Episode 9 : Block Scope & Shadowing in JS

What is a **Block**?

- Block aka *compound statement* is used to group JS statements together into 1 group. We group them within {...}

  ```
  {
    var a = 10;
    let b = 20;
    const c = 30;
    // Here let and const are hoisted in Block scope,
    // While, var is hoisted in Global scope.
  }
  ```

- Block Scope and its accessibility example

  ```
  {
    var a = 10;
    let b = 20;
    const c = 30;
  }
  console.log(a); // 10
  console.log(b); // Uncaught ReferenceError: b is not defined
  ```

  - Reason?
    - In the BLOCK SCOPE; we get b and c inside it initialized as *undefined* as a part of hoisting (in a seperate memory space called **block**)
    - While, a is stored inside a GLOBAL scope.
    - Thus we say, *let* and *const* are BLOCK SCOPED. They are stored in a separate mem space which is reserved for this block. Also, they can't be accessed outside this block. But var a can be accessed anywhere as it is in global scope. Thus, we can't access them outside the Block.

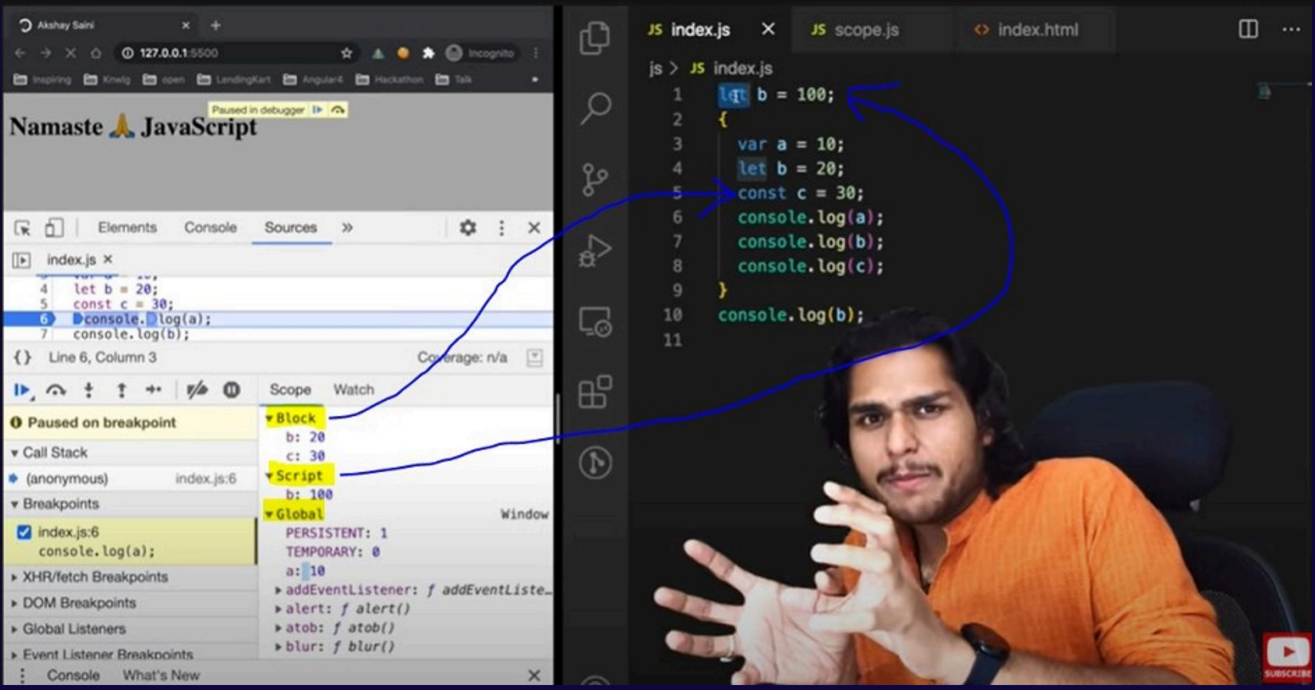
What is **Shadowing**?

-
  ```
  var a = 100;
  {
    var a = 10; // same name as global var
    let b = 20;
    const c = 30;
    console.log(a); // 10
    console.log(b); // 20
    console.log(c); // 30
  }
  console.log(a); // 10, instead of the 100 we were expecting. So block "a" modified val of global "a" as well. In console, only b and c are in block space. a initially is in global space(a = 100), and when a = 10 line is run, a is not created in block space, but replaces 100 with 10 in global space itself.
  ```

- So, If one has same named variable outside the block, the variable inside the block *shadows* the outside variable. **This happens only for var**

- Let's observe the behaviour in case of let and const and understand it's reason.

  ```
  let b = 100;
  {
    var a = 10;
    let b = 20;
    const c = 30;
    console.log(b); // 20
  }
  console.log(b); // 100, Both b's are in separate spaces (one in Block(20) and one in Script(another arbitrary mem space)(100)). Same is also true for *const* declarations.
  ```



```
let b = 20;
const c = 30;
console.log(a);
console.log(b);
```

```
index.js:6
console.log(a);
```

```
▾Block
  b: 20
  c: 30
▾Script
  b: 100
▾Global                                  Window
  PERSISTENT: 1
  TEMPORARY: 0
  a: 10
 ▸addEventListener: ƒ addEventListe…
 ▸alert: ƒ alert()
 ▸atob: ƒ atob()
 ▸blur: ƒ blur()
```

```
let b = 100;
{
  var a = 10;
  let b = 20;
  const c = 30;
  console.log(a);
  console.log(b);
  console.log(c);
}
console.log(b);
```

- Same logic is true even for **functions**

  ```
  const c = 100;
  function x() {
    const c = 10;
    console.log(c); // 10
  }
  x();
  console.log(c); // 100
  ```

What is **Illegal Shadowing**?

  ```
  let a = 20;
  {
    var a = 20;
  }
  // Uncaught SyntaxError: Identifier 'a' has already been declared
  ```

-
  - We cannot shadow let with var. But it is **valid** to shadow a let using a let. However, we can shadow var with let.
  - All scope rules that work in function are same in arrow functions too.
  - Since var is function scoped, it is not a problem with the code below.

    ```
    let a = 20;
    function x() {
      var a = 20;
    }
    ```

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