JavaScript

Exercises

MVT21

JavaScript

Goals

- Get familiar with modern JavaScript
- Be able to debug code using a debugger
- Be able to set up and implement unit tests using JEST
- Learn to set up a backend system using Node.js
- Get familiar with SQL and how to setup a database

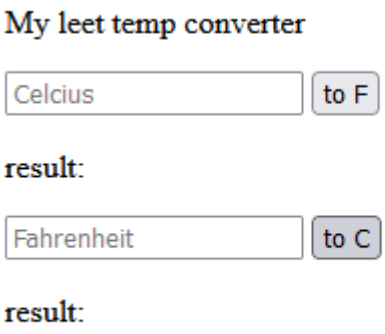
Jonathan Sönnerup
2021–12–09

Contents

Chapter 1

Front-end JavaScript

1.1 Your friend from abroad comes to visit, and she does not understand how to read a temperature scale in Celsius. Albeit being a novice programmer, you have the skills to implement a simple website converting Fahrenheit to Celsius, and vice versa. An example of this awesome project is shown below.



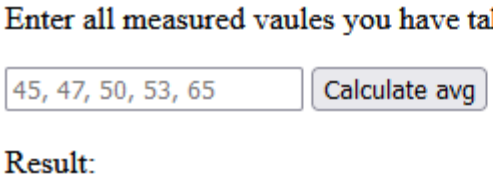
If you don't remember the formula for conversion, we give it here

$$T_C = \frac{T_F - 32}{1.8}$$

$$T_F = T_C \times 1.8 + 32$$

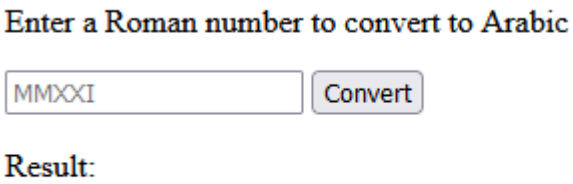
where T_C is the temperature in Celsius, and T_F is the temperature in Fahrenheit.

1.2 In a school project, you are to measure the temperature in your computer during the day, and calculate the average. You want to be able to input all values separated with a comma in a text field directly (not one at a time). Example below.



Hint: Check out the `split()` function for strings, `https://www.w3schools.com/jsref/jsref_split.asp`

1.3 Your dusty friend Pythagoras comes to visit during his trip around Europe. Being a somewhat "old school" mathematician, he is not familiar with the modern number system. You decide to make it easier for him to order a cheese burger in a drive-through by programming a Roman → Arabic converter (you do know that we are using Arabic numbers usually?). Example below.



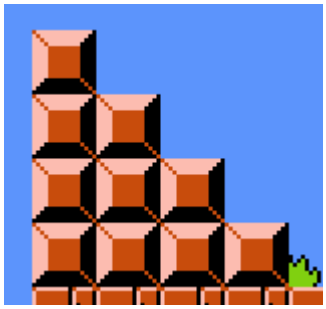
Note that this is quite a tricky challenge. To make it easier for you, only handle Roman numbers where you go from a larger number to a smaller, e.g., `XVI`, and not e.g., `XIV` as this is much harder.

Hint: You can of course create a bunch of if statements to convert all values, but try to use a map instead, example:

```
let roman = {"M": 1000, "D": 500, ...};
console.log(roman["D"]); // will print 500
// we can also do:
console.log(roman.D);
```

