.0932 -0.0329419 10.1371 0.098828L10.3953 0.873401C10.5104 1.21867 10.7813 1.4896 11.1266 1.60469L11.9012 1.86288C12.0329 1.9068 12.0329 2.0
1070 </svg>
1071 </div>
1072 </a>
1073 </div>
1074 </div>
1075
1076 <div class="w3-row-padding serviceboxes" style="margin-top:30px">
1077 <div class="w3-col m4 s12">
1078 <a href="/w3css/w3css_templates.asp" class="serviceslink ga-top-drop ga-top-drop-services-templates" title="Free Web Templates">
1079 <div class="w3-padding services w3-round">
1080 <h4>Templates</h4>
1081 <p>We have created a bunch of responsive website templates you can use - for free</p>
1082 </div>
1083 </a>
1084 </div>
1085
1086 <div class="w3-col m4 s12">
1087 <a href="/howto/default.asp" class="serviceslink ga-top-drop ga-top-drop-services-howto" title="How To Collection">
1088 <div class="w3-padding services w3-round">
1089 <h4>How To's</h4>
1090 <p>Large collection of code snippets for HTML, CSS and JavaScript</p>
1091 </div>
1092 </a>
1093 </div>
1094 <div class="w3-col m4 s12">
1095 <a href="/videos/index.php" class="serviceslink ga-top-drop ga-top-drop-services-videos" title="HTML Video Tutorial">
1096 <div class="w3-padding services w3-round" style="position:relative">
1097 <h4>Videos</h4>
1098 <p>Learn the basics of HTML in a fun and engaging video tutorial</p>
1099 <svg style="position:absolute;top:15px;right:25px;" width="15" height="36" viewBox="0 0 12 16" fill="none" xmlns="http://www.w3.org/2000/svg">
1100 <path d="M6.65723 6.24707C6.76704 5.91764 7.233 5.91765 7.34281 6.24707L7.98828 8.1835C8.276 9.04666 8.95332 9.72399 9.81648 10.0117L11.7529 10.6572C12.0824 10.767 12.0824 11.233 11.7529
1101 <path d="M2.79434 1.14824C2.86023 0.950586 3.1398 0.950587 3.20569 1.14824L3.59297 2.3101C3.7656 2.828 4.172 3.2344 4.6899 3.40703L5.85177 3.79432C6.04942 3.86021 6.04942 4.13978 5.85177
1102 <path d="M9.8629 0.0988265C9.90682 -0.032943 10.0932 -0.0329419 10.1371 0.098828L10.3953 0.873401C10.5104 1.21867 10.7813 1.4896 11.1266 1.60469L11.9012 1.86288C12.0329 1.9068 12.0329 2.0
1103 </svg>
1104 </div>
1105 </a>
1106 </div>
1107 </div>
1108
```

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1109 <div class="w3-row-padding serviceboxes" style="margin-top:30px">
1110   <div class="w3-col m4 s12">
1111     <a href="/w3css/default.asp" class="serviceslink ga-top-drop ga-top-drop-services-w3css" title="W3.CSS Framework">
1112       <div class="w3-padding services w3-round">
1113         <h4>CSS Framework</h4>
1114         <p>Build fast and responsive sites using our free <strong>W3.CSS</strong> framework</p>
1115       </div>
1116     </a>
1117   </div>
1118
1119   <div class="w3-col m4 s12">
1120     <a href="/spaces/index.php" class="serviceslink ga-top-drop ga-top-drop-services-webhosting" title="Web Hosting with Spaces">
1121       <div class="w3-padding services w3-round">
1122         <h4>Web Hosting</h4>
1123         <p>Host your own website, and share it to the world with <strong>W3Schools Spaces</strong></p>
1124       </div>
1125     </a>
1126   </div>
1127   <div class="w3-col m4 s12">
1128     <a href="/spaces/index.php" class="serviceslink ga-top-drop ga-top-drop-services-createserver" title="Get your own server">
1129       <div class="w3-padding services w3-round" style="position:relative">
1130         <h4>Create a Server</h4>
1131         <p>Create your own server using Python, PHP, React.js, Node.js, Java, C#, etc.</p>
1132         <svg style="position:absolute;top:15px;right:25px;" width="15" height="36" viewBox="0 0 12 16" fill="none" xmlns="http://www.w3.org/2000/svg">
1133           <path d="M6.65723 6.24707C6.76704 5.91764 7.233 5.91765 7.34281 6.24707L7.98828 8.1835C8.276 9.04666 8.95332 9.72399 9.81648 10.0117L11.7529 10.6572C12.0824 10.767 12.0824 11.233 11.7529
1134           <path d="M2.79434 1.14824C2.86023 0.950586 3.1398 0.950587 3.20569 1.14824L3.59297 2.3101C3.7656 2.828 4.172 3.2344 4.6899 3.40703L5.85177 3.79432C6.04942 3.86021 6.04942 4.13978 5.85177
1135           <path d="M9.8629 0.098826C9.90682 -0.032943 10.0932 -0.0329419 10.1371 0.098828L10.3953 0.873401C10.5104 1.21867 10.7813 1.4896 11.1266 1.60469L11.9012 1.86288C12.0329 1.9068 12.0329 2.0
1136         </svg>
1137       </div>
1138     </a>
1139   </div>
1140 </div>
1141
1142 <div class="w3-row-padding serviceboxes" style="margin-top:30px">
1143   <div class="w3-col m4 s12">
1144     <a href="/browsers/default.asp" class="serviceslink ga-top-drop ga-top-drop-services-browserstat" title="Browser Statistics">
1145       <div class="w3-padding services w3-round">
1146         <h4>Browser Statistics</h4>
1147         <p>Read long term trends of browser usage</p>
1148       </div>
1149     </a>
1150   </div>
1151
1152   <div class="w3-col m4 s12">
1153     <a href="/typingspeed/default.asp" class="serviceslink ga-top-drop ga-top-drop-services-typing" title="Test Your Typing speed">
1154       <div class="w3-padding services w3-round">
1155         <h4>Typing Speed</h4>
1156         <p>Test your typing speed</p>
1157       </div>
1158     </a>
1159   </div>
1160
1161   <div class="w3-col m4 s12">
1162     <a href="/training/aws/home/" class="serviceslink ga-top-drop ga-top-drop-services-aws-training" title="AWS Training">
1163       <div class="w3-padding services w3-round" style="position:relative">
1164         <h4>AWS Training</h4>
1165         <p>Learn Amazon Web Services</p>
1166         <svg style="position:absolute;top:15px;right:25px;" width="15" height="36" viewBox="0 0 12 16" fill="none" xmlns="http://www.w3.org/2000/svg">
1167           <path d="M6.65723 6.24707C6.76704 5.91764 7.233 5.91765 7.34281 6.24707L7.98828 8.1835C8.276 9.04666 8.95332 9.72399 9.81648 10.0117L11.7529 10.6572C12.0824 10.767 12.0824 11.233 11.7529
1168           <path d="M2.79434 1.14824C2.86023 0.950586 3.1398 0.950587 3.20569 1.14824L3.59297 2.3101C3.7656 2.828 4.172 3.2344 4.6899 3.40703L5.85177 3.79432C6.04942 3.86021 6.04942 4.13978 5.85177
1169           <path d="M9.8629 0.098826C9.90682 -0.032943 10.0932 -0.0329419 10.1371 0.098828L10.3953 0.873401C10.5104 1.21867 10.7813 1.4896 11.1266 1.60469L11.9012 1.86288C12.0329 1.9068 12.0329 2.0
1170         </svg>
1171       </div>
1172     </a>
1173   </div>
1174
1175   <div class="w3-row-padding serviceboxes" style="margin-top:30px">
1176     <div class="w3-col m4 s12">
1177       <a href="/colors/color_picker.asp" class="serviceslink ga-top-drop ga-top-drop-services-color-picker" title="Color Picker">
1178         <div class="w3-padding services w3-round" style="position:relative">
1179           <h4>Color Picker</h4>
1180           <p>Use our color picker to find different RGB, HEX and HSL colors 
1182       </a>
1183   </div>

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1183 </div>
1184
1185 <div class="w3-col m4 s12">
1186   <a href="/codegame/index.html" class="serviceslink ga-top-drop ga-top-drop-services-code-game" title="Coding Game">
1187     <div class="w3-padding services w3-round" style="position:relative">
1188       <h4>Code Game</h4>
1189       <p style="margin-top:15px">W3Schools Coding Game! Help the lynx collect pine cones 
1190     </div>
1191   </a>
1192 </div>
1193
1194 <div class="w3-col m4 s12">
1195   <a target="_blank" href="https://campus.w3schools.com/pages/newsletter" class="serviceslink ga-top-drop ga-top-drop-services-newsletter" title="Join Our Newsletter">
1196     <div class="w3-padding services w3-round">
1197       <h4>Newsletter</h4>
1198       <p>Join our newsletter and get access to exclusive content every month</p>
1199     </div>
1200   </a>
1201 </div>
1202 </div>
1203 <div class="w3-container w3-margin-top">
1204   <a class="w3-bar-item w3-button ga-fp w3-hover-white w3-xlarge w3-round w3-right ga-top-drop ga-top-drop-services-discord" target="_blank" href="https://discord.gg/6Z7UaRbUQM" title="Join the W3s Discord Server">Discord</a>
1205   <a class="w3-bar-item w3-button ga-fp w3-hover-white w3-xlarge w3-round w3-right ga-top-drop ga-top-drop-services-linkedin" target="_blank" href="https://www.linkedin.com/company/w3schools.com/" title="Follow us on LinkedIn">LinkedIn</a>
1206   <a class="w3-bar-item w3-button ga-fp w3-hover-white w3-xlarge w3-round w3-right ga-top-drop ga-top-drop-services-instagram" target="_blank" href="https://www.instagram.com/w3schools.com_official/" title="Follow us on Instagram">Instagram</a>
1207   <a class="w3-bar-item w3-button ga-fp w3-hover-white w3-xlarge w3-round w3-right ga-top-drop ga-top-drop-services-facebook" target="_blank" href="https://www.facebook.com/w3schoolscom/" title="Follow us on Facebook">Facebook</a>
1208 </div>
1209 <br>
1210 </div>
1211 </nav><!-- Google Tag Manager (noscript) -->
1212 <noscript><iframe src="https://www.googletagmanager.com/ns.html?id=GTM-KTCFC3S" height="0" width="0" style="display:none;visibility:hidden"></iframe></noscript>
1213 <!-- End Google Tag Manager (noscript) -->
1214 <script>
1215 (
1216   function setThemeMode() {
1217     var x = localStorage.getItem("preferredmode");
1218     var y = localStorage.getItem("preferredpagemode");
1219     if (x == "dark") {
1220       document.body.className += " darktheme";
1221     }
1222     if (y == "dark") {
1223       document.body.className += " darkpagetheme";
1224     }
1225   })();
1226 </script>
1227
1228 <div class="topnav notranslate" id='topnav' style="position:fixed!important;top:56px">
1229   <div style="overflow:auto;">
1230     <div class="w3-bar w3-left topnavbar" style="width:100%;overflow:hidden;height:32px">
1231       <a href='javascript:void(0);' class='topnav-icons fa fa-menu w3-hide-large w3-left w3-bar-item w3-button ga-nav' style="line-height:1.1;padding-top:8px!important;padding-bottom:7px!important;" onclick="setThemeMode();">≡</a>
