JavaScript Introduction and Basics:

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☐ JavaScript is the programming language used to provide functionality to a web page.
☐ Allows us to program the behaviour of the elements of a web page when the user interacts with them.

Parts of JavaScript:

➢ Variables:

- We can define variables in JavaScript by using:
    - **let :** Used to define a variable and assign a value to it, which can also be modified later when needed.
    - **const :** Used to define a variable and assign a value to it, but this variable cannot be modified once created.

➢ Data types:

- There are 8 data types in JavaScript:
    - **String :** A set of characters enclosed with ‘ or “ .
    - **Number :** Numbers of any type.
    - **Boolean :** True and False conditions.
    - **Null :** A null value
    - **Undefined :** Not defined in the code.
    - **Symbol :** Used to represent unique values which can be used as identifiers.
    - **Object :** Variables that can contain many values.
    - **Bigint :** 64-bit floating point number.

➢ Objects:

- Objects in JavaScript are used to store multiple values in one variable.
- Used by enclosing key-value pairs in '{ }'.
- Each object in a variable can be called by using the variable name and key separated by a dot.
- An object value can be called using the variable name and enclosing the specific key in '[ ]' or using the variable and key name separated by a dot.

➢ Strings:

- A set of characters enclosed within ' ' or " " .
- Its length can be found using the 'length' function.
- Escape characters are used in strings to add quotes, backslash, backspace, new line, etc. within a string.
- Some functions that can be used for a string are,
    - **charAt() :** Used to get the character at the specified index.
    - **at() :** Similar to charAt() but can also use negative indexes.
    - **toUpperCase() :** Used to convert all letters in a string to uppercase.
    - **toLowerCase() :** Used to convert all letters in a string to lowercase.
    - **trim() :**
    - **concat() :** used to merge two or more strings together into a single string.
    - **replace() :** Used to replace a specified character or a set of characters in a string with another character.
    - **repeat() :** Used to return a string which has repeated copies of the required string.
    - **split() :** Used to convert a string to an array with a specified separator.

➢ Arrays:

- A special variable which can hold more than one value of the same data type.
- Initialised by enclosing values in '[ ]' or by using 'new Array()' function.
- Array elements are accessed and modified using the index position of the value enclosed in '[ ]'.
- Some functions available for an array are:
    - **length :** Used to get the number of elements present in an array.
    - **push() :** Used to add a new value to the end of an array.
    - **pop() :** Used to remove the value at the specified index from an array. Removes the value at the end if no index is mentioned.
    - **toString() :** Used to convert an Array to a String separated by commas.
    - **at() :** Used to find the value present at the required index.
    - **join() :** Used to join all values inside an array into a string separated by the specified join character.
    - **shift() :** Used to shift out the first value in the array and return it.
    - **unshift() :** Used to add back the value to the start of the array and shift the other elements to the left.
    - **concat() :** Used to merge two arrays into a single array.
    - **flat() :** Used to flatten an array to a specified dimension.
    - **delete() :** Used to delete a value from an array but does not delete the index and is left with an undefined value.
- In terms of searching an array, we have:
    - **indexOf() :** Used to get the index position of a specified value.
    - **includes() :** Used to check if the specified value is present in an array.

➢ Operators and Comparisons:

- Operators in JavaScript are used to perform mathematical and logical actions on variables and get a final result.
- Some operators used are
    - Arithmetic operators : + , - , * , / , %, ++ , - -
    - Assignment operators : = , += , -= , *= , /=
    - Comparison operators : > , < , == , >= , <= , != , === , !==
    - Logical operators : && , || , !
    - Ternary operator : ? :

➢ Conditions:

- We use conditional statements in JavaScript to check if a certain condition is true or false and perform an action based on it.
- There are 4 types of conditional statements:
    - if : Used to execute a block of code if a condition specified is true.
    - else : Used to execute a block of code if the condition specified in ‘if’ block is false.
    - else-if : Used to execute a block of code if the condition specified in ‘if’ statement is false and the condition entered here is true.
    - Switch : Used to select one of the code blocks for execution based on user input.

➢ Loops:

- Loops are used to execute the same code multiple times depending on the given condition.
- There are 2 types of loops in JavaScript:
    - ‘for’ : Used to execute a block of code multiple times depending on the condition provided within the loop. This loop can also increment/decrement the value after each iteration.
    - ‘While’ : Used to run a block of code multiple times until the condition becomes false.

➢ Functions:

- Functions in JavaScript help us to reuse a block of code by calling them when needed and are called by using the name with ‘()’.
- A function executes a block of code and returns a value if a ‘return’ statement is mentioned.
- The parentheses can take values called parameters which can be used in the block of code.

➢ Map and Filter:

- A ‘map’ function can be used to perform actions on the entire array and return the modified array to a new variable. Initialised using ‘.map()’ .
- A ‘filter’ function can be used to filter out the requred values from an array based on the condition set and are stored in a new variable. Initialised using the ‘.filter()’ .