1. (10 points) Currently, it is argued that CPU is the most significant contributor of power consumption. What is the "ranking" on the rest computer components (memory, network/interconnect interface, hard disk)? What are the trends for the future? Will the "ranking" change? Justify your answer providing trends in high-performance computer organization and in computer component technologies.

2. (10 points) Is it possible to have no gain (or even negative gain) on performance when using a "newer" CPU with temperature-based frequency throttling over an "older" CPU with the same feature? (Assume that the environment and all other computer parts remain the same) What are the factors/parameters that affect this gain?

   a) From the perspective of Amdhal’s law argue about the efficacy of Core Fusion approach.
   b) How Core Fusion balances ILP and TLP?
   c) Compare and contrast Core Fusion ROB with the ROB covered in the class?
   d) How does Core Fusion optimize cache coherency for parallel execution?
   e) In your opinion, what is the “Achilles’ Heal” of the Core Fusion approach?

   a) (20 points) Give pseudocode for “Game of Life” and Matrix Multiplication program under TM model – explain how its performance would differ from the cluster computing platform and cell processor platform.
   b) (5 points) What changes would have to be made to Core Fusion approach to support Transactional memory?

   a) Explain briefly why the paper concludes that “CPU voltage/frequency scaling … has the potential to be moderately effective at reducing peak power consumption once large groups of machines are considered.”
   b) Will any of the conclusions in the paper change if cooling provisioning (limitations) are taken into account.

6. (10 points) Describe (explain) the most important concept (technique) you learnt in the class. Justify your answer.

7. (5 points) In your opinion what is the biggest scientific (technical) advance that you think can revolutionize the field of computer architecture. Justify your answer.

8. (5 points) Give one suggestion to improve the class in the next offering. Justify your suggestion.