HPC\_HW\_Chap5

Chen Fang

Exercise 5.1

The value of \_OPENMP on anvil is 201307. Since this macro is defined, it indicates we can include <omp.h> and use macros corresponding to OpenMP.

Exercise 5.4

&& (AND) 🡪 1 (true)

|| (OR) 🡪 1(true)

& (bitwise AND) 🡪 1111111..11 as binary

| (bitwise OR) 🡪 0

^ (bitwise XOR) 🡪 0

Exercise 5.8

This example is close to the prefix sum. To break the loop-carried dependency, one possible way is to break the array into several sub arrays and compute incomplete prefix sum results within each sub array. This step can be performed in parallel because there is no dependency among sub arrays. Then each sub array needs to be updated, which is a sequential procedure since the update value for each sub array depends on its previous sub array.

Exercise 5.10

The result of my implementation is as follows (n=100000000):

|  |  |  |
| --- | --- | --- |
| thread\_count | atomic | critical |
| 1 | 1.97E+00 | 5.18E+00 |
| 2 | 1.97E+00 | 1.22E+01 |

The atomic directives allow simultaneous execution of updates to different variables, since as the number of thread increases, the time remains unchanged.