# Lab: Strings and Regular Expressions

Problems for in-class lab for the [“JavaScript Fundamentals” course @ SoftUni](https://softuni.bg/courses/javascript-fundamentals). Submit your solutions in the SoftUni judge system at <https://judge.softuni.bg/Contests/312>.

## Print Letters

Write a JS function that prints all the symbols of a string, each on a new line.

The **input** comes as array of one string element.

The **output** is printed on the console, each letter on a new line.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| ['Hello, World!'] | str[0] -> H  str[1] -> e  str[2] -> l  str[3] -> l  str[4] -> o  str[5] -> ,  str[6] ->  str[7] -> W  str[8] -> o  str[9] -> r  str[10] -> l  str[11] -> d  str[12] -> ! |
| ['SoftUni'] | str[0] -> S  str[1] -> o  str[2] -> f  str[3] -> t  str[4] -> U  str[5] -> n  str[6] -> i |

## Concatenate Reversed

Write a JS function that reverses a series of strings and prints them concatenated from last to first.

The **input** comes as array of strings.

The **output** is printed on the console. Print all strings concatenated on a single line, starting from the last input string, going to the first. Reverse each individual string’s letters.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| ['I', 'am', 'student'] | tnedutsmaI |
| ['race', 'car'] | racecar |

## Count Occurrences

Write a JS function that counts how many times a string occurs in a given text. Overlapping strings are allowed.

The **input** comes as array of two strings. The first element is the target string and the second element is the text, in which to search for occurrences.

The **output** should be a number, printed on the console.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| ['the', 'The quick brown fox jumps over the lay dog.'] | 1 |
| ['ma', 'Marine mammal training is the training and caring for marine life such as, dolphins, killer whales, sea lions, walruses, and other marine mammals. It is also a duty of the trainer to do mental and physical exercises to keep the animal healthy and happy.'] | 7 |

## Extract Text

You will be given a text as a string. Write a JS function that extracts and prints only the text that’s surrounded by parentheses.

The **input** comes as array of a single string element.

The **output** is printed on the console on a single line, in the form of a comma-separated list.

### Examples

|  |
| --- |
| **Input** |
| ['Rakiya (Bulgarian brandy) is self-made liquor (alcoholic drink)'] |
| **Output** |
| Bulgarian brandy, alcoholic drink |

## Aggregate Table

You will be given a list of towns and incomes for each town, formatted in a table, separated by pipes (|). Write a JS function that extracts the names of all towns and produces a sum of the incomes. Note that splitting may result in empty string elements and the number of spaces may be different in every table.

The **input** comes as array of string elements. Each element is one row in a formatted table.

The **output** is printed on the console on two lines. On the first line, print a comma-separated list of all towns and on the second, the sum of all incomes.

### Examples

|  |
| --- |
| **Input** |
| ['| Sofia | 300',  '| Veliko Tarnovo | 500',  '| Yambol | 275'] |
| **Output** |
| Sofia, Veliko Tarnovo, Yambol  1075 |

## Restaurant Bill

You are tasked to write a JS function that receives an array of purchases and their prices and prints all your purchases and their total sum.

The **input** comes as an array of string elements – the elements on even indexes (0, 2, 4…) are the product names, while the elements on odd indexes (1, 3, 5…) are the corresponding prices.

The **output** should be printed on the console - a single sentence containing all products and their total sum in the format “**You purchased {all products separated by comma + space} for a total sum of {total sum of products}**”.

### Examples

|  |
| --- |
| **Input** |
| ['Beer Zagorka', '2.65', 'Tripe soup', '7.80','Lasagna', '5.69'] |
| **Output** |
| You purchased Beer Zagorka, Tripe soup, Lasagna for a total sum of 16.14 |

|  |
| --- |
| **Input** |
| ['Cola', '1.35', 'Pancakes', '2.88'] |
| **Output** |
| You purchased Cola, Pancakes for a total sum of 4.23 |

## Usernames

Write a JS function that parses a list of emails and returns a list of usernames, generated from them. Each username is composed from the name of the email address, a period and the first letter of every element in the domain name. See the examples for more information.

The **input** comes as array of string elements. Each element is an email address.

The **output** is printed on the console on a single line as a comma-formatted list.

