You:

What is Javascript

ChatGPT:

JavaScript is a high-level, versatile, and widely used programming language primarily used for front-end web development. It allows developers to add interactivity, dynamic behavior, and functionality to websites and web applications. JavaScript is an essential component of modern web development, and it can also be used for server-side development (Node.js) and in various other contexts.

Here are some key characteristics and uses of JavaScript:

1. **Client-Side Scripting:** JavaScript is mainly employed in web browsers to create interactive user interfaces, validate form data, manipulate the Document Object Model (DOM), and handle events like clicks and mouse movements.

2. **Versatile:** It is a multi-paradigm language, meaning it supports various programming styles, including procedural, object-oriented, and functional programming.

3. **Cross-Platform:** JavaScript is supported by all major web browsers (Chrome, Firefox, Safari, Edge, etc.), making it a cross-platform language. This means code written in JavaScript can run on different devices and operating systems.

4. **Third-Party Libraries and Frameworks:** JavaScript has a rich ecosystem of libraries and frameworks like React, Angular, and Vue.js, which simplify and accelerate web development tasks.

5. **Server-Side Development:** With the introduction of Node.js, JavaScript can also be used for server-side programming, enabling developers to create full-stack applications using a single programming language.

6. **Asynchronous Programming:** JavaScript supports asynchronous operations, which is crucial for handling tasks like fetching data from servers without blocking the main thread of the application. This is commonly done using callbacks, Promises, and async/await.

7. **Open Standards:** JavaScript is based on open standards defined by the ECMAScript specification. This ensures consistency and compatibility across different implementations and environments.

8. **Dynamic Typing:** JavaScript is dynamically typed, meaning variable types are determined at runtime. This provides flexibility but also requires careful consideration to avoid type-related issues.

9. **Interoperability:** JavaScript can easily interact with HTML and CSS, making it the primary language for building dynamic web pages.

JavaScript is a fundamental technology for modern web development, and its importance has grown significantly over the years as web applications have become more sophisticated and interactive. It's commonly used alongside HTML and CSS to create the front end of web applications, while on the server side, it can be used with frameworks like Express.js to handle requests and responses.

You:

list the important points of javascript, and datatypes

ChatGPT:

Sure, here are some important points about JavaScript and its data types:

JavaScript: Important Points

1. **High-Level Language:** JavaScript is a high-level programming language, which means it abstracts many low-level details, making it easier for developers to write code.

2. **Interpreted Language:** JavaScript is typically executed by web browsers (or server-side environments like Node.js) as an interpreted language, meaning the code is executed line by line without a separate compilation step.

3. **Dynamic Language:** JavaScript is dynamically typed, allowing variables to change data types during runtime.

4. **Event-Driven:** JavaScript is event-driven, meaning it can respond to user interactions (e.g., clicks, mouse movements) and execute code in response to these events.

5. **Single-Threaded:** JavaScript is single-threaded, meaning it can only execute one task at a time in a single main thread. However, it can use asynchronous programming techniques to handle non-blocking operations.

6. **Prototypal Inheritance:** JavaScript uses a prototypal inheritance model, where objects inherit properties and methods from other objects through their prototypes.

7. **Versatile Usage:** Besides web development, JavaScript can also be used for server-side development (Node.js), desktop application development (Electron), and even in embedded systems.

JavaScript Data Types JavaScript has several data types, including:

1. **Primitive Data Types:**

    - **Number:** Represents both integer and floating-point numbers.
    - **String:** Represents sequences of characters enclosed in single (''), double (" "), or backticks (``).
    - **Boolean:** Represents true or false values.
    - **Null:** Represents the intentional absence of any object value.
    - **Undefined:** Represents variables that have been declared but not assigned a value.

2. **Composite Data Types:**

    - **Object:** Represents a collection of key-value pairs (properties and methods).
    - **Array:** A special type of object that represents an ordered list of values.
    - **Function:** A reusable block of code that can be executed.

3. **Special Data Types:**

    - **Symbol:** Represents a unique and immutable value, often used as object property keys.
    - **BigInt:** Represents arbitrarily large integers.

These data types allow JavaScript to handle a wide range of values and operations. JavaScript's dynamic typing means you don't need to declare a variable's type explicitly; it's determined based on the assigned value. This flexibility makes JavaScript both powerful and potentially error-prone, so developers need to be mindful of data types in their code.

