

What is Polymorphism?

Definition:

Polymorphism means “**many forms**.” In OOP, it allows the **same method name** to behave differently based on the object calling it.

Types in JavaScript:

1. **Compile-time (Method Overloading)** – Not directly supported in JS
2. **Run-time (Method Overriding)** – Supported using inheritance

Example of Run-time Polymorphism (Method Overriding):

```
// Parent class
class Animal {
    speak() {
        console.log("The animal makes a sound.");
    }
}

// Child class overriding speak()
class Dog extends Animal {
    speak() {
        console.log("The dog barks.");
    }
}

class Cat extends Animal {
    speak() {
        console.log("The cat meows.");
    }
}

// Creating objects
const a1 = new Animal();
const d1 = new Dog();
const c1 = new Cat();

// Polymorphism in action
a1.speak(); // Output: The animal makes a sound.
d1.speak(); // Output: The dog barks.
c1.speak(); // Output: The cat meows.
```

Explanation (Point-by-Point):

1. All classes have a method named `speak()`.
2. The method behaves **differently** depending on which class's object calls it.
3. This is **polymorphism** – same method, **different behavior**.

Real-Life Analogy:

The word “**draw**” can mean:

- Drawing a picture with a pencil 
- Drawing money from an ATM  Same action word – **different behavior based on context**. That's **polymorphism**.