JavaScript CRASHCOURSE in 3 Hourse With Notes

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Introduction to JavaScript

1. History of JavaScript
2. What is JavaScript
3. Popularity of JavaScript
4. Applications of JavaScript
5. Runtime Environment
6. JavaScript vs ECMA
7. JavaScript vs TypeScript
8. JavaScript in Console
9. JavaScript in Webpage
10. DOM Manipulation
11. JavaScript with Node

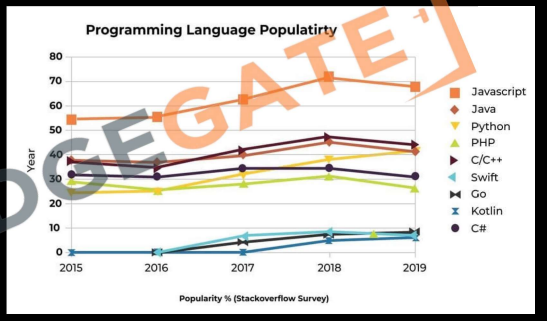
1. History of JavaScript

1. JavaScript was originally named Mocha, then renamed to LiveScript, and finally JavaScript to capitalize on the popularity of Java at the time.
2. JavaScript was created by Brendan Eich in 1995 while he was working at Netscape Communications Corporation.
3. JavaScript is an interpreted language, meaning it is executed line by line.

2. What is JavaScript

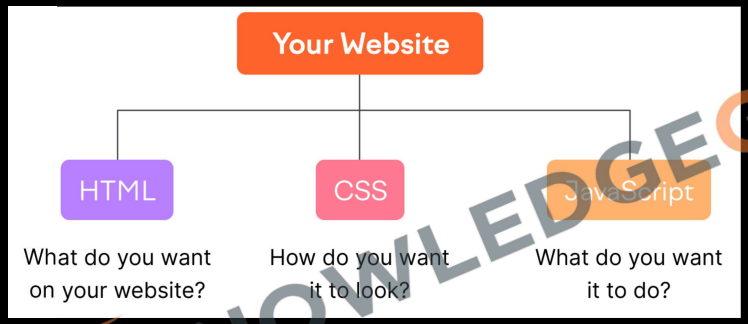
1. JavaScript is a high-level, dynamic programming language commonly used for creating interactive effects within web browsers.
2. Actions: Enables interactivity.
3. Updates: Alters page without reloading.
4. Events: Responds to user actions.
5. Data: Fetches and sends info to server.

3. Popularity of JavaScript



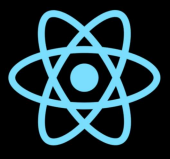
1. JavaScript is one of the most popular programming languages in the world, consistently ranking at the top in surveys and job listings.
2. Average JavaScript Dev Salary in India:
   - Entry-Level (0-1 year): Around ₹3,50,000 per annum.
   - Mid-Level (2-5 years): Approximately ₹6,00,000 to ₹10,00,000 per annum.
   - Experienced (5+ years): Can exceed ₹10,00,000 per annum, potentially reaching up to ₹20,37,500.

4.Applications of JavaScript



1. HTML: Defines the structure and content of the website.
2. CSS: Specifies the appearance and layout of the website.
3. JavaScript: Adds interactivity and dynamic behavior to the website.

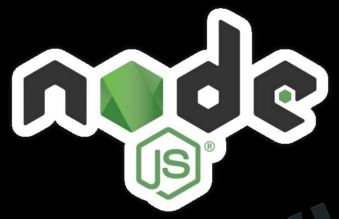
4.Applications of JavaScript



Web Applications:

- React: A library for building user interfaces, maintained by Facebook.
- Angular: A platform for building mobile and desktop web applications, maintained by Google.
- Vue.js: A progressive framework for building user interfaces.

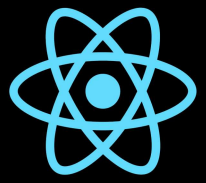
4.Applications of JavaScript




Server-Side:

- Node.js: Allows JavaScript to run on the server, used for building scalable network applications.
- Express.js: A minimal and flexible Node.js web application framework.

4.Applications of JavaScript



Mobile Applications:

- React Native: Builds mobile apps using JavaScript and React.
- Ionic: A framework for building cross-platform mobile apps with web technologies like HTML, CSS, and JavaScript.
- NativeScript: Allows building native iOS and Android apps using JavaScript or TypeScript.

4.Applications of JavaScript



BuildTools:

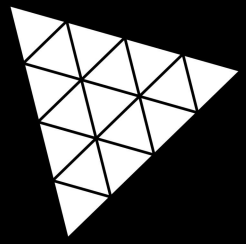
- Webpack: A module bundler for JavaScript applications.
- Parcel: A fast, zero-configuration web application bundler.
- Gulp: A toolkit to automate tasks in your development workflow.

4.Applications of JavaScript


Desktop Applications:

- Electron: Allows building cross-platform desktop applications using HTML, CSS, and JavaScript.
- NW.js: A framework for building native applications with web technologies.

4.Applications of JavaScript

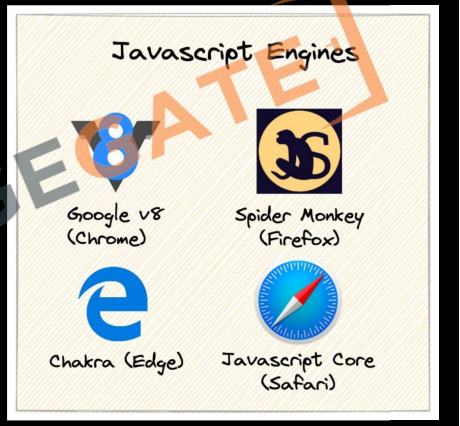


Cameras and Speakers:

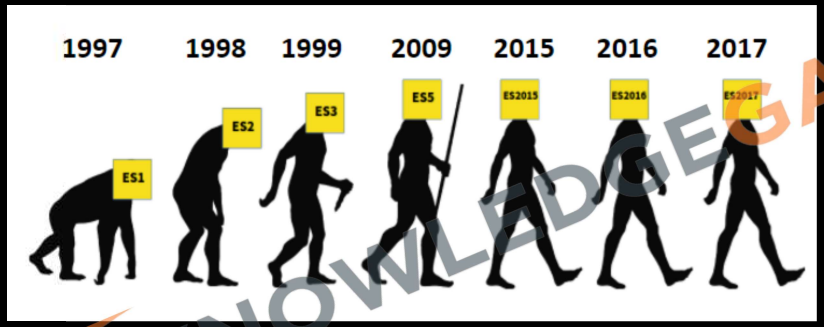
- Three.js: A library that makes WebGL - 3D programming for the web - easier to use.
- WebRTC: A technology that enables peer-to-peer audio, video, and data sharing.
- Howler.js: A JavaScript audio library for the modern web.

5. Runtime Environment

1. Provides infrastructure to execute JavaScript code.
2. Core: Includes a JavaScript engine (e.g., V8, SpiderMonkey).
3. Browser Environment: Offers APIs for DOM manipulation, events, and network requests.
4. Node.js: Extends JavaScript capabilities to server-side programming.
5. Asynchronous Support: Handles non-blocking operations with event loops, callbacks, and promises.

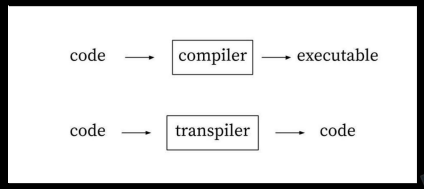


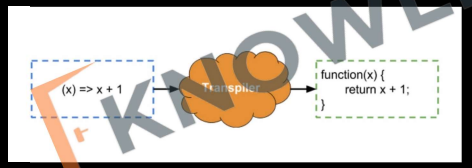
6. JavaScript vs ECMA



1. ECMAScript is the standardized specification developed by ECMA International that defines the core features, syntax, and functionalities of JavaScript and similar scripting languages.
2. JavaScript is the actual language implementation.

7. JavaScript vs TypeScript



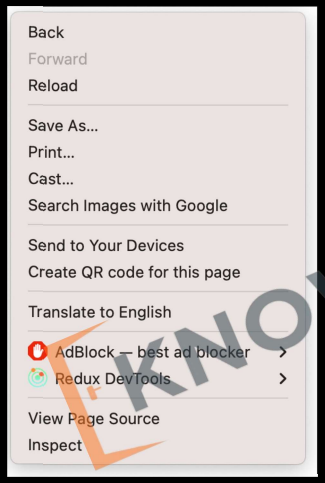


1. JavaScript runs at the client side in the browser.
2. Coffee Script / TypeScript are transpiled to JavaScript.

7. JavaScript vs TypeScript

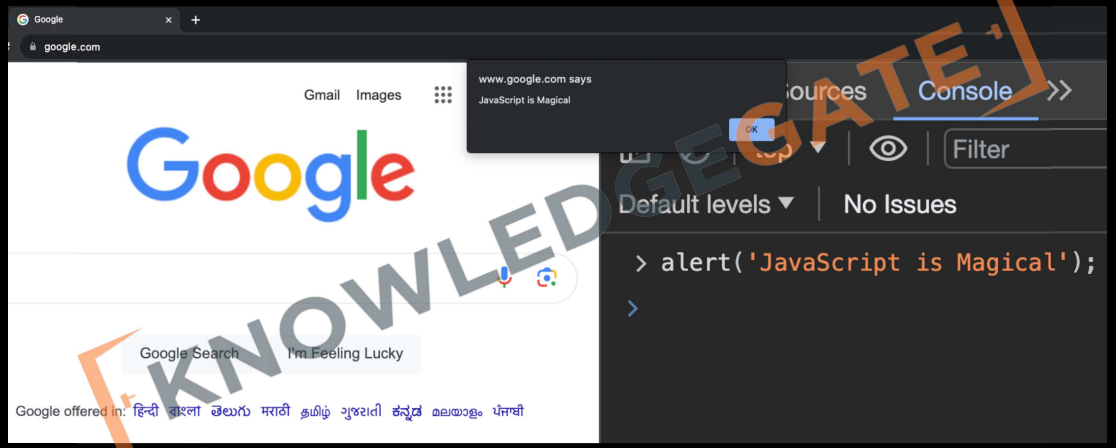
Feature	JavaScript (JS)	TypeScript (TS)
Definition	A dynamic, high-level scripting language.	A statically typed superset of JavaScript.
Typing	Dynamically typed.	Statically typed with optional type annotations.
Compilation	Interpreted by browsers.	Transpiles to JavaScript before execution.
Error Detection	Errors detected at runtime.	Errors caught at compile-time.
Tooling Support	Basic tooling, less support for large-scale projects.	Enhanced tooling support with features like IntelliSense.
Learning Curve	Easier to learn for beginners.	Slightly steeper learning curve due to static typing.
Code Maintenance	Can be harder to maintain and debug in large codebases.	Easier to maintain and refactor due to static types.
Development Speed	Faster for small projects and prototyping.	Potentially slower initial development but saves time in the long run with fewer bugs.
Community and Usage	Widely used, especially in web development.	Growing rapidly, especially in large-scale applications.
Example Usage	var x = 10;	let x: number = 10;

8. JavaScript in Console (Inspect)

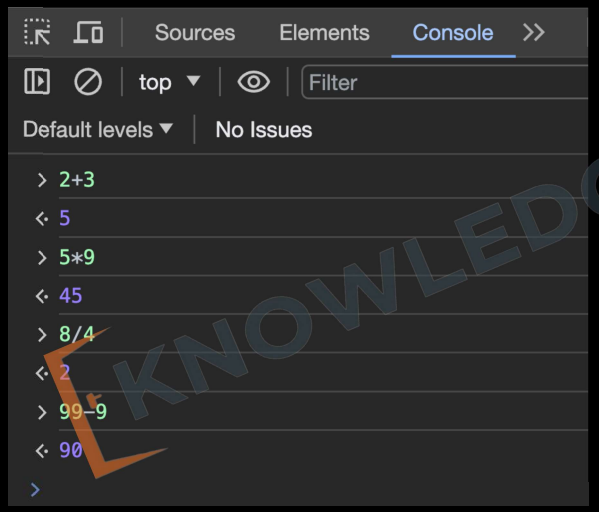


1. Allows real-time editing of HTML/CSS/JS
2. Run Scripts: Test code in console.
3. Debug: Locate and fix errors.
4. Modify DOM: Change webpage elements.
   Errors: View error messages.