### Examples

|  |
| --- |
| **Input** |
| ['peshoo@gmail.com', 'todor\_43@mail.dir.bg', 'foo@bar.com'] |
| **Output** |
| peshoo.gc, todor\_43.mdb, foo.bc |

## Censorship

The thought police are at it again and they need your help! Write a JS function that would **censor news articles**. You will be given a text and then a list of strings that need to be blacked out from the text. Replace all occurrences of the strings with dashes of the same length as the string. The strings will **not overlap**, so order of processing is not important. See the examples for more information.

The **input** comes as array of string elements. The first element is the text to be censored and all following elements are the strings to be censored.

The **output** is the return value of your functions. Save the censored results in a string and return it.

### Examples

|  |
| --- |
| **Input** |
| ['roses are red, violets are blue', '**, violets are**', '**red**'] |
| **Output** |
| roses are ---------------- blue |

|  |
| --- |
| **Input** |
| ['David Ruben Piqtoukun (born 1950) is an Inuit artist from Paulatuk, Northwest Territories. His output includes sculpture and prints; the sculptural work is innovative in its use of mixed media. His materials and imagery bring together modern and traditional Inuit stylistic elements in a personal vision. An example of this is his work "The Passage of Time" (1999), which portrays a shaman in the form of a salmon moving through a hole in a hand. While shamanic imagery is common in much of Inuit art, the hand in this work is sheet metal, not a traditional material such as walrus ivory, caribou antler or soapstone. Ruben\'s brother, Abraham Apakark Anghik Ruben, is also a sculptor. Fellow Inuit artist Floyd Kuptana learned sculpting techniques as an apprentice to David Ruben.', '**Inuit**'] |
| **Output** |
| David Ruben Piqtoukun (born 1950) is an ----- artist from Paulatuk, Northwest Territories. His output includes sculpture and prints; the sculptural work is innovative in its use of mixed media. His materials and imagery bring together modern and traditional ----- stylistic elements in a personal vision. An example of this is his work "The Passage of Time" (1999), which portrays a shaman in the form of a salmon moving through a hole in a hand. While shamanic imagery is common in much of ----- art, the hand in this work is sheet metal, not a traditional material such as walrus ivory, caribou antler or soapstone. Ruben's brother, Abraham Apakark Anghik Ruben, is also a sculptor. Fellow ----- artist Floyd Kuptana learned sculpting techniques as an apprentice to David Ruben. |

## Escaping

You will be given a list of strings, containing user-submitted data. Write a JS function that prints an HTML list from the data. The strings, however, may contain special HTML characters, which is an oft-used method for injection attacks. To prevent unwanted behavior or harmful content, all special characters need to be replaced with their encoded counterparts – they will look the same to the user, but will not pose a security risk. Use the following table to compose your function:

|  |  |
| --- | --- |
| **Raw** | **Encoded** |
| < | &lt; |
| > | &gt; |
| & | &amp; |
| " | &quot; |

Use the provided HTML template to visually test your code – if you don’t escape the control characters, formatted HTML will show up. Don’t care how the HTML template works. Your job is to write the JS escaping function only.

The **input** comes as array of string elements.

The **output** is the return value of your function. Compose the list in a string and return it. See the examples for formatting details.

|  |
| --- |
| **HTML** |
| <!DOCTYPE **html**> <**html lang="en"**> <**head**>  <**meta charset="UTF-8"**>  <**title**>Escaping</**title**> </**head**> <**body**> <**div**><**label for="userInput"**>Paste test input here:</**label**></**div**> <**div**> <**textarea rows="12" cols="40" id="userInput"**></**textarea**> <**input type="button" value="Escape"  onclick="document**.getElementById(**'result'**).**innerHTML** = *escape*(**JSON**.parse(**document**.getElementById(**'userInput'**).**value**.replace(/'/g, String.fromCharCode(34))));**"**/> </**div**> <**div**><**label for="result"**>Results will show up here:</**label**></**div**> <**div id="result"**></**div**> <**script**>  **function** *escape*(input) {  *//* ***TODO*** } </**script**> </**body**> </**html**> |

