Homework 4 A New Golden Age for Computer Architecture

Introduction

We live in the world that is constantly changing. As you graduate from this course, you should keep up with current trends and emerging techniques. This assignment serves as a practice for your lifelong learning journey. You will read a review article that talks about the past, the present, and the future of computer architecture. Even though the past might seem boring and irrelevant at first, you will notice that many of the techniques in the past keeps reappearing in new forms. This is true in many field of studies.

You will find many concepts that we learned in the course, and it should serve as a good review.

This exercise will have you read and answer questions based on a recent article by computer architecture experts, John L. Hennessy and David A. Patterson.

You can access the article by going to the materials section in mcv.

Answer the following questions. **You may answer in Thai.**

1. According to the CPU time formula, why is RISC better than CISC?
2. Why did the 'Itanic' ISA become unused?
3. What type of parallel architecture according to Flynn's taxonomy is Itanic?
4. Explain 'Dennard scaling' in your own words.
5. Why it is not practical to keep increasing the number of pipeline stages and thus increasing the ILP?
6. According to Figure 5, when 8% of the time is serial, what is the percentage of energy wasted by a 45-processor configuration?
7. Why VLIW can be a good fit for DSA?
8. What is your impression regarding Figure 7? Does it change your view of how to program? What are the things that you should be aware of in order to write more efficient softwares?
9. Explain what systolic arrays are. How are systolic arrays different from typical SIMD architectures? When are they first created? You should read other sources to get a better understanding of it. Write down the sources you used.
10. Explain the similarities and differences between Agile software development and Agile hardware development.

Lastly, **important concepts from this article will also appear in the final exam.**