perplexity

is object in js same as the one in cpp where its instance of class, how functions can be stored as var in js, can it be in cpp

JavaScript and C++ handle the concept of objects and storing functions in variables quite differently:

Object Differences: JavaScript vs C++

- **C++ Objects:** In C++, objects are always instances of *classes* or *structs*, which serve as explicit blueprints defining both data and behavior. Every object in C++ is strongly typed and must be constructed from a class definition[1] [2].
- **JavaScript Objects:** JavaScript is prototype-based, not strictly class-based (though it has class syntax since ES6 for syntactic sugar). You can create objects directly using literals or functions—no need for a strict class blueprint. Objects inherit properties and methods dynamically through prototype chains, making them more flexible and dynamic than C++ objects[1] [3] [4].

Storing Functions as Variables

In JavaScript

- **Functions as First-Class Citizens:** JavaScript treats functions as objects. They can be created anonymously and assigned to variables.
- **How it works:**

```
const add = function(a, b) { return a + b; };
// or with arrow functions (ES6+)
const multiply = (a, b) => a * b;

let result = add(4, 5); // 9
```

  Now, `add` and `multiply` are variables pointing to a function. You can pass, return, and store them freely[5] [6] [7].

In C++

- **Traditional Approach:** C++ supports storing pointers to functions in variables.

```
int add(int a, int b) { return a + b; }
int (*funcPtr)(int, int) = &add;
int result = funcPtr(2, 3); // 5
```

- **Modern Approach:** With C++11 and later, `std::function` (from `<functional>`) allows even more flexibility:

```
#include <functional>
std::function<int(int, int)> func = add;
int result = func(2, 3); // 5
```

- **Lambdas:** You can also store *lambda* (anonymous) functions in variables:

```
auto fun = []() { std::cout << "Hello!"; };
fun(); // prints Hello!
```

  This makes it possible to mimic JavaScript's function-by-variable style in modern C++, with some extra syntax[8] [9] [10].

Summary Table

Feature	JavaScript	C++
Object Instantiation	Prototype-based; no strict class req	Class-based; must instantiate from class
Methods in Objects	Functions are properties (methods)	Methods defined in class, called on object
Store Function in Variable?	Yes (natively, as values)	Yes (with function pointers, lambdas, std::function)
Dynamic Typing	Yes	No (static typing)

In short:

- *JavaScript objects are more flexible and not tied to classes like C++ objects.*
- *Functions can be stored as variables in both languages, but it's much simpler and more natural in JavaScript, while C++ requires pointers, lambdas, or* `std::function` *for similar capability*[1] [5] [8] [6] [10] [4] [7].

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