3. Hoisting in JavaScript 🔥 (variables & functions)

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❓ Questions and Answers

1. What is Hoisting in JavaScript?

Q: What does "hoisting" mean in JavaScript?

A: Hoisting is JavaScript's default behavior of moving declarations to the top of their containing scope during the compile phase. This means variables and functions can be used before they are declared in the code.

Analogy: Imagine you're preparing a presentation. Before you start speaking, you arrange all your slides in order. Similarly, JavaScript arranges all declarations before executing the code.

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2. How does Hoisting Work?

Q: How does JavaScript handle hoisting?

A: During the compile phase, JavaScript scans the code and moves all variable and function declarations to the top of their respective scopes. However, only the declarations are hoisted, not the initializations.

Example:

```
console.log(a); // undefined
var a = 5;
```

In this example, `a` is hoisted and initialized with `undefined`. When `console.log(a)` is executed, it prints `undefined`.

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3. How does Hoisting work with `var`?

Q: What happens when variables declared with `var` are hoisted?

A: Variables declared with `var` are hoisted to the top of their scope and initialized with `undefined`. This allows them to be used before their declaration, but they will have an `undefined` value until the code execution reaches their initialization.

Example:

```
console.log(a); // undefined
var a = 10;
```

Here, `a` is hoisted and initialized with `undefined`, so the `console.log(a)` prints `undefined`.

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4. How does Hoisting work with `let` and `const`?

Q: What happens when variables declared with `let` and `const` are hoisted?

A: Variables declared with `let` and `const` are hoisted to the top of their block scope but are not initialized. They remain in a "temporal dead zone" from the start of the block until the declaration is encountered, leading to a `ReferenceError` if accessed before their declaration.

Example:

```
javascript
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console.log(a); // ReferenceError: Cannot access 'a' before initialization
let a = 10;
```

In this case, accessing `a` before its declaration results in a `ReferenceError` because `let` variables are hoisted but not initialized.

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5. How does Hoisting work with Functions?

Q: What happens when functions are hoisted?

A: Function declarations are hoisted along with their definitions, allowing them to be called before their declaration in the code.

Example:

```
greet(); // "Hello, World!"
function greet() {
  console.log("Hello, World!");
}
```

Here, the `greet` function is hoisted with its definition, so it can be called before its declaration.

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6. Common Pitfalls and Best Practices

Q: What are some common mistakes related to hoisting, and how can they be avoided?

A: Common mistakes include:

- **Accessing variables before their declaration:** This can lead to unexpected results or errors.
- **Using `var` instead of `let` or `const`:** `var` declarations are hoisted and initialized with `undefined`, which can cause issues.

Best Practices:

- **Declare variables at the top of their scope:** This makes the code more predictable and easier to understand.
- **Use `let` and `const` instead of `var`:** This helps avoid issues related to hoisting and scoping.
- **Avoid accessing variables before their declaration:** This prevents unexpected results and errors.

🔑 Summary and Key Takeaways

- **Hoisting:** JavaScript's behavior of moving declarations to the top of their containing scope during the compile phase.
- `var` **Declarations:** Hoisted and initialized with `undefined`.
- `let` **and** `const` **Declarations:** Hoisted but not initialized, leading to a "temporal dead zone" until the declaration is encountered.
- **Function Declarations:** Hoisted along with their definitions, allowing them to be called before their declaration.
- **Best Practices:** Declare variables at the top of their scope, use `let` and `const` instead of `var`, and avoid accessing variables before their declaration.