You:

what is ECMAScript 2015, list the importance of it ,(should know points)

ChatGPT:

ECMAScript 2015, also known as ES6 (ECMAScript 6) or ECMAScript 2015, is a significant update to the ECMAScript specification, which is the standard that defines the JavaScript programming language. ES6 introduced several new features and improvements to JavaScript, enhancing its readability, maintainability, and expressiveness. Here are some important points to know about ECMAScript 2015:

1. Major JavaScript Update: ES6 is one of the most substantial updates to the JavaScript language since its inception. It was released in 2015 and brought significant changes to the language.

2. Enhanced Syntax:

- **Arrow Functions:** ES6 introduced arrow functions, which provide a more concise syntax for defining functions.
- **Template Literals:** Template literals allow for easy string interpolation and multiline strings using backticks (`...`).
- **Destructuring Assignment:** It enables you to extract values from arrays or objects and assign them to variables using a compact syntax.

3. Block-Scoped Variables:

- `let` and `const` keywords were introduced for declaring variables with block scope, which helps avoid variable hoisting issues associated with `var`.

4. Classes:

- ES6 introduced class syntax for defining objects with constructor functions and methods. This makes object-oriented programming in JavaScript more structured and familiar to developers from other programming languages.

5. Modules:

- ES6 introduced a module system with `import` and `export` statements, allowing developers to organize and share code more efficiently.

6. Enhanced Array Handling:

- ES6 introduced several new methods for working with arrays, such as `map`, `filter`, `reduce`, and `find`, which simplify common operations.

7. Promises:

- ES6 introduced the `Promise` object, which provides a more structured way to work with asynchronous operations, improving error handling and readability.

8. Default Parameters and Rest Parameters:

- You can now specify default values for function parameters and use the rest parameter syntax (`...args`) to handle variable-length argument lists more easily.

9. Symbol Data Type:

- ES6 introduced the `Symbol` data type, which allows you to create unique, immutable values, often used as object property keys.

10. Enhanced Object Literals:

- Object literals gained shorthand syntax for defining methods and computed property names.

11. Iterators and Iterables:

- ES6 introduced the concept of iterators and iterables, which allows you to define custom iterable data structures.

12. Spread Operator:

- The spread operator (`...`) allows you to spread the elements of an iterable (e.g., an array) into another array or function arguments.

13. Compatibility: ES6 features gradually gained support in major web browsers and Node.js, making it possible for developers to use these modern features in their projects while maintaining backward compatibility.

14. Improved Developer Productivity: The introduction of ES6 features significantly improved developer productivity by offering cleaner and more expressive syntax, reducing common pitfalls, and promoting best practices.

ES6 marked a significant step forward for JavaScript, making it more powerful and developer-friendly. It laid the foundation for subsequent ECMAScript versions, which continue to evolve the language and expand its capabilities. Learning and using ES6 features is essential for modern JavaScript development.

You:

what are the major update from python 3

ChatGPT:

As of my last knowledge update in September 2021, Python 3 has gone through several major releases, each introducing new features, optimizations, and improvements. Here are some of the notable major updates from Python 3:

1. **Python 3.0 (2008):**
    - Python 3.0 was a significant milestone as it introduced a number of backward-incompatible changes from Python 2.x to clean up and improve the language.
    - Key features included print as a function, integer division, improved Unicode support, and a new syntax for raising exceptions.
2. **Python 3.3 (2012):**
    - Introduced the `yield from` syntax for better handling of coroutines.
    - Added the `faulthandler` module for diagnosing crashes.
    - Introduced __`qualname`__ attribute for classes and functions, improving introspection.
3. **Python 3.4 (2014):**

- Added the `asyncio` library for asynchronous programming using coroutines and `async/await` syntax.
- Introduced enums, a built-in enumeration type.
- Improved statistics module for statistical calculations.
- Introduced the `pathlib` module for working with file paths in a more intuitive and platform-independent way.

4. **Python 3.5 (2015):**

    - Introduced the `async` and `await` keywords for native coroutine support.
    - Added the `typing` module for type hints.
    - Introduced `asyncio` enhancements and improvements.
    - Added the `@` matrix multiplication operator (`a @ b`) for better handling of matrix operations.

