

Hoisting

1. In JavaScript, before the code is executed, memory is allocated to the variables in the memory component and gets initialized to `undefined`.
2. For functions, the block containing the function's code is assigned to the function name, e.g.,
square :

```
function square() {  
    console.log("hello");  
}
```

3. Arrow functions and function expressions are not hoisted:

- They act as variables and get `undefined` during the memory creation phase.

```
var x = () => 2 + 2;  
var y = function() {};
```

- Calling `x()`; before declaration results in a `TypeError`:

```
x(); // TypeError: x is not a function  
var x = () => 2 + 2;
```

4. Temporal Dead Zone (TDZ) for `let` and `const` in JavaScript:

- `let` and `const` variables are hoisted but under the **script object**, not the global object.
- Variables present in the global object print `undefined` :

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

- Variables in the script object throw a `ReferenceError`:

```
console.log(b); // ReferenceError  
let b = 10;
```

- TDZ is the period from when a variable is hoisted to when it is initialized. Accessing a variable in TDZ throws a `ReferenceError`.

5. Errors in JavaScript:

- **Syntax Error:**

```
const z;  
console.log(z); // SyntaxError: Missing initializer in const declaration
```

- **Type Error:**

```
x(); // TypeError: x is not a function
var x = () => 2 + 2;

const b = 1000;
b = 5; // TypeError: Assignment to constant variable.
```

- **Reference Error:**

```
console.log(b); // ReferenceError
let b = 10;

console.log(z); // ReferenceError: z is not defined
```

Summary

- `var` variables are hoisted under the **global object**, whereas `let` and `const` are hoisted under the **script object** but remain in **Temporal Dead Zone** until initialized.
- Function declarations are hoisted, but **arrow functions and function expressions are not** because they are stored as variables.
- **Types of errors:**
 - **Syntax Error:** Declaring `const` without initializing.
 - **Type Error:** Calling an arrow function before declaration.
 - **Reference Error:** Accessing a `let` or `const` variable before declaration.

References

- [Hoisting Explanation](#)
- [Temporal Dead Zone \(TDZ\)](#)