Project 2 Teamwork Team Andrew - acotaj

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: **Team Andrew**
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/Project2-TOC
6	Overall project attempted, with sub-projects: **NTM Trace**
7	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)

File/folder Name	File Contents and Use
Code Files	
./src/ntm_tracer.py	**File providing functionality for NTM Tracer utilized by main.py** ***All other files (enrtypoint.py, main.py, and helper files were not changed)**
Test Files	
./src/input/a_plus.csv **./src/input/composite.csv** **./src/input/equal_01s.csv** **./src/input/ktape.csv** **./src/input/ntm_n1n.csv**	**Provided file - accepts string of as** **Provided file - accepts composite numbers** **Provided file - accepts string of equal number of 0s & 1s** **Included in Forked Repo - Different Topic** **Included in Forked Repo - Different Topic**
Output Files	
./aplus_aaa.png **./composite_111111.png**	**Photo showing output of running program with aplus.csv and input aaa** **Photo showing output of running program with composite.csv and input 111111**

	<table><tr><td>**./equal_01s_001011.png**</td><td>**Photo showing output of running program with equal_01s.csv and input 001011** ***these pictures were requested in Project 2 NTM Submission Assignment on canvas (photos will be submitted on that assignment and will also be in repository)**</td></tr><tr><td colspan="2">Plots (as needed)</td></tr><tr><td>**N/A**</td><td>**N/A**</td></tr></table>
8	Individual Student time (in hours) to complete: **~9-10 hours**
9	Your specific activities and responsibilities: **Worked independently - programming, debugging, verification, and authentication all done by me.**
10	What was personally learned (topic, programming, algorithms): **Through this project, I gained a deeper understanding of NTMs, specifically learning to visualize nondeterminism as a tree of configurations rather than a single linear path and calculating the degree of nondeterminism by analyzing branching factors. On the technical side, I improved my Python proficiency some more, particularly in parsing structured CSV files to dynamically build machine logic and utilizing collections.deque for efficient state management. Additionally, implementing the BFS algorithm was crucial for correctly exploring valid nondeterministic paths layer-by-layer to find the shortest accepting string, distinguishing it from the potential pitfalls of DFS in infinite trees.**
11	How team was organized, and what might be improved: **As I worked independently, I was responsible for the entire software lifecycle, including analyzing requirements, designing the BFS logic, implementing the CSV parser, and creating comprehensive test cases for complex logic like the prime number checks. I organized the workflow by breaking the project into manageable milestones, ensuring the basic "a_plus" machine was fully functional before scaling up to more complex behaviors. While working alone provided complete control over the code structure, having a teammate would have been significantly beneficial for testing, as a second pair of eyes could have helped verify execution traces and identify edge cases more efficiently.**
12	Any additional material: **N/A - Thank You for a Wonderful Class!**