

The focus of the lectures this week has been on refining your JavaScript skills and working with Strings. In this lab, you will continue to work with Strings and make a call to a function that you will write yourself!

Getting Ready

Similar to previous weeks, we have prepared a base set of files for you to work from. You can find them on the CS 105 website, under the “Labs” section, under the link to “Lab #4”. (You can find the CS 105 website by using an internet search for “CS 105” or by going to <http://bit.ly/cs105sp14>.)

Make sure to **extract** your ZIP file you have downloaded. Once extracted, open up `js.js` in a plain text editor to get started.

Finding a Hidden Message

Consider the title of this MP:

A MessAge in a ZillIoN Glass bottles

Ignoring all of the character except the capitalized characters, we can decode a (somewhat poorly) hidden message inside the original message:

**A M A Z I N G
AMAZING**

For this lab, you will write two pieces of code that will work together to find the hidden message inside of the original message. To do that, your code will make use of two string functions:

`s.charAt(index)`: When `s` is a variable that contains a String, this will return the Character at the index specified by `index`. (Remember: indexes start at 0!)

`s.length`: When `s` is a variable that contains a String, this will return the number of characters in `s` (eg: the length of the string).

As usual, we will begin by breaking the problem down into **pseudo-code**:

```
set hiddenMessage to an empty string

for each character in the originalMessage:
  if the character is a capital letter:
    add the character to the hiddenMessage

return the hiddenMessage
```

Checking for a Capital Letter

From the pseudo-code, you should be somewhat familiar with how to do most of the lines of code. However, the conditional in the middle of the code – **if the character is a capital letter** – is something you have not seen in lecture.

While we could check for every capital letter with an if-statement and a whole bunch of OR (||) operators: `if (c == "A" || c == "B" || c == "C" || ...)`

...this seems like a lot of work. The computer has a few tricks to make this easier.

During Week #2 of lecture, there was an example where eight students held signs representing binary bit values: 1, 2, 4, 8, 16, 32, 64, and 128. Behind them, on the projector, was an **ASCII chart** – the mechanism that a computer uses to translate the 0s and 1s that it stores internally into characters. The capital and lowercase letters from the ASCII chart are displayed here:

60+					70+										80+										90
5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	Z
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
90+			100+							110+												120+			
7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z

From this table, any character with an ASCII code greater than or equal to 65 **and** an ASCII code less than or equal to 90 is a capital (uppercase) letter. Knowing that, we just need to get the ASCII code of a character. In JavaScript, there is a function for that:

`s.charCodeAt(index)`: When `s` is a variable that contains a String, this will return the ASCII code at the index specified by `index`.

If our variable that contains the current Character we are looking at is `c`, we can now program a function that we can call `isUpperCase(c)`: a function that returns `true` if the `c` is uppercase and `false` if `c` is not uppercase. Add the following code at the end of your JavaScript file (outside of any other functions):

```
function isUpperCase(c)
{
  if (c.charCodeAt(0) >= 65 && c.charCodeAt(0) <= 90)
  {
    return true;
  }

  return false;
}
```

Completing the Lab Assignment

Now that you have an `isUpperCase()` function to test if a character is uppercase, you should have enough knowledge to complete the `findMessage()` function in your JavaScript file – the pseudo code is provided for you on the front of this page. Work with your group to come up with a solution and, if you get stuck or have any questions, a TA or CA would be happy to help!

Finished? Submit it! **All team members** must submit the lab assignment on the CS 105 website!