1232       <a href='/default.asp' style="display:none" class='topnav-icons fa fa-home w3-left w3-bar-item w3-button ga-nav' title='Home'>Home</a>
1233       <a class="w3-bar-item w3-button ga-nav" href='/html/default.asp' title='HTML Tutorial' style="padding-left:18px!important;padding-right:18px!important;">HTML</a>
1234       <a class="w3-bar-item w3-button ga-nav" href='/css/default.asp' title='CSS Tutorial'>CSS</a>
1235       <a class="w3-bar-item w3-button ga-nav" href='/js/default.asp' title='JavaScript Tutorial'>JAVASCRIPT</a>
1236       <a class="w3-bar-item w3-button ga-nav" href='/sql/default.asp' title='SQL Tutorial'>SQL</a>
1237       <a class="w3-bar-item w3-button ga-nav" href='/python/default.asp' title='Python Tutorial'>PYTHON</a>
1238       <a class="w3-bar-item w3-button ga-nav" href='/java/default.asp' title='Java Tutorial'>JAVA</a>
1239       <a class="w3-bar-item w3-button ga-nav" href='/php/default.asp' title='PHP Tutorial'>PHP</a>
1240       <a class="w3-bar-item w3-button ga-nav" href='/bootstrap/bootstrap_ver.asp' title='Bootstrap Tutorial'>BOOTSTRAP</a>
1241       <a class="w3-bar-item w3-button ga-nav" href='/howto/default.asp' title='How To'>HOW TO</a>
1242       <a class="w3-bar-item w3-button ga-nav" href='/w3css/default.asp' title='W3.CSS Tutorial'>W3.CSS</a>
1243       <a class="w3-bar-item w3-button ga-nav" href='/c/index.php' title='C Tutorial'>C</a>
1244       <a class="w3-bar-item w3-button ga-nav" href='/cpp/default.asp' title='C++ Tutorial'>C++</a>
1245       <a class="w3-bar-item w3-button ga-nav" href='/cs/index.php' title='C# Tutorial'>C#</a>
1246       <a class="w3-bar-item w3-button ga-nav" href='/react/default.asp' title='React Tutorial'>REACT</a>
1247       <a class="w3-bar-item w3-button ga-nav" href='/r/default.asp' title='R Tutorial'>R</a>
1248       <a class="w3-bar-item w3-button ga-nav" href='/jquery/default.asp' title='jQuery Tutorial'>JQUERY</a>
1249       <a class="w3-bar-item w3-button ga-nav" href='/django/index.php' title='Django Tutorial'>DJANGO</a>
1250       <a class="w3-bar-item w3-button ga-nav" href='/typescript/index.php' title='TypeScript Tutorial'>TYPESCRIPT</a>
1251       <a class="w3-bar-item w3-button ga-nav" href='/nodejs/default.asp' title='NodeJS Tutorial'>NODEJS</a>
1252       <a class="w3-bar-item w3-button ga-nav" href='/mysql/default.asp' title='MySQL Tutorial'>MYSQL</a>
1253       <a href='javascript:void(0);' class='topnav-icons fa w3-right w3-bar-item w3-button ga-nav' style="line-height:1.1;padding-top:7px!important;padding-bottom:7px!important;" onclick='gSearch(this)' title='Search'>🔍</a>
1254     </div>
1255   </div>
1256 </div>
```

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1257 <a href='javascript:void(0);' class='topnav-icons fa w3-right w3-bar-item w3-button ga-nav' style="line-height:1.1;padding-top:7px!important;padding-bottom:7px!important;" onclick='gTra(this)' title="
1258 <a href='javascript:void(0);' class='topnav-icons fa w3-right w3-bar-item w3-button ga-nav' style="line-height:1.1;padding-top:7px!important;padding-bottom:7px!important;" onmouseover="mouseoverdarki
1259 </div>
1260
1261 <div style='display:none;position:absolute;z-index:4;right:52px;height:30px;top:-4px;background-color:#282A35;letter-spacing:normal;' id='googleSearch'>
1262   <div class='gcse-search'></div>
1263 </div>
1264 <div style='display:none;position:absolute;z-index:3;right:111px;padding-top:3px;height:32px;txop:-3px;background-color:#282A35;text-align:right;' id='google_translate_element'></div>
1265
1266
1267 <div id="darkmodemenu" class="ws-black" onmouseover="mouseoverdarkicon()" onmouseout="mouseoutofdarkicon()">
1268   <input id="radio_darkpage" type="checkbox" name="radio_theme_mode" onclick="click_darkpage()"><label for="radio_darkpage"> Dark mode</label>
1269   <br>
1270   <input id="radio_darkcode" type="checkbox" name="radio_theme_mode" onclick="click_darkcode()"><label for="radio_darkcode"> Dark code</label>
1271 </div>
1272 </div>
1273 </div>
1274
1275 <script>
1276 (
1277 function setThemeCheckboxes() {
1278   var x = localStorage.getItem("preferredmode");
1279   var y = localStorage.getItem("preferredpagemode");
1280   if (x == "dark") {
1281     document.getElementById("radio_darkcode").checked = true;
1282   }
1283   if (y == "dark") {
1284     document.getElementById("radio_darkpage").checked = true;
1285   }
1286 })();
1287
1288 function mouseoverdarkicon() {
1289   if(window.matchMedia("(pointer: coarse)").matches) {
1290     return false;
1291   }
1292   var a = document.getElementById("darkmodemenu");
1293   a.style.top = "32px";
1294 }
1295 functionmouseoutofdarkicon() {
1296   var a = document.getElementById("darkmodemenu");
1297   a.style.top = "-36px";
1298 }
1299
1300 function changepagetheme(n) {
1301   var a = document.getElementById("radio_darkcode");
1302   var b = document.getElementById("radio_darkpage");
1303   document.body.className = document.body.className.replace("darktheme", "");
1304   document.body.className = document.body.className.replace("darkpagetheme", "");
1305   document.body.className = document.body.className.replace(" ", " ");
1306   if (a.checked && b.checked) {
1307     localStorage.setItem("preferredmode", "light");
1308     localStorage.setItem("preferredpagemode", "light");
1309     a.checked = false;
1310     b.checked = false;
1311   } else {
1312     document.body.className += " darktheme";
1313     document.body.className += " darkpagetheme";
1314     localStorage.setItem("preferredmode", "dark");
1315     localStorage.setItem("preferredpagemode", "dark");
1316     a.checked = true;
1317     b.checked = true;
1318   }
1319 }
1320
1321
1322 function click_darkpage() {
1323   var b = document.getElementById("radio_darkpage");
1324   if (b.checked) {
1325     document.body.className += " darkpagetheme";
1326     document.body.className = document.body.className.replace(" ", " ");
1327     localStorage.setItem("preferredpagemode", "dark");
1328   } else {
1329     document.body.className = document.body.className.replace("darkpagetheme", "");
1330     document.body.className = document.body.className.replace(" ", " ");
```

```
1331     localStorage.setItem("preferredpagemode", "light");
1332   }
1333 }
1334
1335 function click_darkcode() {
1336   var a = document.getElementById("radio_darkcode");
1337   if (a.checked) {
1338     document.body.className += " darktheme";
1339     document.body.className = document.body.className.replace(" ", " ");
1340     localStorage.setItem("preferredmode", "dark");
1341   } else {
1342     document.body.className = document.body.className.replace("darktheme", " ");
1343     document.body.className = document.body.className.replace(" ", " ");
1344     localStorage.setItem("preferredmode", "light");
1345   }
1346 }
1347
1348
1349 <div class='w3-sidebar w3-collapse' id='sidenav'>
1350   <div id='leftmenuinner'>
1351     <div id='leftmenuinnerinner'>
1352       <!-- <a href='javascript:void(0)' onclick='close_menu()' class='w3-button w3-hide-large w3-large w3-display-topright' style='right:16px;padding:3px 12px;font-weight:bold;'>&times;</a>-->
1353       <h2 class='left'><span class='left_h2'>HTML</span> Tutorial</h2>
1354       <a target='_top' href='default.asp'>HTML HOME</a>
1355       <a target='_top' href='html_intro.asp'>HTML Introduction</a>
1356       <a target='_top' href='html_editors.asp'>HTML Editors</a>
1357       <a target='_top' href='html_basic.asp'>HTML Basic</a>
1358       <a target='_top' href='html_elements.asp'>HTML Elements</a>
1359       <a target='_top' href='html_attributes.asp'>HTML Attributes</a>
1360       <a target='_top' href='html_headings.asp'>HTML Headings</a>
1361       <a target='_top' href='html_paragraphs.asp'>HTML Paragraphs</a>
1362       <a target='_top' href='html_styles.asp'>HTML Styles</a>
1363       <a target='_top' href='html_formatting.asp'>HTML Formatting</a>
1364       <a target='_top' href='html_quotation_elements.asp'>HTML Quotations</a>
1365       <a target='_top' href='html_comments.asp'>HTML Comments</a>
1366       <a target='_top' href='html_colors.asp'>HTML Colors</a>
1367       <a target='_top' href='html_overview.asp'>HTML Overview</a>
1368       <div class='tut_overview'>
1369         <a target='_top' href='html_colors.asp'>Colors</a>
1370         <a target='_top' href='html_colors_rgb.asp'>RGB</a>
1371         <a target='_top' href='html_colors_hex.asp'>HEX</a>
1372         <a target='_top' href='html_colors_hsl.asp'>HSL</a>
1373       </div>
1374       <a target='_top' href='html_css.asp'>HTML CSS</a>
1375       <a target='_top' href='html_links.asp'>HTML Links</a>
1376       <div class='tut_overview'>
1377         <a target='_top' href='html_links.asp'>Links</a>
1378         <a target='_top' href='html_links_colors.asp'>Link Colors</a>
1379         <a target='_top' href='html_links_bookmarks.asp'>Link Bookmarks</a>
1380       </div>
1381       <a target='_top' href='html_images.asp'>HTML Images</a>
1382       <div class='tut_overview'>
1383         <a target='_top' href='html_images.asp'>Images</a>
1384         <a target='_top' href='html_images_imagemap.asp'>Image Map</a>
1385         <a target='_top' href='html_images_background.asp'>Background Images</a>
1386         <a target='_top' href='html_images_picture.asp'>The Picture Element</a>
1387       </div>
1388       <a target='_top' href='html_favicon.asp'>HTML Favicon</a>
1389       <a target='_top' href='html_page_title.asp'>HTML Page Title</a>
