CYDEO

JavaScript Programming Day02

Content

- String
- Arrays
- Functions
- Class & Object
- Inheritance
- AI Tools In Coding

String

- String is a sequence of characters, surrounded by double quotes (“”) or single quotes (‘’)
- A string object is immutable; once it is created, it can’t be altered

```
let greeting = "Hello World";

let name = "Wooden Spoon";
```

```
let greeting = 'Hello World';

let name = 'Wooden Spoon';
```

String: Sequence of Characters

- Strings are ordered sequences of characters, and each character has a unique index number

```
let s = 'CYDEO !';
//index: 0123456
```

String Methods

Method Name	Method Name	Method Name
charAt()	length	toLowerCase()
toUpperCase()	trim()	indexOf()
lastIndexOf()	replace()	substring()
repeat()	split()	startsWith()
endsWith()	includes()	

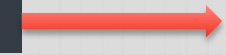
String Concatenation

- The action of linking things together by using “+” or “${}” operator

```
let age = 20;
console.log("I am " + age + " years old");
```

I am 20 years old

```
let age = 20;
console.log(`I am ${age} years old`);
```



I am 20 years old

Arrays

Arrays

- Special type of variable that's used to store multiple values of any types
- The values in the array are ordered, changeable, can be duplicated, and can be of any data type
- Each element has a unique index number

```
let days = ["MON", "TUE", "WED", "THU", "FRI"];

let fruits = ["Cherry", "Lemon", "Cherry"];

let scores = [75, 78, 85, 90, 93, 95, 85];

let myArray = ["A", "B", 1, 2, true, false];
```

Accessing Array Elements

- Elements of an array can be accessed by using the square brackets [ ]
- Index number needs to be provided within the square brackets

