

## Language Map for JavaScript

<b>Variable Declaration</b> <i>Is this language strongly typed or dynamically typed? Provide at least three examples (with different data types or keywords) of how variables are declared in this language.</i>	JavaScript is dynamically typed.  var x = 25; var is used when supporting old browsers.  let name = "Kendall"; let is used if const cannot be used.  const season = "Winter"; const should be used if the value or type should not be changed.
<b>Data Types</b> <i>List all of the data types (and ranges) supported by this language.</i>	String – stores a list of zero or more characters. Range dependent on storage and browser. Number – numbers are stored in both integer and double-precision 64-bit binary format. $-(2^{53} - 1)$ to $2^{53} - 1$ . Bigint – used to store values that are too big to be stored by Number data type. Boolean – stores true or false Undefined – a variable that has not been assigned a value is undefined Null – stores one value that is null Symbol – used to create unique identifiers for objects Object – can consist of objects, arrays
<b>Selection Structures</b> <i>Provide examples of all selection structures supported by this language (if, if else, etc.) <b>Don't just list them, show code samples of how each would look in a real program.</b></i>	<b>if:</b> if (hour < 18) { greeting = "Good day"; }  <b>else:</b> if (hour < 18) { greeting = "Good day" } else { greeting = "Good evening"; }  <b>else if:</b> if (time < 10) { greeting = "Good morning"; } else if (time < 20) { greeting = "Good day"; } else {

	<pre> greeting = "Good evening"; }  <b>switch:</b> switch (grade) = {   case 0:     grade = "A";     break;   case 1:     grade = "B";     break;   case 2:     grade = "C";     break;   case 3:     grade = "D";     break;   case 4:     grade = "F";     break; } </pre>
<p><b>Repetition Structures</b></p> <p><i>Provide examples of all repetition structures supported by this language (loops, etc.) <b>Don't just list them, show code samples of how each would look in a real program.</b></i></p>	<pre> <b>for:</b> const n = 3;  for (let i = 1; i &lt;= n; i++) {   console.log("Hello"); }  <b>for/in:</b> const person = { fName: "Harry", lName: "Potter", age: 14 };  let text = " ";  for (let x in person) {   text += person[x]; }  <b>for/of:</b> let language = "JavaScript"; </pre>

	<pre>let text = “ “; for (let x of language) {   text += x; }</pre> <p><b>while:</b></p> <pre>while (i &lt; 10) {   text += “The number is “ + i;   i++; }</pre> <p><b>do/while:</b></p> <pre>do {   text += “The number is “ + i;   i++; } while (i &lt; 10);</pre>
<p><b>Arrays</b></p> <p><i>If this language supports arrays, provide at least two examples of creating an array with a primitive or String data types (e.g. float, int, String, etc.)</i></p>	<pre>const colors = [yellow, purple, green, blue];</pre> <pre>const numbers = [ ]; numbers[0] = 22; numbers[1] = 93; numbers[2] = 101;</pre> <pre>const states = new Array(“Kentucky”, “California”, “Utah”);</pre>
<p><b>Data Structures</b></p> <p><i>If this language provides a standard set of data structures, provide a list of the data structures and their Big-Oh complexity.</i></p>	<p><b>Array:</b> Big-Oh is <math>O(1)</math> for accessing elements at a specific index. <math>O(n)</math> for search methods. If adding an element to the end of the array, Big O is <math>O(1)</math>. If adding to the beginning of the array, all elements must be shifted and Big O is <math>O(n)</math>.</p> <p><b>Hashmap:</b> Search methods are <math>O(1)</math>.</p> <p><b>Stack:</b> Insertion and removal are <math>O(1)</math>. Search and access methods are <math>O(n)</math>.</p> <p><b>Queue:</b> Insertion and removal are <math>O(1)</math>. Search and access methods are <math>O(n)</math>.</p> <p><b>Linked list:</b></p> <ul style="list-style-type: none"> <li>• <b>Singly:</b> Insertion is <math>O(1)</math>. Removal, search, and access methods are <math>O(n)</math>.</li> <li>• <b>Doubly:</b> Insertion and removal are <math>O(1)</math>. Search and access are <math>O(n)</math>.</li> </ul> <p><b>Set:</b> usually implemented as a hash table or a search tree. Depending on which, search methods are <math>O(1)</math> or <math>O(\log n)</math>. has( ) method is <math>O(1)</math>.</p> <p><b>Trees:</b> For binary search trees, insertion/removal and search methods are <math>O(\log n)</math>.</p> <p><b>Trie:</b> Insert and search methods are <math>O(n)</math>, where n is the number of characters in a word.</p> <p><b>Graph:</b> Adding nodes or edges are <math>O(1)</math>.</p>

<p><b>Objects</b></p> <p><i>If this language support object-orientation, provide an example of how you would write a simple object with a default constructor and then how you would instantiate it.</i></p>	<pre>const wizard = {   firstName: "Harry",   lastName: "Potter",   age: 14,   house: "Gryffindor" };  wizard.house;</pre> <p>Output: Gryffindor</p>
<p><b>Runtime Environment</b></p> <p><i>What runtime environment does this language compile to? For example, Java compiles to the Java Virtual Machine.</i></p> <p><i>Do other languages also compile to this runtime?</i></p>	<p>The most common JavaScript runtime environment is the browser. NodeJS is also a JavaScript runtime environment. It is only for JavaScript.</p>
<p><b>Libraries/Frameworks</b></p> <p><i>What are the popular libraries or frameworks used by programmers for this language? List at least three (3) and describe what they are used for..</i></p>	<p>jQuery is a popular JavaScript library. It is fast, light-weight, and has many features. It makes it easier for HTML document manipulation and traversal, animation, and event handling.</p> <p>D3.js allows developers to manipulate documents based on data. It emphasizes web standards and provides users with modern browser capabilities without being limited to a single framework. It supports HTML, CSS, and SVG.</p> <p>Lodash is a JavaScript utility library that makes it easy to work with numbers, arrays, strings, objects, etc. It helps the user to write maintainable and concise JavaScript code.</p>
<p><b>Domains</b></p> <p><i>What industries or domains use this programming language? Provide specific examples of companies that use this language and what they use it for. E.g. Company X uses C# for its line of business applications.</i></p>	<p>Facebook uses Javascript. Facebook interfaces are a collection of independent JavaScript apps.</p> <p>Google uses JavaScript for many products. It is used to write code for search results, Google document, the Chrome browser, etc.</p> <p>Instagram uses the ReactJS library. It is used for loading, images, video delivery, uploading, etc.</p>