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 3-4. Use the English language. Deadline: Oct 28th, 23:59.

Answers to bonus questions are counted only if you get at least half the points to each previous question.

Question 1 - Cache vocabulary (2pt)

For each of the following pairs of terms, describe in 1-2 sentence the difference between the two:

- direct mapped vs. set-associative caches.
- write policy vs. replacement policy.
- hit vs miss.
- line index vs tag.

Question 2 - LRU variants (2pt)

There are many variants to the pure LRU replacement policy for set-associative caches. For example, 2Q, LRU/2, Least Frequently Used, Random Replacement, etc.

Using own research, select 2 possible variants of your own choice, determine by whom and when they were devised, and a short summary (1-2 sentences) of their known advantages and limitations.

Cite your information sources properly.

Question 3 - Hardware vs software TLBs (2pt)

Explain the difference between hardware-managed and software-managed TLBs in your own words (1-2 sentences for each). Give 2 example names of processor architectures for each.

Cite your information sources properly.
Question 4 - Virtual memory and caching (4pt)

Read the following article (link to a copy on the course’s home page):


Then explain in your own words:

- what are the respective advantages and disadvantages of the 3 types of caches: P/P, V/P, P/V and V/V;
- what is the “synonym problem”;
- at least two different solutions to the synonym problem.

(max 1 A4 page)