1390       <a target='_top' href='html_tables.asp'>HTML Tables</a>
1391       <div class='tut_overview'>
1392         <a target='_top' href='html_tables.asp'>HTML Tables</a>
1393         <a target='_top' href='html_table_borders.asp'>Table Borders</a>
1394         <a target='_top' href='html_table_sizes.asp'>Table Sizes</a>
1395         <a target='_top' href='html_table_headers.asp'>Table Headers</a>
1396         <a target='_top' href='html_table_padding_spacing.asp'>Padding & Spacing</a>
1397         <a target='_top' href='html_table_colspan_rowspan.asp'>Colspan & Rowspan</a>
1398         <a target='_top' href='html_table_styling.asp'>Table Styling</a>
1399         <a target='_top' href='html_table_colgroup.asp'>Table Colgroup</a>
1400       </div>
1401
1402
1403
1404 <a target='_top' href='html_lists.asp'>HTML Lists</a>
```

```
1405 | <div class="tut_overview">
1406 | <a target="_top" href="html_lists.asp">Lists</a>
1407 | <a target="_top" href="html_lists_unordered.asp">Unordered Lists</a>
1408 | <a target="_top" href="html_lists_ordered.asp">Ordered Lists</a>
1409 | <a target="_top" href="html_lists_other.asp">Other Lists</a>
1410 | </div>
1411 | <a target="_top" href="html_blocks.asp">HTML Block & Inline</a>
1412 | <a target="_top" href="html_classes.asp">HTML Classes</a>
1413 | <a target="_top" href="html_id.asp">HTML Id</a>
1414 | <a target="_top" href="html_iframe.asp">HTML Iframes</a>
1415 | <a target="_top" href="html_scripts.asp">HTML JavaScript</a>
1416 | <a target="_top" href="html_filepaths.asp">HTML File Paths</a>
1417 | <a target="_top" href="html_head.asp">HTML Head</a>
1418 | <a target="_top" href="html_layout.asp">HTML Layout</a>
1419 | <a target="_top" href="html_responsive.asp">HTML Responsive</a>
1420 | <a target="_top" href="html_computercode_elements.asp">HTML Computercode</a>
1421 | <a target="_top" href="html5_semantic_elements.asp">HTML Semantics</a>
1422 | <a target="_top" href="html5_syntax.asp">HTML Style Guide</a>
1423 | <a target="_top" href="html_entities.asp">HTML Entities</a>
1424 | <a target="_top" href="html_symbols.asp">HTML Symbols</a>
1425 | <a target="_top" href="html_emojis.asp">HTML Emojis</a>
1426 | <a target="_top" href="html_charset.asp">HTML Charset</a>
1427 | <a target="_top" href="html_urlencode.asp">HTML URL Encode</a>
1428 | <a target="_top" href="html_xhtml.asp">HTML vs. XHTML</a>
1429 | <br>
1430 | <h2 class="left"><span class="left_h2">HTML</span> Forms</h2>
1431 | <a target="_top" href="html_forms.asp">HTML Forms</a>
1432 | <a target="_top" href="html_forms_attributes.asp">HTML Form Attributes</a>
1433 | <a target="_top" href="html_form_elements.asp">HTML Form Elements</a>
1434 | <a target="_top" href="html_form_input_types.asp">HTML Input Types</a>
1435 | <a target="_top" href="html_form_attributes.asp">HTML Input Attributes</a>
1436 | <a target="_top" href="html_form_attributes_form.asp">HTML Input Form Attributes</a>
1437 | <br>
1438 | <h2 class="left"><span class="left_h2">HTML</span> Graphics</h2>
1439 | <a target="_top" href="html5_canvas.asp">HTML Canvas</a>
1440 | <a target="_top" href="html5_svg.asp">HTML SVG</a>
1441 | <br>
1442 | <h2 class="left"><span class="left_h2">HTML</span> Media</h2>
1443 | <a target="_top" href="html_media.asp">HTML Media</a>
1444 | <a target="_top" href="html5_video.asp">HTML Video</a>
1445 | <a target="_top" href="html5_audio.asp">HTML Audio</a>
1446 | <a target="_top" href="html_object.asp">HTML Plug-ins</a>
1447 | <a target="_top" href="html_youtube.asp">HTML YouTube</a>
1448 | <br>
1449 | <h2 class="left"><span class="left_h2">HTML</span> APIs</h2>
1450 | <a target="_top" href="html5_geolocation.asp">HTML Geolocation</a>
1451 | <a target="_top" href="html5_draganddrop.asp">HTML Drag/Drop</a>
1452 | <a target="_top" href="html5_webstorage.asp">HTML Web Storage</a>
1453 | <a target="_top" href="html5_webworkers.asp">HTML Web Workers</a>
1454 | <a target="_top" href="html5_serversideevents.asp">HTML SSE</a>
1455 | <br>
1456 | <h2 class="left"><span class="left_h2">HTML</span> Examples</h2>
1457 | <a target="_top" href="html_examples.asp">HTML Examples</a>
1458 | <a target="_top" href="html_editor.asp">HTML Editor</a>
1459 | <a target="_top" href="html_quiz.asp">HTML Quiz</a>
1460 | <a target="_top" href="html_exercises.asp">HTML Exercises</a>
1461 | <a target="_top" href="html_bootcamp.asp">HTML Bootcamp</a>
1462 | <a target="_top" href="html_exam.asp">HTML Certificate</a>
1463 | <a target="_top" href="html_summary.asp">HTML Summary</a>
1464 | <a target="_top" href="html_accessibility.asp">HTML Accessibility</a>
1465 | <br>
1466 | <h2 class="left"><span class="left_h2">HTML</span> References</h2>
1467 | <a target="_top" href="/tags/default.asp">HTML Tag List</a>
1468 | <a target="_top" href="/tags/ref_attributes.asp">HTML Attributes</a>
1469 | <a target="_top" href="/tags/ref_standardattributes.asp">HTML Global Attributes</a>
1470 | <a target="_top" href="/tags/ref_html_browsersupport.asp">HTML Browser Support</a>
1471 | <a target="_top" href="/tags/ref_eventattributes.asp">HTML Events</a>
1472 | <a target="_top" href="/tags/ref_colornames.asp">HTML Colors</a>
1473 | <a target="_top" href="/tags/ref_canvas.asp">HTML Canvas</a>
1474 | <a target="_top" href="/tags/ref_av_dom.asp">HTML Audio/Video</a>
1475 | <a target="_top" href="/tags/ref_html_dtd.asp">HTML Doctypes</a>
1476 | <a target="_top" href="/tags/ref_charactersets.asp">HTML Character Sets</a>
1477 | <a target="_top" href="/tags/ref_urlencode.asp">HTML URL Encode</a>
1478 | <a target="_top" href="/tags/ref_language_codes.asp">HTML Lang Codes</a>
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1479 <a target="_top" href="/tags/ref_httpmessages.asp">HTTP Messages</a>
1480 <a target="_top" href="/tags/ref_httmethods.asp">HTTP Methods</a>
1481 <a target="_top" href="/tags/ref_pxtoemconversion.asp">PX to EM Converter</a>
1482 <a target="_top" href="/tags/ref_keyboardshortcuts.asp">Keyboard Shortcuts</a>
1483 <br><br>
1484 </div>
1485 </div>
1486 </div>
1487 <div class='w3-main w3-light-grey' id='belowtopnav' style='margin-left:220px;'>
1488
1489 <div class='w3-row w3-white'>
1490
1491 <div class='w3-col l10 m12' id='main'>
1492 <div id='mainLeaderboard' style='overflow:hidden;'>
1493   <!-- MainLeaderboard-->
1494
1495   <!--<pre>main_leaderboard, all: [728,90][970,90][320,50][468,60]</pre>-->
1496   <div id="adgin-main_leaderboard-0"></div>
1497   <!-- adspace leaderboard -->
1498
1499 </div>
1500
1501
1502 <h1>HTML <span class="color_h1">Input Attributes</span></h1>
1503 <div class="w3-clear nextprev">
1504 <a class="w3-left w3-btn" href="html\_form\_input\_types.asp">Previous &#10094;</a>
1505 <a class="w3-right w3-btn" href="html\_form\_attributes\_form.asp">Next &#10095;</a>
1506 </div>
1507 <hr>
1508
1509 <p class="intro">This chapter describes the different attributes for the HTML <code class="w3-code span">&lt;input&gt;</code> element. </p>
1510 <hr>
1511
1512 <h2>The value Attribute</h2>
1513 <p>The input <code class="w3-code span">value</code> attribute specifies an initial value for an input field:</p>
1514 <div class="w3-example">
1515 <h3>Example</h3>
1516 <p>Input fields with initial (default) values:</p>
1517 <div class="w3-code notranslate htmlHigh">
1518 &lt;form&gt;<br>
1519 &nbsp; &lt;label for="fname"&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text" value="John" name="fname" id="fname"&gt;<br>&nbsp; &lt;label for="lname"&gt;Last name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text" value="Doe" name="lname" id="lname"&gt;<br>&lt;/form&gt;
1520 </div>
1521 <a class="w3-btn w3-margin-bottom" href="tryit.asp?filename=tryhtml\_input\_attributes\_value" target="_blank">Try it Yourself &raquo;</a>
1522 </div>
1523 <hr>
1524
1525
1526 <h2>The readonly Attribute</h2>
1527 <p>The input <code class="w3-code span">readonly</code> attribute specifies that an input field is read-only.</p>
1528 <p>A read-only input field cannot be modified (however, a user can tab to it, highlight it, and copy the text from it).</p>
1529 <p>The value of a read-only input field will be sent when submitting the form!</p>
1530 <div class="w3-example">
1531 <h3>Example</h3>
1532 <p>A read-only input field:</p>
1533 <div class="w3-code notranslate htmlHigh">
1534 &lt;form&gt;<br>
1535 &nbsp; &lt;label for="fname"&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text" value="John" name="fname" id="fname" readonly="readonly"&gt;<br>&nbsp; &lt;label for="lname"&gt;Last name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text" value="Doe" name="lname" id="lname"&gt;<br>&lt;/form&gt;
1536 </div>
1537 <a class="w3-btn w3-margin-bottom" href="tryit.asp?filename=tryhtml\_input\_attributes\_readonly" target="_blank">Try it Yourself &raquo;</a>
1538 </div>
1539 <hr>
1540
1541 <h2>The disabled Attribute</h2>
1542 <p>The input <code class="w3-code span">disabled</code> attribute specifies that an input field should be disabled.</p>
1543 <p>A disabled input field is unusable and un-clickable.</p>
1544 <p>The value of a disabled input field will not be sent when submitting the form!</p>
1545 <div class="w3-example">
1546 <h3>Example</h3>
1547 <p>A disabled input field:</p>

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1553 <div class="w3-code notranslate htmlHigh">
1554   &lt;form&gt;<br>
1555   &lt;label for="fname"&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text"&gt;
1556   id="fname"; fname&quot; name=&quot;fname&quot; value=&quot;John&quot; disabled&gt;&lt;br&gt;<br>&nbsp; &lt;label for="lname"&gt;Last
1557   name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text"&gt; id=&quot;lname&quot; name=&quot;lname&quot;
