Lab: Associative Arrays

1. Phone Book

Write a function that stores information about a **person's name** and his **phone number**. The input comes as an **array of strings**. Each string contains the name and the number. If you receive the same name **twice** just **replace** the number. At the end print the result **without sorting it**. Try using an **associative array.**

Example

Input	Output
['Tim 0834212554', 'Peter 0877547887', 'Bill 0896543112', 'Tim 0876566344']	Tim -> 0876566344 Peter -> 0877547887 Bill -> 0896543112

2. Storage

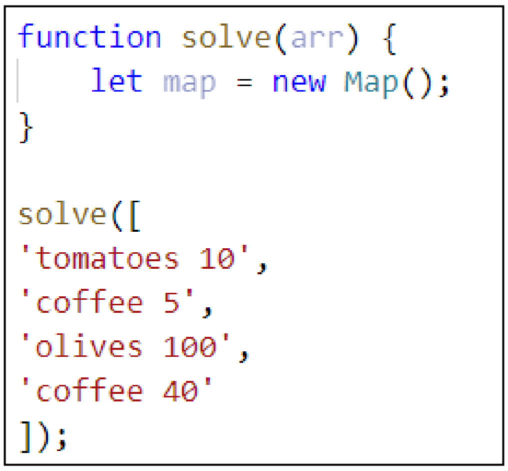
Write a function that takes a certain number of **items** and their **quantity**. If the same item appears **more than once**, **add the new amount** to the **existing one**. At the end print all the items and their amount without sorting them. The input comes as **array of strings**. Try using a **`Map()`**.

Example

Input	Output
['tomatoes 10', 'coffee 5', 'olives 100', 'coffee 40']	tomatoes -> 10 coffee -> 45 olives -> 100

Hints

Create the **`solve()`** function and create a new **`Map()`**:



```
function solve(arr) {
    let map = new Map();
}

solve([
'tomatoes 10',
'coffee 5',
'olives 100',
'coffee 40'
]);
```

Loop through the array, split into tokens and create variables for each one:

```
function solve(arr) {
    let map = new Map();

    for (let string of arr) {
        let tokens = string.split(' ');
        let product = tokens[0];
        let quantity = Number(tokens[1]);
    }
}
```

- This time for the quantity we need a number, because if we see the same product again, we must add the new quantity

Now let us make the checks for the keys in the map:

```
if (!map.has(product)) {
    map.set(product, +quantity);
} else {
    let currQuantity = map.get(product);
    let newQuantity = currQuantity += quantity;
    map.set(product, newQuantity);
}
```

- First, we check if the map does ***<u>NOT</u>*** have the product we are currently at and **if so**, we **set it to the given quantity**
- Otherwise, we get the **existing quantity**, we **add the new quantity** and **set** the product's quantity **to the new** one

Now we just have to print the result:

```
for (let kvp of map) {
        console.log(`${kvp[0]} -> ${kvp[1]}`);
}
```

- Each key-value pair is and **array of 2 elements** (the **key** and the **value**), so we use **for-of** loop and print the key and the value

3. School Grades

Write a function to store students with their grades. If a student appears more than once, add the new grades. At the end print the students sorted by average grade. The input comes as **array of strings**.

Example

Input	Output
['Lilly 4 6 6 5', 'Tim 5 6', 'Tammy 2 4 3', 'Tim 6 6']	Tammy: 2, 4, 3 Lilly: 4, 6, 6, 5 Tim: 5, 6, 6, 6

Hints

Create the function, pass in the array, **split** each element into tokens, **extract** the **name** and the **grades**:

```
    for(let string of arr){
        let tokens = string.split(" ");
        let name = tokens[0];
        let grades = tokens.splice(1, tokens.length)
.map(Number);
```

- The **grades** should be **numbers** (because we want to take the **average** later), so we map them to **`Number`**

Now check if the map does ***NOT*** have the name and if so, **set it to an empty array** and **push all the grades**. Otherwise just **push the grades**:

```
if(!map.has(name)){
    map.set(name, []);
    map.set(name, map.get(name).concat(grades));
}else{
    map.set(name,map.get(name).concat(grades));
}
```

- If we **don't have** the name, we need to **create it** and **concatenate [.`concat()`]** the empty array and the new one
- Otherwise, we just **`concat()`**them

Now we have to sort them by average grades:

```
let sorted = Array.from(map).sort((a, b) => average(a, b));
```

Of course, there is no such function average, so we need to create it.

```
function average(a, b){
    let aSum = 0;
    for(let i = 0; i < a[1].length; i++) {
        aSum += a[1][i];
    }
    let bSum = 0;
    for(let i = 0; i < b[1].length; i++) {
        bSum += b[1][i];
    }
```

- **a** and **b** are two key-value pairs of our map. The grades are the values.

