

# Lab: Objects & Composition

Problems for in-class lab for the ["JavaScript Advanced" course @ SoftUni](https://judge.softuni.bg/Contests/2758/Objects-and-Composition-Lab). Submit your solutions in the SoftUni judge system at <https://judge.softuni.bg/Contests/2758/Objects-and-Composition-Lab>.

## 1. City Record

You will receive a city's **name** (string), **population** (number), and **treasury** (number) as arguments, which you will need to set as **properties** of an **object** and **return** it.

### Examples

Input	Output
'Tortuga', 7000, 15000	{ name: 'Tortuga', population: 7000, treasury: 15000 }
'Santo Domingo', 12000, 23500	{ name: 'Santo Domingo', population: 12000, treasury: 23500 }

## 2. Town Population

You have been tasked to create a registry for different **towns** and their **population**.

### Input

The **input** comes as array of strings. Each element will contain data for a town and its population in the following format: "{townName} <-> {townPopulation}"

If you receive the same town twice, **you should add** the **given population** to the **current one**.

### Output

As **output**, you must print all the towns and their population.

### Examples

Input	Output
['Sofia <-> 1200000', 'Montana <-> 20000', 'New York <-> 10000000', 'Washington <-> 2345000', 'Las Vegas <-> 1000000']	Sofia : 1200000 Montana : 20000 New York : 10000000 Washington : 2345000 Las Vegas : 1000000
['Istanbul <-> 100000', 'Honk Kong <-> 2100004', 'Jerusalem <-> 2352344', 'Mexico City <-> 23401925', 'Istanbul <-> 1000']	Istanbul : 101000 Honk Kong : 2100004 Jerusalem : 2352344 Mexico City : 23401925

### 3. City Taxes

This task is an extension of Problem 1, you may use your solution from that task as a base.

You will receive a city's **name** (string), **population** (number), and **treasury** (number) as arguments, which you will need to set as **properties** of an **object** and **return** it. In addition to the input parameters, the object must have a property **taxRate** with an initial value of **10**, and three **methods** for managing the city:

- **collectTaxes()** - Increase **treasury** by **population \* taxRate**
- **applyGrowth(percentage)** - Increase population by **given percentage**
- **applyRecession(percentage)** - Decrease treasury by **given percentage**

Round down the values after each calculation.

#### Input

Your solution will receive three **valid** parameters. The methods that expect parameters will be tested with valid input.

#### Output

Return an **object** as described above. The methods of the object modify the object and don't return anything.

Input	Output
<pre>const city =   cityTaxes('Tortuga',     7000,     15000); console.log(city);</pre>	<pre>{   name: 'Tortuga',   population: 7000,   treasury: 15000,   taxRate: 10,   collectTaxes: [Function: collectTaxes],   applyGrowth: [Function: applyGrowth],   applyRecession: [Function: applyRecession] }</pre>
Testing with code	
Input	Output
<pre>const city =   cityTaxes('Tortuga',     7000,     15000); city.collectTaxes(); console.log(city.treasury); city.applyGrowth(5); console.log(city.population);</pre>	<pre>85000 7350</pre>

### 4. Object Factory

Create a function that can compose objects by copying functions from a given library of functions. You will receive **two parameters** – a **library** of functions as an associative array (object) and an **array of orders**, represented as objects. You must **return** a new array – the fulfilled orders.

The **first parameter** will be an object where each property is a **function**. You will use this **library of functions** to compose new objects.

The **second parameter** is an **array of orders**. Each order is an **object** with the following shape:

```
{
  template: [Object],
  parts: string[]
}
```

A **template** is an object that must be **copied**. The **parts array** contains the names of **required functions** as **strings**.

You must **create and return a new array**, by fulfilling all orders from the **orders array**. To fulfill an order, create a copy of the object's template and then add to it all functions, listed in the **parts array** of the order, by taking them from the **function library** (the first parameter to your solution).

## Input

You will receive two parameters:

- **library** – an object
- **orders** – an array of objects

## Output

Your solution must **return an array** of objects.

## Example

### Input

```
const library = {
  print: function () {
    console.log(`${this.name} is printing a page`);
  },
  scan: function () {
    console.log(`${this.name} is scanning a document`);
  },
  play: function (artist, track) {
    console.log(`${this.name} is playing '${track}' by ${artist}`);
  },
};

const orders = [
  {
    template: { name: 'ACME Printer' },
    parts: ['print']
  },
  {
    template: { name: 'Initech Scanner' },
    parts: ['scan']
  },
  {
    template: { name: 'ComTron Copier' },
    parts: ['scan', 'print']
  },
  {
    template: { name: 'BoomBox Stereo' },
    parts: ['play']
  }
];
```

```
const products = factory(library, orders);
console.log(products);
```

### Output

```
[
  {
    name: 'ACME Printer',
    print: [Function: print]
  },
  {
    name: 'Initech Scanner',
    scan: [Function: scan]
  },
  {
    name: 'ComTron Copier',
    scan: [Function: scan],
    print: [Function: print]
  },
  {
    name: 'BoomBox Stereo',
    play: [Function: play]
  }
]
```

## 5. Assembly Line

Create a function that **returns** a **library of decorator functions**. They can be used to **compose** different functionality in a **car object** that they receive as an argument.

Your solution must **return an object**, containing **three decorator functions**:

**hasClima** – compose air conditioning controls into the passed-in object. This function takes an **object as a parameter** and adds to it the following properties:

- **temp** – **number** with default value **21**;
- **tempSettings** – **number** with default value **21**;
- **adjustTemp** – **function** which takes **no arguments**. If **temp** is less than **tempSettings**, this function adds 1 to **temp**. If **temp** is more than **tempSettings**, it decreases **temp** by 1. If **temp** and **tempSettings** are equal, the function does nothing.