1558   value=&quot;Doe&quot;&gt;<br>&lt;/form&gt;
1559 </div>
1560 <a class="w3-btn w3-margin-bottom" href="tryit.asp?filename=tryhtml\_input\_attributes\_disabled" target="_blank">Try it Yourself &raquo;</a>
1561 </div>
1562 <hr>
1563 <div id="midcontentadcontainer" style="overflow:auto;text-align:center">
1564   <!-- MidContent -->
1565   <!-- <p class="adtext">Advertisement</p> -->
1566
1567   <div id="adngin-mid_content-0"></div>
1568
1569 </div>
1570 <hr>
1571
1572 <h2>The size Attribute</h2>
1573 <p>The input <code class="w3-codespan">size</code> attribute specifies the
1574 visible width, in characters, of an input field.</p>
1575 <p>The default value for <code class="w3-codespan">size</code> is 20.</p>
1576 <p><strong>Note:</strong> The <code class="w3-codespan">size</code> attribute
1577 works with the following input types: text, search, tel, url, email, and
1578 password.</p>
1579 <div class="w3-example">
1580   <h3>Example</h3>
1581   <p>Set a width for an input field:</p>
1582   <div class="w3-code notranslate htmlHigh">
1583     &lt;form&gt;<br>&nbsp; &lt;label for="fname"&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input
1584     type="text"&gt; id=&quot;fname&quot; name=&quot;fname&quot; size=&quot;50&quot;&gt;&lt;br&gt;<br>&nbsp; &lt;label
1585     for=&quot;pin&quot;&gt;PIN:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text"&gt; id=&quot;pin&quot; name=&quot;pin&quot;
1586     size=&quot;4&quot;&gt;<br>&lt;/form&gt; </div>
1587 <a class="w3-btn w3-margin-bottom" href="tryit.asp?filename=tryhtml\_input\_attributes\_size" target="_blank">Try it Yourself &raquo;</a>
1588 </div>
1589 <hr>
1590
1591 <h2>The maxlength Attribute</h2>
1592 <p>The input <code class="w3-codespan">maxlength</code> attribute specifies the maximum number of characters allowed in an input field.</p>
1593 <p><strong>Note:</strong> When a <code class="w3-codespan">maxlength</code> is set, the input field will not accept more than the
1594 specified number of characters. However, this attribute does not provide any feedback.
1595 So, if you want to alert the user,
1596 you must write JavaScript code.</p>
1597 <div class="w3-example">
1598   <h3>Example</h3>
1599   <p>Set a maximum length for an input field:</p>
1600   <div class="w3-code notranslate htmlHigh">
1601     &lt;form&gt;<br>&nbsp; &lt;label for="fname"&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input
1602     type="text"&gt; id=&quot;fname&quot; name=&quot;fname&quot; size=&quot;50&quot;&gt;&lt;br&gt;<br>&nbsp; &lt;label
1603     for=&quot;pin&quot;&gt;PIN:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type="text"&gt; id=&quot;pin&quot; name=&quot;pin&quot;
1604     maxlength=&quot;48&quot; size=&quot;4&quot;&gt;<br>&lt;/form&gt; </div>
1605 <a class="w3-btn w3-margin-bottom" href="tryit.asp?filename=tryhtml\_input\_attributes\_maxlength" target="_blank">Try it Yourself &raquo;</a>
1606 </div>
1607 <hr>
1608
1609 <h2>The min and max Attributes</h2>
1610 <p>The input <code class="w3-codespan">min</code> and <code class="w3-codespan">max</code> attributes specify the minimum and maximum values for an
1611 input field.</p>
1612 <p>The <code class="w3-codespan">min</code> and <code class="w3-codespan">max</code> attributes work with the following input types: number, range, date, datetime-local, month, time and week.</p>
1613 <p><strong>Tip:</strong> Use the max and min attributes together to create a
1614 range of legal values.</p>
1615 <div class="w3-example">
1616   <h3>Example</h3>
1617   <p>Set a max date, a min date, and a range of legal values:</p>
1618   <div class="w3-code notranslate htmlHigh">
1619     &lt;form&gt;<br>&nbsp; &lt;label for="datemax"&gt;Enter a date before
1620     1980-01-01:&lt;/label&gt;<br>&nbsp; &lt;input type="date" id="datemax" name="datemax" value="1979-12-31"&gt;&lt;br&gt;<br>&nbsp; &lt;label for="datemin"&gt;Enter a date
1621     after 2000-01-01:&lt;/label&gt;<br>&nbsp; &lt;input type="date" id="datemin" name="datemin" value="2000-01-02"&gt;&lt;br&gt;<br>&nbsp; &lt;label for="quantity"&gt;Quantity
1622     (between 1 and 5):&lt;/label&gt;<br>&nbsp; &lt;input type="number" id="quantity" name="quantity" value="3"&gt;&lt;/form&gt;
1623 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5\_input\_max\_min">Try it Yourself &raquo;</a>

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1627 </div>
1628 <hr>
1629
1630 <h2>The multiple Attribute</h2>
1631 <p>The input <code class="w3-codeespan">multiple</code> attribute specifies that the user is allowed to enter more than one value in
1632 an input field.</p>
1633 <p>The <code class="w3-codeespan">multiple</code> attribute works with the following input types: email, and file.</p>
1634 <div class="w3-example">
1635 <h3>Example</h3>
1636 <p>A file upload field that accepts multiple values:</p>
1637 <div class="w3-code notranslate htmlHigh">
1638   &lt;form&gt;<br>&nbsp; &lt;label for="files">Select files:</label><br>&nbsp; &lt;input
1639   type="file"; id="files"; name="files"; multiple&gt;<br>&lt;/form&gt;</div>
1640 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_multiple">Try it Yourself &raquo;</a>
1641 </div>
1642 <hr>
1643
1644 <h2>The pattern Attribute</h2>
1645 <p>The input <code class="w3-codeespan">pattern</code> attribute specifies a regular expression that the
1646 input field's value is checked against, when the form is submitted.</p>
1647 <p>The <code class="w3-codeespan">pattern</code> attribute works with the following input types: text,
1648 date, search, url, tel, email, and password.</p>
1649 <p><strong>Tip:</strong> Use the global <a href="/tags/att_global_title.asp">title</a> attribute to describe the pattern to help the user.</p>
1650 <p><b>Tip:</b> Learn more about <a href="/js/js_regexp.asp">regular expressions</a> in our JavaScript tutorial.</p>
1651 <div class="w3-example">
1652 <h3>Example</h3>
1653 <p>An input field that can contain only three letters (no numbers or special
1654 characters):</p>
1655 <div class="w3-code notranslate htmlHigh">
1656   &lt;form&gt;<br>&nbsp; &lt;label for="country_code">Country code:</label><br>&nbsp;
1657   &lt;input type="text" id="country_code" name="country_code" pattern="[A-Za-z]{3}" title="Three letter country code" type="text" /><br>&lt;/form&gt;</div>
1658 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_pattern">Try it Yourself &raquo;</a>
1659 </div>
1660 <hr>
1661
1662
1663 <h2>The placeholder Attribute</h2>
1664 <p>The input <code class="w3-codeespan">placeholder</code> attribute specifies
1665 a short hint that describes the expected value of an input field (a sample value or a short description of the
1666 expected format).</p>
1667 <p>The short hint is displayed in the input field before the user enters a
1668 value.</p>
1669 <p>The <code class="w3-codeespan">placeholder</code> attribute works with the following input types: text, search, url, tel, email, and password.</p>
1670 <div class="w3-example">
1671 <h3>Example</h3>
1672 <p>An input field with a placeholder text:</p>
1673 <div class="w3-code notranslate htmlHigh">
1674   &lt;form&gt;<br>&nbsp; &lt;label for="phone">Enter a phone number:</label><br>&nbsp;
1675   &lt;input type="tel" id="phone" name="phone" placeholder="123-45-678" pattern="[0-9]{3}-[0-9]{2}-[0-9]{3}" type="text" /><br>
1676 </form&gt;</div>
1677 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_placeholder">Try it Yourself &raquo;</a>
1678 </div>
1679 <hr>
1680
1681
1682 <h2>The required Attribute</h2>
1683 <p>The input <code class="w3-codeespan">required</code> attribute specifies that an input field must be filled out before submitting the form.</p>
1684 <p>The <code class="w3-codeespan">required</code> attribute works with the following input types: text, search, url, tel, email, password, date pickers, number, checkbox, radio, and file.</p>
1685 <div class="w3-example">
1686 <h3>Example</h3>
1687 <p>A required input field:</p>
1688 <div class="w3-code notranslate htmlHigh">
1689   &lt;form&gt;<br>&nbsp; &lt;label for="username">Username:</label><br>&nbsp; &lt;input
1690   type="text" id="username" name="username" required="" type="text" /><br>&lt;/form&gt;</div>
1691 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_required">Try it Yourself &raquo;</a>
1692 </div>
1693 <hr>
1694
1695 <h2>The step Attribute</h2>
1696 <p>The input <code class="w3-codeespan">step</code> attribute specifies the legal number intervals for an
1697 input field.</p>
1698 <p>Example: if step="3", legal numbers could be -3, 0, 3, 6, etc.</p>
1699 <p><b>Tip:</b> This attribute can be used together with the max and min attributes to create a range of legal values.</p>
1700 <p>The <code class="w3-codeespan">step</code> attribute works with the following input types: number, range, date, datetime-local, month, time and week.</p>

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1701 <div class="w3-example">
1702 <h3>Example</h3>
1703 <p>An input field with a specified legal number intervals:</p>
1704 <div class="w3-code notranslate htmlHigh">
1705   &lt;form&gt;<br>&nbsp; &lt;label for=&quot;points&quot;&gt;Points:&lt;/label&gt;<br>&nbsp; &lt;input
1706   type=&quot;number&quot; id=&quot;points&quot; name=&quot;points&quot; step=&quot;3&quot;&gt;<br>&lt;/form&gt;</div>
1707 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_step">Try it Yourself &raquo;</a>
1708 </div>
1709 <div class="w3-panel w3-note">
1710   <p><strong>Note:</strong> Input restrictions are not foolproof, and JavaScript provides many ways to
1711 add illegal input. To safely restrict input, it must also be checked by the receiver
1712 (the server)!
