CS135 Tutorial 01

Substitution Rules

Repeatedly rewrite the leftmost eligible subexpression with one of the following substitution rules until a value or error is obtained:

1. `(f v1 … vn) => v`
   where `f` is a built-in function, `v1 … vn` are values, and `v` is the value of *f(v1 … vn)*.
2. `(f v1 … vn) => exp'`
   where `(define (f x1 … xn) exp)` occurs to the left, and `exp'` is obtained by substituting into the expression `exp`, with all occurrences of the formal parameter `xi` replaced by the value `vi` (for i from 1 to n).
3. `id => val`
   where `(define id val)` occurs to the left.

Implement a conversion function

Write a function `fahr->celsius` to convert degrees Fahrenheit to degrees Celsius.

$$C(F) = \frac{5}{9} * (F - 32)$$

Craft

The assignment says marks will be given for correctness and “craft”. Craft is defined as “the result of applying knowledge, skill, and care into creating a product”. What are the signs of “craft” in `supplies-cost`?

- Choosing meaningful identifier names – even better than the problem slide.
- Helper functions:
  - Easier to understand
  - Easier to debug
- Defined appropriate constants
- Documented what our code is supposed to do.
- Tested the code.
- Consistent indentation, helped by DrRacket’s indentation feature.

A02: Examples submission

- Starting with A02, you will need to submit examples by Friday morning.
- If we were to submit examples for what we did today, they would be:

```
(check-expect (fahr->celsius 32) 0)   ; freezing point of water
(check-expect (fahr->celsius 212) 100)  ; boiling point of water
(check-expect (fahr->celsius -40) -40)  ; cross-over point

(check-expect (supplies-cost 1 1 1 1) (* 3 5))
(check-expect (supplies-cost 2 1 1 1) 15)
(check-expect (supplies-cost 2 2 1 1) 20) ; 2 packs of binders
(check-expect (supplies-cost 2 0 0 0) 0)
```

- The goal is to ensure you understand how to do the problem yourself before the weekend.

Buying supplies

A teacher is buying school supplies for their classroom of *n* students. Each student needs *b* binders, *m* markers, and *p* pens. What is the cost of the supplies?

The supplies come in packs of a specific size: 3 binders per pack, 8 markers per pack, and 7 pens per pack. Each pack costs $5.

Define `(supplies-cost n b m p)` to calculate the cost of purchasing `b` binders, `m` markers, and `p` pens for each of the `n` students.