### Examples

|  |
| --- |
| **Input** |
| ['<b>unescaped text</b>', 'normal text'] |
| **Output** |
| <ul>  <li>&lt;b&gt;unescaped text&lt;/b&gt;</li>  <li>normal text</li>  </ul> |

|  |
| --- |
| **Input** |
| ['<div style=\"color: red;\">Hello, Red!</div>', '<table><tr><td>Cell 1</td><td>Cell 2</td><tr>'] |
| **Output** |
| <ul>  <li>&lt;div style=\&quot;color: red;\&quot;&gt;Hello, Red!&lt;/div&gt;</li>  <li>&lt;table&gt;&lt;tr&gt;&lt;td&gt;Cell 1&lt;/td&gt;&lt;td&gt;Cell 2&lt;/td&gt;&lt;tr&gt;</li>  </ul> |

## Regular Expressions!

## Match All Words

Write a JS function that matches all words in a text, a word is anything that consists of letters, numbers or underscores (\_).

The **input** comes as an array of string consisting of a single entry - the text from which to extract the words.

The **output** should be printed on the console and should consist of all words concatenated with a **“|“**(pipe), check the examples bellow to better understand the format.

### Examples

|  |
| --- |
| **Input** |
| ['A Regular Expression needs to have the global flag in order to match all occurrences in the text'] |
| **Output** |
| A|Regular|Expression|needs|to|have|the|global|flag|in|order|to|match|all|occurrences|in|the|text |
| **Input** |
| ['\_(Underscores) are also word characters'] |
| **Output** |
| \_|Underscores|are|also|word|characters |

### Hints

* Read about the special characters in Regular Expressions at MDN to find some that can ease your task <https://developer.mozilla.org/en-US/docs/Web/JavaScript/Guide/Regular_Expressions>

## Simple Email Validation

Write a JS function that validates simple emails. The emails should have a **username**, which consists only of **English alphabet letters** and **digits**, **a “@” sign**, and a domain name after it. The domain should consist **only of** **2 strings** **separated** by a **single dot**. The 2 strings should contain **NOTHING** but **lowercase English alphabet letters**.

The **input** comes as an array of strings. The array will hold one element which is an email.

The **output** should be printed on the console. If the given email is valid, print “Valid”, if it is not, print “Invalid”.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| valid@email.bg | Valid |
| invalid@emai1.bg | Invalid |

## \*Expression Split

Write a JS function that splits a passed in JS code into separate parts. The passed in code will always have one or more spaces between operators and operands. Normal brackets (**‘(‘**,**’)’**), commas (**,**), semicolons (**;**) and the member access operator (**‘.’(dot)**, as in “console**.**log”) should also be used for splitting. String literals will always be initialized with double quotes (") and will **contain only letters**. Make sure there are no empty entries in the output.

The **input** comes as array of one string element - the JS code that has to be split.

The **output** should be printed on the console, with each elements obtained from the split is printed on a new line.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| ['let sum = 4 \* 4,b = "wow";'] | let  sum  =  4  \*  4  let  b  =  "wow" |
| ['let sum = 1 + 2;if(sum > 2){\tconsole.log(sum);}'] | let  sum  =  1  +  2  if  sum  >  2  {  console  log  sum  } |

## Match the Dates

Write a JS function that finds and extracts all the dates in the given sentences. The dates should be in format   
**dd-MMM-yyyy**. **Example: 12-Jun-1999**.

The **input** comes as an array of strings. Each string represents a sentence.

The **output** should be printed on the console. The output should consist of all extracted **VALID** dates. Each element should be printed on a new line.

### Examples

|  |
| --- |
| **Input** |
| I am born on 30-Dec-1994. My father is born on the 29-Jul-1955. |
| **Output** |
| 30-Dec-1994 (Day: 30, Month: Dec, Year: 1994)  29-Jul-1955 (Day: 29, Month: Jul, Year: 1955) |

|  |
| --- |
| **Input** |
| 01-Jan-1999 is a valid date. So is 01-July-2000. I am an awful liar, by the way – Ivo, 28-Sep-2016. |
| **Output** |
| 1-Jan-1999 (Day: 1, Month: Jan, Year: 1999)  28-Sep-2016 (Day: 28, Month: Sep, Year: 2016) |

## Parse the Employee Data

Write a JS function that **validates employee data**, and stores it **if it is** **valid**. The employee data consists of 3 elements – **Employee Name**, **Employee Salary** and **Employee Position**.