**hasAudio** – compose audio player functionality into the passed-in object. This function takes an **object as a parameter** and adds to it the following properties:

- **currentTrack** – **object** with properties **name** (string) and **artist** (string). The default value is **null**;
- **nowPlaying** – **function**, which **prints** on the console the text:  
`Now playing '\${currentTrack.name}' by \${currentTrack.artist}` , where **name** and **artist** are properties of the **currentTrack** object. If **currentTrack** is **null**, this function does nothing.

**hasParktronic** – compose parking aid functionality into the passed in object. This function takes an **object as a parameter** and adds to it the following properties:

- **checkDistance** – **function**, which takes a **single argument distance** (number) and **prints** a message on the console, depending on its value:

`distance < 0.1 – "Beep! Beep! Beep!"`

`0.1 <= distance < 0.25 – "Beep! Beep!"`

`0.25 <= distance < 0.5 – "Beep!"`

In any other case, print an **empty string**.

## Input

Your **solution** will receive **no arguments**. All the methods in the returned library must take an **object as an argument**. Any methods that you compose into this object must meet the input requirements listed in the description above.

## Output

Your **solution** must **return an object** containing the **three decorators** described above.

## Example

Setup	
<pre>const assemblyLine = createAssemblyLine();  const myCar = {   make: 'Toyota',   model: 'Avensis' };</pre>	
Input	Output
<pre>assemblyLine.hasClima(myCar); console.log(myCar.temp); myCar.tempSettings = 18; myCar.adjustTemp(); console.log(myCar.temp);</pre>	<pre>21 20</pre>
Input	Output
<pre>assemblyLine.hasAudio(myCar); myCar.currentTrack = {   name: 'Never Gonna Give You Up',   artist: 'Rick Astley' }; myCar.nowPlaying();</pre>	<pre>Now playing 'Never Gonna Give You Up' by Rick Astley</pre>
Input	Output
<pre>assemblyLine.hasParktronic(myCar); myCar.checkDistance(0.4); myCar.checkDistance(0.2);</pre>	<pre>Beep! Beep! Beep!</pre>
Input	Output
<pre>console.log(myCar);</pre>	<pre>{   make: 'Toyota',   model: 'Avensis',   temp: 20,   tempSettings: 18,   adjustTemp: [Function],   currentTrack: {     name: 'Never Gonna Give You Up',     artist: 'Rick Astley'   }, }</pre>

```
nowPlaying: [Function],
checkDistance: [Function]
}
```

## 6. From JSON to HTML Table

You're tasked with creating an HTML table of students and their scores. You will receive a single string representing an **array of objects**, the **table's headings** should be equal to the **object's keys**, while **each object's values** should be a **new entry** in the table. Any **text values** in an object should be **escaped**, to avoid introducing dangerous code into the HTML.

### Input

The **input** comes with a **single string argument** (the array of objects).

### Output

The **output** should be printed on the console – for each **entry row** in the input print the **object representing it**.

### Note:

Objects' **keys** will always be the **same**. Check more information for the **HTML Entity** [here](#).

### HTML

You are provided with an HTML file to test your table in the browser.

#### index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>FromJSONToHTMLTable</title>
  <style>
    table,th{
      border: groove;
      border-collapse: collapse;
    }
    td{
      border: 1px solid black;
    }
    td,th{
      padding: 5px;
    }
  </style>
</head>
<body>
  <div id="wrapper">
    <div>
      <script>
        function fromJSONToHTMLTable(input){
          //Write your code here
        }
        window.onload = function(){
          let container = document.getElementById('wrapper');
          container.innerHTML =
            fromJSONToHTMLTable([ ['{"Name": "Stamat", "Price": 5.5}, {"Name": "Rumen", "Price": 6}]]);
        };
      </script>
    </div>
  </div>
</body>
</html>
```

## Examples

Input	Output
<code>`[{"Name":"Stamat",   "Score":5.5},  {"Name":"Rumen",   "Score":6}]`</code>	<pre>&lt;table&gt;   &lt;tr&gt;&lt;th&gt;Name&lt;/th&gt;&lt;th&gt;Score&lt;/th&gt;&lt;/tr&gt;   &lt;tr&gt;&lt;td&gt;Stamat&lt;/td&gt;&lt;td&gt;5.5&lt;/td&gt;&lt;/tr&gt;   &lt;tr&gt;&lt;td&gt;Rumen&lt;/td&gt;&lt;td&gt;6&lt;/td&gt;&lt;/tr&gt; &lt;/table&gt;</pre>
<code>`[{"Name":"Pesho",   "Score":4,   "Grade":8},  {"Name":"Gosho",   "Score":5,   "Grade":8},  {"Name":"Angel",   "Score":5.50,   "Grade":10}]`</code>	<pre>&lt;table&gt;   &lt;tr&gt;&lt;th&gt;Name&lt;/th&gt;&lt;th&gt;Score&lt;/th&gt;&lt;th&gt;Grade&lt;/th&gt;&lt;/tr&gt;   &lt;tr&gt;&lt;td&gt;Pesho&lt;/td&gt;&lt;td&gt;4&lt;/td&gt;&lt;td&gt;8&lt;/td&gt;&lt;/tr&gt;   &lt;tr&gt;&lt;td&gt;Gosho&lt;/td&gt;&lt;td&gt;5&lt;/td&gt;&lt;td&gt;8&lt;/td&gt;&lt;/tr&gt;   &lt;tr&gt;&lt;td&gt;Angel&lt;/td&gt;&lt;td&gt;5.5&lt;/td&gt;&lt;td&gt;10&lt;/td&gt;&lt;/tr&gt; &lt;/table&gt;</pre>