Assignment 2 : Processes - Threads

Create **two applications** that will calculate basic statistics about a collection of data using multiple process and multiple threads respectively.

The master thread/parent process should read the data from a file and then spawn the child threads/child processes to process the data.

Example:

```
gbarlas@kinpenguin:~$ ./statFork 4 data.txt
Min: -10
Max: 1253
Average: 128.64
```

should generate four child processes (so five in total) to process the data. A similar convention of calling should be done for the multi-threaded program. E.g.

```
gbarlas@kinpenguin:~$ ./statThread 4 data.txt
Min: -10
...
```

The data file should be a text file that has a number per line and starts with the total number of data items in the first line. E.g.:

```
1000
346.4
7798.2
... // 998 more lines follow
```

Use pipelines to allow the parent process collection of the partial results from the children. In the case of threads, shared data can be utilized.

Once you complete and test your code, test and compare the performance of the two programs for different number of child processes and threads, i.e. find the execution times and calculate the speedup (the parent should be also computing part of the result).

A graph showing your results for 2, 4, 6 and 8 processes/threads should be provided.