1713 </p>
1714 </div>
1715 <hr>
1716
1717 <h2>The autofocus Attribute</h2>
1718 <p>The input <code class="w3-codespan">autofocus</code> attribute specifies that
1719 an input field should automatically get focus when the page loads.</p>
1720 <div class="w3-example">
1721 <h3>Example</h3>
1722 <p>Let the &quot;First name&quot; input field automatically get focus when the page loads:</p>
1723 <div class="w3-code notranslate htmlHigh">
1724   &lt;form&gt;<br>&nbsp; &lt;label for=&quot;fname&quot;&gt;First name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input
1725   type=&quot;text&quot; id=&quot;fname&quot; name=&quot;fname&quot; autofocus&gt;&lt;br&gt;<br>&nbsp; &lt;label for=&quot;lname&quot;&gt;Last
1726   name:&lt;/label&gt;&lt;br&gt;<br>&nbsp; &lt;input type=&quot;text&quot; id=&quot;lname&quot; name=&quot;lname&quot;&gt;<br>
1727   &lt;/form&gt;</div>
1728 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_autofocus">Try it Yourself &raquo;</a>
1729 </div>
1730 <hr>
1731
1732 <h2>The height and width Attributes</h2>
1733 <p>The input <code class="w3-codespan">height</code> and <code class="w3-codespan">width</code> attributes specify the height and width of an <code class="w3-codespan">&lt;input
1734 type=&quot;image&quot;&gt;</code> element.</p>
1735 <div class="w3-panel w3-note">
1736   <p><strong>Tip:</strong> Always specify both the height and width attributes for
1737 images. If height and width are set, the space required for the image is
1738 reserved when the page is loaded. Without these attributes, the browser does not
1739 know the size of the image, and cannot reserve the appropriate space to it. The
1740 effect will be that the page layout will change during loading (while the images
1741 load).</p>
1742 </div>
1743 <div class="w3-example">
1744 <h3>Example</h3>
1745 <p>Define an image as the submit button, with height and width attributes:</p>
1746 <div class="w3-code notranslate htmlHigh">
1747   &lt;form&gt;<br>&nbsp; &lt;label for=&quot;fname&quot;&gt;First name:&lt;/label&gt;<br>&nbsp; &lt;input
1748   type=&quot;text&quot; id=&quot;fname&quot; name=&quot;fname&quot;&gt;&lt;br&gt;&lt;br&gt;&lt;br&gt;<br>&nbsp; &lt;label for=&quot;lname&quot;&gt;Last
1749   name:&lt;/label&gt;<br>&nbsp; &lt;input type=&quot;image&quot; id=&quot;img_submit.gif&quot; name=&quot;img_submit.gif&quot; alt=&quot;Submit&quot; width=&quot;48&quot; height=&quot;48&quot;&gt;
1750   <br>&lt;/form&gt;</div>
1751 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_height_width">Try it Yourself &raquo;</a>
1752 </div>
1753 <hr>
1754
1755
1756 <h2>The list Attribute</h2>
1757 <p>The input <code class="w3-codespan">list</code> attribute refers to a <code class="w3-codespan">&lt;datalist&gt;</code> element that contains pre-defined options for an &lt;input&gt; element.</p>
1758 <div class="w3-example">
1759 <h3>Example</h3>
1760 <p>An &lt;input&gt; element with pre-defined values in a &lt;datalist&gt;:</p>
1761 <div class="w3-code notranslate htmlHigh">
1762   &lt;form&gt;<br>&nbsp;
1763   &lt;input list=&quot;browsers&quot;&gt;<br>&nbsp;
1764   &lt;datalist id=&quot;browsers&quot;&gt;<br>
1765   &nbsp;&nbsp;&nbsp; &lt;option value=&quot;Internet Explorer&quot;&gt;<br>
1766   &nbsp;
1767   &nbsp; &lt;option value=&quot;Firefox&quot;&gt;<br>
1768   &nbsp;
1769   &nbsp; &lt;option value=&quot;Chrome&quot;&gt;<br>
1770   &nbsp;
1771   &nbsp; &lt;option value=&quot;Opera&quot;&gt;<br>
1772   &nbsp;
1773   &nbsp; &lt;option value=&quot;Safari&quot;&gt;<br>
1774   &nbsp;

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1775 &lt;/datalist&ampgt<br>&lt;/form&gt;</div>
1776 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_datalist">Try it Yourself &raquo;</a>
1777 </div>
1778 <hr>
1779
1780 <h2>The autocomplete Attribute</h2>
1781 <p>The input <code class="w3-codespan">autocomplete</code> attribute specifies whether a form or
1782 an input field should have autocomplete on or off.</p>
1783 <p>Autocomplete allows the browser to predict the value. When a user starts to
1784 type in a field, the browser should display options to fill in the field, based
1785 on earlier typed values.</p>
1786 <p>The <code class="w3-codespan">autocomplete</code> attribute works with <code class="w3-codespan">&lt;form&gt;</code> and the
1787 following <code class="w3-codespan">&lt;input&gt;</code> types: text, search, url, tel, email, password, datepickers, range, and color.</p>
1788 <div class="w3-example">
1789 <h3>Example</h3>
1790 <p>An HTML form with autocomplete on, and off for one input field:</p>
1791 <div class="w3-code notranslate htmlHigh">
1792   &lt;form action="action_page.php" autocomplete="on">&nbsp; &lt;label for="fname">First
1793   name:&lt;/label&gt;<br>&nbsp; &lt;input type="text" id="fname" name="fname"&gt;&lt;br&gt;&lt;br&gt;<br>&nbsp;
1794   &lt;label for="lname">Last name:&lt;/label&gt;<br>&nbsp; &lt;input type="text" id="lname"
1795   name="lname"&gt;&lt;br&gt;&lt;br&gt;<br>&nbsp; &lt;label for="email">Email:&lt;/label&gt;<br>&nbsp;
1796   &lt;input type="email" id="email" name="email" autocomplete="off"&gt;&lt;br&gt;&lt;br&gt;<br>&nbsp;
1797   &lt;input type="submit" value="Submit"&gt;&lt;/form&gt;
1798 </div>
1799 <a class="w3-btn w3-margin-bottom" target="_blank" href="tryit.asp?filename=tryhtml5_input_autocomplete">Try it Yourself &raquo;</a>
1800 </div>
1801 <p><strong>Tip:</strong> In some browsers you may need to activate an
1802 autocomplete function for this to work (Look under "Preferences" in the
1803 browser's menu).</p>
1804 <hr>
1805
1806 <h2>HTML Exercises</h2>
1807 <form autocomplete="off" id="w3-exerciseform" action="exercise.asp?filename=exercise_html_form_attributes1" method="post" target="_blank">
1808 <h2>Test Yourself With Exercises</h2>
1809 <div class="exercisewindow">
1810 <h2>Exercise:</h2>
1811 <p>In the input field below, add placeholder that says "Your name here".</p>
1812 <div class="exerciseprecontainer">
1813 &lt;form action="/action_page.php"&gt;
1814 <br>
1815 &lt;input type="text" <input name="ex1" spellcheck="false" maxlength="28" style="width: 284px;">
1816 <br>
1817 &lt;/form&gt;
1818 </div>
1819 <br>
1820 <button type="submit" class="w3-btn w3-margin-bottom">Submit Answer &raquo;</button>
1821 <p><a target="_blank" href="exercise.asp?filename=exercise_html_form_attributes1">Start the Exercise</a></p>
1822 </div>
1823 </form>
1824 <hr>
1825
1826 <h2>HTML Form and Input Elements</h2>
1827 <table class="ws-table-all notranslate">
1828 <tr>
1829 <th>Tag</th>
1830 <th>Description</th>
1831 </tr>
1832 <tr>
1833 <td><a href="/tags/tag_form.asp">&lt;form&gt;</a></td>
1834 <td>Defines an HTML form for user input</td>
1835 </tr>
1836 <tr>
1837 <td><a href="/tags/tag_input.asp">&lt;input&gt;</a></td>
1838 <td>Defines an input control</td>
1839 </tr>
1840 </table>
1841 <div class="w3-note w3-panel">
1842   <p>For a complete list of all available HTML tags, visit our <a href="/tags/default.asp">HTML Tag Reference</a>.</p>
1843 </div>
1844
1845 <br>
1846 <div class="w3-clear nextprev">
1847 <a class="w3-left w3-btn" href="html_form_input_types.asp">Previous &#10094;</a>
1848 <a class="w3-right w3-btn" href="html_form_attributes_form.asp">Next &#10095;</a>

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1849 </div>
1850 <div id="mypagediv2" style="position:relative;text-align:center;margin-bottom:20px;clear:both;"></div>
1851 </div>
1852
1853 <div class="w3-col l2 m12" id="right">
1854
1855 <div class="sidesection">
1856   <div id="skyscraper">
1857     <div id="adngin-sidebar_top-0"></div>
1858   </div>
1859 </div>
1860 </div>
1861 </div>
1862
1863 <style>
1864 .ribbon-vid {
1865   font-size:12px;
1866   font-weight:bold;
1867   padding: 6px 20px;
1868   left:-20px;
1869   top:-10px;
1870   text-align: center;
1871   color:black;
1872   border-radius:25px;
1873 }
1874 </style>
1875
1876 <div class="sidesection" style="margin-top:20px; margin-bottom:20px;">
1877   <a id="upperfeatureshowcaselink" class="ga-right ga-fullaccess-purple" href="https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course" target="_blank">
1878     <picture id="upperfeatureshowcase">
1879       <source id="upperfeatureshowcase3001" srcset="/images/img_fullaccess_up_purple_300.png" media="(max-width: 990px)" style="border-radius: 5px;">
1880       <source id="upperfeatureshowcase120" srcset="/images/img_fullaccess_up_purple_120.png" media="(max-width: 1260px)" style="border-radius: 5px;">
1881       <source id="upperfeatureshowcase160" srcset="/images/img_fullaccess_up_purple_160.png" media="(max-width: 1700px)" style="border-radius: 5px;">
1882       
1883     </picture>
1884   </a>
1885 </div>
1886
1887 <div class="sidesection">
1888   <h4><a href="/colors/colors_picker.asp">COLOR PICKER</a></h4>
1889   <a href="/colors/colors_picker.asp" class="ga-right">
1890     
1891   </a>
1892 </div>
1893
1894 <div class="sidesection">
1895   <div class="sharethis">
1896     <a href="https://www.facebook.com/w3schoolscom/" target="_blank" title="Facebook"><span class="fa fa-facebook-square fa-2x ga-right"></span></a>
1897     <a href="https://www.instagram.com/w3schools_com_official/" target="_blank" title="Instagram"><span class="fa fa-instagram fa-2x ga-right"></span></a>
1898     <a href="https://www.linkedin.com/company/w3schools.com/" target="_blank" title="LinkedIn"><span class="fa fa-linkedin-square fa-2x ga-right"></span></a>
