

**Project Title:** Sudoku Solvers

**Team Members:**

- Michael Richards - mrichards2021@my.fit.edu
- Jaden Krekow - jkrekow2021@my.fit.edu
- Alice Luce - pluce2021@my.fit.edu
- Adrian Rodriguez - adrianrodrig2019@my.fit.edu

**Faculty Advisor:** Raghuveer Mohan - rmohan@fit.edu

**Client:** Not Applicable

**Progress Matrix:**

To Do	Completion	Alice	Adrian	Jaden	Michael	To Do
Rules-Based visualizer	90%	90%	0%	0%	0%	Bug fixes
Bee Colony Search	90%	0%	80%	0%	10%	Algorithm has been finished but visualization with algorithm
Hyper Arc Consistency	95%	0%	0%	95%	0%	Convert console visualization into GUI visualization
Poster	100%	15%	60%	0%	15%	Added information relating to GUI, features, motivation, algorithm specific details, and references used

Run time	50%	20%	15%	15%	0%	Find out and fix inconsistency time taken with generation and solutions appearing on board
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1. Discussion of each accomplished task for the current Milestone:
  - a. Rules Based visualizer shows what each rule is looking at. It shows all possibilities the solver believes are in play and highlights when possibilities are ruled out.
  - b. Hyper-arc consistency bugs are fixed and correctly finds solution now. Visualizes in console by making initialized board cells grey, domain cells reduced (pruned) are yellow, values assigned to cells are green, conflict with assignments are red, and when a cell is backtracked it is highlighted orange.
  - c. Bee colony algorithm has been completed and now depicts at least 50 generations with 10 boards that scout for the best solutions. Each board has issues counted that violate board rules and the board returned is the board where 0 issues are found. Visualization is a bit tricky with how it uses multiple instances of the original board and we want it to visualize with the single board the user sees.
  
2. Discussion (at least a few sentences, ie a paragraph) of contribution of each team member to the current Milestone:
  - a. Alice Luce: Developed rules-based visualization including groundwork for additional visualizers to utilize notes
  - b. Adrian Rodriguez: Bee Colony Optimization is an algorithm we want added to our desired 5 available solution algorithms. The plan will be using the board with the best solution and having visualization done for that specific instance. Add the visible description boxes that describe the algorithms and what is being visualized.
  - c. Jaden Krekow: Hyper-arc consistency algorithm bugs fixed and correctly finds solution for boards that have few cells filled. Console visualization added for board with color coded numbers printed to signify different operations.
  - d. Michael Richards: Helped during the debugging process of Bee colony, and worked on adding information to the poster.

**Plan for the next Milestone:**

To Do	Alice	Adrian	Jaden	Michael
Poster		Touch up any needed details for poster		
Visualizer	Implement visualizer and description of algorithms for each implemented algorithm	Assist with visualization of algorithm on GUI	Implement functionality for Hyper-arc to GUI	Implement visualization for Dancing Links
Dancing Links Algorithm				Integrate and test dancing links algorithms
Hyper-arc Algorithm			Implement graph data structure without use of external library	
Bee Colony		Create a description and do bug fixes for bee colony optimization		Help with bug fixes and code review

1. Discussion (at least a few sentences, ie a paragraph) of each planned task for the next Milestone
  - a. Now more algorithms have visualizers than not, the focus will continue with additional work to add textual descriptions of each solver's current state during the visualizing.
  - b. The dancing links algorithm will be the final algorithm implemented and visualized for a feature-complete application
  - c. The hyper-arc algorithm is currently using an external library to create the directed graphs it operates off. This library does not allow the ability to retrieve a residual graph and therefore there is a chance the residual graph I build is partially redundant and would prevent discrepancies.
2. Date of meeting with Client during the current milestone:
  - a. N/A
3. Client feedback on the current milestone
  - a. see Faculty Advisor Feedback below
4. Date(s) of meeting(s) with Faculty Advisor during the current milestone:

- a. 3/24/25
- 5. Faculty Advisor feedback on each task for the current Milestone
  - a. Directed how algorithm visualization could be performed for hyper-arc algorithm and bee colony optimization.

6. Faculty Advisor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

----- on a separate page -----

Evaluation by Faculty Advisor

Faculty Advisor: detach and return this page to Dr. Chan (HC 209) or email the scores to pkc@cs.fit.edu

Score (0-10) for each member: circle a score (or circle two adjacent scores for .25 or write down a real number between 0 and 10)

Alice Luce	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Jaden Krekow	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Micheal Richards	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
Adrian Rodriguez	0	1	2	3	4	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10

Faculty Advisor Signature: \_\_\_\_\_ Date: \_\_\_\_\_