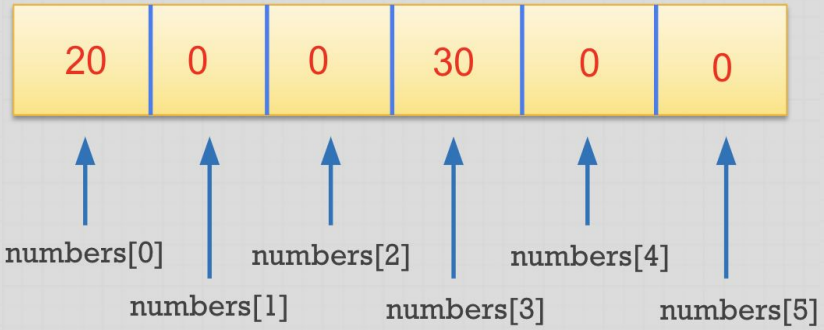
```
numbers[0] = 20;
```

arrayRefVar

index

value

```
numbers[3] = 30;
```



Assigning Values to Array Indexes

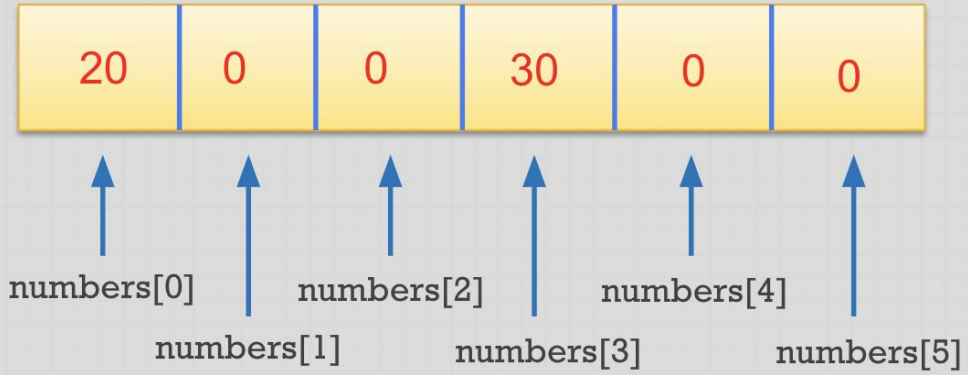
```
numbers[0] = 20;
```

arrayRefVar

index

value

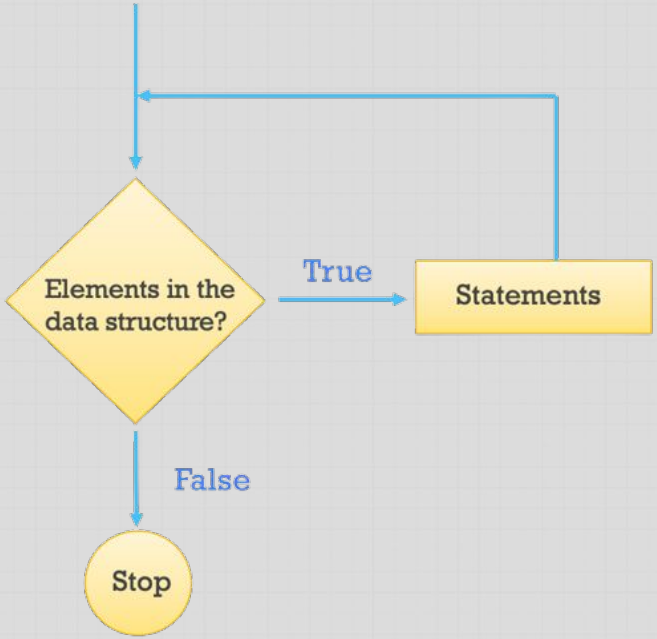
```
numbers[3] = 30;
```



For...of Loop

- Used to access each successive value of a sequence
- Iteration order and number of iterations are fixed
- Does not have index numbers

```
for (let element of sequence) {

    // Statements

}
```



Array Methods

Method Name	Description
push(element)	Adds the specified element to the end of the array
unshift(element)	Adds the specified to the beginning of the array
splice(index, # of elements)	Remove the specified number of element starting from index
shift()	Removes the first element from the array
pop()	Removes the last element from the array

Functions

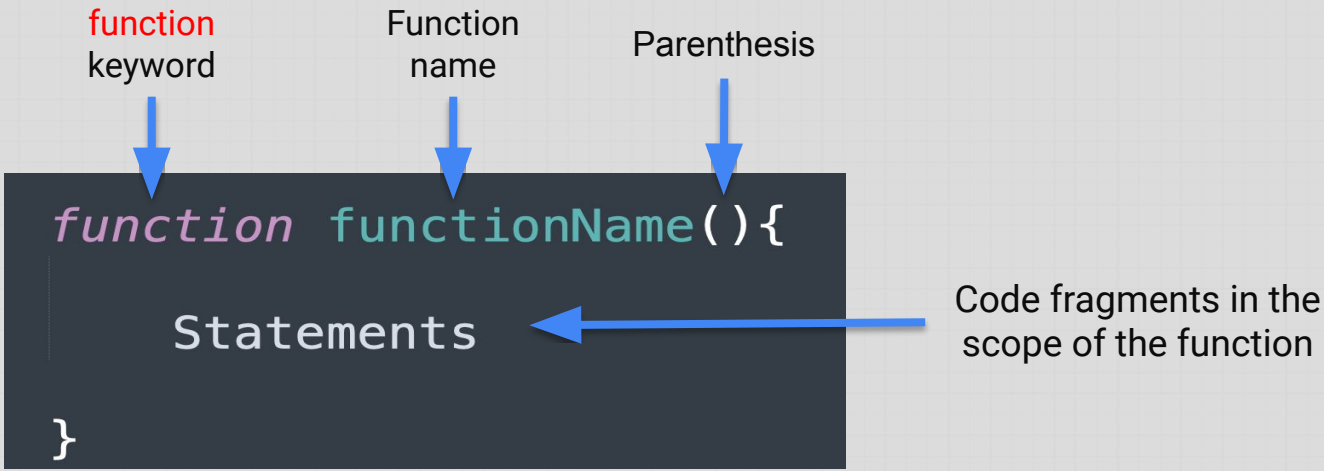
Function

- Grouping a series of code fragments to perform a task
- Allows us to reuse the function rather than repeating the same set of statements
- Improves the reusability and efficiency of our codes

```
printMessage();

cube(10);

execute();

reverse('CYDEO');

takeScreenSHort();

...
```

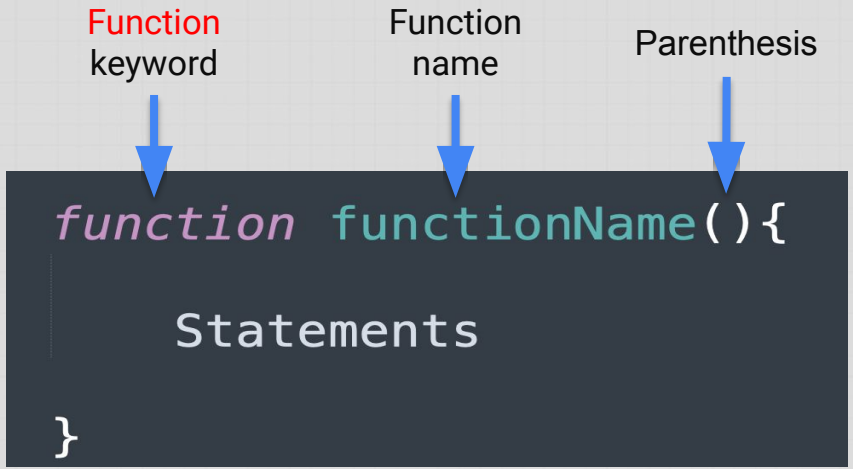
Declaring A Function

- A function must be declared before we call it and use it
- To create a function, we need to use the function keyword



