

COEN 11 - Practice VIII

Solutions on Wednesday

1. Give an example of a situation in which using different threads for different tasks would be helpful.

2. Splitting the work -- calculate the value of π using N threads:
$$\pi = 4 \left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots + (-1)^n \frac{1}{(2n+1)} \right)$$

Algorithm:

```
double factor=1.0;
double sum=0.0;
for (i = 0; i < n; i++, factor = -factor)
    sum += factor / (2*i + 1);
pi=4*sum;
```

3. Splitting the data -- write a thread function to initialize int array x so that each element receives its index in the array: $x[i] = i$, and each thread initializes its portion of the array. Note that i relates to the entire array. The size of the array is N, and your program will execute with nthreads (which is a global value). Each thread receives an id between 0 and nthreads-1. Assume N is a multiple of nthreads.
4. Splitting the data -- write a thread function to initialize int 2D array x (NxN) so that each thread initializes its portion with i+j in each slot. Note that i and j relate to the entire array. Each thread operates on a strip independently, and your program will execute with nthreads (which is a global value). Each thread receives an id between 0 and nthreads-1. Assume N is a multiple of nthreads.