CSCI 338
Homework 5

Assigned 10/4/2022, due by start of class (3:05 pm) on 10/11/2022. Please submit this assignment to the appropriate dropbox on D2L. You must follow the collaboration policy detailed on the course website.

Problem 1 (5 points). Provide a high-level description of a TM that decides the following language: $L = \{\text{same number of 0's and 1's}\}$

Problem 2 (3 points). Read the following article on the Church-Turing Thesis:
`https://cacm.acm.org/magazines/2019/1/233526-the-church-turing-thesis/fulltext`
In several sentences, summarize the article. Also, provide an explanation of the Church-Turing thesis that would be understandable to someone without any computational/mathematical background.

Problem 3 (5 points). Let $DNA_{DFA} = \{\langle B, \omega \rangle : B \text{ is a DFA that does not accept } \omega\}$. Show that DNA_{DFA} is decidable.

Problem 4 (5 points). Let $ALL_{DFA} = \{\langle A \rangle : A \text{ is a DFA and } L(A) = \Sigma^*\}$. Show that ALL_{DFA} is decidable.