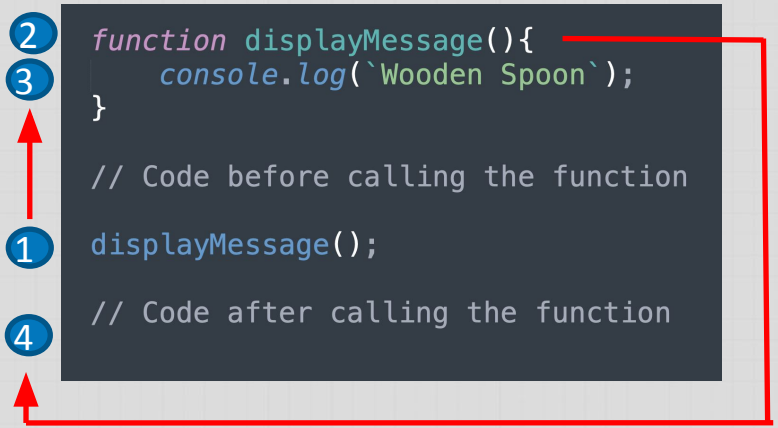
Components of Function

- The function keyword: indicates that the start of the function
- The function name: Descriptive name of the function
- The parenthesis: function/method name is always followed by a set of parenthesis, can be capable of receiving arguments



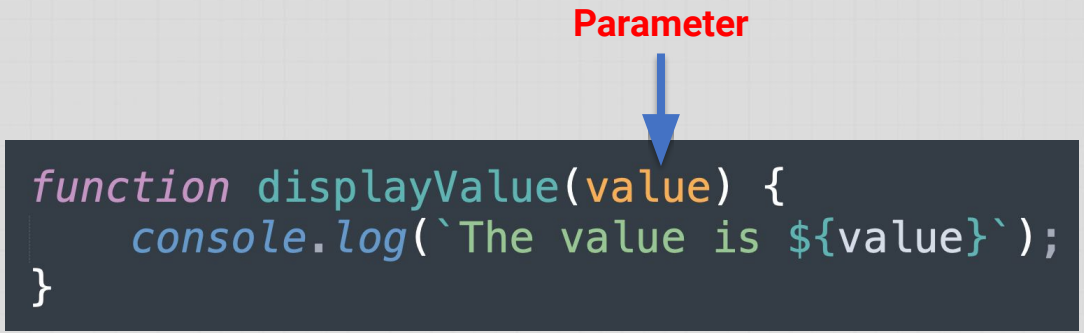
Calling a Function

- When we need to script to perform the task the function does
- The function executes the codes in its scope from top to button
- When it has finished, the code continues to run from the point where it was initially called



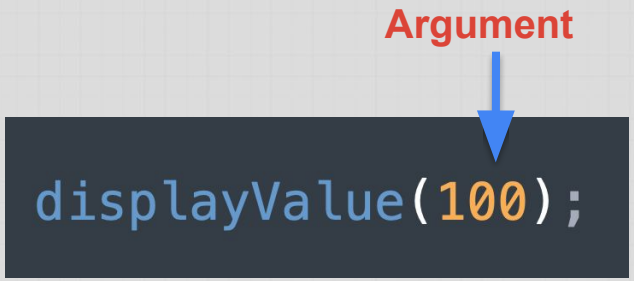
Passing Parameters to Function

- When we declare a function, parameters can be given
- Parameters passed to the function act like variables within the function's scope
- Used for providing additional information the function must have to perform its task



