MSc in High Performance Computing
Coursework for Threaded Programming Part 1

The object of this assessment is to experiment with the loop scheduling options in OpenMP. You will be required to conduct some experiments, and submit a report detailing the results of these experiments, as well as the source code you have written.

You are provided with a piece of code which contains two loops which you should parallelise with OpenMP directives. The code measures the execution time for 1000 repetitions of each loop, and includes a verification test for each loop.

The code can be found on the course pages on Learn. You may choose to work with either the C `loops.c` or Fortran 90 `loops.f90` version.

You should use `-O3` option to ensure a high le ter any of the code, except lo

Parallelisation

Add OpenMP directives to parallelise the loops in the routine `loop2`. You should parallelise only the outermost loop in each case.

SCHEDULE clause options

Once you have parallelised the loops, run the code on 4 threads on the back end of `cirrus`, using the following SCHEDULE clause options:

- STATIC
- AUTO
- STATIC,n
- DYNAMIC,n
- GUIDED,n

where for the latter three cases, n (the chunksize) takes the values $1, 2, 4, 8, 16, 32, 64$. From these experiments, determine for each loop the best scheduling option on 4 threads. Using this option (which may be different for the two loops), run the code on 1, 2, 4, 6, 8, 12 and 16 threads.

Submission

You are required to submit the following:

1. A written report.
   (Guideline length: 6-8 pages including figures.)
2. Source code.

The deadline for both report and source code is 16:00 on Friday 25th October 2019.
Your report should contain:

- a *very short* introduction;
- graphs of the execution time of each loop versus the chunksize for the STATIC, n, DYNAMIC, n and GUIDED, n schedules.
- graphs of the speedup (T_1/T_p) for each loop using the best schedule versus number of threads.
- some text describing *and explaining* the results you obtained;
- some *brief* conclusions.

You should *not* include any background material in your report. Your source code submission sh *est scheduling option for each l*

The maximu ated as follows:

- Report content and presentation out of **2**
- Source code out of **3**.