5. **Python 3.6 (2016):**

    - Introduced formatted string literals, often referred to as "f-strings."
    - Added a `__annotations__` attribute for function annotations.
    - Introduced asynchronous comprehensions.
    - Improved `asyncio` with performance enhancements.

6. **Python 3.7 (2018):**

    - Introduced data classes for concise class definitions.
    - Added the `breakpoint()` function for debugging.
    - Improved `asyncio` with enhancements like `asyncio.run()` and `asyncio.get_event_loop()` changes.
    - Introduced `__future__` imports to enable forward-compatible syntax.

7. **Python 3.8 (2019):**

    - Introduced the "walrus operator" (`:=`) for assignment expressions.
    - Added the `math.prod()` function for product calculations.
    - Introduced the `functools.cached_property` decorator.
    - Improved `asyncio` with performance improvements and new features.

8. **Python 3.9 (2020):**

    - Introduced dictionary improvements, including merge (`|`) and update (`|=`) operators.
    - Added the `zoneinfo` module for time zone support.
    - Introduced the `str.removeprefix()` and `str.removesuffix()` methods.
    - Improved performance with various optimizations.

9. **Python 3.10 (Expected in 2021):**

    - While I don't have specific details on Python 3.10 as it was not released before my last update in September 2021, you can expect new features, syntax enhancements, and performance improvements in this release. Some planned features included structural pattern matching and additional syntactical enhancements.

Please note that Python continues to evolve, and new versions may have been released with additional updates and improvements beyond my last knowledge update in September 2021. To get the latest information on Python releases, you should refer to the official Python website and documentation.

You:

list the super important javscript concept with code snippets

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ChatGPT:

Certainly! Here are some super important JavaScript concepts with code snippets to illustrate each one:

1. **Variables and Data Types:**

    - Defining variables using `let`, `const`, and `var`:

```
javascript
let name = "John";
const age = 30;
var score = 85;
```

2. **Functions:**
    - Creating a basic function and calling it:

```
javascript
function greet(name) {
  console.log(`Hello, ${name}!`);
}

greet("Alice");
```

3. **Conditionals (if-else):**
    - Using `if` and `else` statements:

```
javascript
let temperature = 25;

if (temperature > 30) {
  console.log("It's hot outside.");
} else {
  console.log("It's cool outside.");
}
```

4. **Loops (for and while):**
    - Using `for` and `while` loops:

```
javascript
for (let i = 0; i < 5; i++) {
  console.log(`Iteration ${i}`);
}

let count = 0;
while (count < 3) {
  console.log(`Count: ${count}`);
  count++;
}
```

5. **Arrays:**
    - Creating and manipulating arrays:

```
javascript
const fruits = ["apple", "banana", "cherry"];
fruits.push("orange"); // Add an element to the end
console.log(fruits[0]); // Access an element
```

6. **Objects:**
    - Creating and accessing object properties:

```
javascript
let person = {
  name: "Alice",
  age: 25,
};

console.log(person.name); // Access property
```

7. **DOM Manipulation:**
    - Accessing and modifying HTML elements using the Document Object Model (DOM):

```
javascript
// HTML: <p id="demo">Hello</p>
```

```
const element = document.getElementById("demo");
element.innerHTML = "Goodbye"; // Change the content
```

8. **Event Handling:**
   - Adding event listeners to respond to user interactions:

```
javascript
// HTML: <button id="myButton">Click me</button>

const button = document.getElementById("myButton");
button.addEventListener("click", function () {
  console.log("Button clicked!");
});
```

9. **Asynchronous Programming (Callbacks):**
   - Using callbacks to handle asynchronous operations:

```
javascript
function fetchData(callback) {
  setTimeout(() => {
    callback("Data fetched!");
  }, 2000);
}

fetchData((result) => {
  console.log(result);
});
```

10. **Promises:**
    - Handling asynchronous operations with promises:

```
javascript
function fetchData() {
  return new Promise((resolve, reject) => {
    setTimeout(() => {
      resolve("Data fetched!");
    }, 2000);
  });
}

fetchData()
  .then((result) => {
    console.log(result);
  })
  .catch((error) => {
    console.error(error);
  });
```

These are fundamental concepts in JavaScript that you'll encounter regularly when developing web applications. Understanding and mastering these concepts will form a strong foundation for your JavaScript programming skills.