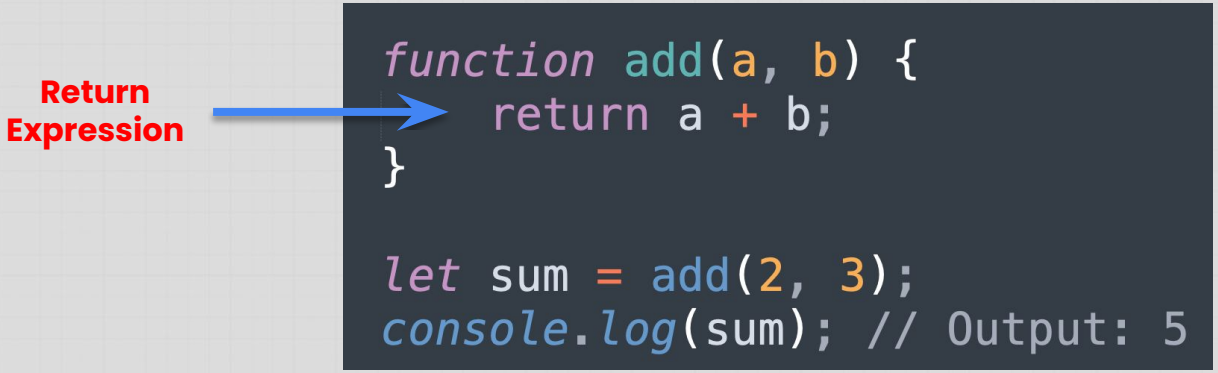
Calling a Function that Needs Information

- Must specify the values the method should use
- Values need to be given in the parentheses that follow the function name
- The values we passed to the method are called arguments
- Arguments can be provided as values or as variables



Return Values From Functions

- A function can return a value by using a return statement
- The return statement ends function execution and specifies a value to be returned to the function caller

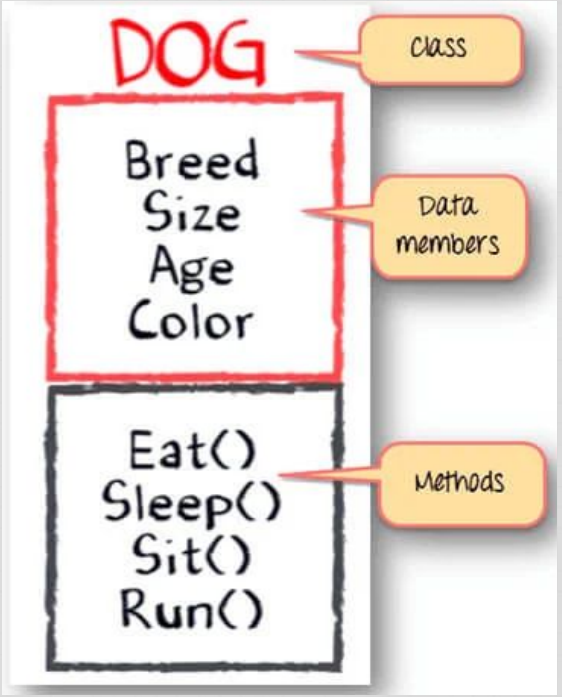


Class & Object

What is A Class?

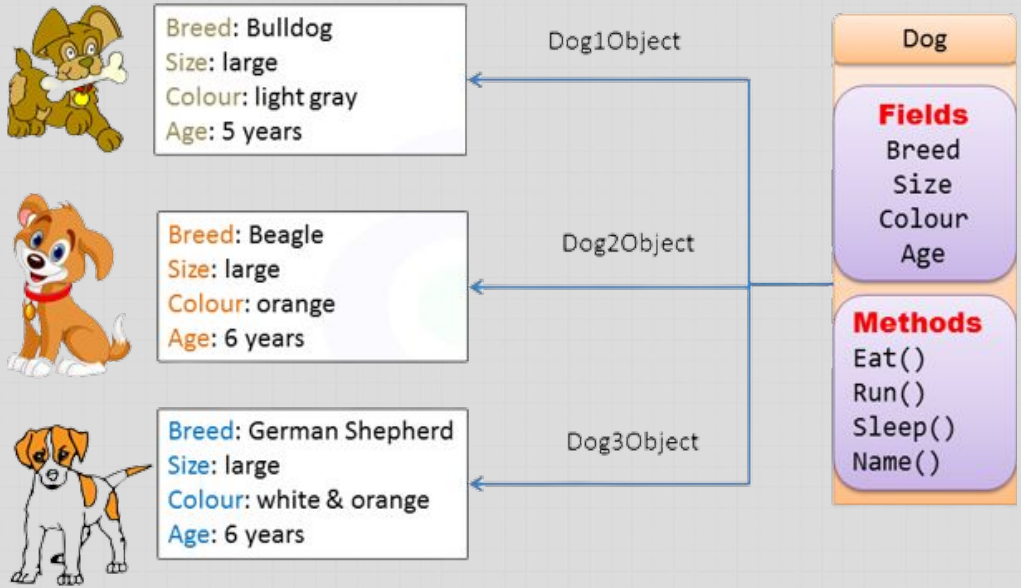
- Where objects came from
- A blueprint or set of instructions to build

  a specific type of Object
- No memory allocated for a class



What is An Object?

