

Data Centers and High Performance Computing
September 8th, 2016

Name: _____ **Surname:** _____ **Student ID:** _____

Remember to write your correct personal data on this sheet, and use it as a folder to wrap the exposition. If you think a question is ambiguous, write your interpretation and answer accordingly. You are not allowed to use any note or digital device. If you are found copying or consulting notes, you will not pass the written test.

Question 1 - (7 points)

Discuss the evolution of core interconnection buses, starting from the Front Side Bus up to QuickPath Interconnect, emphasizing the design choices that led this evolution.

Question 2 - (7 points)

In the context of synchronization algorithm implemented using CAS-like instruction, present the ABA problem and state possible solutions to it.

Question 3 - (7 points)

Discuss the methodological differences between checkpoint-based and reverse computation-based rollbacks in the context of speculative simulation. State what are the performance impacts of the two techniques, illustrating what are their worst-case scenarios.

Question 4 - (5 points)

In the context of Transactional Memories, explain the difference between Serializability and Opacity.

Question 5 - (5 points)

Describe the assembly language instructions offered by Intel RTM and explain why an additional "T" bit is used for each cache line.

I, the undersigned, according to the provisions of law N. 675/96, allow the teachers to publish on the website the results of this written test.

Legible signature in full: _____