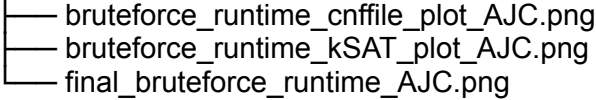


Project TeamworkTemplate

Version 1 9/11/24

A **separate copy** of this template should be filled out and submitted by each student, regardless of the number of students on the team. Also change the title of this template to “Project x Teamwork <team> - <netid>”

1	Team Name: AJC (originally ‘Andrew the Brute’)																		
2	Individual name: Andrew Cotaj																		
3	Individual netid: acotaj																		
4	Other team members names and netids: N/A																		
5	Link to github repository: https://github.com/AdrewC2026/Project1-TOC																		
6	Overall project attempted, with sub-projects: SAT, Brute Force																		
7	<p>List of included files (if you have many files of a certain type, such as test files of different sizes, list just the folder): (Add more rows as necessary)</p> <table border="1"> <thead> <tr> <th>File/folder Name</th> <th>File Contents and Use</th> </tr> </thead> <tbody> <tr> <td colspan="2">Code Files</td> </tr> <tr> <td></td> <td> <pre> ├── plot_final_runtime_AJC.py └── plot_runtime_AJC.py </pre> </td> </tr> <tr> <td colspan="2">Test Files</td> </tr> <tr> <td></td> <td> <pre> ├── input │ ├── 2SAT.cnf │ ├── cnffile.cnf │ └── kSAT.cnf </pre> </td> </tr> <tr> <td colspan="2">Output Files</td> </tr> <tr> <td></td> <td> <pre> ├── results │ ├── brute_force_2SAT_sat_solver_results_AJC.csv │ ├── brute_force_cnffile_sat_solver_results_AJC.csv │ └── brute_force_kSAT_sat_solver_results_AJC.csv </pre> </td> </tr> <tr> <td colspan="2">Plots (as needed)</td> </tr> <tr> <td></td> <td> <pre> ├── plots_AJC │ └── brute_force_runtime_2SAT_plot_AJC.png </pre> </td> </tr> </tbody> </table>	File/folder Name	File Contents and Use	Code Files			<pre> ├── plot_final_runtime_AJC.py └── plot_runtime_AJC.py </pre>	Test Files			<pre> ├── input │ ├── 2SAT.cnf │ ├── cnffile.cnf │ └── kSAT.cnf </pre>	Output Files			<pre> ├── results │ ├── brute_force_2SAT_sat_solver_results_AJC.csv │ ├── brute_force_cnffile_sat_solver_results_AJC.csv │ └── brute_force_kSAT_sat_solver_results_AJC.csv </pre>	Plots (as needed)			<pre> ├── plots_AJC │ └── brute_force_runtime_2SAT_plot_AJC.png </pre>
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	<div>  </div>
8	<p>Individual Student time (in hours) to complete:</p> <p>~10-11 hours</p>
9	<p>Your specific activities and responsibilities</p> <p>Worked independently = everything</p>
10	<p>What was personally learned (topic, programming, algorithms)</p> <p>As I played around with the instances of different variable sizes, it became apparent just how fast and how dramatically the runtime scaled as the number of variables increased. I initially thought my program was stuck or had a bug, but I then came to realize that the solver was doing exactly what brute force requires: checking all 2^n possible assignments. Even modest increases from 16 to 20 variables produced massive jumps in runtime, which helped me internalize why brute-force SAT is considered impractical and why SAT is a canonical NP-complete problem.</p>
11	<p>How team was organized, and what might be improved.</p> <p>Individual project - N/A</p>
12	<p>Any additional material:</p> <p>In <i>sat.py</i>, I included a limit variable for variable size so that there would not be excessively long times.</p> <p>Furthermore, all the programs have names of files hard-coded. Personally, I would have made it a bit more global so that names would not have to be changed across numerous files. I was unsure if this would go against certain project parameters however.</p>