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CS 4050
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Assignment 1: Recursive Palindrome
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Documentation: Recursive Palindrome

Definition of the Problem

Develop a program that takes a custom user string and determines if the string is a palindrome or not. User's can choose to run a series of example cases to showcase the program, choose to input a custom string for analysis, or exit the program.

This program needs to analyze the string recursively (linear recursion), return the result of the analysis (true or false) and display the processing time for each tested string.

Inputs

For Initial Menu:

Run test cases

Test a custom string (input custom string)

Exit program

Outputs

Run test cases (Is test string a palindrome? True/False, processing duration)

Test a custom string (Is user input a palindrome? True/False, processing duration)

Exit program upon request

Pseudocode

RecursivePalindrome(class):

Main:

1. Initialize Scanner, palindromeChecker, testCaseRunner, and exit program(false).
2. Loop:
 - a. Display program title and user options (Run test cases, Check a custom string, exit)
 - b. Accept operation choice from user (1, 2, or 3)
 - c. If selection is 1 (Run test cases):
 - i. Start palindromeChecker
 - ii. Repeat loop
 - d. If selection is 2 (Check a custom string):
 - i. Display user prompt for input
 - ii. Accept user input
 - iii. Begin duration clock
 - iv. Start palindromeChecker with user input parameter
 - v. Stop duration clock
 - vi. Calculate duration
 - vii. Display "Is <userInput> a palindrome? <True/False>"

- viii. Display duration time "Processing time: <duration> milliseconds"
 - ix. Repeat loop
 - e. If selection if 3 (Exit):
 - i. Exit program
 - f. Display error if input is not 1, 2, or 3
 - i. Repeat loop
- 3. Close Scanner

PalindromeChecker(class):

1. Run preprocessor (isPalindrome) with user string parameter
 - a. Remove string of punctuation, special characters, and spaces
 - b. Convert string to lower case
 - c. Pass converted string to palindrome checker
2. Run palindrome checker (isPalindromeRecursive) with stripped string
 - a. Determine string length
 - b. Recursive Loop:
 - i. If string length is one or less:
 1. Return "true"
 - ii. If beginning character is not the same as the end character:
 1. Return "false"
 - c. Run recursion with next characters, repeat until return is "true" or "false"
 - d. Return result to isPalindrome
3. Return to Main

TestCaseRunner(class):

1. Define array of test strings
2. Loop:
 - a. For each item in test strings array:
 - i. Start duration clock
 - ii. Pass test case to PalindromChecker
 - iii. End duration clock
 - iv. Calculate duration
 - v. Display "Is <testString> a palindrome? <True/False>"
 - vi. Display "Processing time <duration> milliseconds"
 - vii. Repeat loop until all string are run
 - b. End loop and return to Main.

UML