Assignment 0
Due on 2040-04-14. 00:00:00.

1. High performance computing is in general refers to the practice of
   a. Using very fast CPUs
   b. Using high-performance algorithms
   c. Improving a number of processors in parallel to solve a large problem
   d. Writing cache-aware programs

2. Which of these problems cannot be solved using HPC methods?
   a. Weather analysis
   b. Complex scientific simulations
   c. Finding perfect drug products
   d. None of the above

3. Cost of computation is defined as the aggregate of the run times of all the computers in a HPC system
   for solving a problem. As we increase the number of processors to get better solution in a
   HPC solution, the cost of computation
   a. Increases
   b. Decreases
   c. Remains same
   d. Cannot be computed

4. Parallel cost is obtained as multiplication of parallel computing time with number of processors.
   Parallel efficiency is defined as ratio of sequential computing time and parallel cost and is
   always less than one. The indicator that the speed-up is a, sequential time divided by parallel
   time is number of processors (cme) is
   a. Monotonically increasing
   b. Monotonically decreasing
   c. Sat. not
   d. Slopes less than 40°

5. Speed-up ratio of sequential time(parallel time) is always less than number of processors. In
   other words, if we increase number of processors to solve a problem, the computational time
   does not decrease by same factor. This is due to the following factor:
   a. Non-parallel load balancing
   b. Communication overhead
   c. Synchronization time
   d. Sequential component in the program

6. Which of these systems do not need to consider cache coherence?
   a. Shared memory multiprocessors
   b. CPUs
   c. Distributed memory clusters
   d. None of the above

7. Which programming API is not suitable for shared memory systems?
   a. OpenMP
   b. CUDA
   c. MPI
   d. None of the above

8. The performance of an HPC system in solving scientific computing problem is quantified in
   a. RAM size
   b. Processor speed
   c. Number of tasks executed concurrently
   d. Number of instructions executed per second (floating)

9. Which of these steps are present in a distributed memory parallel program but not in a shared memory
   program
   a. Task balancing or evenly distributing the tasks to different processors
   b. Communication across the processors
   c. Message passing across the processors
   d. None of the above

10. The fastest supercomputers are
    a. Distributed memory systems
    b. Hybrid CPU clusters
    c. Shared memory MIMD multiprocessors
    d. Hybrid CPU-GPU clusters