Department of Electrical Engineering and Computer Science

CIS 490/590 Foundations of Computing
Fall 2021
Assignment 4
(Due date: 11/17/21)

1. Construct a PDA that accepts the following languages: [7.5 points]

a) $L = \{vcv^R : v \in \{a,b\}^*\}$
b) $L = \{a^n b^m c^n : n,m \geq 1\}$
c) $L = \{a^n b^m c^{(n+m)} : n,m \geq 1\}$

2. Construct a Turing Machine for each of the following language: [10 points]

a) $L = \{ww : w \in \{a,b\}\}$
b) $L = \{a^i b^j c^k : i>j>k;\ k \geqslant 1\}$
c) 1's complement
d) 2's complement

3. Write Python program for a TM that implements the 1's complement of part 2. Then design a GUI that allows the user to enter the binary input and returns its 1's complement. [2.5 points]

What to turn in:
Submit your work through **Blackboard** as **one single** folder including:

- An `HTML` file called `index.html` that links to the overall summary of your answers.
- A folder called `CIS_490_590` that includes all files, program codes along with the supported files (if any), etc.

Notes:

- Late submissions will receive a penalty of 10% per day up to two days.
- No material will be accepted after two days past the deadline.
- Email submissions will not be accepted.