Objectives

There were two main objectives to our summer research:

- Develop a super-fast numerical equation solver in Java for large systems of equations
- Examine the speed advantages of utilizing parallel processing to solve these large systems of equations

Methods (cont’d)

Occurrence Matrices

- Occurrence matrices were used to model the equation sets by setting the value to true (1) for unknown variables in each equation

Methods (cont’d)

Blocking Algorithm

- The goal of this is to create a process which separates the equations into smaller blocks which can be solved independently when solved in a specific order. It outputs the blocks and the order.

Subsetting Algorithm within Blocking Algorithm

- The subsetting algorithm intelligently determines subsets of equations based on the variables. These can then be placed into the combination generator in order to find the blocks. The following graph shows the advantage of this method over a combination generator alone.

Methods (cont’d)

Layering Algorithm

- The layering algorithm uses the ordered output from the blocking algorithm and determines which blocks can be solved simultaneously on the same “layer,” based on shared variables between blocks and the solution order.