JavaScript Intro

<!--! 1. what is js ? -->

JavaScript is a high-level, versatile, and dynamic programming language primarily
  used for creating interactive and dynamic content on websites.
 It enables web developers to add functionality, interactivity, and behavior to web pages.

<!--! 2. Characteristics Of JS -->

1. High-Level Language
2. Interpreted Language
3. Single Threaded
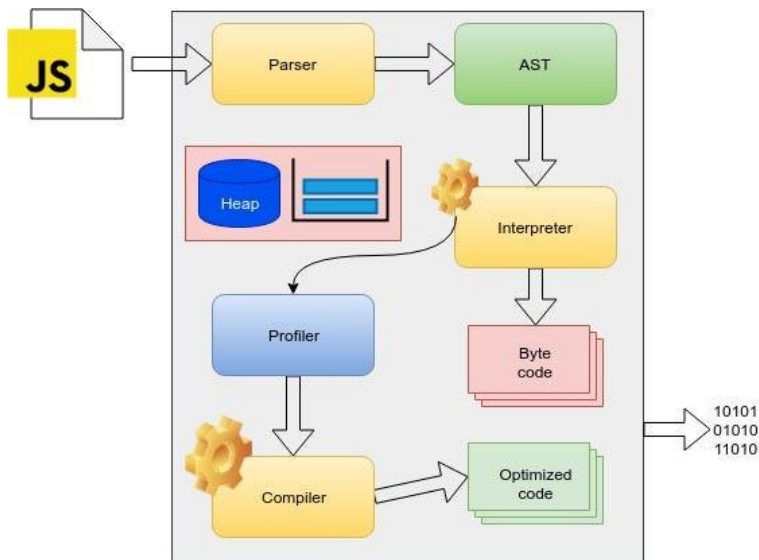4. loosely typed
5. Dynamic language
6. Synchronous language

<!-- ! 3. ways to write js -->

<!-- ? 1. inside browser (Internal , External) -->
<!-- ?   2. outside browser (with the help of nodejs) -->

<!-- ! 4. output methods -->

1. console.log
2. document.write()
3. alert()

<!-- ! 5.   how js file runs in browser -->

<!-- ? Parser: -->

 It checks for syntax and semantics. it breaking the code into tokens in order to understand their meanings and these tokens gets converted into Abstract Syntax Tree(AST).

 <!-- ? Abstract Syntax tree: (AST) -->

 It is a hierarchical tree like structure of program representation which allows interpreter to understand the program.
 This AST is initially goes to the Interpreter.

<!-- ? Interpreter: -->

 It lets the AST to get converted into Byte code.

<!-- ? Profiler: -->

  It will check for the repeating code that can be optimized. As soon as, it gets the repeating code, it basically moves the code into compiler.

<!-- ? Compiler: -->
  It produced the most optimized byte code.

<!--! browser   js Engine -->

        chrome ==> v8 engine
        edge   ==> chakra
        firefox ==> spider monkey

<!-- ! 6.   what is token ? -->

<!-- ?   smallest unit of programming language -->

    <!-- ! (i) keywords : -->

     A predefined reserved word which JS engine can understand

    <!-- ? Rules: -->
   -Every keyword must be in lower case .
    -A keyword can't be used as an identifiers.

    Examples:
       if , for , let , while

    <!-- ! (ii) identifier: -->

    The names provided by the programmers to the components
(variable,function,class) of JS .

  <!-- ?   Rules: -->

    -Identifier can't start with a number (but it has number) .
    - keywords can't be used as identifier.
    - number alone can't be variable name but alpha numeric is possible.
    - space in identifier is not possible.
    - case sensitive
    -Except dollar ($)and underscore (_) no other special character is
allowed.

<!-- !   (iii) Literals : -->

     The data which is used in the JS program.

    1)Number
    2)Boolean
    3)Null
    4)Undefined
    5)Object
    6)BigInt

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<!-- ! 7.  declaration of variable in js  -->

    <!-- ?  1. var =>   -->

        variable declaration ☑,
        variable Initialization ☑,
        variable Re-declaration ☑,
        variable Re-Initialization ☑,
        variable Re-declaration  and variable Re-Initialization ☑,


    <!-- ?  2. let  -->

        variable declaration ☑,
        variable Initialization ☑,
        variable Re-declaration ✗,
        variable Re-Initialization ☑,
        variable Re-declaration  and variable Re-Initialization ✗,

    <!-- ?  3. const  -->

        variable declaration ✗,
        variable Initialization ✗,
        variable declaration and initialization ☑
        variable Re-declaration ✗,
        variable Re-Initialization ✗,
        variable Re-declaration  and variable Re-Initialization ✗,
```