Object Oriented Programming in JavaScript

We have two types of OOP languages:

1. **class-based** Object-Oriented Programming

   ex: java, .net, python, cpp etc…

2. **prototype-based (object based)** Object-Oriented Programming

   ex: javascript, typescript, perl, php, …

- Object represents a physical component.
- Object is a real-time entity.
  - We can see
  - We can touch
  - We can use

  Ex: etc…
- Object is an instance of a class, nothing but memory block (one copy of class)

"**Object**" is a predefine class; every class/object should be derived from "**Object**" class prototype.

- Object is a collection of members:
  1. **properties (**variables or fields)
  2. **methods (**functions**)**
  - **Properties:** details about the object. Properties are the variables which are stored inside the Object. Properties are used to store data about specific person,product or thing.

    Ex: array.length=5
  - **Methods:** to perform manipulations on the properties. Methods are the functions stored inside the object. **Methods read values from properties**, **write values into properties,** to **perform logical operations.**

    Ex: array.sort() array.push() array.indexOf()

Note: objects are used to data maintenance

Array	**Object**
Sequence	random
Index base	properties (key)
[ ]	**{ }**

Example:

Car is an object:

-properties

- Car model: I20
- Car colour : white
- Car no: 5579

-methods

- Start()
- Change gear()
- Stop()

Person is an object:

-properties

> name: siva

> age: 50

> gen: male

-methods

> sleep()

> eat()

> talk()

- In the above example the “car” object has three properties called “car model, car colour, car no”, which have respective values.

“**Object**” is a predefine class; every class/object should be derived from “**Object**” class prototype.

Creating objects:

We can create objects in 2 ways: -

1. with object literals
2. by using new & constructor function

Object literals

- Object literals are represented as curly braces **{ }**, which can include properties and methods.
- The property and values are separated with:symbol
- The method-name and body are separated with :symbol

Syntax:

```
const  refname = {

                    “property”:value, property:value, ...,

                        “method-name”: function() {body},
                         method-name() {body}
                    }
```

Note:

Methods we can write in any of 3 forms, i.e like normal function or expression or arrow

how to access?

refname.property

refname.property=value

refname.method-name()

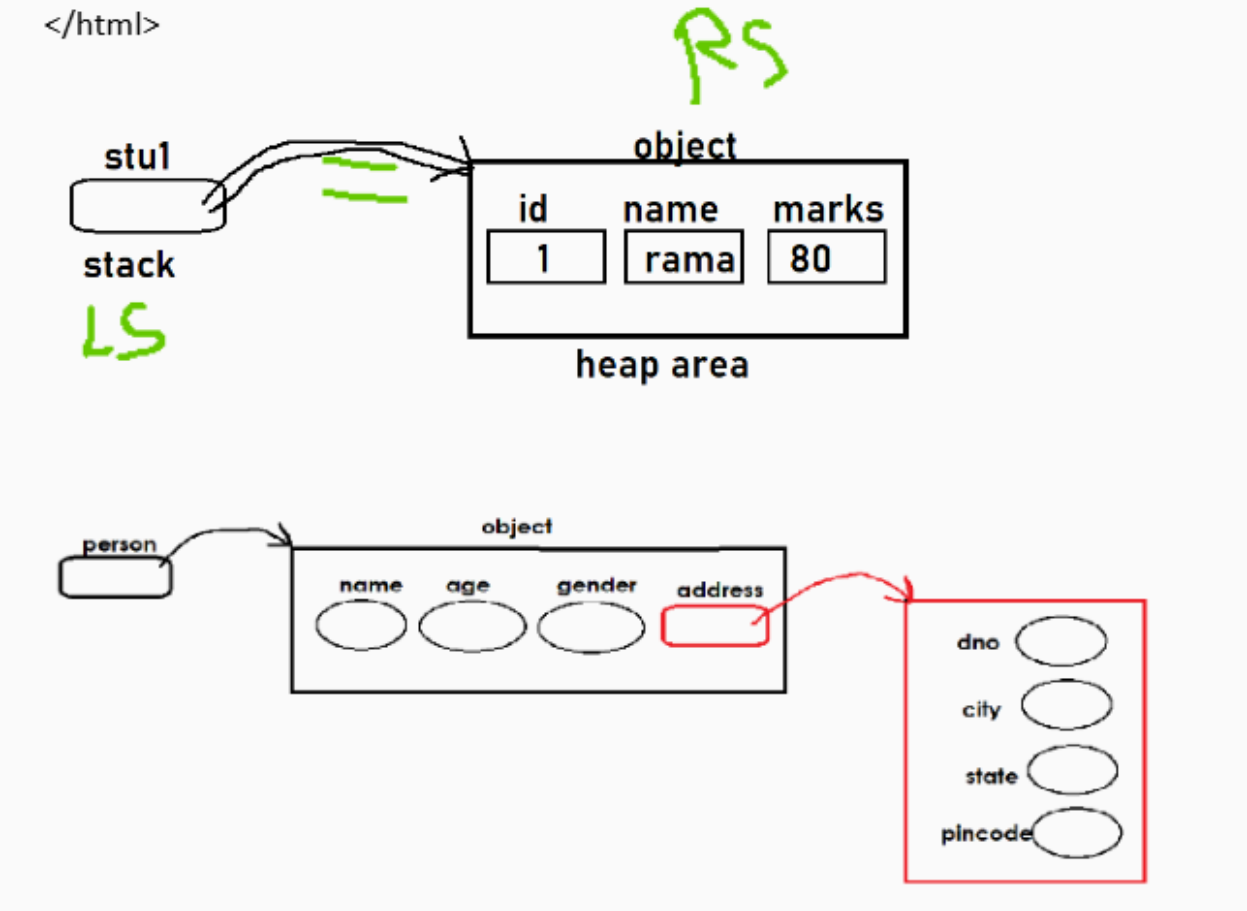
Note:

