

Final assignment: functional programming essay

In lieu of a final exam this year, we're instead going to have a longer essay over functional programming, the main focus for the second half of the semester.

First, I've posted two articles on our webpage, "Why Functional Programming Matters" and "Can functional programming be liberated from the von Neumann style?". You don't need to read these closely, but I've posted them so you can see some of the early arguments for the development of the functional paradigm.

Then, for your essay, I'd then like you to go find a serious application of functional programming, either in industry or academia. I know of several - Haskell is used by Facebook in its anti-spam system, as well as a bunch of other companies: https://wiki.haskell.org/Haskell_in_industry. The company WhatsApp uses Erlang, another strong functional language. Scala is reportedly used at Twitter, LinkedIn, and Foursquare, among others. On the academic side, there's an entire journal on theory and applications of functional programming: <https://www.cambridge.org/core/journals/journal-of-functional-programming>. All of these reflect a rising trend of functional programming, for a variety of different reasons.

Pick one of these (relatively recent) applications of functional programming, and learn more. (Note that this will require some internet hunting, so you can find good sources!) I'm leaving this flexible, so you can hopefully find something that you are interested to learn more about. You can grab an academic paper describing an application, or look for an open source tool with documentation and/or history posted, or find a company that is open about their product and choices - or even some combination of these that address the same basic usage or functionality. It might be easier to pick one using Haskell, but you're welcome to pick something different if you prefer - it just has to be a serious use of a functional language.

Once you select it, summarize and describe the company and/or purpose of the project you chose. What functional language are they using, and why do you think they chose to use a functional paradigm versus more standard ones? Are there advantages they get from their exact choice of functional language, or strong historical reasons? Do you agree or disagree with their choice, and why? What challenges have they identified and worked around?

Specific things to include:

- Please begin the essay with a VERY clear description of your choice, as well as several reputable references backing up your description of it. (i.e. Don't just invent something!)
- I also expect a clear opinion before the end - do you agree with or find flaws in their choice?
- I'm hoping for a certain amount of technical description in here; you don't have to answer all of the questions above, but hopefully they give you some ideas.
- You are welcome to draw from our own use of Haskell and other languages covered in the class, or use the two essays I've posted, if they help you understand and make an evaluation.
- As always, editing and grammar is also graded! If you need help with copy edits, remember that the writing center is still around! See https://www.slu.edu/life-at-slu/student-success-center/pdfs/writingservices_spring2020_covid19.pdf
- In the end, I expect at least 1500 words (so at least 3 pages); you can go longer if needed, although this is NOT meant to be a 15 page final report! Rather, you're shooting for a short technical analysis and opinion piece. Please do include citations from your references, to show where you got your information.