8. JavaScript in Console (Alert)



8. JavaScript in Console (Math)

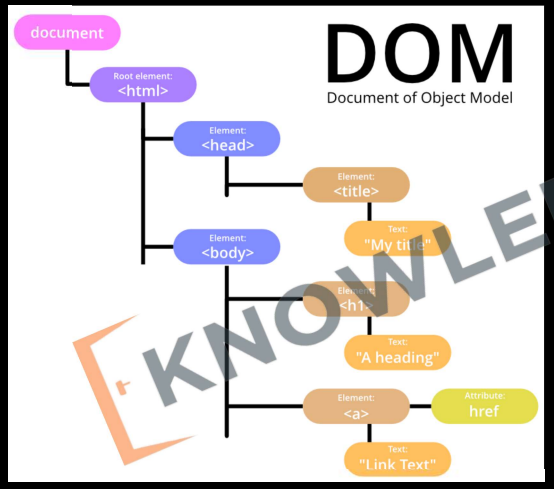


Console can be used as a Calculator

9. JavaScript in Webpage

```
<!DOCTYPE html>          Defines the HTML Version
<html lang="en">         Parent of all HTML tags / Root element
    <head>                   Parent of meta data tags
        <title>My First Webpage</title>  Title of the web page
    </head>
    <body>                   Parent of content tags
        <h1>Hello World!</h1>  Heading tag
    </body>
</html>
```


9. JavaScript in Webpage



1. **Structure Understanding:** Helps in understanding the hierarchical structure of a webpage, crucial for applying targeted CSS styles.
2. **Dynamic Styling:** Enables learning about dynamic styling, allowing for real-time changes and interactivity through CSS.

9. JavaScript in Webpage (Script Tag)

1. Embed Code: Incorporates JavaScript into an HTML file, either directly or via external files.
2. Placement: Commonly placed in the <head> or just before the closing </body> tag to control when the script runs.
3. External Files: Use src attribute to link external JavaScript files, like <script src="script.js"></script>.
4. Console Methods: log, warn, error, clear

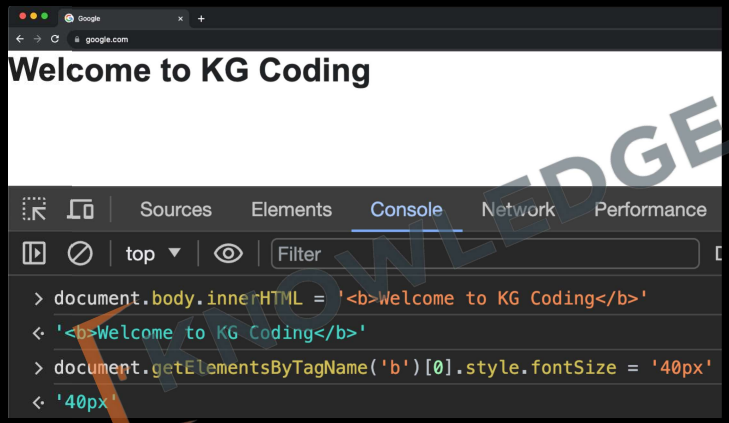
```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="UTF-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1.0" />
    <title>Basic JavaScript Example</title>
    <script>
      // This function changes the content of the paragraph with id="demo"
      function changeContent() {
        document.getElementById("demo").innerHTML =
          "Content changed by JavaScript!";
      }
    </script>
  </head>
  <body>
    <h1>Welcome to My Web Page</h1>
    <p id="demo">JavaScript can change HTML content.</p>
    <button onclick="changeContent()">Click me to change content</button>
  </body>
</html>
```


9. JavaScript in Webpage (Comments)

```
/**
 * * This is a important comment
 * ! This is warning comment
 * ? This is a question comment
 * TODO: This is a todo comment
 */
```

1. Used to add notes in source code in JavaScript or CSS.
2. Not displayed on the web page
3. Syntax: /* comment here */
4. Helpful for code organization
5. Can be multi-line or single-line

10. DOM Manipulation



1. Change HTML
2. Change CSS
3. Perform Actions

11 JavaScript with Node

1. JavaScript Runtime: Node.js is an open-source, cross-platform runtime environment for executing JavaScript code outside of a browser.
2. NodeJs is a JavaScript in a different environment means Running JS on the server or any computer.
3. Built on Chrome's V8 Engine: It runs on the V8 engine, which compiles JavaScript directly to native machine code, enhancing performance.
4. V8 is written in C++ for speed.
5. V8 + Backend Features = NodeJs

11 JavaScript with Node

math.js

```
1  // Basic arithmetic operations and console output
2  console.log("5 + 3 =", 5 + 3);
3  console.log("10 - 6 =", 10 - 6);
4  console.log("7 + 2 =", 7 + 2);
5  console.log("20 - 4 =", 20 - 4);
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
prashantjain@Mac-mini test % node math.js
5 + 3 = 8
10 - 6 = 4
7 + 2 = 9
20 - 4 = 16
prashantjain@Mac-mini test %
```

Revision

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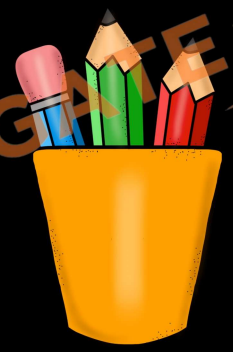

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Core Concepts of JavaScript

12. Arithmetic Operators
13. Variables
14. Ways to Create Variables
15. Primitive Types
16. typeof Operator
17. Comparison Operators
18. if-else
19. Logical Operators
20. Functions
21. Loops
22. For Loop
23. Callbacks
24. Anonymous Functions as Values

12. Arithmetic Operators

Operators	Meaning	Example	Result
+	Addition	4+2	6
-	Subtraction	4-2	2
*	Multiplication	4*2	8
/	Division	4/2	2
%	Modulus operator to get remainder in integer division	5%2	1

13 Variables

Variables are like containers used for storing data values.