The **input** comes as an array of strings. Each element represents input employee data. You should capture only the valid from them. The input will have the following format:

{employeeName} - {employeeSalary} - {employeePosition}

The **Employee name** will be a **string**, which can contain only **English Alphabet Letters** and must **start with a capital**. The **Employee salary** should be a **VALID** **number**. The **Employee Position** can contain **English Alphabet letters**, **digits, dashes**, **and can consist of several words**. Any input that **does NOT follow** the specified above rules, is to be treated as **invalid,** and is to **be ignored**.

The **output** should be printed on the console. For every **valid Employee data** found, you should print each of its elements. Check the examples.

### Examples

|  |
| --- |
| **Input** |
| Isacc - 1000 - CEO  Ivan - 500 - Employee  Peter - 500 - Employee |
| **Output** |
| Name: Isacc  Position: CEO  Salary: 1000  Name: Ivan  Position: Employee  Salary: 500  Name: Peter  Position: Employee  Salary: 500 |

|  |
| --- |
| **Input** |
| Jonathan - 2000 - Manager  Peter- 1000- Chuck  George - 1000 - Team Leader |
| **Output** |
| Name: Jonathan  Position: Manager  Salary: 2000  Name: George  Position: Team Leader  Salary: 1000 |

### Hints

* Use **Groups** for this problem, it would be a lot easier.

## Form Filler

Write a JS function that automatically fills a form for a lazy client. The client will give you **3 elements** of **data** about himself – his **username**, his **email**, and his **phone number**. After those 3 elements you will be given the form, as text, with several placeholders in it. You must replace each **valid placeholder** with its corresponding value. The placeholders have special symbols and can **contain only English alphabet letters**. There are **3 types** of valid placeholders:

* **<!{letters}!>** - put the given username in place of this
* **<@{letters}@>** - put the given email in place of this
* **<+{letters}+>** - put the given email in place of this

The **input** comes as an array of strings. The **first 3 elements** will represent – the **username**, the **email** and the **phone number**. Each element after that will represent a sentence, if you find a placeholder somewhere in those sentences you should replace it.

The **output** should be printed on the console. The output should consist of all sentences, printed again, this time with their placeholders replaced with the actual data.

### Examples

|  |
| --- |
| **Input** |
| Pesho pesho@softuni.bg 90-60-90 Hello, <!username!>!  Welcome to your Personal profile.  Here you can modify your profile freely.  Your current username is: <!fdsfs!>. Would you like to change that? (Y/N) Your current email is: <@DasEmail@>. Would you like to change that? (Y/N) Your current phone number is: <+number+>. Would you like to change that? (Y/N) |
| **Output** |
| Hello, Pesho!  Welcome to your Personal profile.  Here you can modify your profile freely.  Your current username is: Pesho. Would you like to change that? (Y/N) Your current email is: pesho@softuni.bg. Would you like to change that? (Y/N) Your current phone number is: 90-60-90. Would you like to change that? (Y/N) |

## \*Match Multiplication

You are given a text with numbers in it. Your job is to extract each number from the original text, multiply it by its offset from the start of the string and replace it back in the string. The offset should be calculated based on the original string. Check the examples to get a better idea.

The **input** comes as an array of strings with one element - the text which contains the numbers.

The **output** should be printed on the console - consisting of the same text with the number being replaced by their new values (after being multiplied by the offset).

### Examples

|  |
| --- |
| **Input** |
| ['8Just text 14 with number5 in i7.'] |
| **Output** |
| 0Just text 154 with number125 in i217. |
| Input |
| ['Moar t3xt w1th 99 numbers in 17. C00l numb3rs 411 4rr0und.'] |
| **Output** |
| Moar t18xt w11th 1485 numbers in 493. C0l numb126rs 18906 200rr0und. |

|  |
| --- |
| **Comments** |
| We extract the first number **3** counting the indexes from the start we can see that the number **3** begins **6 characters** **from the start**, thus we multiply **3 \* 6** and receive the new number **18**. Even though **18** takes **2** indexes and reinserting it would shift the rest of the text to the right, the offset of the next number **1** is counted from the original string where **1** is **11 characters** **from the start**, thus we multiply **1 \* 11**. Continuing we receive the new values for all numbers. |

### Hint

* Check the overloads for the **String.replace** function, there may be an overload that can help you.