Day 9: Binary Calculator

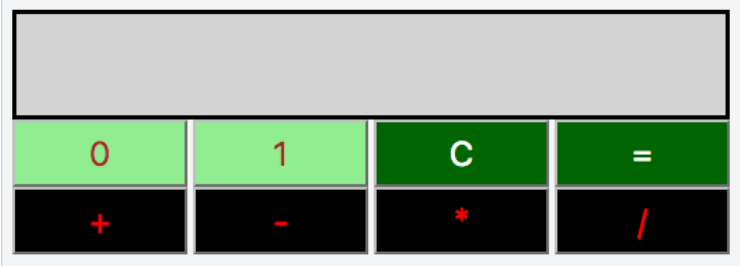
Objective

In this challenge, we implement a calculator that uses binary numbers. Check out the attached tutorial for learning materials.

Task

Implement a simple calculator that performs the following operations on *binary numbers*: addition, subtraction, multiplication, and division. Note that division operation must be *integer division* only; for example, $1001/100 = 10$, $1110/101 = 10$, and $101/1 = 101$.

The calculator's initial state must look like this:



- *Element IDs. Each element in the document must have an* `id`*, specified below:*

innerHTML	id	Description/Behavior
	res	Contains the result of button presses.
	btns	A button container that displays all eight calculator buttons.
0	btn0	A button expressing binary digit $\mathbf{0}$.
1	btn1	A button expressing binary digit $\mathbf{1}$.
C	btnClr	A button to clear the contents of $\boldsymbol{res}$.
=	btnEql	A button to evaluate the contents of the expression in $\boldsymbol{res}$.
+	btnSum	A button for the addition operation.
-	btnSub	A button for the subtraction operation.
*	btnMul	A button for the multiplication operation.
/	btnDiv	A button for the integer division operation.

- *Styling.* The document's elements must have the following styles:
  - `res` has a `background-color` of `lightgray`, a `border` that is `solid`, a `width` of `81%`, a `height` of `48px`, and a `font-size` of `20px`.
  - `btns` has a `width` of `90%`.
  - `btn0` and `btn1` have a `background-color` of `lightgreen` and a `text-color` of `brown`.
  - `btnClr` and `btnEql` have a `background-color` of `darkgreen` and a `text-color` of `white`.
  - `btnSum`, `btnSub`, `btnMul`, and `btnDiv` have a `background-color` of `black`, a `text-color` of `red`.
  - All the buttons in `btns` have a `width` of `22%`, a `height` of `36px`, and a `font-size` of `18px`.

The `.js` and `.css` files are in different directories, so use the *link* tag to provide the CSS file path and the *script* tag to provide the JS file path:

```
<!DOCTYPE html>
<html>
  <head>
    <link rel="stylesheet" href="css/binaryCalculator.css" type="text/css">
  </head>
```

```
    <body>
     <script src="js/binaryCalculator.js" type="text/javascript"></script>
    </body>
</html>
```

Constraints

- All expressions in the test dataset are entered in the form $operand1 \rightarrow operator \rightarrow operand2$, where $operand1$ is the first binary number, $operand2$ is the second binary number, and $operator$ is in the set $\{+, -, *, =\}$.
- Both operands will always be positive integers when converted from base-2 to base-10.
- All expressions will be valid.

Explanation

Consider the following sequence of button clicks:

$$1 \rightarrow 1 \rightarrow 0 \rightarrow 1 \rightarrow 1 \rightarrow + \rightarrow 1 \rightarrow 0 \rightarrow 0 \rightarrow 0 \rightarrow =$$

Before pressing the $=$ button, the result *div* looks like this:

After pressing the $=$ button to evaluate our expression, the result *div* looks like this:

Notice that $(11011)_2 = (27)_{10}$, $(1000)_2 = (8)_{10}$, and $(100011)_2 = (35)_{10}$, so our calculator evaluated the expression correctly.

Now, let's consider our next sequence of button clicks as:

$$0 \rightarrow 1 \rightarrow * \rightarrow 1 \rightarrow 1 \rightarrow 1 \rightarrow =$$

Before pressing the $=$ button, the result *div* looks like this:

After pressing the $=$ button to evaluate our expression, the result *div* looks like this:

Consider the next sequence of button clicks as:

$$C \rightarrow 1 \rightarrow 1$$

The result *div* looks like this: