

# Regular Expressions

This lesson is a brief introduction to Regular Expressions and their importance in JavaScript.

The previous validations were quite primitive: many strings containing a @ character are not valid email addresses. To perform more advanced checks, you can use a powerful tool: *regular expressions*.

A regular expression defines a *pattern* to which strings are compared, searching for matches. Many programming languages support them. A powerful addition to a programmer's toolbox, they can nonetheless take quite a bit of time to be comfortable with. What follows is just an introduction to the vast domain of regular expression.

Let's get started by trying to create a regular expression checking for the presence of an @ character inside a string. Here's the associated JavaScript code.

## JavaScript

```
const regex = /@/; // String must contain @
console.log(regex.test("")); // false
console.log(regex.test("@")); // true
console.log(regex.test("sophie&mail.fr")); // false
console.log(regex.test("sophie@mail.fr")); // true
```



A JavaScript regular expression is defined by placing its pattern between a pair of / characters. It's an object whose `test()` method checks matches between the pattern and the string passed as a parameter. If a match is detected, this method returns `true`, and `false` otherwise.

The following table presents some of the numerous possibilities offered by regular expressions.

Pattern	Matches if	Match	No Match
<code>abc</code>	String contains <code>"abc"</code>	<code>"abc"</code> , <code>"abcdef"</code> , <code>"123abc456"</code>	<code>"abdc"</code> , <code>"1bca"</code> , <code>"adbc"</code> , <code>"ABC"</code>
<code>[abc]</code>	String contains either <code>"a"</code> , <code>"b"</code> or <code>"c"</code>	<code>"abc"</code> , <code>"daef"</code> , <code>"bbb"</code> , <code>"12c34"</code>	<code>"def"</code> , <code>"xyz"</code> , <code>"123456"</code> , <code>"BBB"</code>
<code>[a-z]</code>	String contains a lowercase letter	<code>"abc"</code> , <code>"12f43"</code> , <code>"_r_"</code>	<code>"123"</code> , <code>"ABC"</code> , <code>"_-"</code>
<code>[0-9]</code> or <code>\d</code>	String contains a digit	<code>"123"</code> , <code>"ab4c"</code> , <code>"a56"</code>	<code>"abc"</code>
<code>a.c</code>	String contains <code>"a"</code> , followed by any character, followed by <code>"c"</code>	<code>"abc"</code> , <code>"acc"</code> , <code>"12a.c34"</code>	<code>"ac"</code> , <code>"abbc"</code> , <code>"ABC"</code>
<code>a\.c</code>	String contains <code>"a.c"</code>	<code>"a.c"</code> , <code>"a.cdef"</code> , <code>"12a.c34"</code>	<code>"ac"</code> , <code>"abc"</code>
<code>a.+c</code>	String contains <code>"a"</code> , followed by at least one character, followed by <code>"c"</code>	<code>"abc"</code> , <code>"abbc"</code> , <code>"12a\$ùc34"</code>	<code>"ac"</code> , <code>"bbc"</code>
<code>a.*c</code>	String contains <code>"a"</code> , followed by zero or more characters,	<code>"abc"</code> , <code>"abbc"</code> , <code>"ac"</code>	<code>"ABC"</code> , <code>"bbc"</code>

	followed by "c"	
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Observing these examples leads us to the following rules:

- Brackets `[]` define a character interval. Any string with at least a character in this interval will match the pattern.
- The `[a-z]` and `[A-Z]` patterns are used to search for the presence of any letter, respectively lowercase and uppercase.
- The `[0-9]` and `\d` patterns are essentially identical and match a digit in a string.
- The `.` character replaces any one character.
- The `\` (backslash) character indicates that the following character should be searched as-if. `.` For example, `\.` is used to match the `.` character itself.
- The `+` character matches one or several instances of the preceding expression.
- The `*` character matches zero, one, or several instances of the preceding expression.

T> The site <https://regex101.com> is useful to understand, test and debug regular expressions.

Let's get back to our example and check the email address field. Here's a possible regular expression (among many others) to test it against:

```
/.+@.+\...+/
```

Q> Before reading further, can you decode this pattern to understand what conditions a string must respect to match it?

OK, here is the answer. This pattern matches a string that:

- Starts with one or several characters (`.+`)
- Next, contains the `@` character (`@`)
- Next, contains one or several characters (`.+`)
- Next, contains the `.` character (`\.`)
- Finishes with one or several characters (`.+`)

In other words, any string of the form `xxx@yyy.zzz` will match this pattern. This is not the end-all, be-all way to validate an email address, but it's a start.

Check out how to put this solution into practice.

Output

JavaScript

HTML

```
// Check email validity when field loses focus
document.getElementById("emailAddress").addEventListener("blur", e => {
  // Match a string of the form xxx@yyy.zzz
  const emailRegex = /.+@.+\.+\.+\/;
  let validityMessage = "";
  if (!emailRegex.test(e.target.value)) {
    validityMessage = "Invalid address";
  }
  document.getElementById("emailHelp").textContent = validityMessage;
});
```