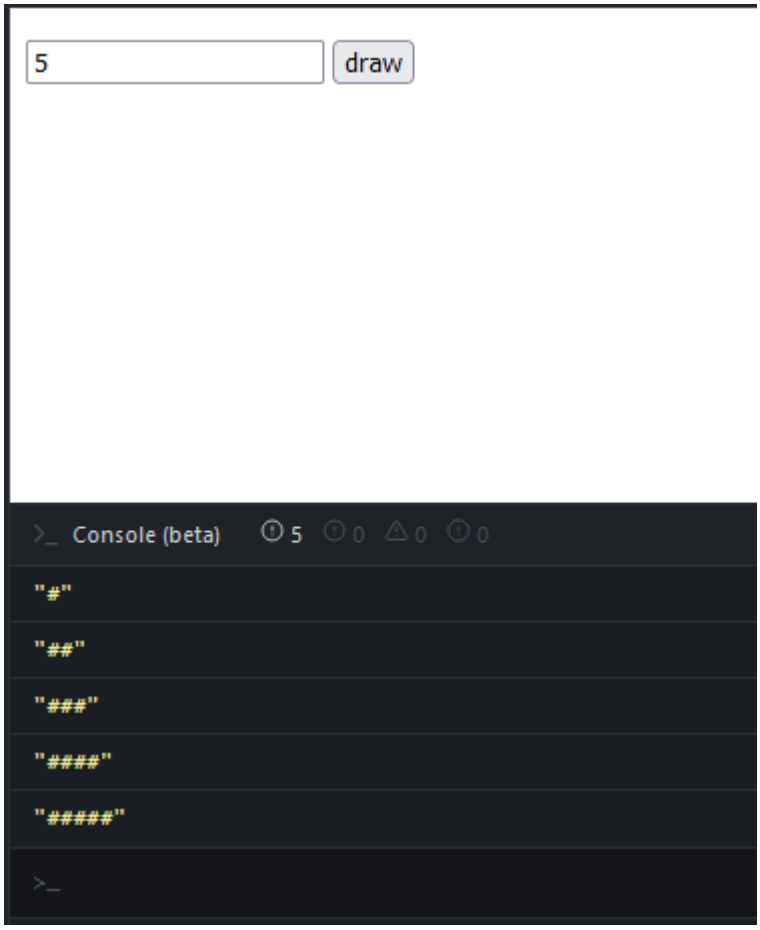
Listing 1.1: Example of using maps.

1.4 You are a fed up with all these modern games like Fartnite, Battleshit 2042, and Cyberprank. Since you have been taking a programming course, you decide to bring the old favourite, Super Mario Bros, back into life. You feel like designing the levels is a good place to start. The first objective is to implement the infamous obstacle, the stair.

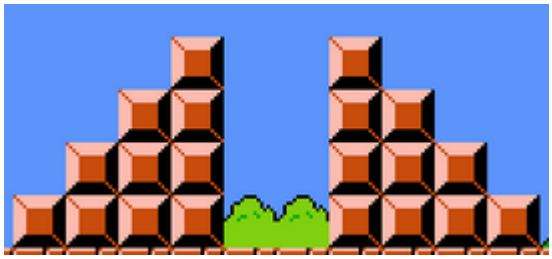


Although it is possible to work with images in JavaScript, you use hashtag "#" as a block instead. Create a simple web page where you can enter the height of the stair, and print the result in the console. Example below.

Note that you have to use nested loops to solve this. `https://sebhastian.com/nested-loops-javascript/`

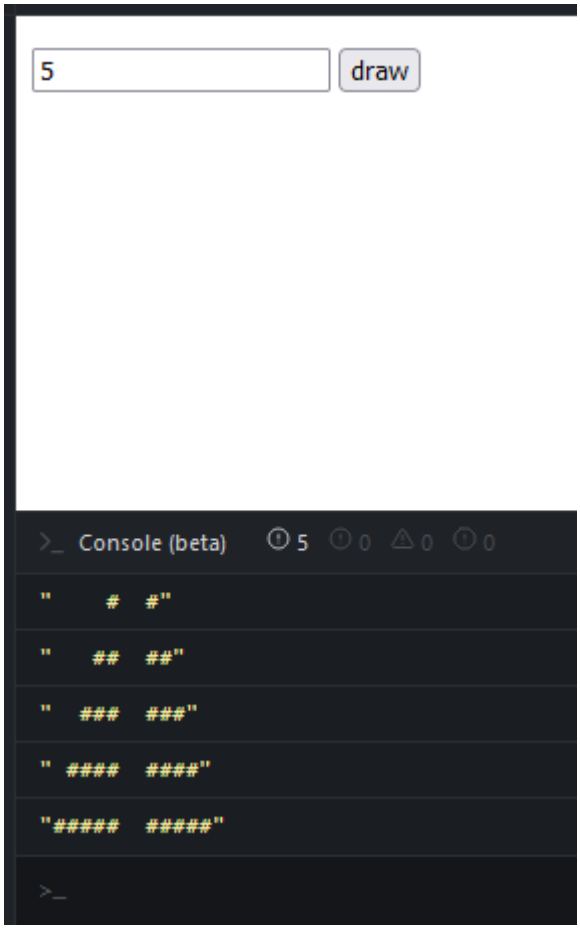


1.5 One stair is cool and all, but what is even cooler is the double stair.



This is similar to the previous exercise, but includes the double stair.

Hint: figure out how many spaces you need before the first "#" for the left stair. The right stair is the same code as the previous exercise.



Chapter 2

Unit Tests