

Homework 1

Due Friday, April 8th via GradeScope

Problem 1: Implement a parallel function that sums separately the odd and even values of a vector.

Idea: Need to implement `parallelSum` using `omp parallel for` with reductions for both even and odd accumulators.

```
1  std::vector<uint> parallelSum(const std::vector<uint> &v)
2  {
3      omp_set_num_threads(4);
4      std::vector<uint> sums(2);
5      uint sum0 = 0; uint sum1 = 0;
6
7      #pragma omp parallel for reduction(+:sum0) reduction(+:sum1)
8      for(uint i=0; i<v.size(); i++) {
9          if (v[i] % 2 == 0) {
10             sum0 += v[i];
11         }
12         else {
13             sum1 += v[i];
14         }
15     }
16     sums[0] = sum0; sums[1] = sum1;
17     return sums;
18 }
```

Console logs from `main_q1.cpp`.

```
$ make main_q1
g++ -std=c++11 -g -Wall -O3 -fopenmp main_q1.cpp -o main_q1

$ ./main_q1
Parallel
Sum Even: 757361650
Sum Odd: 742539102
Time: 0.00433168
Serial
Sum Even: 757361650
Sum Odd: 742539102
Time: 0.106256
main_q1.cpp:60:main      TEST PASSED.
```

Problem 2: Implement Radix Sort in parallel ...

- **Question 1: computeBlockHistograms()** Idea: using openMP to parallelize computation across "blocks" when creating local histograms. Code must pass Test1().

```
$ make main_q2
g++ -std=c++11 -g -Wall -O3 -fopenmp main_q2.cpp -o main_q2

$ ./main_q2
tests_q2.h:22:Test1      TEST PASSED.
```

- ...

Submission information logs.

```
$ /afs/ir.stanford.edu/class/cme213/script/submit.py hw1 private/cme213-jelc53/hw1
Submission for assignment 'hw1' as user 'jelc'
```

Attempt 1/10

Time stamp: 2022-04-01 20:53

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```
private/cme213-jelc53/hw1/main_q1.cpp  [3875 bytes]
private/cme213-jelc53/hw1/main_q2.cpp  [1213 bytes]
private/cme213-jelc53/hw1/main_q3.cpp  [1362 bytes]
private/cme213-jelc53/hw1/main_q4.cpp  [5117 bytes]
private/cme213-jelc53/hw1/matrix.hpp   [3036 bytes]
```

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Directory where files were copied: /afs/ir.stanford.edu/class/cme213/submissions/hw1/jelc

List of files in this directory:

```
main_q1.cpp  [3875 bytes]
main_q2.cpp  [1213 bytes]
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main_q4.cpp  [5117 bytes]
matrix.hpp   [3036 bytes]
metadata     [137 bytes]
```

This completes the submission process. Thank you!