Object is one of predefined class.

Every js class and every js object should be derived from an Object class **prototype**.

Example 1 on object literals (properties)

```
<Html>
<head>
      <title> object literals </title>
</head>
<h1> object literals</h1>
<script>
   var stu1= {"id" : 1, name : "ram", marks: 80};
      var stu2= {id : 2, name : "sam", marks: 90};
      document.write("Id       :"+stu1.id+"<br>");
      document.write("Name       :"+ stu1.name+"<br>");
      document.write("Marks       :"+ stu1.marks+"<br>");
      document.write(stu1+"<br><br>");
      document.write("Id       :"+ stu2.id+"<br>");
      document.write("Name       :"+ stu2.name+"<br>");
      document.write("Marks       :"+ stu2.marks+"<br>");
      document.write(stu2);
</script>
</body>
```



Example 2 on creating object with literals

```
<Html>
<head>
<title>object literals</title>
</head>
<body>
<h1> object with properties and methods </h1>
<script>
   var stu1= { "id" : 1, name : "ram", marks: 30, "getResult": function() {
                                        if(stu1.marks>=40)
                                              return "Pass";
                                          else
                                              return "Fail";
                                        },
                    };
      document.write("Id        :"+ stu1.id +"<br>");
      document.write("Name      :"+ stu1.name +"<br>");
      document.write("Marks     :"+ stu1.marks +"<br>");
```

```
        document.write("Result is        :"+ stu1.getResult() +"<br>");
        document.write(stu1+"<br><br>");
</script>
</body>
</html>
```

This keyword

The “this” keyword represents/substitutes the current working object. For example, if it is called for the first time, the “this” key word represents the first object; if it is called second time, it represents the second object.

"this" is a keyword

"this" is a predefined reference variable (Same as to stud)

"this" maintains reference of current working object.

"Stud" what it maintains "this" also maintains the same thing

"this" used within the object, but "stud" used outside the object

If you want access members within the object use "this".

If you want access members outside the object use "stud"

Note: If we want to access properties inside a method or constructor function, we should use “this” keyword.

Constructor function

Constructor is a function that receives an empty (created by new keyword) object, initializes properties and methods to the object (object init).

Constructor functions technically are regular functions. There are three conventions though:

1. They are named with capital letter first.
2. They should be executed only with "new" keyword, while object creation.
3. Constructor functions don’t return any value, hence no return statement.

