

# FINAL PROJECT OPENMP

The **Final Project** consists of the parallelization of the program **knn.c**. The code is available in Aula Cesga, in Documents -> OpenMP-> FinalProject.

The program implements the k-nearest neighbor algorithm, also known as KNN or k-NN, a non-parametric supervised learning classifier, which uses proximity to make classifications or predictions about the clustering of an individual data point.

The code contains mathematical functions, so you must link to the mathematical library using the -lm flag (gcc -o knn knn.c -lm). The program uses two files (pp\_tra.txt and pp\_tes.txt) as input containing training and test data.

Parallelize the code and measure the performance obtained on the FT3. You should use gprof to get information about the program and decide which subroutine or subroutines to parallelize.

Use AulaCesga (Assignments) to upload the OpenMP version of the code, together with a report explaining the parallelization and the results obtained. The mark will depend on the parallel code, the results and the report

## **Remember:**

When you parallelize a code, always check that the results are still correct by comparing them with the results of the sequential version.

To measure speedups always use dedicated resources, execute several times and calculate the average (if the variability is small) or the median (if the variability is significant).

To measure speedups you have to take as reference the time of the sequential version of the code.

**Weight:** 50% of the OpenMP grade

**Deadline:** December 15<sup>th</sup> 2024