Computer Architecture
CS 325 - 001
Department of Physics and Computer Science
Medgar Evers College
Exam 2: Midterm Part A

Directions: Create an Exams directory and create the file `"midtermA.cpp"` within it. In the file write the functions below. Afterwards, upload your work to github.

Problem	Maximum Points	Points Earned
1	5	
2	5	
Total	10	

1. A simple circuit consists of the use of NOT-gates, AND-gates and OR-gates. It can be written as an infix arithmetic expression where the NOT-gate, AND-gate, and OR-gate are represented by the symbols !, & and | respectively.

   Write a string function named `ToPostFix()` that takes a string parameter. Given that the parameter represents an infix circuit expression, the function returns the expression written in postfix. The operands of the expressions should be represented by lowercase letters. If the expression is invalid (incorrect syntax), the function should return an empty string. Recall, the NOT-gate is a unary operator and the AND-gate and OR-gate are binary operators. The NOT-gate has higher precedence than both the AND-gate and OR-gate, but the AND-gate and OR-gate has the same precedence. Later expression are evaluated from left to right and parenetheses are valid in infix expressions. For instances, the call `ToPostFix("!a & b | !(c & a)")` will return `"a ! b & c a & ! |"`

2. Write a bool function named `EvaluateCircuit()` that takes a string parameter and a bool array parameter. Given that the string parameter is an postfix circuit expression and the bool array is the values of the operands of the circuit expression such that each letter corresponds to the index that is one less than its position in the alphabet, the function returns the evaluation of the expression with the given value from the array. The array can have at most 26 values and the operands of the expression must be lowercase letters. If the expression is invalid. the function should return false.