Syn

```
function  Constname(params)
{
  this.prop=value;
  this.prop=value;
  …
  methods…
}
```

Object Syn:

const refname = new Constname(); **constructor calling**

const refname = new Const-name(args);

Using the new keyword is essential

It's important to remember to use the new keyword before all constructors. If you accidentally forget new, you will be modifying the global object instead of the newly created object. Consider the following example:

<!-- Object Array Literals -->

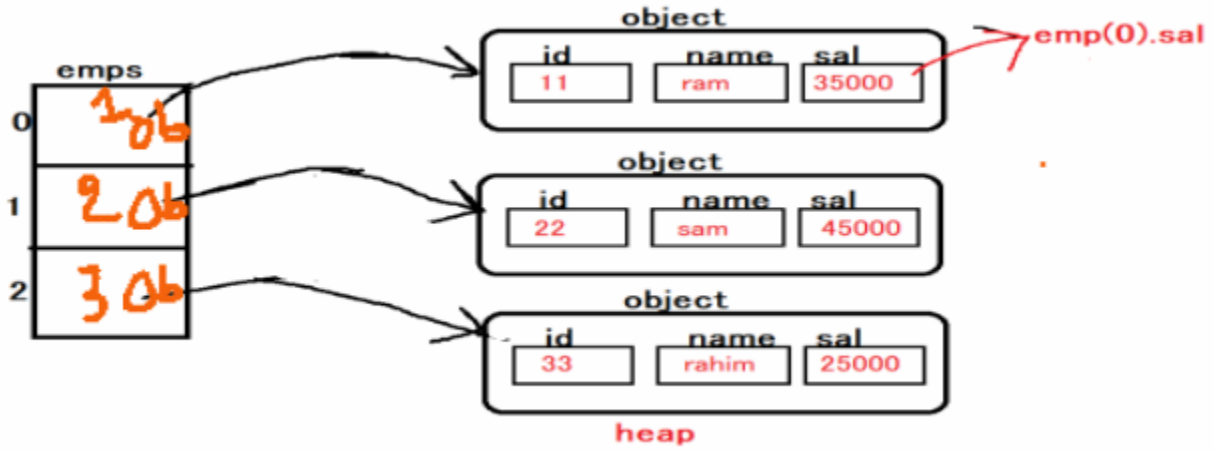
```
<Html>
<body>
<h1> Creating Object Array with Literals </h1>
<script>
  //object array
  var emps =[ { id:11, name:"ram", sal:35000 },
                    { id:22, name:"sam", sal:45000 },
                    { id:33, name:"rahim", sal:25000 }
                     ];
  //retrieving data from array
for(i=0; i<emps.length; i++){
document.write(emps[i].id, emps[i].name, emps[i].sal+"<br>");
  }
document.write(emps);
</script>
</body>
</html>
```

<!--exmaple on object arrays -->

```
<html>
<head>
<script>
        function totalValue(prods) //user define function
        {
```

```
        let inventory_value = 0;
    for(let i=0; i<prods.length; i+=1) {
            amt= prods[i].inventory * prods[i].unit_price;
          inventory_value +=amt;
          document.write(prods[i].name, amt, "<br>");
         }
        return inventory_value;
      }
</script>
</head>
<body>
<script>
    let products = [{ name: "chair", inventory: 5, unit_price: 45},
                { name: "table", inventory: 10, unit_price: 120},
                { name: "sofa", inventory: 2, unit_price: 500}
              ];
                      //array passing as an param to fun
    document.write("Total Bill Amt  :"+  totalValue(products)   );
</script>
</bodY>
```

</html>



prototype

the "prototype" generally represents model of the object (structure), which contains list of properties and methods of the object.

"prototype" is a predefine property.

All JavaScript objects inherit properties and methods from a prototype:

- Student objects inherit from Student.prototype
- Date objects inherit from Date.prototype
- Array objects inherit from Array.prototype

The **Object.prototype** is on the top of the prototype inheritance chain:

Date objects, Array objects, and Person objects inherit from **Object.prototype**.

Adding Properties and Methods to Objects:

Sometimes you want to add new **properties or methods** to an existing object literal of a given type.

Sometimes you want to add new **properties or methods** to an object constructor.

Syn:

Constructor Syn:

Constructor.prototype.new-property = value;

Constructor.prototype.new-method = function() { code };

Literal Syn:

Object.prototype.new-property = value;

Object.prototype.new-method = function() { code };

refname.new-prop=value

refname.new-method=body