Summary of Measurements:

1. Constraint Checks and Runtimes:

- The table below shows snapshots, with one metric being the average constraint checks across three runtimes, unless the first runtime exceeds a specified constraint check limit for a method.
- Constraint check limits are set approximately based on the number of constraint checks an algorithm makes in 20 minutes.
- If checks exceed the limit, consider CPU time as greater than 20 minutes.

2. Observations:

- FC-CBJ with the dom/wdeg heuristic stands out as the best algorithm, solving all problems with the fewest constraint checks and CPU time in most challenging instances.
- In easier instances, other algorithms occasionally outperform FC-CBJ-dom/wdeg due to all algorithms performing well on simpler problems.
- MAC consistently performs the worst among the algorithms, regardless of heuristics.
- The dom/wdeg heuristic generally performs better than MRV, and notably, in unsolvable problems (UNSAT), it detects them with significantly fewer constraint checks and time than MRV.

3. Notes on Min-Con

- Min-Con was pre-implemented with max_steps=100,000, considered a reasonable number.
- In cases where problems are unsolvable (UNSAT), Min-Con lacks a way to recognize it, resulting in running all steps without finding a solution within them.

4. Observations on Min-Con:

- Min-Con couldn't solve any SAT instances within 100,000 steps, likely due to the large number of constraints and variables in RLFA problems.

Observations:

FC-CBJ with the dom/wdeg heuristic performs well, solving most SAT instances with the fewest constraint checks and CPU time.
MAC consistently performs poorly, especially in terms of constraint checks.
Some instances exceed the maximum steps for certain algorithms, indicating potential challenges in solving those specific problems.

These observations provide insights into the effectiveness of different algorithms and heuristics

Table

Table of Summary

Algorithm	Instance	Result	Constraint Checks	CPU Time (s)	Assignments
FC-MRV	2-f24	SAT	~20K	0.18	612
FC-MRV	2-f25	UNSAT	>40,000K (Exceeded)	-	-
FC-dom/wdeg	2-f24	SAT	~43.5K	0.34	410
FC-dom/wdeg	2-f25	UNSAT	>40,000K (Exceeded)	-	-
MAC-MRV	2-f24	SAT	~25K	27.185	207,520
MAC-MRV	2-f25	UNSAT	>1,000K (Exceeded)	-	-
MAC-dom/wdeg	2-f24	SAT	>100K (>40 mins)	0.13	401.6
MAC-dom/wdeg	2-f25	SAT	~22K	0.19	261
FC-CBJ-MRV	2-f24	SAT	~35K	0.13	401.6
FC-CBJ-MRV	2-f25	UNSAT	Max Steps Exceeded	-	-
FC-CBJ-dom/wdeg	2-f24	SAT	~22K	0.19	261
FC-CBJ-dom/wdeg	2-f25	UNSAT	Max Steps Exceeded	-	-
MIN-CON	2-f24	Max Steps Exceeded	-	-	-
MIN-CON	2-f25	Max Steps Exceeded	-	-	-