CS 2500 - Lecture Notes 02

Wednesday, Jan 14

Overhead
Should have found the course site and done the reading by now.
Should have found the assignment by now.

Review
(+ 1 1)
(string-append "hello" "purple")

Naming Things
(define name thing)
(define three (+ 1 1))
(+ 1 three)
(define hello "Hello There")

Functions
(define (add-one x) (+ x 1))
(add-one 7)
(add-one three)
; comments
f(x) = 2x + 5? radius(c) = pi*r^2?

(define (join-words x y)
  (string-append x " " y)
(join-words "hello" "there")

Images
In Racket, you can paste images straight into your source code. They're a kind of value that we can work with just like numbers and strings.

The operations aren’t built in, so we need to pull in a library:
(require 2htdp/image)

(define ROCKET …)
Constant naming convention. The x in add-one is a variable.

(image-height ROCKET)
(image-width ROCKET)
Making donuts:
(overlay (circle 20 "solid" "white")
   (circle 40 "solid" "green"))

No donut command?
(define (donut size color)
   (overlay (... (/ size 2) ...) (... size ...))

(empty-scene 300 300)

(define dot (circle 20 "solid" "green"))
(define background (empty-scene 300 300))
(place-image dot 150 80 background)
tweak with 150, 80

Launching the Rocket
Now let's launch that rocket we had.

programming ~ creating the instructions that solve a (class of) problem(s)
computation ~ using the instructions for a specific problem
problem ~ we represent problems with data, numbers at first

We model problems with data. Models don’t have to be correct, just useful. Putting a man on the moon used an already-obsolete 300 year old model of the physical rules of the world.

If we want to launch the rocket, we need to model its motion.
We need a function that calculates its position over time: height(t) = f(t)
Assume constant speed of 8 meters/second.
(define (height t) …)
(height 0)
(height 40)
(check-expect (height 0) 0)
(check-expect (height 40) 320)
(define BG (empty-scene 300 800))
(define (draw-rocket t)
  (place-image ROCKET 150 (height t) BG))
(draw-rocket 40)

(require 2htdp/universe)
(animate draw-rocket)

Rocket went the wrong way. How do we fix it?