13 Variables (Syntax Rules)

```
// Defining a number variable
let noOfStudents = 5;
// Defining a String variable
let welcomeMessage = "Hello Beta"
```

1. Can't use keywords or reserved words
2. Can't start with a number
3. No special characters other than $ and _
4. = is for assignment
5. ; means end of instruction

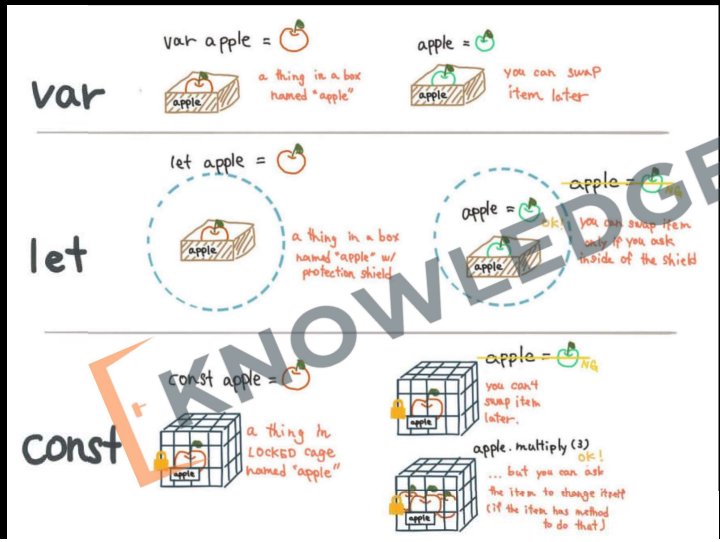
13 Variables (Updating Values)

```
let noOfStudents = 5;
noOfStudents = noOfStudents + 1;

let money = 1;
money += 5; // money = 6
money -= 2; // money = 4
money *= 3; // money = 12
money /= 4; // money = 3
money++;    // money = 4
```

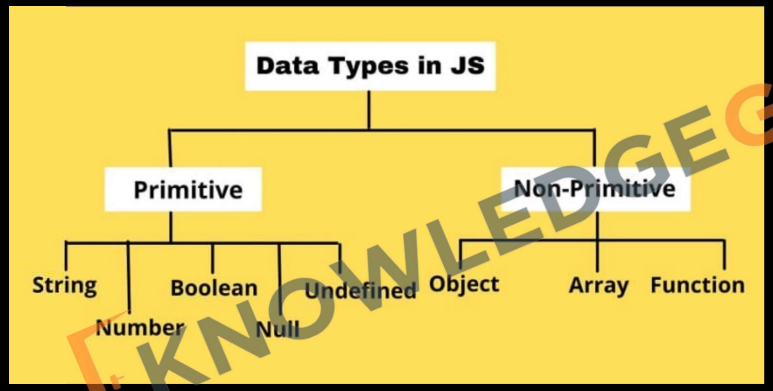
1. Do not need to use let again.
2. Syntax: variable = variable + 1
3. Assignment Operator is used =
4. Short Hand Assignment Operators: +=, -=, *=, /=, ++

14. Ways to Create Variables



15. Primitive Types

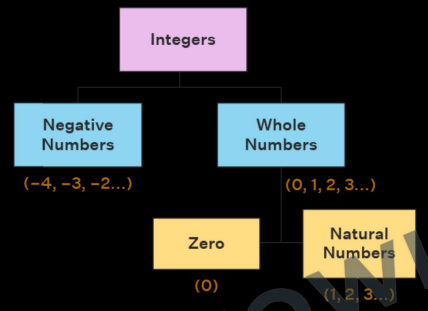
(What are Data Types)

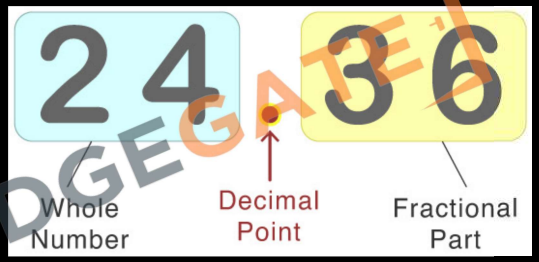


Primitive types in JavaScript are the most basic data types that are not objects and have no methods. They are immutable, meaning their values cannot be changed.

15. Primitive Types

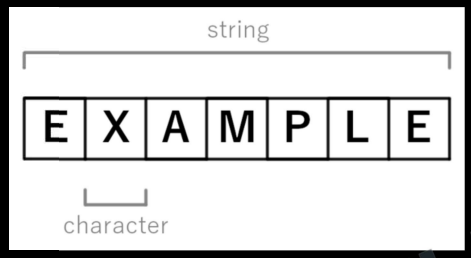
(Types of Numbers)

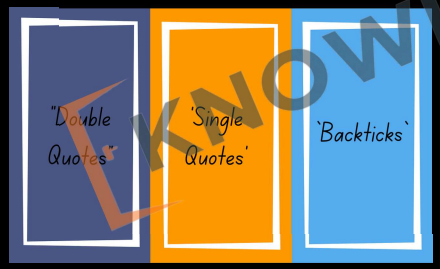




15. Primitive Types

(Strings)

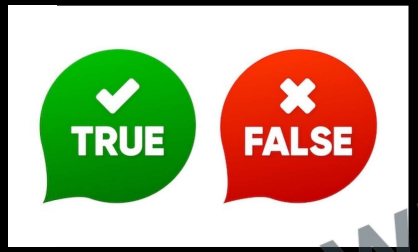




1. Strings hold textual data, anything from a single character to paragraph.
2. Strings can be defined using single quotes ' ', double quotes " ", or backticks ` `. Backticks allow for template literals, which can include variables.
3. You can combine (concatenate) strings using the + operator. For example, "Hello" + " World" will produce "Hello World".

