CSC104 tutorial exercises #7
best before Friday, March 22nd

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 22nd. 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 the command **apply**. Type the following commands into the definitions pane of DrRacket, and then click the "run" button:

```
(require picturing-programs)

(define L1 (list 1 2 3 4 5))
(define L2 (list "how" "now" "brown" "cow"))
(define L3 (list
              (square 5 "solid" "green")
              (square 6 "solid" "blue")
              (square 7 "solid" "red")))
(define L4 (list 2 (square 5 "solid" "green")))
L1
(apply + L1)
(apply * L1)
(apply max L1)
L3
(apply above L3)
L2
(apply string-append L2)
L4
(apply scale L4)
```

Think about what you've seen above until you can predict, before typing them into DrRacket, what is produced by each of the following:

```
(apply + (list 2 3 4 5 6))
(apply beside (list pic:hacker pic:calendar))
(apply string-append (list "three" "blind" "mice"))
```

3. Now read the following code:

```
(require picturing-programs)

; t : number -> image
(define (t n)
  (cond
    [(> n 0) (overlay (t (- n 1)) (circle (* n 5) "outline" "red"))]
    [else (circle 1 "outline" "red")]
    ))
```

Predict what happens in the following cases before you try typing the code in and running it:

```
(t 0) ; Replace every "n" in the definition by 0

(t 1) ; Replace every "n" in the definition by 1
      ; use what you already know about (t 0)

(t 2) ; Replace every "n" in the definition by 2
      ; use what you already know about (t 1)

(t 3) ; Replace every "n" in the definition by 3
      ; use what you already know about (t 2)
```

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.