Programació Conscient de l'Arquitectura (PCA)

Final Project
2012-13/1q

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Final Project Objective

- Apply the optimizations techniques used in the course to reduce the execution time of a real program.
  - Use of an optimization methodology
  - Use of tools
  - Implementation and evaluation of optimizations

Final Project Statement: Optimize protein docking

- We give you a zip file:
  - documentation
  - source code to optimize
  - input files
  - output files
- You have to apply several techniques in order to boost performance
  - unrolling
  - specialization
  - vectorizing
  - threading
  - ...

Environment Setup

- Hardware:
  - You can use any machine you have access to
    - Laboratory machines
    - Personal machine
    - Also, you can compare the optimization impact on different platforms
- Software
  - C Compiler
  - Profilers

Comments

- Remember to avoid NFS-mounted disks
- Be careful with the power energy on the laptops
  - `cpufreq-selector` in Linux

Final Project Deliverable

- Maximum number of pages: 15
- Contents:
  - Author Names
  - Description of the optimization methodology used
    - Automatizing Scripts, Tests used,...
  - Experimental environment setup used
    - Hardware and software
  - Indicate the original code performance
    - Compiled with 03
  - Analyze different optimizations
    - Speedup, justifications, figures, ...
  - Conclusions
    - Final Speed-up , more significant optimizations,...

Some details

- Final project should be done in couples
  - If the group is of 3 persons, we will more strict
- Deadline: 6th January 23:59 on the RACO
- Files to submit
  - Detailed at documentation (pdf, source code, scripts, makefile,...)

How long should the final project take you?

- Since we are not looking for a specific speed-up value, we give you an estimation time to spend on the final project:
  - 20-25 hours **by student**
  - But you can work more :-)
- Take profit of all the hours you have to optimize the final project

Evaluation

- 40% of the Final Mark
- Some aspects that will be evaluated
  - The way you use the optimization methodology
  - The way you justify the optimizations done
    - Exploring the design space (i.e: unrolling degree)
    - **Justification** of the results
  - The final speedup is important but not the only factor to be considered
    - For instance: Describe optimizations that you thought but that they didn't improve the code
  - Format of the report
    - **Structure, clarity, figures and results, ...**
- If necessary, we may ask a group to have a personal interview
- Copies will be evaluated with a 0 for all the students involved on the copy (Destination and source)

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