DEPARTMENT OF INFORMATION TECHNOLOGY, NITK, SURATHKAL

Parallel Computing

Efficiency of Parallel Programs

The **speedup** is defined as the ratio of the serial runtime of the best sequential algorithm for solving a problem to the time taken by the parallel algorithm to solve the same problem on **p** processors.

The **efficiency** is defined as the ratio of speedup to the number of processors. It is a measure of the usage of the computational capacity.

Parallel efficiency is computed as **Speedup / p** where p represents the number of cores.

Q: How to compute sequential and parallel program execution times?

Ans:

Include the following header files in the program.

    #include <sys/time.h>

    #include<stdlib.h>

    //Declare the following variables

    Struct timeval TimeValue_Start;

    Struct timezone TimeZone_Start;

    Struct timeval TimeValue_Final;

    Struct timeval TimeZone_Final;

    long time_start, time_end;

    double time_overhead;

Just before starting parallel region code, note down the time (start time)

gettimeofday(&TimeValue_Start, &TimeZone_Start);

After finishing the parallel region, get the end time.

gettimeofday(&TimeValue_Final, &TimeZone_Final);

Calculate the overhead time as follows:

time_start=TimeValue_Start.tv_sec*1000000+TimeValue_Start.tv_usec;

// usec **is a microsecond**

time_end=TimeValue_Final.tv_sec*1000000+TimeValue_Final.tv_usec;

time_overhead= (time_end – time_start)/1000000.0;

printf("\n\n\t\t   Time   in   Seconds   (T):   %lf\n", time_overhead);

Note: Once Speedup is calculated from the above code, find out the Parallel efficiency using the formula given above.

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