- An instance of a class
- Multiple objects can be created from a class
- Each object has its own memory
- The data stored in an object are called fields



Writing A Custom Class

Class Name	Dog
Fields (Attributes)	name breed size age color ...
Methods (Actions)	eat() drink() play() ...

keyword

Class Name

```
class Dog {

  constructor(name, breed, age, color) {
    this.name = name;
    this.breed = breed;
    this.age = age;
    this.color = color;
  }

  eat() {
    console.log(`${this.name} is eating.`);
  }

  drink() {
    console.log(`${this.name} is drinking.`);
  }

  play() {
    console.log(`${this.name} is playing.`);
  }

}
```

The Constructor Method

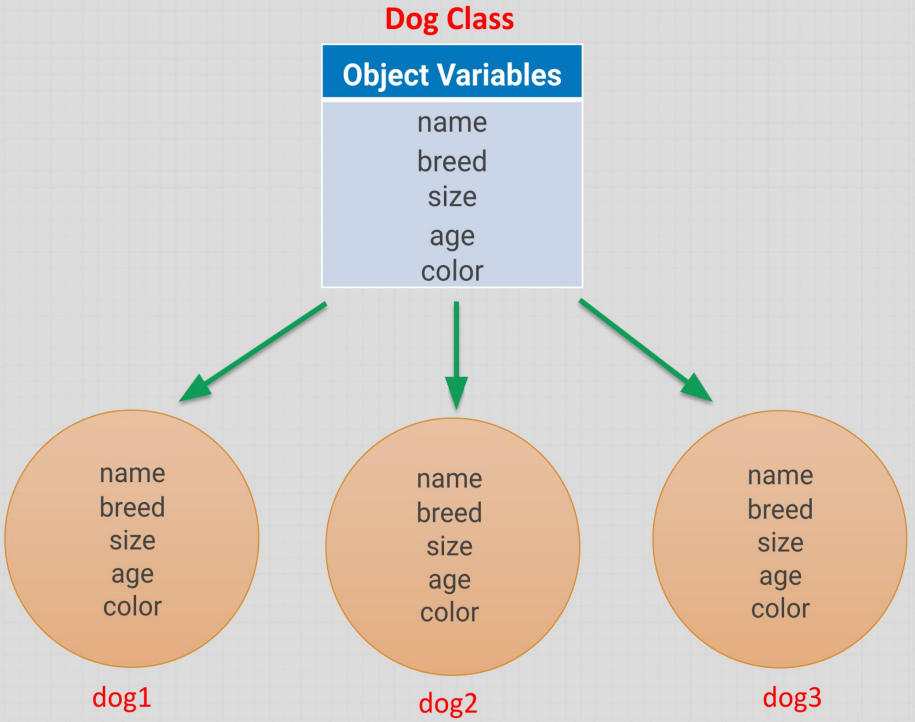
- Built-in constructor method used for defining & initializing the attributes
- Belongs to the object and each object has its own memory
- Gets executed when an object is created from the class

```
class Dog {

  constructor(name, breed, age, color) {
    this.name = name;
    this.breed = breed;
    this.age = age;
    this.color = color;
  }

}
```

Object Variables

- Belongs to the object, each object has a different copy of the instance variable
- Used by the objects to store their data members

