

Computer architecture

Homework week 11

Instructions

Submit by e-mail to the lecturer, as a PDF document with your name and student ID near the beginning. You can work in groups of 2, however, use different groups than week 8/9. Use the English language. Deadline: Nov 18th, 23:59.

Question 1 (4pt)

1. Research then explain in your own words the difference between symmetric multiprocessing (SMP) and symmetric multithreading (SMT) architectures. Suggest how they differ from the programmer's perspective. Provide two example concrete processor architectures for each.
2. A task separated in four threads, when run on 2 Niagara T2 cores, performs 3 times better than if run as one thread on one core. Explain how this is possible.

Question 2 (6pt)

1. Explain in your own words the benefits of out-of-order execution.
2. Explain the differences between the following terms in your own words:
 - single issue vs. multiple issue;
 - control hazard vs. data hazard vs. structural hazard;
 - issue policie vs. completion policy.
3. Which concept in processor architecture is called "Pollack's rule"? What is its relationship with out-of-order execution?