CS 286 Operating Systems, Fall 2021

Study Guide for Week #12

Note: This is NOT a quiz question list
The next quiz question list will be e-mailed to each of you later.

#1: What are the four hardware architecture for “parallel computers”?

#2: What are “tightly coupled systems”?

#3: What are “loosely coupled systems”?

#4: What are the two different types of tightly-coupled multi-processor system?

#5: How are “functionally-specialized multi-processor systems” different from “tightly-coupled multi-processor systems” (i.e., “what is the difference”)?

#6: Mention three different examples for “functionally-specialized multi-processor systems”.

#7: Sketch the internal hardware structure for “blade servers”.

#8: What are “distributed systems”?

#9: Which of the four parallel computer architecture do typical “super-computers” use?

#10: What are two different types of tightly-coupled multi-processor systems?

#11: What are “fine-grained tightly-coupled multi-processor systems”?

#12: What is the typical “granularity” for processor assignments in fine-grained tightly-coupled multi-processor systems?

#13: If a fine-grained tightly-couple multi-processor system consists of two or four processors (or processor cores), its performance usually will not achieve two or four times better performance (execution speed) compared to its single-processor counterpart. What is the major cause of the problem?

#14: What are “medium-grained tightly-coupled multi-processor systems”?

#15: What is the typical “granularity” for processor assignments in medium-grained tightly-coupled multi-processor systems?
#16: What are “threads”?

#17: What are the three parallel models in “Flynn’s Classification”?

#18: How does “SIMD” parallel architecture work?

#19: How does “MIMD” parallel architecture work?

#20: Which Flynn’s parallel model does Intel core 5 multi-core processor belong to?

#21: There is no real computer system that belongs to MISD model. Why not?

#22: Using a single-core SISD processor, what is the algorithm complexity (execution time) of performing $N^2$ matrix multiplication? What is the algorithm complexity (execution time) if SIMD processor (with an infinite number of processing units) is used?