**Lab 5. JavaScript Fundamentals. Advanced Arrays, objects, loops and functions. Attach your code solution after every task.**

**Task 1. Advanced Arrays.**

Kairat is still building his tip calculator, using the same rules as before: Tip 15% of the bill if the bill value is between 50 and 300, and if the value is different, the tip is 20%.

### Your tasks:

1. Write a function 'calcTip' that takes any bill value as an input and returns the corresponding tip, calculated based on the rules above (you can check out the code from first tip calculator challenge if you need to). Use the function type you like the most. Test the function using a bill value of 100
2. And now let's use arrays! So, create an array 'bills' containing the test data below
3. Create an array 'tips' containing the tip value for each bill, calculated from the function you created before
4. **Bonus**: Create an array 'total' containing the total values, so the bill + tip

**Test data:** 125, 555 and 44

function calcTip(money) {

    let tip = (money >= 50 && money <= 300) ? (money \* 15 / 100) : (money \* 20 / 100);

    return tip;

}

console.log(calcTip(300));

console.log(calcTip(301));

let bill = [125, 555, 44];

let tips = new Array();

let total = new Array();

for(let i = 0; i < bill.length; i++){

    tips.push(calcTip(bill[i]));

    total.push(bill[i] + tips[i]);

}

console.log(tips)

console.log(total)

**Task 2. Advanced Object Methods**

Let's go back to Arman and Kuat comparing their BMIs! This time let's use objects to implement the calculations! Remember: BMI = mass / height \*\* 2 = mass

/ (height \* height) (mass in kg and height in meter)

### Your tasks:

1. For each of them, create an object with properties for their full name, mass, and height (Arman Halykov and Kuat Mamyrkhanuly)
2. Create a 'calcBMI' method on each object to calculate the BMI (the same method on both objects). Store the BMI value to a property, and also return it from the method
3. Log to the console who has the higher BMI, together with the full name and the respective BMI. Example: *"* Arman’s *BMI (28.3) is higher than Kuat’s (23.9)!"*

**Test data:** Arman’s weights 78 kg and is 1.69 m tall. Kuat weights 92 kg and is 1.95 m tall.

let ArmanHalykov = {

    name: 'Arman Halykov',

    mass: 78,

    height: 1.69,

    calcBMI(){

        this.bmi = this.mass/(this.heigh \* this.heigh);

        return this.bmi;

    }

}

let KuatMamyrkhanuly = {

    name: 'Kuat Mamyrkhanuly',

    mass: 92,

    height: 1.95,

    calcBMI(){

        this.bmi = this.mass/(this.heigh \* this.heigh);

        return this.bmi;

    }

}

console.log(ArmanHalykov.calcBMI > KuatMamyrkhanuly.calcBMI ? `Arman's BMI

${ArmanHalykov.calcBMI} is higher than Kuat's ${KuatMamyrkhanuly.calcBMI}` : `Kuat's

${KuatMamyrkhanuly.calcBMI} is higher than  Arman's ${ArmanHalykov.calcBMI}`);

**Task 3.** **Advanced Loops and array**

Let's improve Kairat's tip calculator even more, this time using loops!

### Your tasks:

1. Create an array 'bills' containing all 10 test bill values
2. Create empty arrays for the tips and the totals ('tips' and 'totals')
3. Use the 'calcTip' function we wrote before (no need to repeat) to calculate tips and total values (bill + tip) for every bill value in the bills array. Use a for loop to perform the 10 calculations!

**Test data:** 22, 295, 176, 440, 37, 105, 10, 1100, 86 and 52

**Hints:** Call ‘calcTip ‘ in the loop and use the push method to add values to the tips and totals arrays

### Bonus:

1. **Bonus:** Write a function 'calcAverage' which takes an array called 'arr' as an argument. This function calculates the average of all numbers in the given array. This is a **difficult** challenge (we haven't done this before)! Here is how to solve it:
   1. First, you will need to add up all values in the array. To do the addition, start by creating a variable 'sum' that starts at 0. Then loop over the array using a for loop. In each iteration, add the current value to the 'sum' variable. This way, by the end of the loop, you have all values added together
   2. To calculate the average, divide the sum you calculated before by the

length of the array (because that's the number of elements)

* 1. Call the function with the 'totals' array

let bills = [22, 295, 176, 440, 37, 105, 10, 1100, 86, 52];

let tips = new Array();

let total = new Array();

for(let i = 0; i < bills.length; i++){

    tips.push(calcTip(bills[i]));

    total.push(bills[i] + tips[i]);

}

console.log(bills);

console.log(tips);

console.log(total);

**Task 4. Advanced Functions**

Let's build a simple poll app!

A poll has a question, an array of options from which people can choose, and an array with the number of replies for each option. This data is stored in the starter 'poll' object below.