15. Primitive Types

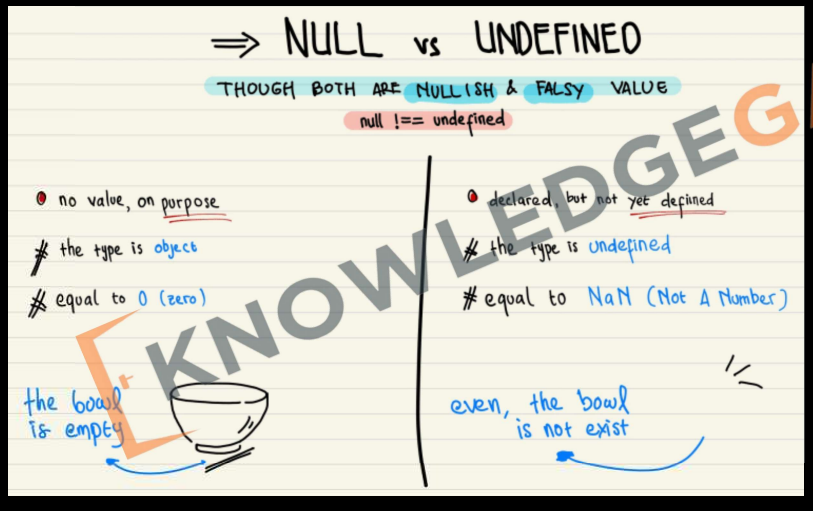
(Boolean)



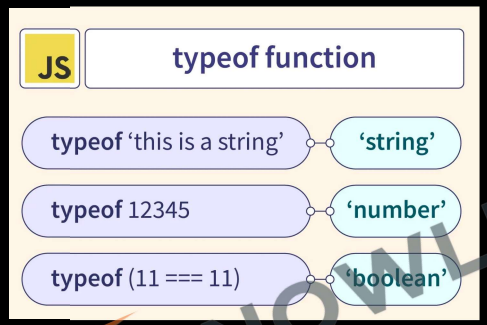
1. Data Type: Booleans are a basic data type in JavaScript.
2. Two Values: Can only be true or false.
3. 'true' is a String not a Boolean

15. Primitive Types

(Null vs Undefined)



16. typeof Operator



1. Check Type: Tells you the data type of a variable.
2. Syntax: Use it like typeof variable.
3. Common Types: Returns "number," "string," "boolean," etc.

17. Comparison Operators

<, >, <=, >=, ==, !=

- Equality
  - == Checks value equality.
  - === Checks value and type equality.
- Inequality
  - != Checks value inequality.
  - !== Checks value and type inequality.
- Relational
  - > Greater than.
  - < Less than.
  - >= Greater than or equal to.
  - <= Less than or equal to.

Order of comparison operators is less than arithmetic operators

18. if-else

```
// Use of if-else
let age = 18;
if (age >= 18) {
  console.log("You are an adult.");
} else {
  console.log("You are a minor.");
}
```

1. Syntax: Uses if () {} to check a condition.
2. What is if: Executes block if condition is true, skips if false.
3. What is else: Executes a block when the if condition is false.
4. Curly Braces can be omitted for single statements, but not recommended.
5. Use Variables: Can store conditions in variables for use in if statements.

18. if-else

```
// Use of if-else ladder
let score = 85;
if (score >= 90) {
  console.log("Grade: A");
} else if (score >= 80) {
  console.log("Grade: B");
} else if (score >= 70) {
  console.log("Grade: C");
} else if (score >= 60) {
  console.log("Grade: D");
} else {
  console.log("Grade: F");
}
```

```
// Use of nested if-else
let number = 10;
if (number > 0) {
  if (number % 2 === 0) {
    console.log("The number is positive and even.");
  } else {
    console.log("The number is positive and odd.");
  }
} else if (number < 0) {
  console.log("The number is negative.");
} else {
  console.log("The number is zero.");
}
```

If-else Ladder: Multiple if and else if blocks; only one executes.

19. Logical Operators

AND

Or

NOT

1. Types: && (AND), || (OR), ! (NOT)
2. AND (&&): All conditions must be true for the result to be true.
3. OR (||): Only one condition must be true for the result to be true.
4. NOT (!): Inverts the Boolean value of a condition.
5. Lower Priority than Math and Comparison operators

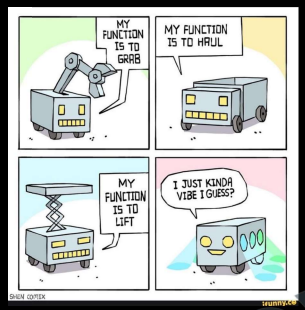
19. Logical Operators

```
// Use of || OR
let day = "Saturday";
if (day === "Saturday" || day === "Sunday") {
  console.log("It's a weekend!");
} else {
  console.log("It's a weekday.");
}

// Use of ! NOT
let isRaining = false;
if (!isRaining) {
  console.log("You don't need an umbrella.");
} else {
  console.log("You need an umbrella.");
}
```

```
// Use of && AND
let age = 25;
let hasDrivingLicense = true;
if (age >= 18 && hasDrivingLicense) {
  console.log("You can drive.");
} else {
  console.log("You cannot drive.");
}
```

20. Functions



1. Definition: Blocks of reusable code.
2. DRY Principle: "Don't Repeat Yourself" it Encourages code reusability.
3. Usage: Organizes code and performs specific tasks.
4. Naming Rules: Same as variable names: camelCase
5. Example: "Beta Gas band kar de"

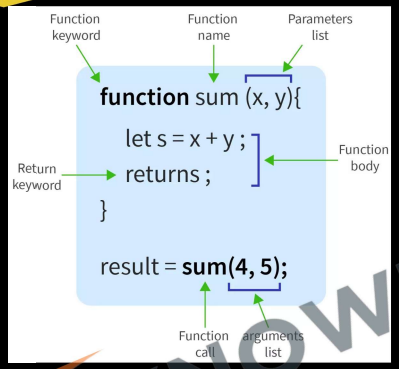
20. Functions (Return Statement)

1. Sends a value back from a function.
2. Example: "Ek glass paani laao"
3. What Can Be Returned: Value, variable, calculation, etc.
4. Return ends the function immediately.
5. Function calls make code jump around.
6. Prefer returning values over using global variables.

