WEEK 4 ASSIGNMENT

1. Which of the following best describes 'speedup' in parallel computing.

A. The ratio of sequential execution time to parallel execution time
B. The increase in power consumption
C. The total number of processors used
D. The reduction in clock speed

Answer: The ratio of sequential execution time to parallel execution time

2. What is 'Amdahl's Law'.

A. A principle for optimizing cache usage
B. A formula to predict the theoretical maximum speedup in parallel computing
C. A method to increase memory bandwidth
D. A technique for improving input/output operations

Answer: A formula to predict the theoretical maximum speedup in parallel computing

3. Which of the following is an example of embarrassingly parallel tasks.

A. Tasks that require frequent synchronization
B. Tasks that can be easily separated into independent parts
C. Tasks that depend on the results of other tasks
D. Tasks that involve continuous communication

Answer: Tasks that can be easily separated into independent parts

4. Which of the following is a challenge in parallel computing.

A. Clock speed management
B. Heat dissipation
C. Load balancing
D. Static memory allocation

Answer: Load balancing

5. What is a 'race condition' in the context of parallel computing.

A. A situation where two or more processes compete for CPU time
B. A condition where the behavior of a system depends on the timing of events
C. A method for optimizing memory usage
D. A technique for increasing processing speed

Answer: A condition where the behavior of a system depends on the timing of events

6. OpenMP is used for.

A. Shared Memory Programming
B. Distributed Memory Programming
C. Both Distributed and Shared Memory Programming
D. None of these

Answer: Shared Memory Programming

7. Which directive is used to parallelize a loop in OpenMP.

A. #pragma omp parallel
B. #pragma omp loop
C. #pragma omp parallel loop
D. #pragma omp parallel for

Answer: #pragma omp parallel for

8. In the OpenMP execution model, what does the term "fork" refer to.

A. The point where the program starts
B. The creation of a single thread
C. The destruction of a team of threads
D. The creation of multiple threads by a single thread

Answer: The creation of multiple threads by a single thread

9. Which of the following best describes the "join" phase in the OpenMP execution model.

A. Threads are created and start executing
B. Threads finish their execution and rejoin the master thread
C. Threads are paused and waiting for synchronization
D. Threads communicate with each other

Answer: Threads finish their execution and rejoin the master thread

10. Which function in OpenMP is used to get the unique ID of a thread.

A. omp_get_num_threads()
B. omp_get_thread_num()
C. omp_num_threads()
D. omp_thread_num()

Answer: omp_get_thread_num()

11. Which function is used to set the number of threads in OpenMP.

A. omp_get_num_threads()
B. omp_get_thread_num()
C. omp_num_threads()
D. omp_set_num_threads()

Answer: omp_set_num_threads()

12. Which function is used to get the total number of threads in OpenMP.

A. omp_get_num_threads()
B. omp_get_thread_num()
C. omp_num_threads()
D. omp_set_num_threads()

Answer: omp_get_num_threads()

13. What is the role of #pragma omp parallel sections in OpenMP.

A. To create a critical section
B. To parallelize individual sections of code
C. To terminate a parallel region
D. To synchronize all threads

Answer: To parallelize individual sections of code

14. Which environment variable is used to set the number of threads in an OpenMP program.

A. OMP_NUM_THREADS
B. OMP_SET_THREADS
C. OMP_THREAD_COUNT
D. OMP_THREADS

Answer: OMP_NUM_THREADS

15. How does OpenMP handle parallel regions in its execution model.

A. By creating multiple parallel regions simultaneously
B. By creating a single parallel region and executing it repeatedly
C. By creating parallel regions dynamically as needed
D. By creating parallel regions only at the beginning of the program

Answer: By creating parallel regions dynamically as needed