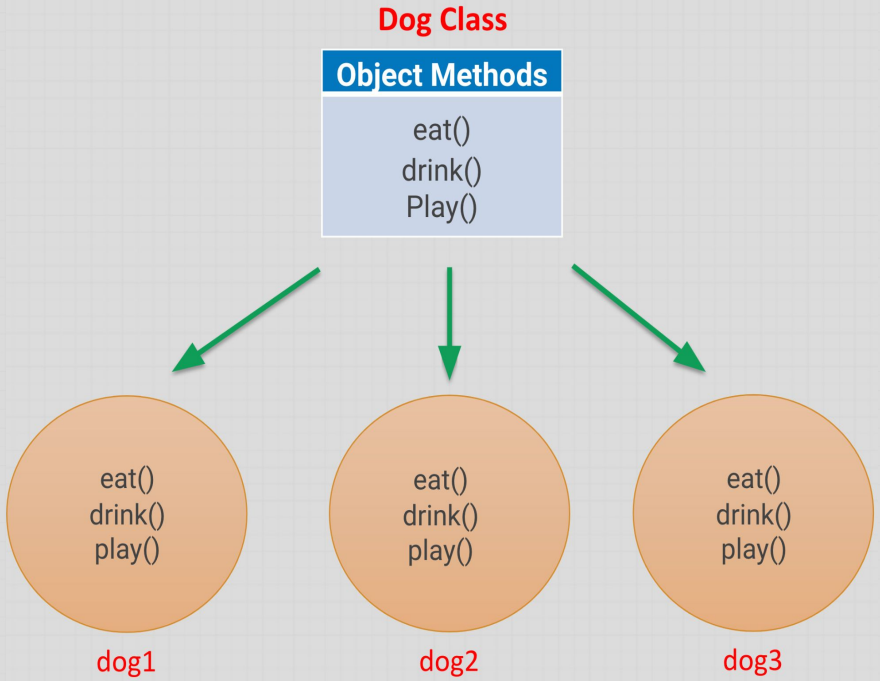
```
constructor(name, breed, age, color) {
  this.name = name;
  this.breed = breed;
  this.age = age;
  this.color = color;
}
```



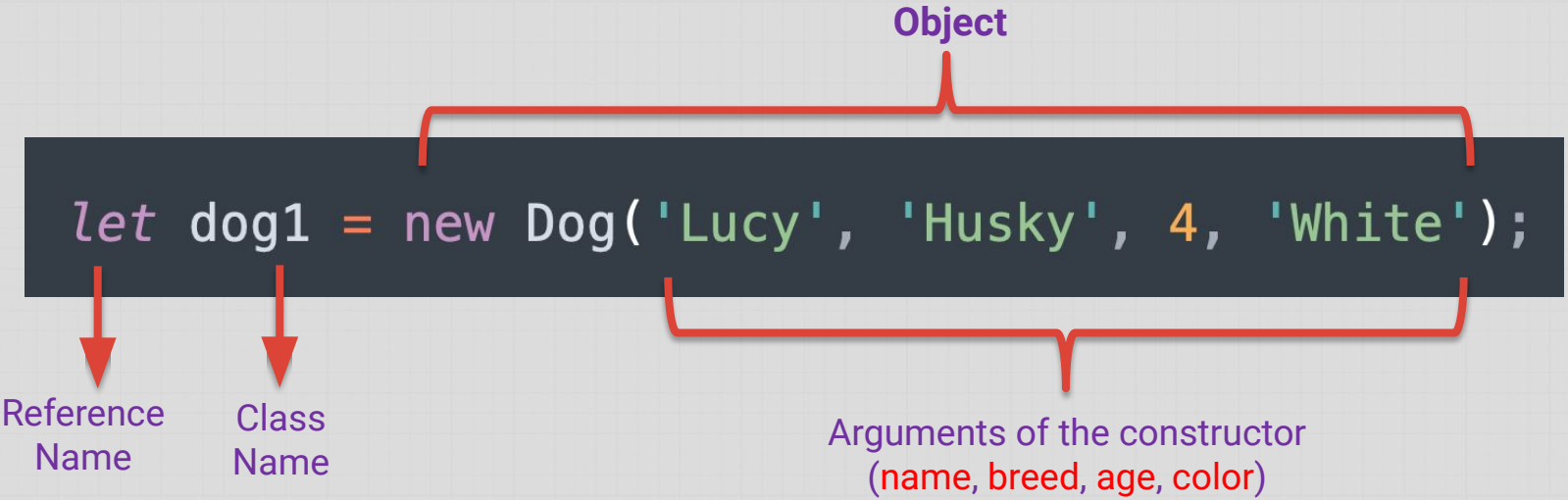
Object Methods

- Objects can share the methods created within the class
- Methods can be called through the object once it's instantiated

```
eat() {
  console.log(`${this.name} is eating.`);
}

drink() {
  console.log(`${this.name} is drinking.`);
}

play() {
  console.log(`${this.name} is playing.`);
}
```



Creating an Object



Accessing an object's data and methods

- An Object's members refer to its data fields and methods. After the object is created its data can be accessed and its methods can be invoked using the dot operator (.)

```
let dog1 = new Dog('Lucy', 'Husky', 4, 'White');

console.log(dog1.name); // Lucy
console.log(dog1.breed); // Husky
console.log(dog1.color); // White

dog1.eat(); // Output: Lucy is eating.
dog1.drink(); // Output: Lucy is drinking.
dog1.play(); // Output: Lucy is playing.
```