You:

explain async await in js

ChatGPT:

Async/await is a feature introduced in ECMAScript 2017 (ES8) that simplifies asynchronous code in JavaScript, making it more readable and maintainable. It allows you to write asynchronous code that looks and behaves more like synchronous code, avoiding the callback hell associated with nested callbacks.

Here's an explanation of async/await in JavaScript:

1. **Async Function Declaration:**

   To use `async/await`, you start by declaring a function as `async`. This tells JavaScript that the function contains asynchronous operations and may pause execution until awaited promises are resolved.

   ```
   javascript
   async function fetchData() {
     // Asynchronous code here
   }
   ```

2. **Awaiting Promises:**

   Inside an `async` function, you can use the `await` keyword before a promise. This makes the function pause execution until the promise is settled (either resolved or rejected). It allows you to retrieve the resolved value of the promise and assign it to a variable.

   ```
   javascript
   async function fetchData() {
     const data = await fetchSomeData(); // Assuming fetchSomeData() returns a Promise
     console.log(data);
   }
   ```

   In this example, the `fetchData` function pauses until the `fetchSomeData` promise is resolved, and then it logs the data.

3. **Error Handling:**

   You can use `try...catch` blocks to handle errors when using `async/await`. If a promise passed to `await` is rejected, an error is thrown, which can be caught and handled with `try...catch`.

   ```
   javascript
   async function fetchData() {
     try {
       const data = await fetchSomeData();
       console.log(data);
     } catch (error) {
       console.error(error);
     }
   }
   ```

4. **Sequential vs. Concurrent Execution:**

   `await` allows you to write asynchronous code in a more sequential style, which can improve readability. However, it doesn't necessarily make the code execute sequentially. Multiple `await` statements can still execute concurrently if they don't have dependencies on each other.

   ```
   javascript
   async function fetchData() {
     const data1 = await fetchSomeData1();
     const data2 = await fetchSomeData2();
     console.log(data1, data2); // data1 and data2 may load concurrently
   }
   ```

   To execute promises sequentially (waiting for one to finish before starting the next), you can use a loop or other control structures.

5. **Benefits:**

   - Improved readability: `async/await` makes asynchronous code more linear and easier to follow.
   - Error handling: Errors can be conveniently handled with `try...catch` blocks.
   - Sequential logic: You can express asynchronous code in a more sequential manner.

Here's a complete example that demonstrates the use of `async/await` with a simple promise-based function:

```
javascript
async function fetchData() {
  try {
    const data = await fetch('https://api.example.com/data');
```

```
    const result = await data.json();
    console.log(result);
  } catch (error) {
    console.error(error);
  }
}

fetchData();
```

In this example, `fetchData` fetches data from an API and logs the result when it's available. If any errors occur during the fetch or parsing, they are caught and logged in the `catch` block.

You:

list different string method with code snippets

ChatGPT:

Certainly! Here are some commonly used string methods in JavaScript, along with code snippets illustrating their usage:

1. **`length` Method:**
   - Returns the length (number of characters) of a string.

   ```
   javascript
   const text = "Hello, World!";
   const length = text.length; // Returns 13
   ```

2. **`charAt()` Method:**
   - Returns the character at a specified index in the string.

   ```
   javascript
   const text = "Hello";
   const char = text.charAt(1); // Returns 'e'
   ```

3. **`substring()` Method:**
   - Returns a portion of the string between two indices.

   ```
   javascript
   const text = "Hello, World!";
   const substring = text.substring(0, 5); // Returns "Hello"
   ```

4. **`slice()` Method:**
   - Returns a portion of the string, allowing negative indices to count from the end.

   ```
   javascript
   const text = "Hello, World!";
   const sliced = text.slice(-6); // Returns "World!"
   ```

5. **`toLowerCase()` and `toUpperCase()` Methods:**
   - Converts a string to lowercase or uppercase.

