CS 270 Lab 1 (Introduction to Racket, DrRacket and Unit Testing)

Week 1 - Sept. 25 – Sept. 29, 2017.

Name 1:_____

Drexel Username 1:_____

Name 2:_____

Drexel Username 2:_____

Part I (25%)_____Part II (25%) _____ Part III (50%)_____.

Instructions: For this exercise you are encouraged to work in groups of two so that you can discuss the problems, help each other when you get stuck and check your partners work. At least one person in your group should have a laptop. Before beginning the lab, you must have DrRacket (goto racket-lang.org and click Download) installed. Also make sure the Racket language is selected, i.e. go to Language -> Choose Language -> The Racket Language

After DrRacket has been installed, click on the DrRacket icon

DrRacket should open and you should see a window with several menus and two panels that looks like

The top panel is called the definition window and the bottom panel the interaction window. Enter the expression (* 2 (+ 3 4)) in the interaction window and hit enter. You should see the number 14. You are now ready to begin the lab.

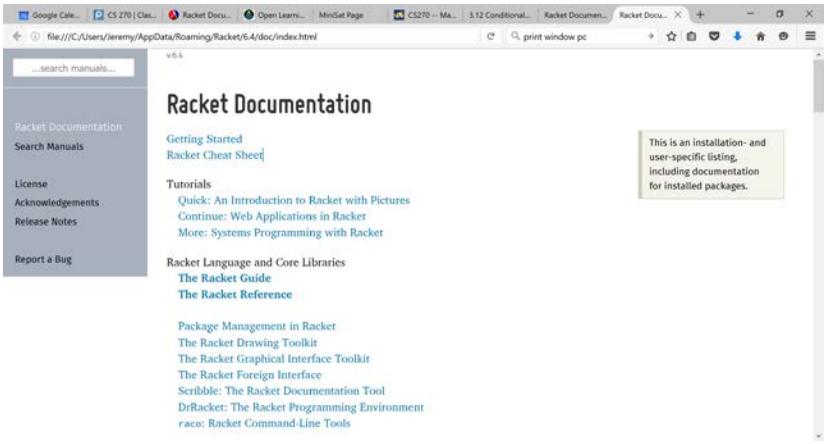
The purpose of Part I of the lab is to get familiar with Racket expressions and their evaluation. Enter the following expressions and observe the result. You will also see how to get information about Racket and Racket functions.

Part I.

1) (+ (* 2 3) (- 4 5))
2) (list 1 2 3)
3) (list (- 4 3) (- 4 2) (- 4 1))
4) '(1 2 3)
5) '(list (- 4 3) (- 4 2) (- 4 1))
6) (1 2 3)
7) null
8) '()
9) (cons 1 null)
10) (cons 1 (cons 2 null))
11) (cons 1 (cons 2 (cons 3 null)))
12) (first (list 1 2 3))
13) (second (list 1 2 3))
14) (third (list 1 2 3))
15) (rest '(1 2 3))
16) (first (rest '(1 2 3)))
17) (rest (rest '(1 2 3)))
18) (first (rest (rest '(1 2 3))))

19) (if (= (length '(1 2 3)) 3) "ok" "not ok")

To learn more about the functions cons, first, rest and the special form if, you can look in Racket documentation. Click on the Racket Help menu and select Racket Documentation. A web browser should open with the following page.



Enter cons in the …search manuals" text box and you will see a bunch of links to information about the function cons. Click on "cons" in the entry "cons provided from racket/base, racket" this is information about cons provided from the base Racket library. Similarly look up information about the if special form.

In this next part of the lab, you will add a definition to the Definition window, load and run the definition and then use the new definition in the interaction window.

Part II.

Enter the following definition into the definition window of DrRacket. Check this syntax of the definition by clicking the Check Syntax button. If the syntax is correct, click on the Run button.

(define (add1 x) (+ x 1))

After the definitions are loaded, enter the following expression into the interactions window.

(add1 3)

Add the additional function definition

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(define (fact n)
  (if (= n 0)
     1
     (* n (fact (- n 1)))))
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Notice how DrRacket keeps track of matching parentheses :) This will help you keep track of the parentheses and not miss a closing parenthesis. Click Run and try calling fact with several different input values.

In the next part of the lab, you will learn how to run unit tests in Racket and will review the sorting examples shown in the second lecture “Specifications, Testing and Formal Verification”.

Part III

Go to the course webpage and get the file lab1.rkt in the Labs section. Open the file in a text editor and quickly review the instructions in the file. This file is intended to be loaded into DrRacket (in fact, you can double click on it and it should open in DrRacket – alternatively once DrRacket is open you can load the file using Open in the File menu. Complete the questions described in the file. Make sure you save all of the modifications you make. The changes should be made in the Definitions window and you can save them using “Save Definitions” under the File menu.