

Assignment 4

Submission date: *Sunday, June 23rd*

Submission Format:

Assignments from now on will be done on Colab. Make sure that you run the installation notebook on Colab before running Julia code on notebook. Submit your solution notebook on Github (for this, download your notebook first).

Question:

You will be implementing Hillis Steele Scan in this assignment. Scan is an operation which takes in an input array and returns the sum of prefixes of the input array. The serial julia code for scan is as follows:

```
scan!(a)
  for i in 2:size(a, 1)
    a[i] += a[i-1]
  end
end
```

At first, it seems like this is a very hard algorithm to parallelize because of the dependency of $a[i]$ with the previous element. But there are several clever parallel algorithms, one among them is Hillis Steele Scan (called HSS from now).

Watch this video to understand HSS: <https://www.youtube.com/watch?v=RdfmxfZBHpo>

You will be writing a kernel to implement HSS for an array with at most 1024 elements. The kernel can take in a single parameter, i.e, the input array and must store the final prefix sum in the same array.

Could the kernel you have defined be extended for an array with 2048 elements?