### Your tasks:

1. Create a method called 'registerNewAnswer' on the 'poll' object. The method does 2 things:
   1. Display a prompt window for the user to input the number of the selected option. The prompt should look like this:

*What is your favourite programming language? 0: JavaScript*

*1: Python*

*2: Rust*

*3: C++*

*(Write option number)*

* 1. Based on the input number, update the 'answers' array property. For example, if the option is 3, increase the value **at position** 3 of the array by

1. Make sure to check if the input is a number and if the number makes sense (e.g. answer 52 wouldn't make sense, right?)
2. Call this method whenever the user clicks the *"Answer poll"* button.
3. Create a method 'displayResults' which displays the poll results. The method takes a string as an input (called 'type'), which can be either *'string'* or *'array'*. If type is *'array'*, simply display the results array as it is, using console.log(). This should be the default option. If type is *'string'*, display a string like *"Poll results are 13, 2, 4, 1".*
4. Run the 'displayResults' method at the end of each

'registerNewAnswer' method call.

1. **Bonus:** Use the 'displayResults' method to display the 2 arrays in the test data. Use both the *'array'* and the *'string'* option. Do **not** put the arrays in the poll object! So what should the this keyword look like in this situation?

**Test data for bonus:**

* Data 1: [5, 2, 3]
* Data 2: [1, 5, 3, 9, 6, 1]

**Hints:** Use tools and materials from all previous lectures. You can use join, querySelector, addEventListener functions (methods).

*const* poll = {

question: "What is your favourite programming language?", options: ["0: JavaScript", "1: Python", "2: Rust", "3: C++"],

*// This generates [0, 0, 0, 0]. More in the next section!*

answers: new Array(4).fill(0),

};

const poll = {

    question: "What is your favourite programming language?",

    options: ["0: JavaScript", "1: Python", "2: Rust", "3: C++"],

    // This generates [0, 0, 0, 0]. More in the next section!

    answers: new Array(4).fill(0),

    displayResults(type = 'array') {

    if(type === 'array') {

    console.log(this.answers);

    } else if(type === 'string') {

    console.log(`Poll results are ${this.answers.join(', ')}`);

    }

    },

    registerNewAnswer() {

    const answer = Number(prompt(`${this.question}

    ${this.options.join('\n')}

    (Write option number)`));

    console.log(answer);

    typeof answer === 'number' && answer < this.answers.length && this.answers[answer] += 1;

    }

    }

    poll.registerNewAnswer();

    poll.displayResults();

    poll.displayResults.call({answers: [5, 2, 3]}, 'string');

    poll.displayResults.call({answers: [1, 5, 3, 9, 6, 1]}, 'string');

**Task 5. Advanced Array Methods**

Aliya and Saule are doing a study on dogs. So each of them asked 5 dog owners about their dog's age, and stored the data into an array (one array for each). For now, they are just interested in knowing whether a dog is an adult or a puppy.

A dog is an adult if it is at least 3 years old, and it's a puppy if it's less than 3 years old.

### Your tasks:

Create a function 'checkDogs', which accepts 2 arrays of dog's ages ('dogsAliya' and 'dogsSaule'), and does the following things:

1. Aliya found out that the owners of the **first** and the **last two** dogs actually have cats, not dogs! So create a shallow copy of Aliya's array, and remove the cat ages from that copied array (because it's a bad practice to mutate function parameters)
2. Create an array with both Aliya's (corrected) and Saule's data
3. For each remaining dog, log to the console whether it's an adult (*"Dog number 1*

*is an adult, and is 5 years old"*) or a puppy (*"Dog number 2 is still a puppy "*)

1. Run the function for both test datasets

### Test data:

* Data 1: Aliya's data [3, 5, 2, 12, 7], Saule's data [4, 1, 15, 8, 3]
* Data 2: Aliya's data [9, 16, 6, 8, 3], Saule's data [10, 5, 6, 1, 4]

let checkDogs = (dogsAliya, dogsSaule) => {

    let copyDogsAliya = dogsAliya.splice(1,2);

    let dogs = dogsSaule.concat(copyDogsAliya);

    for(let i = 0; i < dogs.length; i++){

        if(dogs[i]>=3){

            console.log(`Dog number ${i} is an adult, and is ${dogs[i]} years old`);

        } else{

            console.log(`Dog number ${i} is still a puppy`);

        }

    }

}

let dogsAliya1 = [3,5,2,12,7];

let dogsSaule1 = [4,1,15,8,3];

let dogsAliya2 = [9,16,6,8,3];

let dogsSaule2 = [10,5,6,1,4];

checkDogs(dogsAliya1, dogsSaule1);

checkDogs(dogsAliya2, dogsSaule2);