ESE 566: Hardware/Software Co-Design of Embedded Systems
Project 4 (Fall 2003)

The goal of the fourth project is to (A) design and (B) implement a hardware/software partitioning algorithm. Following specific issues must be addressed in your project:

- The targeted architecture will include a processor and coprocessor communicating trough shared memory. The processor will be the one that you specified in SystemC in your project 1. You can select the coprocessor to be a DSP processor, FPGA, or ASIC.
- Your hardware/software partitioning method will consist of a cost function to guide the partitioning process and a partitioning algorithm.
  - In your report, please offer an intuitive explanation for the cost function you used in your project. Can you provide other means of validating the correctness of your cost function?
  - The partitioning algorithm will rely on an iterative optimization algorithm, such as simulated annealing or tabu search. How can you argument the optimality of your partitioning method?
- The report must include sufficient experimental results to motivate the correctness and efficiency of your hardware/software partitioning algorithm. Use synthetic examples with different number of tasks, task execution times, interconnectivities etc to experiment your algorithm.
- Discuss the results of your hardware/software partitioning method for a case study. It is highly desirable that the case study is based on the application you specified in second project. Please contact me if you decide to use another example for your case study. Your report should discuss the profiling (execution time, and area) you conducted for the case study.
- Your report must thoroughly present your entire activity and experience with the co-design activity. Your report should follow the structure of a conference paper and not exceed 8 pages.
  - Enumerate and explain the similarities between your method and other published hardware/software partitioning methods.
  - Please describe in detail the partitioning technique: cost function, algorithms, and data structures.
  - Details the experiments you conducted.
  - Discuss the results you obtained and explain the efficiency/inefficiency of your technique.
  - Are there any advantages and limitations you identified for the method?
  - How can you further improve the methods you presented?

Due date: December 16, 12 pm.