   ```
   javascript
   const text = "Hello";
   const lowercase = text.toLowerCase(); // Returns "hello"
   const uppercase = text.toUpperCase(); // Returns "HELLO"
   ```

6. **`trim()` Method:**
   - Removes leading and trailing whitespace from a string.

```
javascript
const text = "   Hello, World!   ";
const trimmed = text.trim(); // Returns "Hello, World!"
```

7. **`replace()` Method:**
   - Replaces a specified substring or regular expression match with another string.

```
javascript
const text = "Hello, World!";
const replaced = text.replace("World", "Universe"); // Returns "Hello, Universe!"
```

8. **`split()` Method:**
   - Splits a string into an array of substrings based on a specified separator.

```
javascript
const text = "apple,banana,kiwi";
const fruits = text.split(","); // Returns ["apple", "banana", "kiwi"]
```

9. **`indexOf()` and `lastIndexOf()` Methods:**
   - Returns the index of the first/last occurrence of a specified substring in the string, or -1 if not found.

```
javascript
const text = "Hello, World!";
const firstIndex = text.indexOf("o"); // Returns 4
const lastIndex = text.lastIndexOf("o"); // Returns 7
```

10. **`startsWith()` and `endsWith()` Methods:**
    - Checks if a string starts or ends with a specified substring.

```
javascript
const text = "Hello, World!";
const startsWithHello = text.startsWith("Hello"); // Returns true
const endsWithWorld = text.endsWith("World"); // Returns true
```

These are some of the fundamental string methods in JavaScript that can be used to manipulate and work with text data efficiently.

You:

list different array method with code snippets

ChatGPT:

Certainly! Here are some commonly used array methods in JavaScript, along with code snippets illustrating their usage:

1. **`push()` Method:**
   - Adds one or more elements to the end of an array and returns the new length of the array.

```
javascript
const fruits = ["apple", "banana"];
fruits.push("kiwi", "orange");
// fruits is now ["apple", "banana", "kiwi", "orange"]
```

2. **`pop()` Method:**
    - Removes the last element from an array and returns that element.

```
javascript
const fruits = ["apple", "banana", "kiwi"];
const lastFruit = fruits.pop(); // Returns "kiwi"
// fruits is now ["apple", "banana"]
```

3. **`unshift()` Method:**
    - Adds one or more elements to the beginning of an array and returns the new length of the array.

```
javascript
const fruits = ["banana", "kiwi"];
fruits.unshift("apple", "orange");
// fruits is now ["apple", "orange", "banana", "kiwi"]
```

4. **`shift()` Method:**
    - Removes the first element from an array and returns that element.

```
javascript
const fruits = ["apple", "banana", "kiwi"];
const firstFruit = fruits.shift(); // Returns "apple"
// fruits is now ["banana", "kiwi"]
```

5. **`concat()` Method:**
    - Combines two or more arrays and returns a new array.

```
javascript
const fruits1 = ["apple", "banana"];
const fruits2 = ["kiwi", "orange"];
const combinedFruits = fruits1.concat(fruits2);
// combinedFruits is ["apple", "banana", "kiwi", "orange"]
```

6. **`join()` Method:**
    - Joins all elements of an array into a string, optionally separated by a specified delimiter.

```
javascript
const fruits = ["apple", "banana", "kiwi"];
const fruitString = fruits.join(", "); // Returns "apple, banana, kiwi"
```

7. **`slice()` Method:**
    - Returns a shallow copy of a portion of an array into a new array.

```
javascript
const fruits = ["apple", "banana", "kiwi", "orange"];
const slicedFruits = fruits.slice(1, 3);
// slicedFruits is ["banana", "kiwi"]
```

8. **`splice()` Method:**
    - Changes the contents of an array by removing, replacing, or adding elements in place.

```
javascript
const fruits = ["apple", "banana", "kiwi", "orange"];
fruits.splice(2, 1, "grape");
// fruits is now ["apple", "banana", "grape", "orange"]
```

9. **`forEach()` Method:**
    - Calls a provided function once for each element in the array.

```
javascript
const numbers = [1, 2, 3, 4];
numbers.forEach((num) => console.log(num * 2));
// Logs: 2, 4, 6, 8
```

10. **`filter()` Method:**
    - Creates a new array with all elements that pass a test defined by a provided function.

```
javascript
const numbers = [1, 2, 3, 4, 5];
const evenNumbers = numbers.filter((num) => num % 2 === 0);
// evenNumbers is [2, 4]
```

These are just a few of the many array methods available in JavaScript. Understanding and using these methods effectively can greatly simplify array manipulation and data processing tasks in your JavaScript code.

