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CST435 Parallel and Cloud Computing

Semester I, 2023/2024

ASSIGNMENT 1 – REPORT

(Group Work: Minimum of 4, Maximum of 5 Members)

This assignment covers parallel computing through shared memory approaches: CPU and GPU. The objective of this assignment is to implement string sorting algorithms in both approaches based on the given dataset. Identify three potential string sorting algorithms and choose one string sorting algorithm that is parallelizable so that it can be implemented in C, OpenMP and CUDA. The outcome of the assignment is a comparative study of string sorting algorithms in C, OpenMP and CUDA. Below are some points that guide you in preparing the report:

1. Format of the report [Standard IEEE format]:
   - *i. Abstract/Introduction*
   - *ii. Overview of three string sorting algorithms*
   - *iii. Overview & highlights of C, OpenMP and CUDA*
   - *iv. Serial implementation of string sorting in C*
   - *v. Parallel Program Design for OpenMP (Partitioning, Communication, Agglomeration and Mapping)*
   - *vi. Parallel Program Design for CUDA (Same as in #v. above)*
   - *vii. C, OpenMP and CUDA Implementation*
   - *viii. Expected outcomes and comparison.*
   - *ix. Lessons learned and conclusion.*
   - *x. References*

   Find 3 → pick 1

   Pseudocode x coding

   Will cover in lecture

   vii → pseudocode
2. Find at least ***three relevant papers*** that are related to the above topic. Relevant papers refer to papers published in journals, conference proceedings or technical reports [Tips: IEEE Xplore, ACM and Elsevier]. Web pages, FAQs or presentation slides are not counted as relevant papers. However, they are counted as other references beside the three required relevant papers. Cite them as your references properly. Your deliverables must include the following requirements:
   - Well written and formatted report: IEEE paper format
     - http://www.ieee.org/conferences_events/conferences/publishing/templates.html
   - Failing to comply to the format will affect your overall assignment grade
   - Make the report brief yet concise (Proofread your work)
   - Expected length of the report: min. of 6 & max. of 10 pages including references

     NO need cover
   - Marking Scheme Rubrics: refer to the rubrics posted on the e-learning page
     - Source of the data file - http://www-cs-faculty.stanford.edu/~uno/sgb-words.txt
3. The report should address the followings:
   - Highlights of C, OpenMP and CUDA
   - Implementation of the chosen string sorting algorithm in C, OpenMP and CUDA
   - Pseudocode of the implementation in C, OpenMP and CUDA
   - Discussion and the expected outcome if the algorithm is fully implemented
4. Submit the following together with well formatted report (One submission per group):
   - Soft copy - (Report + 3 most relevant papers): e-learning

Note:

You must write the report yourself using your own ideas / words and not simply cut and paste from your references. List all references at the end of the report. ***In the event that parts of the report are directly copied from others without references, F grade is given.***

Deadline for submission is 1 December 2023, by 11:59 pm. (e-learning)