

1. Describe some differences between multicore and manycore processors.

Multicore processors have one/few but fast cores, while manycore processors have many but slower cores and the throughput of manycore processors are large. Manycore's cores can be simple and implement specific functions while multicore's cores are much efficient and powerful.

2. What is the no. 2 supercomputer in the Top 500 list currently?

Summit - IBM Power System AC922, IBM POWER9 22C 3.07GHz, NVIDIA Volta GV100, Dual-rail Mellanox EDR Infiniband, IBM

3. Which supercomputer in the Top 500 list has the greatest power efficiency in Gflops/watts? What is its power efficiency?

Selene in the Top 500 list has the greatest power efficiency in Gflops/watts.

$$efficiency = \frac{63,460 \times 10^3}{2,646 \times 10^3} GFlops/watts = 23.98 GFlops/watts$$

4. Give a definition of NUMA.

Non-uniform memory access is a memory design, where the memory access time is smaller if its location is closer relative to the processor.

5. What is the difference in latency between the L1 and the L3 cache? Use the estimates from the lecture to answer.

The latency of L1 cache is about 1 nanosecond and the latency of L3 cache is about 40 nanoseconds.