ECE571: Advanced Microprocessor Design – Homework 9
Fall 2024

Due: Friday 15 November 2024, 12:00pm

Create a document that contains the answers to the questions below. A .pdf or .txt file is preferred but I can accept MS Office or Libreoffice format if necessary.

1. Read a few articles about relatively recent Intel processors:

   (a) **Intel Architecture Day 2021: Alder Lake, Golden Cove, and Gracemont Detailed** by Dr. Ian Cutress and Andrei Frumusanu

      `https://www.anandtech.com/print/16881/a-deep-dive-into-intels-alder-lake-microarchitectures`

   (b) Also read the academic paper: **Intel Alder Lake CPU architectures** by Rotem at al. IEEE Micro, May-June 2022, p13-19, vol42. `https://ieeexplore.ieee.org/document/9747991` You should be able to click the "PDF" link, say you belong to University of Maine, and then use your UMaine login to access the paper.

   (c) Answer the following questions:

      i. What is Hybrid Technology?
      ii. What is the purpose of the Intel Thread Director?
      iii. What is one change added in Golden Cove architecture?

2. Also read the Sapphire Rapids (server-class processor) articles:

   (a) **Sapphire Rapids: The Next-Generation Intel Xeon Scalable Processor** by Nassif et al.
      `https://ieeexplore.ieee.org/document/9731107` Again you should be able to click the "PDF" link, say you belong to University of Maine, and then use your UMaine login to access the paper, it's only 1-page long.

   (b) **Intel Xeon Sapphire Rapids: How To Go Monolithic with Tiles** by Ian Cutress `https://www.anandtech.com/show/16921/intel-sapphire-rapids-nextgen-xeon-scalable-gets-a-tiling-upgrade` This article is 3 pages long so be sure to read it all.

   (c) Answer the following questions:

      i. What are the Intel AMX extensions?
      ii. List one change between the previous Intel Icelake processors and the newer Sapphire Rapids processors.

3. **Submitting your work.**

   - Create the document containing the answers to the questions asked.
   - Please make sure your name appears in the document.
   - e-mail the file to me by the homework deadline.