**Questions on Chapter 3**

1. Write lines of code to time a block of MPI code and report a single elapsed time.
2. Why at some point, the run-times of parallel program can start to get worse?
3. Sort 5, 9, 4, 3 using quick sort and using odd-even transposition sort.
4. Sort 15, 11, 9, 16, 3, 14, 8, 7, 4, 6, 12, 10, 5, 2, 13, 1 using parallel odd-even transposition sort (with and without lists’ merge) on four processors.
5. Write lines of code for computing the partner rank in odd-even transposition sort?
6. How to make the communication safe in the parallel odd-even sort program and show how the communication is safe within five processes?

**Questions on Chapter 4**

1. Describe two applications of barriers.
2. Give the implementation of a barrier using busy-waiting and a mutex, semaphores, and condition variables.
3. Reusing counter in barrier implementation using busy waiting is problematic, while it is not problematic when semaphores are used, explain why.
4. Use insert function to add 2, 8, 7, 5 to a linked list. Then, use member function to find 5 and 9. Finally, delete 5 from the list.
5. Executing concurrent multiple read and write operations on a linked list can cause problems. What are these problems and how they can be solved?
6. How read-write locks can be implemented?
7. Explain how matrix dimensions can affect the efficiency of matrix-vector multiplication program.
8. Give an example where incorrect program can produce correct result.