

## COMP 322: Fundamentals of Parallel Programming (Spring 2021)

Instructor: Mack Joyner

### Worksheet 4: due at start of class on Wednesday

*Honor Code Policy: You are free to discuss all aspects of in-class worksheets with your other classmates, the teaching assistants and the professor during the class. You can work in a group and write down the solution that you obtained as a group. If you use any material from external sources, you must provide proper attribution.*

#### Array Sum Speedup

- Assume  $T(S,P) = \text{WORK}(G,S)/P + \text{CPL}(G,S) = (S-1)/P + \log_2(S)$  for the parallel array sum computation shown in slide 4 (using the upper bound)
- Assume  $S = 1024 \implies \log_2(S) = 10$
- Compute for 10, 100, 1000 processors (round to 1 decimal place)
  - $T(S,P) = (S-1)/P + \log_2(S) = 1023/P + 10$
  - Speedup(10) =  $T(1)/T(10) =$
  - Speedup(100) =  $T(1)/T(100) =$
  - Speedup(1000) =  $T(1)/T(1000) =$
- Why does the speedup not increase linearly in proportion to the number of processors?