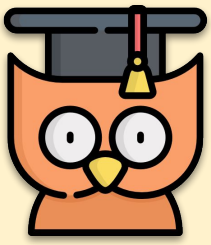
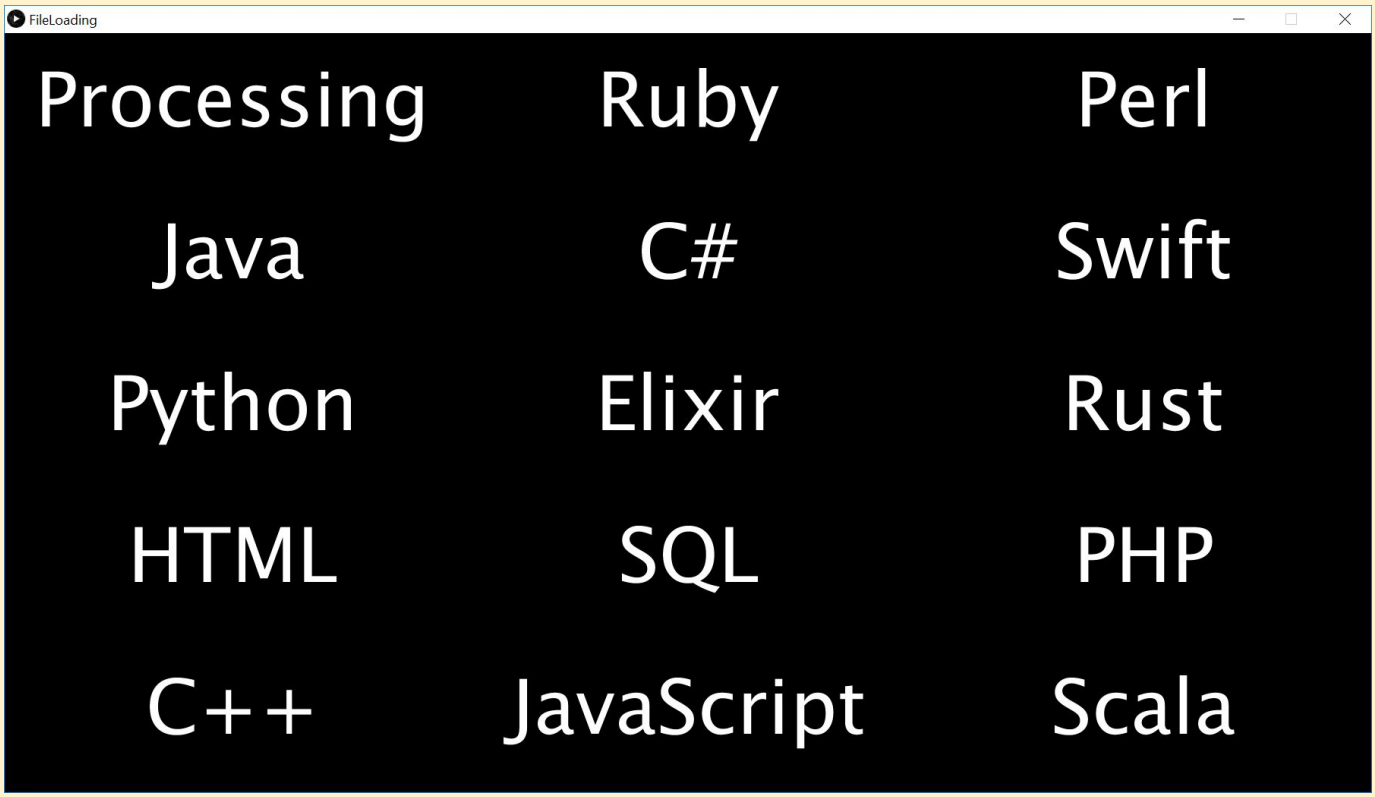
Lesson 1 - File Loading & Saving



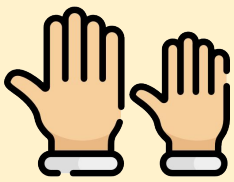
Learning Outcomes:

- Reinforce our knowledge of **Arrays** and **Strings**
- We will learn how to **load** and **save** **Strings** from/to a file
- Use 2 new functions; **loadStrings()** & **saveStrings()**
- We will learn how to **convert** between **ints** and **Strings**



Make sure you're familiar with all these topics before you start:

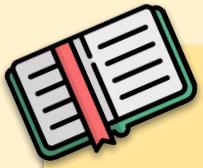
- ✓ Using **Arrays**
- ✓ Using **for** loops to **iterate** through **Arrays**
- ✓ Using **println()** and **text()**
- ✓ Managing user input



REMEMBER: If you have any questions, stay in your seat and put up your hand. We love to help!

String Arrays

In the last grade, we learned about **Strings** and we learned about **Arrays**. In this lesson we're gonna put the 2 together and make an **Array** of **Strings**! But first, let's go over **Arrays** in case you forgot how they work.



Arrays Refresher

An **Array** is a **data structure**. This means that we use them to store **multiple variables**. They're basically like lists of variables. Now let's see if you remember how to use them.

