CSC104 tutorial exercises #8
best before Friday, April 5th

NB: There are **2 pages** and no video for this exercise, and you may need to begin working on it before the morning of Friday April 5th. To help you complete your exercise, course TAs will be in computer labs BA3175, BA3185, BA3195 on Friday from 9:10 a.m. to 9:45 to answer questions. You may ask any of our TAs, not just the one for your section, for help. At 9:45, you will move to your own tutorial room (see the chart on next page) to write a brief quiz, closely based on one of the tasks.

1. Make sure that you have easy access to a computer running DrRacket, either your own machine or a workstation at CDF. This tutorial works better if your fingers are on a keyboard.

2. This exercise explores recursion. Try to make the 3 predictions below **before** typing the code into DrRacket. The key idea is to read the definition, replacing the placeholder L by the appropriate value — 3 or (list 3) or (list 1 2 (list 3)). The command (cons? L) produces true if L is a list, `false` otherwise.

```
; flatten : list -> list
(define (flatten L)
  (cond
    [(cons? L) (apply append (map flatten L))]
    [else (list L)]))

; predict what (flatten 3) does

; predict what (flatten (list 3)) does

; predict what (flatten (list 1 2 (list 3))) does
```

3. Now try to make the following predictions **before** you type the commands into DrRacket. Again, read the definition replacing the placeholder L by the appropriate value — 3 or (list 3 4) or (list 3 4 (list 5 6)). Read the previous question to find out what (cons? L) does.

```
; depth : list -> number
(define (depth L)
  (cond
    [(cons? L) (+ 1 (apply max (map depth L)))]
    [else 0]))

; predict what (depth 3) does

; predict what (depth (list 3 4)) does

; predict what (depth (list 3 4 (list 5 6))) does
```

Resources you may find useful:

My office hour: Fridays 3-5 pm, in BA4270 (Bahen 4270)

Your tutorial: Select Fridays 9:10. **Tutorials start in BA3175–BA3195** at 9:10, and then move to individual tutorial rooms for a quiz in the last 10 minutes. Tutorial sections are as follows:

Surname	Room	TA
Adalja–Chou	BA3175	Orion
Chun–Karalis	BA2135	Nahla
Kim–Luo	BA2139	Maria
Mahadevan–Quan	BA2145	Jessica
Rabie–Worden	BA2159	Yanshuai
Wu–Zhuang	BA2165	Oscar

DCS Help Centre: Monday–Thursday, 4–6 pm in BA2230, see Help Centre page.