

Tutorial 2

- Quick review of C syntax
- Implementing a few functions
- Recursion in C

My first C programs

All we have so far is:

- `int` types
- simple functions
- `main` with only `trace_int`

Let's try using them in Seashell by implementing the factorial function:

```
// factorial(n) calculates the value of n! (n factorial)
// requires: n >= 0
```

Practice Problem 1:

Define, Document and Test Ceil Function

Define the following C function:

```
// ceiling(a, b) calculates the value of a / b  
// rounded up to the nearest integer  
// requires: a >= 0, b > 0
```

Practice Problem 2

Translating Racket to C

Translate the following Racket function to C:

```
;; (sumpow n pow) sums up  $i^{\text{pow}}$  with  $i$  from 0 to  $n$   
;; sumpow: Nat Nat -> Nat
```

```
(define (sumpow n pow)  
  (cond [(zero? n) (expt 0 pow)]  
        [else (+ (expt n pow)  
                  (sumpow (sub1 n) pow))]))
```

Practice Problem 3

Printing a Rectangle

Write the following C function

```
// rectangle() asks the user for two integers, width and
// height. A rectangle with these dimensions is printed.
// requires: width, height >= 1.
```

Example:

```
// IN: width = 4, height = 3
```

```
// OUT:
```

```
*****
```

```
*****
```

```
*****
```