Class vs Object

Class	Object
Class is a collection of similar objects	Object is an instance of a class
Class is conceptual (is a template)	Object is real
No memory is allocated for a class	Each object has its own memory
Class can exist without any objects	Objects can not exist without a class

Inheritance

Inheritance

- Used for creating Is A relationship among the classes
- Allows one class to inherit the variables and methods from another class

Child Inherits qualities from parent

Inheritance

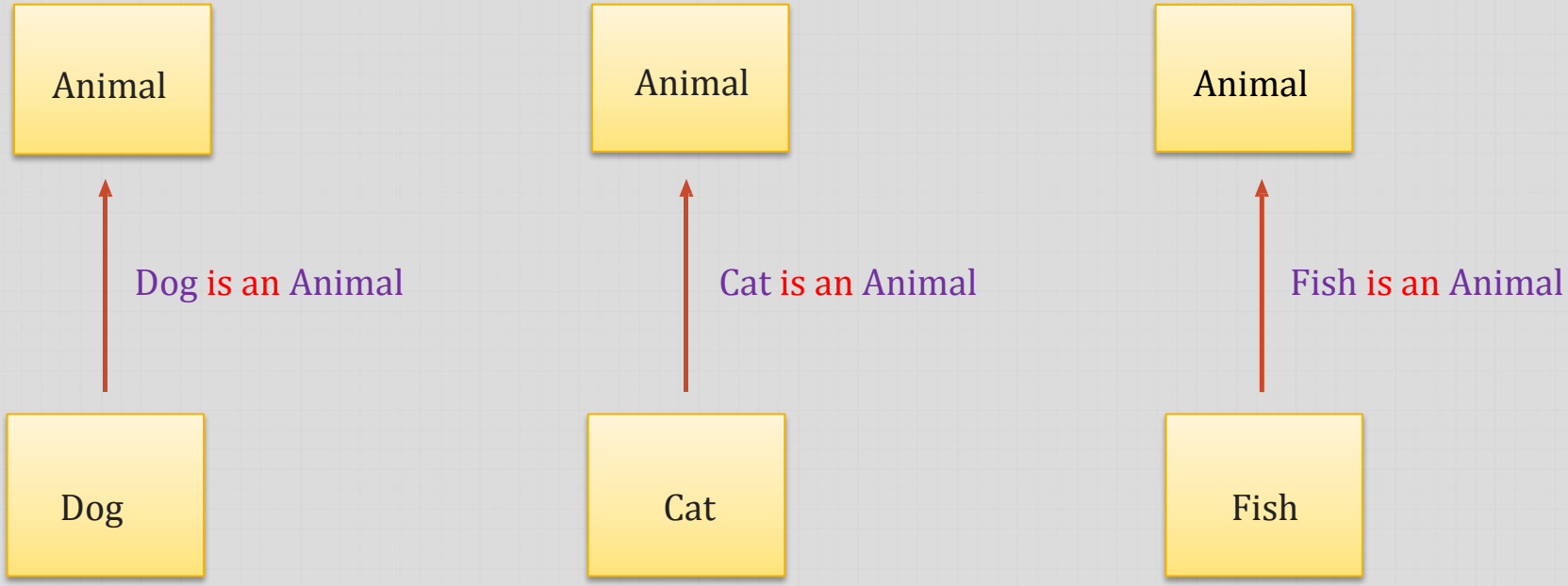
name
breed
size
weight
eat()
move()

bark()

meow()
scratch()

swim()

