CS 2500, Spring 2012
Problem Set 2

Due date: January 23, 2012

Problem 1.

a) What is the value of:

```
(cond
  [(<= n 1000) .040]
  [(<= n 5000) .045]
  [(<= n 10000) .055]
  [(> n 10000) .060])
```

when *n* is (i) 500, (ii) 2800, and (iii) 15000?

b) What is the value of

```
(cond
  [(<= n 1000) (* .040 1000)]
  [(<= n 5000) (+ (* 1000 .040)
                  (* (- n 1000) .045))]
  [else (+ (* 1000 .040)
           (* 4000 .045)
           (* (- n 10000) .055))])
```

when n is (i) 500, (ii) 2800, and (iii) 15000?

Problem 2. Some credit card companies pay back a small portion of the charges a customer makes over a year. One company returns

a) .25% for the first $500 of charges,
b) .50% for the next $1000 (that is, the portion between $500 and $1500),
c) .75% for the next $1000 (that is, the portion between $1500 and $2500),
d) and 1.0% for everything above $2500.

Thus, a customer who charges $400 a year receives $1.00, which is 0.25 * 1/100 * 400, and one who charges $1,400 a year receives $5.75, which is 1.25 = 0.25 * 1/100 * 500 for the first $500 and 0.50 * 1/100 * 900 = 4.50 for the next $900.

Determine by hand the pay-backs for a customer who charged $2000 and one who charged $2600.

Define the function pay-back, which consumes a charge amount and computes the corresponding pay-back amount.

Use check-expect to formulate at least four tests for your function.

Problem 3.

a) The text function provided from 2htdp/image constructs an image that draws the given string, using the font size and color.

For instance:

(text "Hello" 24 "olive") produces the image

Develop a program that "grows" the image of “Hello World” using the text function on a 500 x 300 canvas. The image should be placed in the center of the canvas. Start the text size at 1 and stop growing when the size reaches 80.

b) Add a function that returns the text to size 1 when the mouse is clicked anywhere in the canvas. You can read about mouse events in DrRacket’s Help Desk—the on-mouse clause of big-bang is a good place to start.