1899     <a href="https://discord.gg/6Z7UarbUQM" target="_blank" title='Join the W3schools community on Discord'><span class="fa fa-discord fa-2x ga-right"></span></a>
1900   </div>
1901 </div>
1902
1903 <div class="sidesection" style="margin-top:20px; margin-bottom:20px;">
1904   <a id="lowerfeatureshowcaselink" class="ga-right ga-bootcamp-green" href="https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php" target="_blank">
1905     <picture id="lowerfeatureshowcase">
1906       <source id="lowerfeatureshowcase3001" srcset="/images/img_bootcamp_green_300.png" media="(max-width: 990px)" style="border-radius: 5px;">
1907       <source id="lowerfeatureshowcase120" srcset="/images/img_bootcamp_green_120.png" media="(max-width: 1260px)" style="border-radius: 5px;">
1908       <source id="lowerfeatureshowcase160" srcset="/images/img_bootcamp_green_160.png" media="(max-width: 1700px)" style="border-radius: 5px;">
1909       
1910     </picture>
1911   </a>
1912 </div>
1913
1914 <script>
1915 var internalFeatureRnd = Math.floor(Math.random() * (5 - 1)) + 1;
1916 function addTryItSpaces(subject) {
1917   let spacesButt = document.createElement("a");
1918   let ribb = document.createElement("span");
1919   spacesButt.innerHTML="Get your own " + subject + " Server";
1920   spacesButt.classList.add("ws-black", "ws-hover-black", "spaces-tryit", "ga-featured");
1921   spacesButt.href="https://www.w3schools.com/spaces/";
1922   spacesButt.setAttribute("title", "W3Schools Spaces");

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1923 spacesButt.setAttribute("target", "_blank");
1924
1925 var tryits = document.getElementsByClassName("w3-example");
1926 for (var i = 0; i < tryits.length; i++) {
1927   if (tryits[i].firstElementChild.nodeName == "H3") {
1928     tryits[i].firstElementChild.appendChild(spacesButt.cloneNode(true));
1929     break;
1930   }
1931 }
1932
1933
1934 var uplink1 = "https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course"
1935 var upclass1 = "ga-fullaccess-purple"
1936 var upimgstart1 = "/images/img_fullaccess_up_purple_"
1937 var upimgend1 = ".png"
1938 var uplink2 = "https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course"
1939 var upclass2 = "ga-fullaccess-purple"
1940 var upimgstart2 = "/images/img_fullaccess_up_purple_"
1941 var upimgend2 = ".png"
1942 var uplink3 = "https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course"
1943 var upclass3 = "ga-fullaccess-dark"
1944 var upimgstart3 = "/images/img_fullaccess_up_dark_"
1945 var upimgend3 = ".png"
1946 var uplink4 = "https://campus.w3schools.com/collections/course-catalog/products/w3schools-full-access-course"
1947 var upclass4 = "ga-fullaccess-dark"
1948 var upimgstart4 = "/images/img_fullaccess_up_dark_"
1949 var upimgend4 = ".png"
1950
1951 var loimgsubject = ""
1952 var lolink1 = "https://www.w3schools.com/bootcamp/index.php"
1953 var loclass1 = "ga-bootcamp-green"
1954 var loimgstart1 = "/images/img_bootcamp_green_"
1955 var loimgend1 = ".png"
1956 var lolink2 = "https://www.w3schools.com/bootcamp/index.php"
1957 var loclass2 = "ga-bootcamp-gold"
1958 var loimgstart2 = "/images/img_bootcamp_gold_"
1959 var loimgend2 = ".png"
1960 var lolink3 = "https://www.w3schools.com/training/aws/home/"
1961 var loclass3 = "ga-aws-training-purple"
1962 var loimgstart3 = "/images/img_aws_training_purple_"
1963 var loimgend3 = ".png"
1964 var lolink4 = "https://www.w3schools.com/training/aws/home/"
1965 var loclass4 = "ga-aws-training-dark"
1966 var loimgstart4 = "/images/img_aws_training_dark_"
1967 var loimgend4 = ".png"
1968
1969
1970 var upshowcase120 = document.getElementById("upperfeatureshowcase120");
1971 var upshowcase160 = document.getElementById("upperfeatureshowcase160");
1972 var upshowcase300 = document.getElementById("upperfeatureshowcase300");
1973 var upshowcase3001 = document.getElementById("upperfeatureshowcase3001");
1974 var upshowcaselink = document.getElementById("upperfeatureshowcaselink");
1975 var lowshowcase120 = document.getElementById("lowerfeatureshowcase120");
1976 var lowshowcase160 = document.getElementById("lowerfeatureshowcase160");
1977 var lowshowcase300 = document.getElementById("lowerfeatureshowcase300");
1978 var lowshowcase3001 = document.getElementById("lowerfeatureshowcase3001");
1979 var lowshowcaselink = document.getElementById("lowerfeatureshowcaselink");
1980
1981 switch (subjectFolder) {
1982   case "java":
1983     addTryitSpaces("Java");
1984     break;
1985   case "html":
1986     loimgsubject = "html_";
1987     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
1988     loclass1 = "ga-bootcamp-green-html"
1989     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
1990     loclass2 = "ga-bootcamp-gold-html"
1991     break;
1992   case "tags":
1993     loimgsubject = "html_";
1994     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
1995     loclass1 = "ga-bootcamp-green-html"
1996     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
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1997     loiclass2 = "ga-bootcamp-gold-html"
1998     break;
1999 case "css":
2000     loimgsubject = "css_";
2001     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
2002     loclass1 = "ga-bootcamp-green-css"
2003     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
2004     loclass2 = "ga-bootcamp-gold-css"
2005     break;
2006 case "cssref":
2007     loimgsubject = "css_";
2008     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
2009     loclass1 = "ga-bootcamp-green-css"
2010     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_htmlcss.php";
2011     loclass2 = "ga-bootcamp-gold-css"
2012     break;
2013 case "js":
2014     loimgsubject = "js_";
2015     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_js.php";
2016     loclass1 = "ga-bootcamp-green-js"
2017     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_js.php";
2018     loclass2 = "ga-bootcamp-gold-js"
2019     break;
2020 case "jsref":
2021     loimgsubject = "js_";
2022     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_js.php";
2023     loclass1 = "ga-bootcamp-green-js"
2024     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_js.php";
2025     loclass2 = "ga-bootcamp-gold-js"
2026     break;
2027 case "react":
2028     loimgsubject = "react_";
2029     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_frontend.php";
2030     loclass1 = "ga-bootcamp-green-frontend"
2031     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_frontend.php";
2032     loclass2 = "ga-bootcamp-gold-frontend"
2033     addTryitSpaces("React.js");
2034     break;
2035 case "sql":
2036     loimgsubject = "sql_";
2037     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_sql.php";
2038     loclass1 = "ga-bootcamp-green-sql"
2039     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_sql.php";
2040     loclass2 = "ga-bootcamp-gold-sql"
2041     addTryitSpaces("SQL");
2042     break;
2043 case "mysql":
2044     loimgsubject = "sql_";
2045     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_sql.php";
2046     loclass1 = "ga-bootcamp-green-sql"
2047     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_sql.php";
2048     loclass2 = "ga-bootcamp-gold-sql"
2049     addTryitSpaces("SQL");
2050     break;
2051 case "php":
2052     addTryitSpaces("PHP");
2053     break;
2054 case "numpy":
2055     loimgsubject = "python_";
2056     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2057     loclass1 = "ga-bootcamp-green-python"
2058     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2059     loclass2 = "ga-bootcamp-gold-python"
2060     addTryitSpaces("Python");
2061     break;
2062 case "django":
2063     loimgsubject = "python_";
2064     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2065     loclass1 = "ga-bootcamp-green-python"
2066     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2067     loclass2 = "ga-bootcamp-gold-python"
2068     addTryitSpaces("Django");
2069     break;
2070 case "typescript":
```

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2071     addTryitSpaces("TypeScript");
2072     break;
2073   case "nodejs":
2074     loimgsubject = "node_";
2075     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_backend.php";
2076     loclass1 = "ga-bootcamp-green-backend"
2077     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_backend.php";
2078     loclass2 = "ga-bootcamp-gold-backend"
2079     addTryitSpaces("Node.js");
2080     break;
2081   case "pandas":
2082     loimgsubject = "python_";
2083     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2084     loclass1 = "ga-bootcamp-green-python"
2085     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2086     loclass2 = "ga-bootcamp-gold-python"
2087     addTryitSpaces("Python");
2088     break;
2089   case "python":
2090     loimgsubject = "python_";
2091     lolink1 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2092     loclass1 = "ga-bootcamp-green-python"
2093     lolink2 = "https://www.w3schools.com/bootcamp/bootcamp_python.php";
2094     loclass2 = "ga-bootcamp-gold-python"
2095     addTryitSpaces("Python");
2096     break;
2097   case "cs":
2098     addTryitSpaces("C#");
2099     break;
2100   case "vue":
2101     addTryitSpaces("Vue");
2102     break;
2103   default:
2104     loimgsubject = "";
2105   }
2106 
2107 if (internalFeatureRnd == 1) {
2108   upshowcase120.srcset = upimgstart1 + "120" + upimgend1;
2109   upshowcase160.srcset = upimgstart1 + "160" + upimgend1;
2110   upshowcase300.srcset = upimgstart1 + "300" + upimgend1;
