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Practice Test 3

1. With regards to superpipelined processors, what is the difference between static scheduling and dynamic scheduling?
2. What are the advantages and disadvantages of static scheduling?
3. What are the advantages and disadvantages of dynamic scheduling?
4. Which type of processor is more popular today, statically scheduled or dynamically scheduled? Why?
5. Explain out-of-order issue, out-of-order execution, and out-of-order completion. Which of these are common in modern CPUs. Which are not common. Why?
6. What are RAW, WAR, and WAW data hazards?
7. What kind of CPU is susceptible to each type of hazard. (Specifically, what must be allowed out-of-order for each hazard to occur.)
8. Why are WAR and WAW considered "fake" data hazards.
9. Be able to step through a simple example of Tomasulo's algorithm (e.g., one similar to the posted videos).
10. What is the difference between architectural and physical registers. How are each used.
11. The typical i7 processor has somewhere between 6 and 8 functional units; but (as we saw in class), can only sustain a throughput of 3 instructions per second. Why?
12. What determines how "wide" a processor can be (i.e., how many functional units it has.)
13. When did CPUs begin getting "wider"? Why?
14. When did CPUs stop getting "wider"? Why?
15. What did CPU designers switch their focus to after it no longer made sense to make CPUs wider?
16. What is simultaneous multithreading (aka "hyperthreading")?
17. What is the difference between power and energy?
18. What is "max power"? Why is it important?
19. What is Thermal Design Power (TDP)? Why is it important?
20. With respect to desktop computers, what is the main power-related challenge?

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21. With respect to laptops and other mobile devices, what is the main power-related challenge.
22. What is static energy?
23. What is dynamic energy?
24. How does reducing a CPU's frequency save power?
25. Under what conditions does reducing a CPUs frequency save energy?
26. What is Dynamic Voltage and Frequency Scaling? Why is it helpful/important?
27. What is "polling"?
28. What do most modern CPUs use instead of polling?
29. What is "memory mapped I/O"?