20. Functions (Parameters)

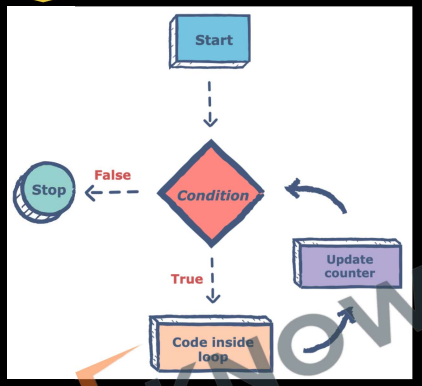
1. Input values that a function takes.
2. Parameters put value into function, while return gets value out.
3. Example: "Ek packet dahi laao"
4. Naming Convention: Same as variable names.
5. Parameter vs Argument
6. Examples: alert, Math.round, console.log are functions we have already used
7. Multiple Parameters: Functions can take more than one.
8. Default Value: Can set a default value for a parameter.

20. Functions (Syntax)



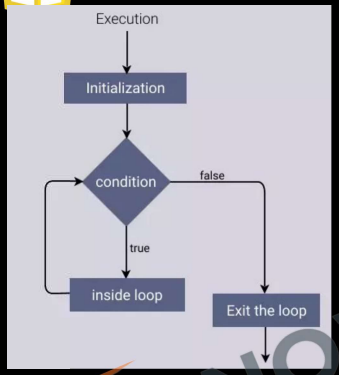
1. Use function keyword to declare.
2. Follows same rules as variable names.
3. Use () to contain parameters.
4. Invoke by using the function name followed by ().
5. Fundamental for code organization and reusability.

21. What is a Loop?



1. Code that runs multiple times based on a condition.
2. Loops also alter the flow of execution, similar to functions.
   - Functions: Reusable blocks of code.
   - Loops: Repeated execution of code.
3. Loops automate repetitive tasks.
4. Types of Loops: for, while, do-while.
5. Iterations: Number of times the loop runs.

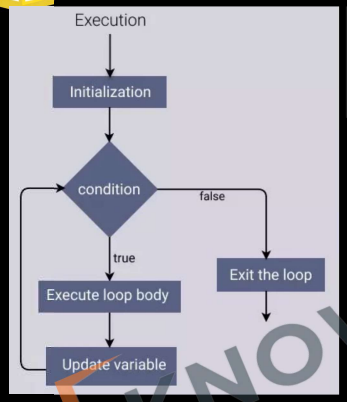
21. While Loop




```
while (condition) {
  // Body of the loop
}
```

1. Iterations: Number of times the loop runs.
2. Used for non-standard conditions.
3. Repeating a block of code while a condition is true.
4. Remember: Always include an update to avoid infinite loops.

22. For Loop




```
for (initialisation; condition; update) {
  // Body of the loop
}
```

1. Standard loop for running code multiple times.
2. Generally preferred for counting iterations.

23. Callbacks

```
// Define a callback function
function greeting(name) {
  console.log('Hello, ' + name);
}

// Define a function that takes a callback
function processUserInput(callback) {
  var name = prompt('Please enter your name.');
  callback(name);
}

// Call the function with the callback
processUserInput(greeting);
```

1. A callback is a function passed as an argument to another function, which is then invoked inside the outer function to complete some kind of routine or action.
2. Usage: Callbacks are commonly used in asynchronous programming to execute code after an asynchronous operation has completed.

24. Anonymous Functions as Values

```
1   // syntax
2   (function() {
3       // function body
4   });
5
6   // Example as a callback
7   setTimeout(function() {
8     console.log("This is anonymous");
9   }, 1000);
10
11
12  // Assigned to a variable
13  const add = function(a, b) {
14      return a + b;
15  };
16  console.log(add(2, 3)); // Outputs: 5
```

1. Anonymous functions are functions without a name.
2. They are often used as arguments to other functions or assigned to a variable.
3. Useful for creating function scopes and avoiding global variables.

Revision

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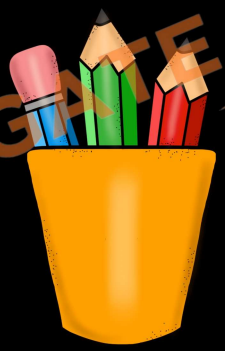
13. Variables
14. Ways to Create Variables
15. Primitive Types
16. typeof Operator
17. Comparison Operators
18. if-else
19. Logical Operators
20. Functions
21. Loops
22. For Loop
23. Callbacks
24. Anonymous Functions as Values



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Advanced JavaScript

25. Object Oriented Language
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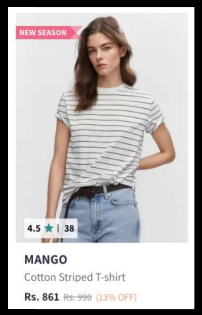
24. Object Oriented Language

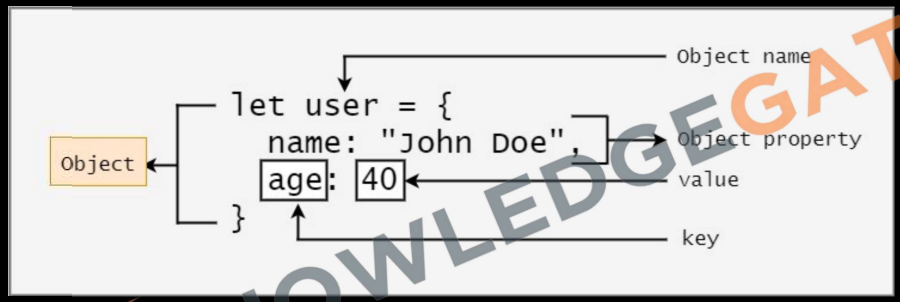



```
let product = {
  company: 'Mango',
  item_name: 'Cotton striped t-shirt',
  price: 861
};
```

1. Groups multiple values together in key-value pairs.
2. How to Define: Use {} to enclose properties.
3. Example: product {name, price}
4. Dot Notation: Use . operator to access values.
5. Key Benefit: Organizes related data under a single name.