2111   upshowcase3001.srcset = upimgstart1 + "300" + upimgend1;
2112   upshowcaselink.href = uplink1;
2113   upshowcaselink.classList.remove("ga-fullaccess-purple");
2114   upshowcaselink.classList.add(upclass1);
2115   lowshowcase120.srcset = loimgstart1 + loimgsubject + "120" + upimgend1;
2116   lowshowcase160.srcset = loimgstart1 + loimgsubject + "160" + upimgend1;
2117   lowshowcase300.srcset = loimgstart1 + loimgsubject + "300" + upimgend1;
2118   lowshowcase3001.srcset = loimgstart1 + loimgsubject + "300" + upimgend1;
2119   lowshowcaselink.href = lolink1;
2120   lowshowcaselink.classList.remove("ga-bootcamp-green");
2121   lowshowcaselink.classList.add(loclass1);
2122 } else if (internalFeatureRnd == 2) {
2123   upshowcase120.srcset = upimgstart2 + "120" + upimgend2;
2124   upshowcase160.srcset = upimgstart2 + "160" + upimgend2;
2125   upshowcase300.srcset = upimgstart2 + "300" + upimgend2;
2126   upshowcase3001.srcset = upimgstart2 + "300" + upimgend2;
2127   upshowcaselink.href = uplink2;
2128   upshowcaselink.classList.remove("ga-fullaccess-purple");
2129   upshowcaselink.classList.add(upclass2);
2130   lowshowcase120.srcset = loimgstart2 + loimgsubject + "120" + upimgend2;
2131   lowshowcase160.srcset = loimgstart2 + loimgsubject + "160" + upimgend2;
2132   lowshowcase300.srcset = loimgstart2 + loimgsubject + "300" + upimgend2;
2133   lowshowcase3001.srcset = loimgstart2 + loimgsubject + "300" + upimgend2;
2134   lowshowcaselink.href = lolink2;
2135   lowshowcaselink.classList.remove("ga-bootcamp-green");
2136   lowshowcaselink.classList.add(loclass2);
2137 } else if (internalFeatureRnd == 3) {
2138   upshowcase120.srcset = upimgstart3 + "120" + upimgend3;
2139   upshowcase160.srcset = upimgstart3 + "160" + upimgend3;
2140   upshowcase300.srcset = upimgstart3 + "300" + upimgend3;
2141   upshowcase3001.srcset = upimgstart3 + "300" + upimgend3;
2142   upshowcaselink.href = uplink3;
2143   upshowcaselink.classList.remove("ga-fullaccess-purple");
2144   upshowcaselink.classList.add(upclass3);
```

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2145 lowshowcase120.srcset = loimgstart3 + "120" + upimgend3;
2146 lowshowcase160.srcset = loimgstart3 + "160" + upimgend3;
2147 lowshowcase300.srcset = loimgstart3 + "300" + upimgend3;
2148 lowshowcase3001.srcset = loimgstart3 + "300" + upimgend3;
2149 lowshowcaselink.href = lolink3;
2150 lowshowcaselink.classList.remove("ga-bootcamp-green");
2151 lowshowcaselink.classList.add(loclass3);
2152 } else if (internalFeatureRnd == 4) {
2153 upshowcase120.srcset = upimgstart4 + "120" + upimgend4;
2154 upshowcase160.srcset = upimgstart4 + "160" + upimgend4;
2155 upshowcase300.srcset = upimgstart4 + "300" + upimgend4;
2156 upshowcase3001.srcset = upimgstart4 + "300" + upimgend4;
2157 upshowcaselink.href = uplink4;
2158 upshowcaselink.classList.remove("ga-fullaccess-purple");
2159 upshowcaselink.classList.add(upclass4);
2160 lowshowcase120.srcset = loimgstart4 + "120" + upimgend4;
2161 lowshowcase160.srcset = loimgstart4 + "160" + upimgend4;
2162 lowshowcase300.srcset = loimgstart4 + "300" + upimgend4;
2163 lowshowcase3001.srcset = loimgstart4 + "300" + upimgend4;
2164 lowshowcaselink.href = lolink4;
2165 lowshowcaselink.classList.remove("ga-bootcamp-green");
2166 lowshowcaselink.classList.add(loclass4);
2167 }
2168 </script>
2169
2170 <div id="stickypos" class="sidesection" style="text-align:center;position:sticky;top:50px;">
2171 <div id="stickyadcontainer">
2172 <div style="position:relative;margin:auto;">
2173
2174 <div id="adngin-sidebar_sticky-0"></div>
2175 <script>
2176 function secondSnigel() {
2177     if(window.adngin & window.adngin.adnginLoaderReady) {
2178         if (Number(w3_getStyleValue(document.getElementById("main"), "height").replace("px", "")) > 2200) {
2179             if (document.getElementById("adngin-mid_content-0")) {
2180                 adngin.queue.push(function(){ adngin.cmd.startAuction(["sidebar_sticky", "mid_content"]); });
2181             } else {
2182                 adngin.queue.push(function(){ adngin.cmd.startAuction(["sidebar_sticky"]); });
2183             }
2184         } else {
2185             if (document.getElementById("adngin-mid_content-0")) {
2186                 adngin.queue.push(function(){ adngin.Cmd.startAuction(["mid_content"]); });
2187             }
2188         }
2189     } else {
2190         window.addEventListener('adnginLoaderReady', function() {
2191             if (Number(w3_getStyleValue(document.getElementById("main"), "height").replace("px", "")) > 2200) {
2192                 if (document.getElementById("adngin-mid_content-0")) {
2193                     adngin.queue.push(function(){ adngin.cmd.startAuction(["sidebar_sticky", "mid_content"]); });
2194                 } else {
2195                     adngin.queue.push(function(){ adngin.cmd.startAuction(["sidebar_sticky"]); });
2196                 }
2197             } else {
2198                 if (document.getElementById("adngin-mid_content-0")) {
2199                     adngin.queue.push(function(){ adngin.cmd.startAuction(["mid_content"]); });
2200                 }
2201             }
2202         });
2203     }
2204   }
2205 </script>
2206
2207 </div>
2208 </div>
2209 </div>
2210
2211 <script>
2212 uic_r_c()
2213 </script>
2214
2215 </div>
2216 </div>
2217 <div id="footer" class="footer w3-container w3-white">
2218

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2219 <hr>
2220
2221 <div style="overflow:auto">
2222   <div class="bottomad">
2223     <!-- BottomMediumRectangle -->
2224     <!--<pre>bottom_medium_rectangle, all: [970,250][300,250][336,280]</pre>-->
2225     <div id="adngin-bottom_left-0" style="padding:0 10px 10px 0;float:left;width:auto;"></div>
2226     <!-- adspace bmr -->
2227     <!-- RightBottomMediumRectangle -->
2228     <!--<pre>right_bottom_medium_rectangle, desktop: [300,250][336,280]</pre>-->
2229     <div id="adngin-bottom_right-0" style="padding:0 10px 10px 0;float:left;width:auto;"></div>
2230   </div>
2231 </div>
2232
2233 <hr>
2234
2235 <div class="w3-row-padding w3-center w3-small" style="margin:auto">
2236
2237   <div class="w3-col m12 w3-hide-medium w3-hide-small" style="width:20%">
2238     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="/spaces/index.html" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-size:17px;font-family:Source Sans Pro, sans-serif;">Sp
2239   </div>
2240   <div class="w3-col m12 w3-hide-large">
2241     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="/spaces/index.html" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-size:17px;font-family:Source Sans Pro, sans-serif;">Sp
2242   </div>
2243
2244
2245   <div class="w3-col m12 w3-hide-medium w3-hide-small" style="width:20%">
2246     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="/pro/index.php" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-size:17px;font-family:Source Sans Pro, sans-serif;" title=
2247   </div>
2248   <div class="w3-col m12 w3-hide-large">
2249     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="/pro/index.php" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-size:17px;font-family:Source Sans Pro, sans-serif;" title=
2250   </div>
2251
2252   <div class="w3-col m12 w3-hide-medium w3-hide-small" style="width:20%">
2253     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="https://campus.w3schools.com/pages/newsletter" target="_blank" style="white-space:nowrap;text-decoration:none;margin-top:1px;margin-bottom:1
2254   </div>
2255   <div class="w3-col m12 w3-hide-large">
2256     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="https://campus.w3schools.com/pages/newsletter" target="_blank" style="white-space:nowrap;text-decoration:none;margin-top:1px;margin-bottom:1
2257   </div>
2258
2259
2260   <div class="w3-col m12 w3-hide-medium w3-hide-small" style="width:20%">
2261     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="https://campus.w3schools.com/collections/certifications" target="_blank" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-s
2262   </div>
2263
2264   <div class="w3-col m12 w3-hide-large">
2265     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="https://campus.w3schools.com/collections/certifications" target="_blank" style="text-decoration:none;margin-top:1px;margin-bottom:1px;font-s
2266   </div>
2267
2268   <div class="w3-col m12 w3-hide-medium w3-hide-small" style="width:20%">
2269     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="javascript:void(0); onclick="displayError();return false" style="white-space:nowrap;text-decoration:none;margin-top:1px;margin-bottom:1px;font-f
2270   </div>
2271   <div class="w3-col m12 w3-hide-large">
2272     <a class="w3-btn ws-black w3-block w3-round ga-bottom" href="javascript:void(0); onclick="displayError();return false" style="white-space:nowrap;text-decoration:none;margin-top:1px;margin-bottom:1px;font-f
2273   </div>
2274
2275 </div>
2276 <hr>
2277 <div class="ws-grey w3-padding w3-margin-bottom" id="err_form" style="display:none;position:relative">
2278 <span onclick="this.parentElement.style.display='none'" class="w3-button w3-display-topright w3-large">&times;</span>
2279
2280 <h2>Report Error</h2>
2281
2282 <p>If you want to report an error, or if you want to make a suggestion, do not hesitate to send us an e-mail:</p>
2283 <p>help@W3Schools.com</p>
2284 <br>
2285
2286 </div>
2287 <div class="w3-container ws-grey w3-padding" id="err_sent" style="display:none;position:relative">
