

Comparison between different Arc Consistency Algorithms

Suppose, you are given an integer number N , a set of domains D and a set of constraints C you need to compare the performance/run time of different Arc Consistency Algorithms ($AC - 1$ to $AC - 4$) according to the following way,

1. Initially take N as 5.
2. Generate a random graph of N nodes.
3. Select a constraint from C for each arc in the graph.
4. Run different Arc Consistency Algorithms ($AC - 1$ to $AC - 4$) to determine whether is it possible to assign a value to each node i ($1 \leq i \leq N$) under its corresponding domain, D_i such that the arc constraints satisfied.
5. Save the run time of each algorithm.
6. Follow step-2 to step-5, 20 times and take the average run time.
7. Increment N by 5 and follow step-2 to step-6 until N is greater than 50.
8. Plot a graph using the number of nodes in X -axis and average run time for each algorithm in Y -axis to show the comparison.

Constraints:

- Number of nodes, N ($5 \leq N \leq 50$).
- For each node i ($1 \leq i \leq N$), domain, D_i ($1 \leq D_i \leq 200$).
- Suppose, x_i is assigned to node i ($1 \leq i \leq N$). Set of constraints, C for any two adjacent node i and j ($1 \leq i, j \leq N$ and $i \neq j$) :
 - $x_i \neq x_j$
 - $x_i = x_j$
 - If $(i < j)$, $x_i < x_j$
 - If $(i < j)$, $x_i > x_j$
 - x_i and x_j are coprime
 - x_i and x_j are not coprime
 - $(x_i + x_j)$ is even
 - $(x_i + x_j)$ is odd