24. Object Oriented Language

(Object Syntax)



1. Basic Structure: Uses {} to enclose data.
2. Rules: Property and value separated by a colon(:)
3. Comma: Separates different property-value pairs.
4. Example: { name: "Laptop", price: 1000 }

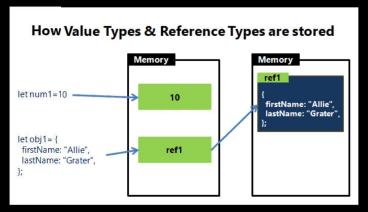
25. Working with Objects

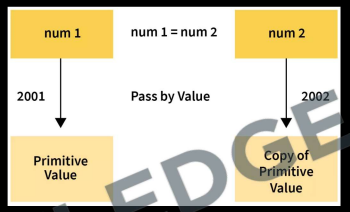
(Accessing Objects)

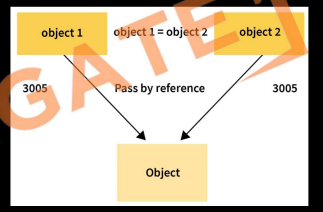
1. Dot Notation: Access properties using . Operator like product.price
2. Bracket Notation: Useful for properties with special characters product["nick-name"]. Variables can be used to access properties
3. typeof returns object.
4. Values can be added or removed to an object
5. Delete Values using delete

26. Reference Types

(Primitive vs Reference Types)

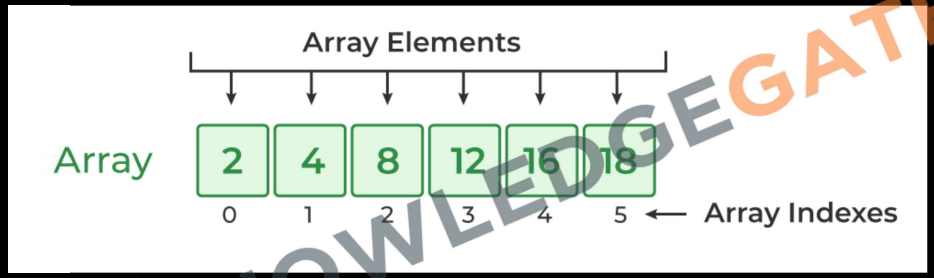






1. Objects work based on references, not actual data.
2. Copying an object copies the reference, not the actual object.
3. When comparing with ==, you're comparing references, not content.
4. Changes to one reference affects all copies.

27. Arrays (What is an Array?)



1. An Array is just a list of values.
2. Index: Starts with 0.
3. Arrays are used for storing multiple values in a single variable.

27. Array (Syntax & Values)

```
let myArray = [1, 'KG Coding', null, true,
  {likes: '1 Million'}];
```

1. Use [] to create a new array, [] brackets enclose list of values
2. Arrays can be saved to a variable.
3. Accessing Values: Use [] with index.
4. Syntax Rules:
   - Brackets start and end the array.
   - Values separated by commas.
   - Can span multiple lines.
5. Arrays can hold any value, including arrays.
6. typeof operator on Array Returns Object.

28. for-each Loop

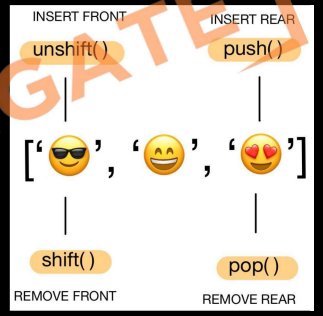
```
let foods = ['bread', 'rice', 'meat', 'pizza'];

foods.forEach(function(food) {
    console.log(food);
})
```

1. A method for array iteration, often preferred for readability.
2. Parameters: One for item, optional second for index.
3. Using return is similar to continue in traditional loops.
4. Not straightforward to break out of a forEach loop.
5. When you need to perform an action on each array element and don't need to break early.

29. Array Methods

1. Array.isArray() checks if a variable is an array.
2. Length property holds the size of the array.
3. Common Methods:
   - push/pop: Add or remove to end.
   - shift/unshift: Add or remove from front.
   - splice: Add or remove elements.
   - toString: Convert to string.
   - sort: Sort elements.
   - valueOf: Get array itself.
4. Arrays also use reference like objects.
5. De-structuring also works for Arrays.



30. Arrow Functions

```
let sum = function(num1, num2) {
  return num1 + num2;
}
let Sum1 = (num1, num2) => {
  return num1 + num2;
}
let Sum2 = (num1, num2) => num1 + num2;
let square = num => num * num;
```

1. A concise way to write anonymous functions.
2. For Single Argument: Round brackets optional.
3. For Single Line: Curly brackets and return optional.
4. Often used when passing functions as arguments.

30. Arrow Functions

(Anonymous & Arrow Callbacks)

```
// Anonymous Callback Function
fetchData(function(data) {
  console.log('Received:', data);
});

// Arrow Function as Callback
fetchData(data => {
  console.log('Received:', data);
});
```

1. Instead of naming the callback function, you can define it directly within the argument list.
2. ES6 arrow functions can also be used as callbacks for a more concise syntax.

32. De-structuring

```
let product = {
  company: 'Mango',
  itemName: 'Cotton striped t-shirt',
  price: 861
};
// Destructuring
let company = product.company
// is same as
let { company } = product;
```

```
// Property shorthand
let price = 861;
let product = {
  company: 'Mango',
  itemName: 'Cotton striped t-shirt',
  price: price
};
// is same as
let product1 = {
  company: 'Mango',
  itemName: 'Cotton striped t-shirt',
  price
};
```

```
// Method shorthand
let product = {
  company: 'Mango',
  itemName: 'Cotton striped t-shirt',
  displayPrice: function() {
    return `$${this.price.toFixed(2)}`;
  }
};
// is same as
let product1 = {
  company: 'Mango',
  itemName: 'Cotton striped t-shirt',
  displayPrice() {
    return `$${this.price.toFixed(2)}`;
  }
};
```

1. De-structuring: Extract properties from objects easily.
2. We can extract more than one property at once.
3. Shorthand Property: {message: message} simplifies to just message.
4. Shorthand Method: Define methods directly inside the object without the function keyword.