2288 <span onclick="this.parentElement.style.display='none'" class="w3-button w3-display-topright">&times;</span>
2289 <h2>Thank You For Helping Us!</h2>
2290 <p>Your message has been sent to W3Schools.</p>
2291 </div>
2292

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2293 <div class="w3-row w3-center w3-small">
2294 <div class="w3-col l3 m6 s12">
2295 <div class="top10">
2296 <h5 style="font-family: 'Source Sans Pro', sans-serif;">Top Tutorials</h5>
2297 <a href="/html/default.asp" class="ga-bottom">HTML Tutorial</a><br>
2298 <a href="/css/default.asp" class="ga-bottom">CSS Tutorial</a><br>
2299 <a href="/js/default.asp" class="ga-bottom">JavaScript Tutorial</a><br>
2300 <a href="/howto/default.asp" class="ga-bottom">How To Tutorial</a><br>
2301 <a href="/sql/default.asp" class="ga-bottom">SQL Tutorial</a><br>
2302 <a href="/python/default.asp" class="ga-bottom">Python Tutorial</a><br>
2303 <a href="/w3css/default.asp" class="ga-bottom">W3.CSS Tutorial</a><br>
2304 <a href="/bootstrap/bootstrap_ver.asp" class="ga-bottom">Bootstrap Tutorial</a><br>
2305 <a href="/php/default.asp" class="ga-bottom">PHP Tutorial</a><br>
2306 <a href="/java/default.asp" class="ga-bottom">Java Tutorial</a><br>
2307 <a href="/cpp/default.asp" class="ga-bottom">C++ Tutorial</a><br>
2308 <a href="/jquery/default.asp" class="ga-bottom">jQuery Tutorial</a><br>
2309 </div>
2310 </div>
2311 <div class="w3-col l3 m6 s12">
2312 <div class="top10">
2313 <h5 style="font-family: 'Source Sans Pro', sans-serif;">Top References</h5>
2314 <a href="/tags/default.asp" class="ga-bottom">HTML Reference</a><br>
2315 <a href="/cssref/index.php" class="ga-bottom">CSS Reference</a><br>
2316 <a href="/jsref/default.asp" class="ga-bottom">JavaScript Reference</a><br>
2317 <a href="/sql/sql_ref_keywords.asp" class="ga-bottom">SQL Reference</a><br>
2318 <a href="/python/python_reference.asp" class="ga-bottom">Python Reference</a><br>
2319 <a href="/w3css/w3css_references.asp" class="ga-bottom">W3.CSS Reference</a><br>
2320 <a href="/bootstrap/bootstrap_ref_all_classes.asp" class="ga-bottom">Bootstrap Reference</a><br>
2321 <a href="/php/php_ref_overview.asp" class="ga-bottom">PHP Reference</a><br>
2322 <a href="/colors/colors_names.asp" class="ga-bottom">HTML Colors</a><br>
2323 <a href="/java/java_ref_keywords.asp" class="ga-bottom">Java Reference</a><br>
2324 <a href="/angular/angular_ref_directives.asp" class="ga-bottom">Angular Reference</a><br>
2325 <a href="/jquery/jquery_ref_overview.asp" class="ga-bottom">jQuery Reference</a><br>
2326 </div>
2327 </div>
2328 <div class="w3-col l3 m6 s12">
2329 <div class="top10">
2330 <h5 style="font-family: 'Source Sans Pro', sans-serif;">Top Examples</h5>
2331 <a href="/html/html_examples.asp" class="ga-bottom">HTML Examples</a><br>
2332 <a href="/css/css_examples.asp" class="ga-bottom">CSS Examples</a><br>
2333 <a href="/js/js_examples.asp" class="ga-bottom">JavaScript Examples</a><br>
2334 <a href="/howto/default.asp" class="ga-bottom">How To Examples</a><br>
2335 <a href="/sql/sql_examples.asp" class="ga-bottom">SQL Examples</a><br>
2336 <a href="/python/python_examples.asp" class="ga-bottom">Python Examples</a><br>
2337 <a href="/w3css/w3css_examples.asp" class="ga-bottom">W3.CSS Examples</a><br>
2338 <a href="/bootstrap/bootstrap_examples.asp" class="ga-bottom">Bootstrap Examples</a><br>
2339 <a href="/php/php_examples.asp" class="ga-bottom">PHP Examples</a><br>
2340 <a href="/java/java_examples.asp" class="ga-bottom">Java Examples</a><br>
2341 <a href="/xml/xml_examples.asp" class="ga-bottom">XML Examples</a><br>
2342 <a href="/jquery/jquery_examples.asp" class="ga-bottom">jQuery Examples</a><br>
2343 </div>
2344 </div>
2345 <div class="w3-col l3 m6 s12">
2346 <div class="top10">
2347
2348 <a href="https://campus.w3schools.com/collections/course-catalog" target="_blank" class="ga-bottom"><h5 style="font-family: 'Source Sans Pro', sans-serif;">Get Certified</h5></a>
2349 <a href="https://campus.w3schools.com/collections/certifications/products/html-certificate" target="_blank" class="ga-bottom">HTML Certificate</a><br>
2350 <a href="https://campus.w3schools.com/collections/certifications/products/css-certificate" target="_blank" class="ga-bottom">CSS Certificate</a><br>
2351 <a href="https://campus.w3schools.com/collections/certifications/products/javascript-certificate" target="_blank" class="ga-bottom">JavaScript Certificate</a><br>
2352 <a href="https://campus.w3schools.com/collections/certifications/products/front-end-certificate" target="_blank" class="ga-bottom">Front End Certificate</a><br>
2353 <a href="https://campus.w3schools.com/collections/certifications/products/sql-certificate" target="_blank" class="ga-bottom">SQL Certificate</a><br>
2354 <a href="https://campus.w3schools.com/collections/certifications/products/python-certificate" target="_blank" class="ga-bottom">Python Certificate</a><br>
2355 <a href="https://campus.w3schools.com/collections/certifications/products/php-certificate" target="_blank" class="ga-bottom">PHP Certificate</a><br>
2356 <a href="https://campus.w3schools.com/collections/certifications/products/jquery-certificate" target="_blank" class="ga-bottom">jQuery Certificate</a><br>
2357 <a href="https://campus.w3schools.com/collections/certifications/products/java-certificate" target="_blank" class="ga-bottom">Java Certificate</a><br>
2358 <a href="https://campus.w3schools.com/collections/certifications/products/c-certificate" target="_blank" class="ga-bottom">C++ Certificate</a><br>
2359 <a href="https://campus.w3schools.com/collections/certifications/products/c-certificate-1" target="_blank" class="ga-bottom">C# Certificate</a><br>
2360 <a href="https://campus.w3schools.com/collections/certifications/products/xml-certificate" target="_blank" class="ga-bottom">XML Certificate</a><br>
2361
2362
2363 </div>
2364 </div>
2365 </div>
```

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2367 <hr>
2368 <div class="w3-opacity" style="font-size:12px;text-align:right;margin-bottom:16px; margin-right:8px;">
2369   <a href="/forum/default.asp" target="_blank" class="xw3-text-grey xw3-hover-text-black ga-bottom" style="text-decoration:none" title="Forum">FORUM</a> |
2370   <a href="/about/default.asp" target="_top" class="xw3-text-grey xw3-hover-text-black ga-bottom" style="text-decoration:none" title="About W3Schools">ABOUT</a>
2371 </div>
2372
2373 <div class="w3-center w3-small w3-opacity">
2374 W3Schools is optimized for learning and training. Examples might be simplified to improve reading and learning.
2375 Tutorials, references, and examples are constantly reviewed to avoid errors, but we cannot warrant full correctness of all content.
2376 While using W3Schools, you agree to have read and accepted our <a href="/about/about_copyright.asp" class="ga-bottom">terms of use</a>,
2377 <a href="/about/about_privacy.asp" class="ga-bottom">cookie and privacy policy</a>.<br><br>
2378 <a href="/about/about_copyright.asp" class="ga-bottom">Copyright 1999-2023</a> by Refsnes Data. All Rights Reserved.<br>
2379 <a href="https://www.w3schools.com/w3css/default.asp" class="ga-bottom">W3Schools is Powered by W3.CSS</a>.<br><br>
2380 </div>
2381 <div class="w3-center w3-small">
2382 <a href="https://www.w3schools.com" class="ga-bottom">
2383   <i class="fa fa-logo ws-text-green ws-hover-text-green" style="position:relative;font-size:42px!important;"></i>
2384 </div>
2385 <br><br>
2386 </div>
2387
2388 </div>
2389 <script src="/lib/w3schools_footer.js?update=20230706"></script>
2390
2391 <script>
2392   MyLearning.loadUser('footer', function () {
2393     if (UserSession.loggedIn) {
2394       document.getElementById("signupbtn_topnav").style.display = "none";
2395       document.getElementById("probtn_topnav").style.display = "block";
2396     } else {
2397       addMyLearnButt();
2398     }
2399   });
2400   function docReady(fn) {
2401     document.addEventListener("DOMContentLoaded", fn);
2402     if (document.readyState === "interactive" || document.readyState === "complete") {
2403       fn();
2404     }
2405   }
2406   uic_r_z();
2407   uic_r_d()
2408
2409   function addMyLearnButt() {
2410     let nav = document.getElementsByClassName("nextprev");
2411     if (document.body.contains(nav[1])) {
2412       if ((nav[1].firstElementChild.innerHTML.indexOf("Previous") || nav[1].firstElementChild.innerHTML.indexOf("Home") !== -1) && (nav[1].firstElementChild.nextElementSibling.innerHTML.indexOf("Next") !== -1)) {
2413         let myLearnButt = document.createElement("a");
2414         myLearnButt.innerHTML="Log in to track progress";
2415         myLearnButt.classList.add("w3-btn", "w3-hide-small", "myl-nav-but");
2416         myLearnButt.href="https://www.w3schools.com/signup/?utm_source=classic&utm_medium=" + subjectFolder + "_tutorial&utm_campaign=button_lower_navigation";
2417         myLearnButt.setAttribute("title", "Sign Up and improve Your Learning Experience");
2418         myLearnButt.setAttribute("target", "_blank");
2419         nav[1].classList.add("w3-center");
2420         nav[1].firstElementChild.insertAdjacentElement("afterend", myLearnButt);
2421       }
2422     }
2423   }
2424 </script>
2425
2426 <!--[if lt IE 9]>
2427 <script src="https://oss.maxcdn.com/libs/html5shiv/3.7.0/html5shiv.js"></script>
2428 <script src="https://oss.maxcdn.com/libs/respond.js/1.4.2/respond.min.js"></script>
2429 <![endif]-->
2430 </body>
2431 </html>
2432

```