SENG2200/6220 –Programming Languages & Paradigms
Computer Lab for Week 11, Semester 1, 2020

Objectives

This lab aims to build the understanding and practice on Scheme programming. You may work on either

- Racket Scheme programming environment.
- Online environment e.g., : https://repl.it/repls/CoarseSaddlebrownComputergame

Questions

1. Write a function **max** which takes two numbers as input arguments and return the maximum number. Write the definition of this function in two ways.

2. Based on Q1 code, use **recursion** to find the maximum number of a list. (You may add other assistant functions if needed.)

3. What are differences between functions **let**, **let*** and **letrec**. Give examples to justify your answers.

4. What is the output of the following Scheme programs?
   a. ((lambda (a b c . z) (list a b c z)) 1)
   b. ((lambda (a b c . z) (list a b c z)) 1 2 3)
   c. ((lambda (a b c . z) (list a b c z)) 1 2 3 4)
   d. ((lambda (a b c . z) (list a b c z)) 1 2 3 4 5)
   e. ((lambda s (reverse s)) 1 2)
   f. ((lambda (s t) (+ s t)) 1 2)
   g. ((lambda (s t) (quote (+ s t))) 1 2)
   h. ((lambda (s t) (quasiquote (unquote (+ s t)))) 1 2)
   i. (apply + '(1 2 3 4))
   j. (map + '(1 2 3 4) '(5 6 7 8))

5. Write Scheme code to implement the factorial function.

6. Convert Q5 into a tail recursive function.