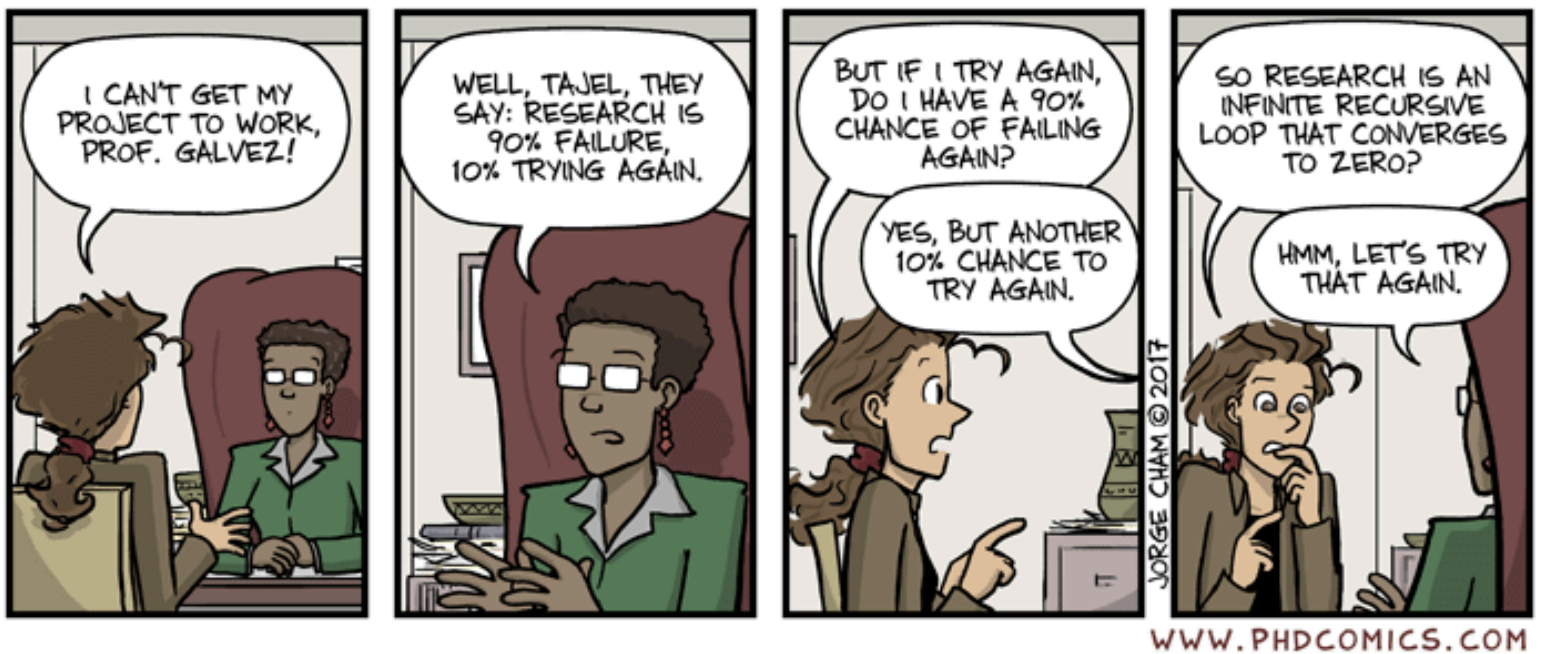
Meeting 05 - Recursion

Bor-Yuh Evan Chang

Tuesday, September 10, 2024

Meeting 05 - Recursion



In-Class Slides

In-Class Jupyter

Book Chapter

Announcements

- HW 1 + Quiz 1 was due ~~Friday 9/6~~ Monday 9/9 6pm
  - How was it? Do you want to go over parts of it?
- Lab 1 due this Friday 9/13 6pm
  - Use GitHub and VS Code: Submit `Lab1.scala`. Just read Jupyter notebook or use it for scratch work.

Announcements

- A proposal: Lawrence (CM) will come to the classroom (ECCR 265) 1:45-2 and 3:15-3:30 for his “administrative office hours” so that you can more easily get your administrative issues resolved.
- A proposal: Would you go to evening review sessions run by your CAs? Think: an extra, optional recitation to review a planned topic (e.g., go over solutions to a past assignment, do extra practice on a difficult topic)

Announcements

- Bug in assertion for `eval` on `0 / 0` test in `Lab1Spec.scala`.
  - If you accepted the assignment to create your homework repo after 1:30am this morning, you have the updated version.
  - If you have the old version, the easiest way to update is to download the new version from https://github.com/csci3155-f24/pppl-lab1/blob/main/src/test/scala/jsy/lab1/Lab1Spec.scala.

Today

- Triage Your Questions
  - HW1?
- Preview Lab 1 (using coding.csel.io)
- Questions on Binding and Scope: A Scala crash course.
- Parts of Data Types: A Scala crash course.
- Recursion: A Scala crash course.

Your Questions?

- Review:
  - How do *environments* (type or value) relate to *scope*?
  - What is `Nil`, `::`, and `foreach`?

Your Questions?

Factorial

Factorial: Some Evaluation Steps

Factorial: Pattern Matching

Factorial: Preconditions

Factorial: Tail Recursive

Tail-Recursive Factorial: Some Evaluation Steps

Tail-Recursive Factorial

```
factorial(n = 3)
-->* loop(acc = 1, n = 3)
-->* loop(acc = 3, n = 2)
-->* loop(acc = 6, n = 1)
-->* loop(acc = 6, n = 0)
-->* 6
defined function factorial
res9_1: Int = 6
```

Exercise: Exponentiation

Exercise: Tail-Recursive Fibonacci

```
defined function fibonacci
res13_1: Long = 13L
```