S.P.P.U. External Practical Viva Questions and Answers

Name: HK

Viva Questions and Answers (Parallel Reduction using OpenMP)

1. What is the objective of your project?

Answer:

The objective is to find the minimum, maximum, sum, and average of an array efficiently by using parallel reduction techniques in OpenMP.

2. What is a reduction operation?

Answer:

A reduction operation combines all the values from multiple threads into a single result (e.g., sum, min, max) after parallel computation.

3. How is OpenMP used in this project?

Answer:

OpenMP #pragma omp parallel for reduction is used to perform min, max, and sum operations across multiple threads concurrently.

4. Which functions have you implemented?

Answer:

- min_reduction - finds minimum value.
- max_reduction - finds maximum value.

- sum_reduction - computes sum of all elements.

- average_reduction - calculates average of elements.

5. What reduction operators are used?

Answer:

- min: for finding the minimum value.

- max: for finding the maximum value.

- +: for calculating the sum.

6. Why do we need 'reduction' in parallel processing?

Answer:

Without reduction, concurrent updates to a shared variable would cause race conditions. 'reduction' ensures correct and thread-safe updates.

7. How is dynamic memory allocation used in your code?

Answer:

The array is dynamically allocated at runtime using 'new int[n]', allowing the user to enter any number of elements.

8. What is the initial value for min and max reduction?

Answer:

- For minimum: INT_MAX (highest possible integer).

- For maximum: INT_MIN (lowest possible integer).

9. Is there any error in your average calculation?

Answer:

Yes, the average should be calculated by dividing by n (total number of elements), not (n-1).

10. How can performance be further improved?

Answer:

- Minimize false sharing by proper variable scoping.

- Use optimized thread counts.

- Aggregate partial results before final reduction.

Best of Luck, HK!