Let's use an **Arrays** of **ints** to make an average percentage calculator

1. Declare an **Array** with 10 ints, do **not** give the array any values yet
   Hint: `int[] scores = new int[10];`

2. In **void setup()**, use a **for** loop to iterate through the **Array** and give each number a **random** value between 0 and 100

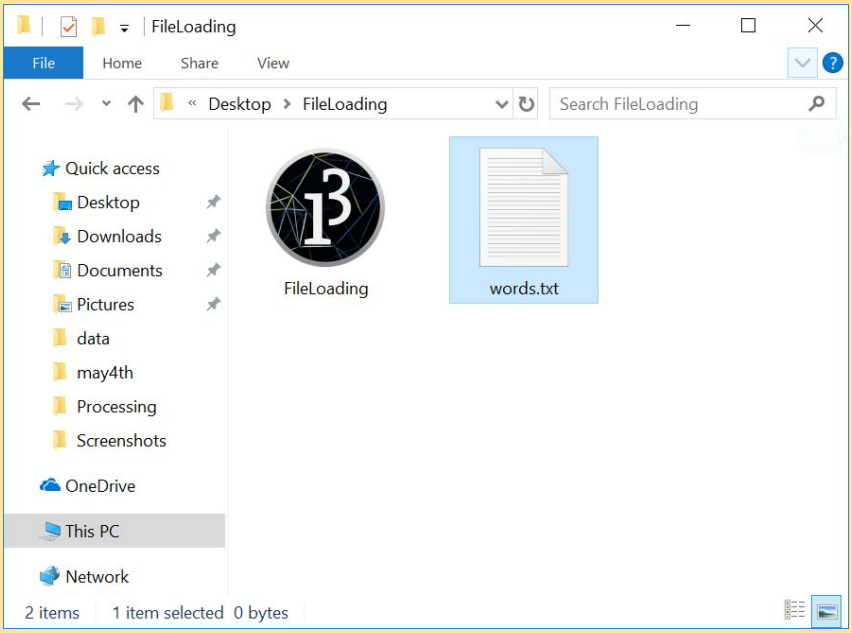
3. In **void draw()**, calculate the average, by **adding** up all the values in the **Array** and **diving** the total by the **length** of the Array

4. Display your average on the screen using the **text()** function

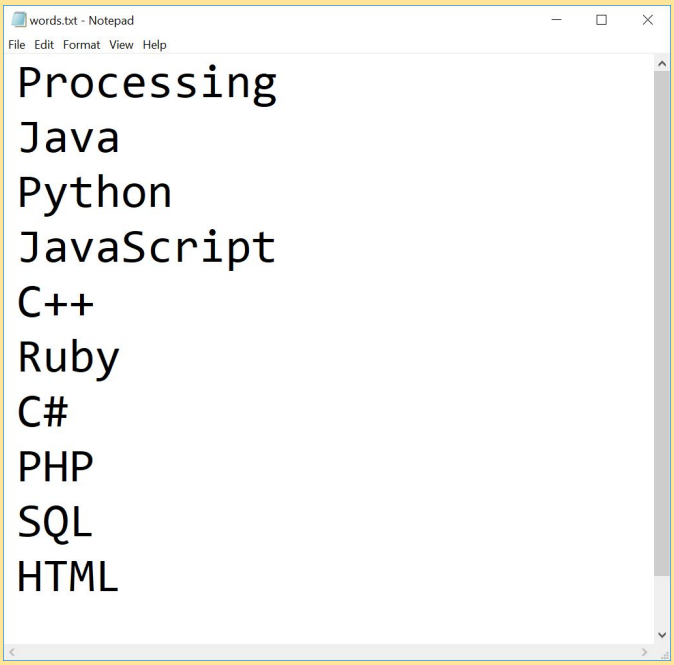
Now let's start loading files!

1. First thing we'll need is a file! Create a new processing sketch and **save** it. Then go to the sketch **folder** and create a new text document by **right** clicking inside the sketch folder, clicking on **New** and then **Text Document**. Let's name this document **words.txt**

   It should look something like this:



2. Right now, our text file is empty though, so let's add some words to it! Go into the file and add at least 10 words to it, each one on a new line. Something like this:



Now that we have our file, we can load it into Processing.

1. Declare an **Array** of **Strings** with this line:

```
String[] wordList;
```

2. In **void setup()**, let's load our file into our **wordList** using this line:

```
wordList = loadStrings("words.txt");
```

The **loadStrings()** function takes all the **Strings** from the file and stores them all inside our **wordList.**

Note: This line will only work if there's a file called **words.txt** in the sketch folder

3. Use a **for** loop to iterate through the **wordList** and **print()** each word on the **console**

4. **Change** some of the **Strings** in the **wordList** inside your program and again **print()** the modified version on the **console**

5. Now let's save our updated **wordList** onto a new file using this line:

```
saveStrings("newWords.txt", wordList);
```

The **saveStrings()** function takes all the **Strings** in the **wordList** and writes them to a file called **newWords.txt**

Note: if a file with that name doesn't exist inside the sketch folder, it will create a new one, but if it does, it will simply replace the existing file with the new one.

Congratulations

You have loaded and saved your first files in Processing

Now would be a great time to save your sketch if you haven't already

Extra Challenge

Loading and saving files is very useful in games for keeping track of highscores, but these use **numbers**, not words. Can you change your code so that it can read/write **ints** instead of **Strings**?

Hints:

- You'll need a new text file, e.g., **numbers.txt**
- You'll need an array of **ints**, not **Strings**
- You'll need to use the **str()** and **int()** functions when loading and saving from/to your file, to **convert** from one variable type to the other

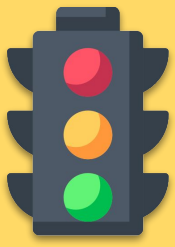
  It should look something like this:

```
numberList = int(loadStrings("numbers.txt"));
saveStrings("newNumbers.txt", str(numberList));
```

Make sure you understand all these concepts and have competed all of the tasks before moving on to the next lesson

Concepts:

- **String and int Arrays**
- **loadStrings() and saveStrings()**
- **Converting between ints and Strings**
- **Using the str() and int() functions**



If you don't understand all these concepts, read back through the lesson or ask a tutor for help.