You:

list different objects method with code snippets

ChatGPT:

Certainly! Here are some commonly used methods for working with JavaScript objects, along with code snippets illustrating their usage:

1. **`Object.keys()` Method:**
    - Returns an array of a given object's own enumerable property names.

```
javascript
const person = {
  name: "Alice",
  age: 30,
  city: "New York"
};

const keys = Object.keys(person);
// keys is ["name", "age", "city"]
```

2. **`Object.values()` Method:**
    - Returns an array of a given object's own enumerable property values.

```
javascript
const person = {
  name: "Alice",
  age: 30,
  city: "New York"
};

const values = Object.values(person);
// values is ["Alice", 30, "New York"]
```

3. **`Object.entries()` Method:**
    - Returns an array of a given object's own enumerable property `[key, value]` pairs.

```
javascript
const person = {
  name: "Alice",
  age: 30,
  city: "New York"
};

const entries = Object.entries(person);
// entries is [["name", "Alice"], ["age", 30], ["city", "New York"]]
```

4. **`Object.assign()` Method:**
    - Copies the values of all enumerable properties from one or more source objects to a target object.

```
javascript
const target = {};
const source1 = { a: 1 };
const source2 = { b: 2 };

Object.assign(target, source1, source2);
// target is { a: 1, b: 2 }
```

5. **`Object.freeze()` Method:**
    - Freezes an object, making it immutable (properties cannot be added, modified, or removed).

```
javascript
const person = {
  name: "Alice",
  age: 30
};

Object.freeze(person);
person.name = "Bob"; // This has no effect; person remains unchanged
```

6. **`Object.seal()` Method:**
    - Seals an object, preventing new properties from being added and marking existing properties as non-configurable.

```
javascript
const person = {
  name: "Alice",
  age: 30
};

Object.seal(person);
person.city = "New York"; // This has no effect; person remains unchanged
```

7. **`Object.create()` Method:**
    - Creates a new object with the specified prototype object and optional property descriptors.

```
javascript
const personPrototype = {
  greet: function() {
    console.log(`Hello, my name is ${this.name}.`);
  }
};

const person = Object.create(personPrototype);
person.name = "Alice";
person.greet(); // Logs "Hello, my name is Alice."
```

8. **`hasOwnProperty()` Method:**
    - Checks if an object has a specified property.

```
javascript
const person = {
  name: "Alice",
  age: 30
};
```

```
const hasName = person.hasOwnProperty("name"); // Returns true
const hasCity = person.hasOwnProperty("city"); // Returns false
```

These are some of the essential methods for working with JavaScript objects. They allow you to manipulate, iterate over, and freeze/seal objects, making it easier to manage and organize data in your JavaScript code.

You:

iterate over, and freeze/seal objects,which are they give code snippets

----

ChatGPT:

Certainly! I'll provide code snippets to illustrate how to iterate over objects and how to freeze or seal objects in JavaScript.

Iterating Over Objects:

You can iterate over the properties of an object using various methods. Here, we'll use a `for...in` loop to iterate over the keys (property names) of an object.

```
javascript
const person = {
  name: "Alice",
  age: 30,
  city: "New York"
};

for (const key in person) {
  if (person.hasOwnProperty(key)) {
    const value = person[key];
    console.log(`${key}: ${value}`);
  }
}
```

This code snippet will output:

```
vbnet
name: Alice
age: 30
city: New York
```

Freezing Objects:

The `Object.freeze()` method is used to make an object immutable, meaning its properties cannot be added, modified, or removed.

```
javascript
const person = {
  name: "Alice",
  age: 30
};

Object.freeze(person);

person.name = "Bob"; // This assignment will have no effect.
person.city = "New York"; // This addition will have no effect.

console.log(person); // Outputs: { name: 'Alice', age: 30 }
```

As shown in the example, after calling `Object.freeze(person)`, attempts to change or add properties to the `person` object have no effect.

Sealing Objects:

The `Object.seal()` method seals an object, which means it prevents the addition of new properties and marks existing properties as non-configurable (i.e., their descriptors cannot be changed).

```
javascript
const person = {
  name: "Alice",
  age: 30
};

Object.seal(person);

person.name = "Bob"; // This assignment is allowed.
person.city = "New York"; // This addition is not allowed.

console.log(person); // Outputs: { name: 'Bob', age: 30 }
```

In this example, while we can modify existing properties like `name`, we cannot add new properties like `city` after sealing the object.

It's important to note that both `Object.freeze()` and `Object.seal()` work at the top level of the object. If the object contains nested objects or arrays, those inner objects may not be frozen or sealed unless you explicitly apply these methods to them as well.