33. Spread & Rest Operator

(Spread)

```
1   // Array Expansion
2   const arr1 = [1, 2, 3];
3   const arr2 = [...arr1]; // [1, 2, 3]
4   // [1, 2, 3, 4, 5]
5   const arr3 = [...arr1, 4, 5];
6
7   // Object Expansion
8   const obj1 = { a: 1, b: 2 };
9   // { a: 1, b: 2, c: 3 }
10  const obj2 = { ...obj1, c: 3 };
11
12  // Function Arguments
13  function sum(a, b, c) {
14    return a + b + c;
15  }
16  const numbers = [1, 2, 3];
17  console.log(sum(...numbers)); // 6
```

1. Represented by three dots (...), the spread operator is used to expand elements of an iterable (like an array or string) into individual elements.
2. Useful for copying arrays and objects without modifying the original.
3. Ensures immutability in functions where modification of inputs is not desired.

33. Spread & Rest Operator

(Rest)

```
// Function Parameters
function sum(...numbers) {
  return numbers.reduce((acc, curr) => acc + curr, 0);
}
console.log(sum(1, 2, 3, 4)); // 10

// Array Destructuring
const [first, second, ...rest] = [1, 2, 3, 4, 5];
console.log(rest); // [3, 4, 5]

// Object destructuring
const { a, b, ...rest } = { a: 1, b: 2, c: 3, d: 4 };
console.log(rest); // { c: 3, d: 4 }
```

- Used to collect the remaining elements of an array after extracting some elements.
- Used to collect the remaining properties of an object after extracting some properties.

1. Represented by three dots (...), the rest operator is used to collect multiple elements into a single array or object.
2. Allows a function to accept an indefinite number of arguments as an array.

34. Promises

(Need: Callback Hell)

```
function step1(callback) {
  setTimeout(() => {
    console.log('Step 1');
    callback();
  }, 1000);
}

function step2(callback) {
  setTimeout(() => {
    console.log('Step 2');
    callback();
  }, 1000);
}
```

```
function step3(callback) {
  setTimeout(() => {
    console.log('Step 3');
    callback();
  }, 1000);
}

step1(() => {
  step2(() => {
    step3(() => {
      console.log('All steps completed');
    });
  });
});
```

When multiple asynchronous operations need to be performed in sequence, callbacks can lead to deeply nested and hard-to-read code, often referred to as "callback hell."

34. Promises

(States of Promise)

1. Definition: A promise is an object representing the eventual completion or failure of an asynchronous operation.
2. States of a Promise:
   - Pending: Initial state, neither fulfilled nor rejected.
   - Fulfilled: Operation completed successfully.
   - Rejected: Operation failed.

34. Promises

(Creation of Promise)

```
// Creating a Promise
let promise = new Promise((resolve, reject) => {
  // Asynchronous operation
  if (result()) {
    resolve('Success');
  } else {
    reject('Error');
  }
});
```

Promises are created using the Promise constructor, which takes an executor function with two arguments: resolve and reject.

34. Promises
(Handling of Promise)

```
// Handling a Promise: handle value
promise.then(value => {
  console.log(value); // 'Success'
});

// Handling a Promise: handle rejection
promise.catch(error => {
  console.error(error); // 'Error'
});

/* Handling a promise: Executes a block of
code regardless of the promise's outcome.*/
promise.finally(() => {
  console.log('Operation completed');
});
```

Promises have then, catch, and finally methods for handling the results of the asynchronous operation.

- then(): Used to handle fulfilment.
- catch(): Used to handle rejection.
- finally(): Executes a block of code regardless of the promise's outcome.

34. Promises
(Solving Callback Hell)

```
function step1() {
  return new Promise((resolve) => {
    setTimeout(() => {
      console.log('Step 1');
      resolve();
    }, 1000);
  });
}

function step2() {
  return new Promise((resolve) => {
    setTimeout(() => {
      console.log('Step 2');
      resolve();
    }, 1000);
  });
}
```

```
function step3() {
  return new Promise((resolve) => {
    setTimeout(() => {
      console.log('Step 3');
      resolve();
    }, 1000);
  });
}

step1()
  .then(() => step2())
  .then(() => step3())
  .then(() => {
    console.log('All steps completed');
  });
```

In this version, each step returns a Promise that resolves after a timeout. The steps are chained together using .then(), making the code more readable and easier to maintain.

35. Fetch API

```
fetch('https://jsonplaceholder.typicode.com/posts')
  .then(response => {
    if (!response.ok) {
      throw new Error('Network response was not ok ' + response.statusText);
    }
    return response.json();
  })
  .then(data => console.log(data))
  .catch(error => console.log(error));
```

- The Fetch API provides a modern way to make HTTP requests in JavaScript.
- It is a promise-based API, making it easier to handle asynchronous requests.

36. Async / Await

```
// using async
async function myFunction() {
  return 'Hello';
}

// using await
async function fetchData() {
  let response = await fetch('https://api.example.com/data');
  let data = await response.json();
  return data;
}
```

1. Syntax Sugar for Promises: async/await is built on top of promises, providing a cleaner and more readable way to work with asynchronous code.
2. Defining Async Functions: An async function is declared using the async keyword before the function definition. This function always returns a promise.
3. The await keyword is used to pause the execution of an async function until a promise is resolved. It can only be used inside an async function.

36. Async / Await

(Handling Exceptions)

```
async function getData() {
  try {
    let response = await fetch('https://api.example.com/data');
    let data = await response.json();
    return data;
  } catch (error) {
    console.error('Error:', error);
  }
}
```

Errors in async functions can be handled using try...catch blocks, making error management straightforward and consistent with synchronous code.

36. Async / Await

(Fetch API using async/await)

```
async function fetchData(url) {
  try {
    const response = await fetch(url);
    if (!response.ok) {
      throw new Error('Network response was not ok ' + response.statusText);
    }
    const data = await response.json();
    console.log(data);
  } catch (error) {
    console.log(error);
  }
}

fetchData('https://jsonplaceholder.typicode.com/posts');
```

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