

CSE 332: Data Structures and Parallelism

Exercises (Parallelism)

Directions: *Submit your solutions using gitlab. You must fill out the partners form for para to get access to your repository. Choosing a partner is disabled, because these exercises are solo.*

EX13. filterEmpty (20 points)

Use the ForkJoin framework to write the following method in Java:

```
public static int[] filterEmpty(String[] arr)
```

Returns an array with the lengths of the non-empty strings from arr (in order).

For example, if arr is ["", "", "cse", "332", "", "hw", "", "7", "rox"], then filterEmpty(arr) == [3, 3, 2, 1, 3].

A parallel algorithm to solve this problem in $\mathcal{O}(\lg n)$ span and $\mathcal{O}(n)$ work is the following:

- (1) Do a parallel map to produce a bit set
- (2) Do a parallel prefix over the bit set
- (3) Do a parallel map to produce the output

In lecture, we wrote parallelPrefix together, and it is included in the gitlab repository. Rather than re-implementing that piece yourself, you should just use it. For the other two parts though, you should write them. Do not bother with a sequential cutoff for this exercise, just have a base case that processes a single element.