CSC 520 Fall 2022
HW #1
25 points/5 extra credit points

Submit a .zip archive that can contain these files:

- A plain text .txt file that affirms the honor code. For individuals: `On my honor as an SFSU student, I, <name>, have neither given or received inappropriate help with this homework assignment.` For groups: `On our honor as SFSU students, we, <names>, have neither given or received inappropriate help with this homework ssignment. All group members participated in this work, and all concur with the submission.`
- A.jff file with your JFLAP TM solution for problem 1.
- A .py Python source code file with your answer for problem 2

Note that plain text files are fully readable by plain text editor such as vi or emacs. They are not .pdf or .docx or .rtf files.

1. **(12.5 points/5 extra credit points for a minimal correct solution. Include your JFLAP TM as a .jff file in the zip archive.)** $\Sigma = \{C,A,G,T\}$, $L = \{w : C^m s T^n, n=m\%2+1, s \in (A|G)^*, (m + n) > \#_G(s), s \neq \varepsilon\}$. Create a JFLAP TM that recognizes L. H1–test.txt contains test cases you may find helpful, and which can be loaded into JFLAP using the Load Input button in Multiple Runs. H1–test_results.txt gives expected results of those test cases (both files included with the test materials).

2. **(12.5 points. Include your solution as a .py Python source code file in the .zip archive).** The decision program Mod3 takes *P* and *I* as input, where *P* is the source code for a Python program, and *I* is any string. Mod3 outputs `'yes'` if |P(*I*)| % 3 = |*I*| % 3, and outputs `'no'` otherwise. That is, Mod3 accepts program/input pairs such that the length of the input mod 3 = the length of the output mod 3. For example, if someProgram(`'C'`) = `'CAGT'`, then Mod3(rf('`someProgram.py`'),`'C'`) = `'yes'` because |`'C'`| % 3 = |`'CAGT'`| % 3 = 1. And if someProgram(`'A'`) = `'GG'`, then Mod3(rf('`someProgram.py`'),`'A'`) = `'no'` because |`'A'`| % 3 ≠ |`'GG'`| % 3. Use Python to show that Mod3 is undecidable by using a reduction from yesOnString. **Please do not use someProgram in your proof**.