CS2613: Programming Languages Laboratory (FR02A)
Lab #8 – Winter 2024

Language: Racket (#2)
# of Tasks: 3
Topics:

- Strings
- Lists
- Sets

*All tasks are to be completed individually in line with the academic offense guidelines detailed on the syllabus and are **due before the end of the lab period** unless stated otherwise.*

Submission Method for all Tasks: Self-Assessment (Found on D2L under Assessments > Quizzes). The test is open for the entire lab period so you can do the questions for a Task, keep the tab open, and move on to the next Task.

Task #1

Task Style: Programming w/ Self-Assessment

Description:

Write a function that takes a string as a parameter. The function should recursively determine if the string is a palindrome (return true) or not (return false). A palindrome a string that is the same forwards and backwards. If the string is empty or only contains a single character, it should be considered a palindrome. You may assume that lowercase and uppercase characters are separate characters for this problem: 'a' != 'A'.

Resources:

- The Racket Reference
  - 4.4
  - 4.6 - (char=?)
- Lists:
  - https://learnxinyminutes.com/docs/racket/

Example:

```
(palindrome "cs2613") = #f
(palindrome "racecar") = #t
(palindrome "hannah") = #t
```

Task #2

Task Style: Programming

Description:

Write a function that takes the following: a word, a key value, and a starting position (assume it will always be 0 on the first call) and returns a list of characters that have been encrypted using the Caesar cipher. For more information: https://en.wikipedia.org/wiki/Caesar_cipher

Assume that the key will never cause a character to go beyond the limits of the ASCII table (therefore there is no need for wrapping).

Example:
Word: “xyz” with a key of 3 becomes the list of characters: {, |, and } as these are the next characters in the ASCII Table. See examples below for more information about how it works.

Resources:

- The Racket Reference
  - 4.2
  - 4.6 – char->integer, integer->char

Test Case:

```
(list->string (cipher "abcde" 8 0)) = “ijklm”
(list->string (cipher "secret message" 10 0)) = “}om|o~*wo}}kqo”
```

Notice that I am using list->string to change the list of characters into a string.

Task #3

Task Style: Reflection
Submission Method: Part of the Self-Assessment for this lab ("Assessments > Quizzes").

Description:
In less than 5 sentences, describe the difference between a list and a set in Racket.

Resources:

- Understand the difference between a list and a set:
  - https://learnxinyminutes.com/docs/racket/
  - The Racket Reference: 4.10, 4.18