# Assignment 8

Algorithms, Spring 2024

**Honor code:** *Work on this assignment alone or with one partner (highly encouraged). Partner policy: You and your partner will work together on the assignment throughout the whole process, you will write it and review it together, and will submit one assignment. You can talk to anyone in the class (collaboration level 1). It is not allowed to search online for the specific problems in this assignment—doing so violates academic honesty for the class.*

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**String shuffling:** A *shuffle* of two strings $A$ and $B$ is formed by interspersing the characters into a new string, keeping the characters from $A$ and $B$ in the same order.

For example, the string BANANAANANAS is a shuffle of the string BANANA and ANANAS (in several different ways, actually: BANANAANANAS, BANANAANANAS and also BANANAANANAS).
Similarly, the strings ANEVEGARIN and ANEGAVERIN are both shuffles of NEVER and AGAIN.

**The problem:** Given three strings $A$, $B$ and $C$, of length $m, n$ and $m + n$ respectively, come up with an efficient algorithm to determine whether $C$ is a shuffle of $A$ and $B$. To do this, you need to define one function which takes as parameters three strings, and returns True if the third one is a shuffle of the first two, and False otherwise. The algorithm should run in time $O(mn)$.

```
# param string1, string2, string3: three strings
# returns True if string3 is a shuflle of string1 and string2
# returns False otherwise
is_shuffle(string1, string2, string3)
```

**To submit:**

- use Gradescope.

- Your file shoud be called `assignment8.py`. Note that the autograder expects a file with precisely this name, so if you submit a file with a different name it will not see it.

- Your file should contain a function called `is_shuffle(string1, string2, string3)` as specified above.

- Your file can contain other functions in addition to `is_shuffle`, but `is_shuffle` has to be implemented exactly as specified.

- The autograder will run this function on a bunch of test cases and you will see the score. You can submit as many times as you want.