Homework 1 – Due 10:00 PM, Wed., Sept. 1

- To submit your homework:
  - Submit a PDF file
  - Use the "handin" program on the CADE machines
  - Use the following command:

    "handin cs4961 hw1 <prob1file>"

Problem 1:

- What are your goals after this year and how do you anticipate this class is going to help you with that? Some possible answers, but please feel free to add to them. Also, please write at least one sentence of explanation.
  - A job in the computing industry
  - A job in some other industry where computing is applied to real-world problems
  - As preparation for graduate studies
  - Intellectual curiosity about what is happening in the computing field
  - Other

Homework 1

Problem 2:

(a) Provide pseudocode (as in the book and class notes) for a correct and efficient parallel implementation in C of the parallel prefix computation (see Fig. 1.4 on page 14). Assume your input is a vector of n integers, and there are n/2 processors. Each processor is executing the same thread code, and the thread index is used to determine which portion of the vector the thread operates upon and the control. For now, you can assume that at each step in the tree, the threads are synchronized.

(b) The structure of this and the tree-based parallel sums from Figure 1.3 are similar to the parallel sort we did with the playing cards on Aug. 24. In words, describe how you would modify your solution of (a) above to derive the parallel sorting implementation.

Homework 1, cont.

Problem 3 (see supplemental notes for definitions):

Loop reversal is a transformation that reverses the order of the iterations of a loop. In other words, loop reversal transforms a loop with header

```
for (i=0; i<N; i++)
```

into a loop with the same body but header

```
for (i=N-1; i>=0; i--)
```

Is loop reversal a valid reordering transformation on the "i" loop in the following loop nest? Why or why not?

```
for (j=0; j<N; j++)
    for (i=0; i<N; i++)
        a[i+1][j+1] = a[i][j] + c;
```