- For us to calculate average we need to take the sum and divide it by the length of each array

```
let aAverage = aSum / a[1].length;
let bAverage = bSum / b[1].length;
```

Finally, we return **aAverage** – **bAverage**:

```
let aAverage = aSum / a[1].length;
let bAverage = bSum / b[1].length;
return aAverage - bAverage;
```

We sorted the map, now loop through the keys and values and print them in the format from the example.

4. Word Occurrences

Write a function that **counts** the times each **word occurs** in a text. Print the words **sorted by count** in **descending** order. The input comes as an **array of strings**.

Example

Input	Output
["Here", "is", "the", "first", "sentence", "Here", "is", "another", "sentence", "And", "finally", "the", "third", "sentence"]	sentence -> 3 times Here -> 2 times is -> 2 times the -> 2 times first -> 1 times another -> 1 times And -> 1 times finally -> 1 times third -> 1 times

Hint

- Create a map
- Loop through the elements of the array of words
- Update the map
- Sort the map by value in descending:

```
let sorted = Array.from(map).sort((a, b) => b[1] - a[1]);
```

- Finally, print the result in format as the example above

5. Neighborhoods

Write a function that receives **list of neighborhoods** and then some **people**, who are going to live in it. The **input** will come as **array of strings**. The **first element** will be the list of neighborhoods **separated** by **", "**. The rest of the elements will be a neighborhood followed by a **name** of a person in the format `"{neighborhood} - {person}"`. **Add** the person to the neighborhood **only** if the neighborhood is in the **list** of neighborhoods. At the end print the neighborhoods **sorted** by the count of inhabitants in descending order. Print them in the following format:

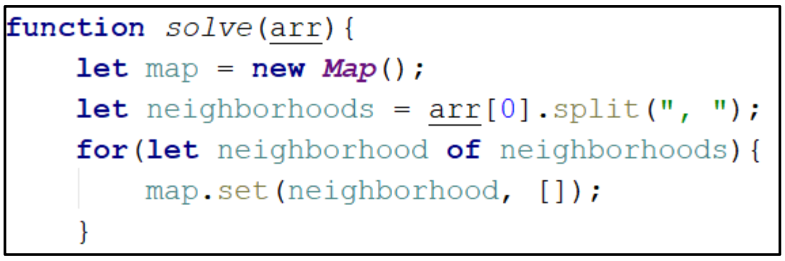
```
"{neighborhood}: {inhabitants count}
--{1st inhabitant}
--{2nd inhabitant}
…"
```

Example

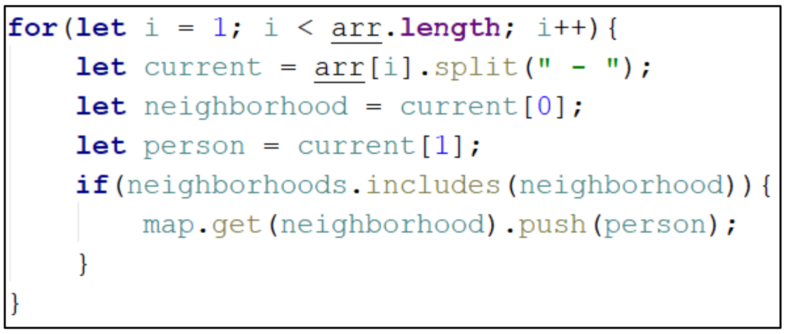
Input	Output
['Abbey Street, Herald Street, Bright Mews', 'Bright Mews - Garry', 'Bright Mews - Andrea', 'Invalid Street - Tommy', 'Abbey Street - Billy']	Bright Mews: 2 --Garry --Andrea Abbey Street: 1 --Billy Herald Street: 0

Hints

- **Save** the first element of the array as the neighborhoods
- **Fill** the map with them and set their values as empty arrays
- **Loop** through the rest of the elements
- **Check** if the neighborhood is in the list/map and add the person
- **Sort** them by count of inhabitants
- **Print**



```
function solve(arr){
    let map = new Map();
    let neighborhoods = arr[0].split(", ");
    for(let neighborhood of neighborhoods){
        map.set(neighborhood, []);
    }
```



```
for(let i = 1; i < arr.length; i++){
    let current = arr[i].split(" - ");
    let neighborhood = current[0];
    let person = current[1];
    if(neighborhoods.includes(neighborhood)){
        map.get(neighborhood).push(person);
    }
}
```

```
let sorted = Array.from(map).sort((a, b) => { /* TODO */ });

for (let kvp of sorted) {
    //TODO
}
```

- ***NOTE:*** The count of the people is the length of the second element in both **a** and **b.** To sort in descending, just **subtract** the length of **a** inhabitance from the length of the **b** inhabitants.