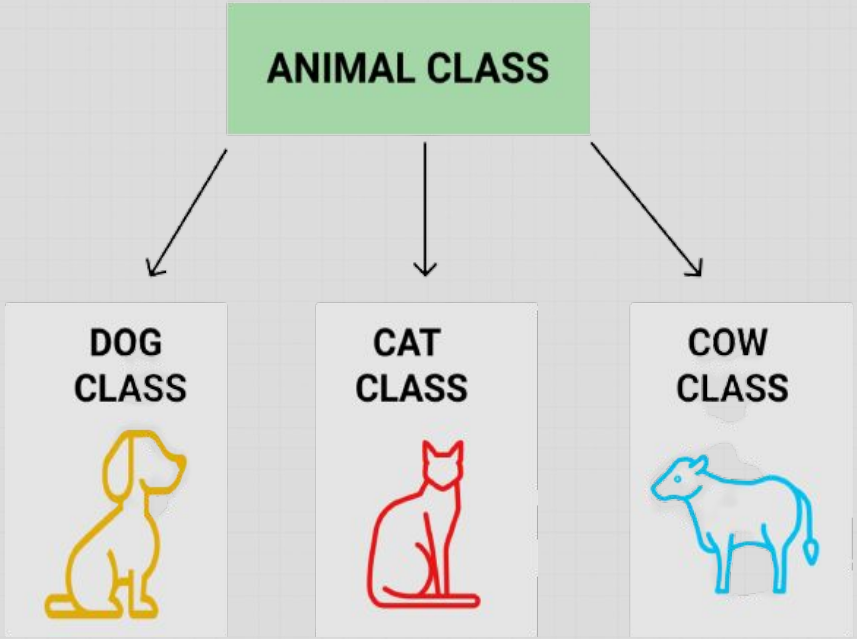
Inheritance



The animal is called SUPER class and the other classes are called SUB class

Inheritance

- One or more classes can be inherited by a class by specifying the parent class(es) in parentheses after the class name
- The constructor and private members can not be inherited from parent to child




```
class Animal {

  constructor(name) {
    this.name = name;
  }

}

class Dog extends Animal {

  constructor(name) {
    super(name);
  }

  bark(){
    console.log(`${this.name} is barking.`);
  }

}
```

Super keyword

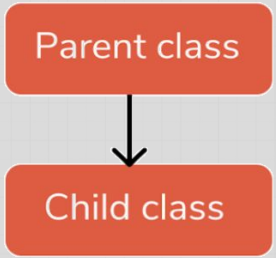
- The super keyword refers to the superclass (Parent).
- We can use super() to call a superclass's constructor

```
class Person {
  constructor(name, age) {
    this.name = name;
    this.age = age;
  }
}

class Employee extends Person {

  constructor(name, age, jobTitle) {
    super(name, age);
    this.jobTitle = jobTitle;
  }

}
```

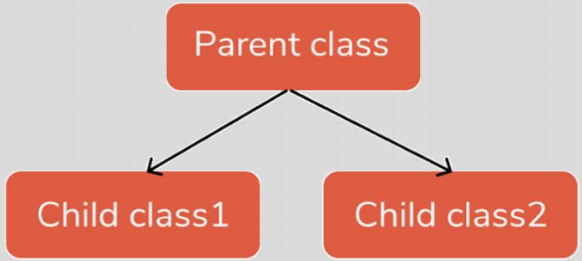
Accesses the parent class members

Types of Inheritance

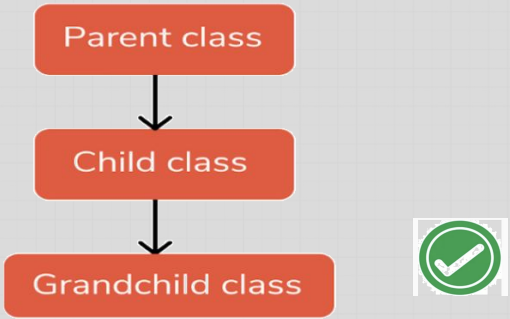
Single Inheritance



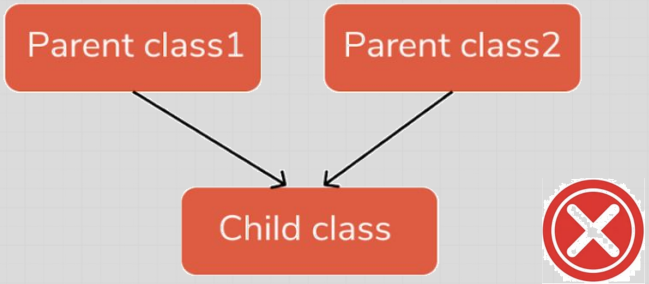
Hierarchical Inheritance



Multilevel Inheritance



Multiple Inheritance



AI Tools In Coding

Applications of AI in Software Development

- **Automated Code Generation**: AI tools which can write codes snippets or entire programs based on given descriptions
- **Code Completion**: AI systems that suggest the next part of the code you are writing
- **Bug Detection and Fixing**: AI systems that identify bugs and suggest fixes

GitHub Copilot

tabnine

Benefits of using AI tools

- **Increases Productivity**: AI tools can help programmers write code faster and automating repetitive tasks
- **Improved Code Quality:** AI tools can suggest best practices and common patterns to write cleaner and more maintainable codes
- **Error Reduction:** AI can catch potential errors and bugs early in the development process
- **Learning and Skill Enhancement:** AI tools exposes developers to new coding techniques and patterns