Homework 09, CPSC-4175

Chapter 02, Object-Oriented and Classical Software Engineering

October 10, 2017

1. The book depicts an ideal software process as a linear flow, like this:
   Requirements ⇒ *Analysis* ⇒ *Design* ⇒ *Implementation*
   The book then notes that "software development is considerably different in practice[.]" Which reason do you think is more important for this difference, human error or changing requirements? Why?

2. What do you think that the book means when it says that "the waterfall model, which was first put forward in 1970, is iterative (but not incremental)?"

3. Using the book's explanation of *stepwise refinement*, relate an account from your previous personal experience when you used this type of development model. This does not have to be software related. Were you successful in your development? Why or why not?

4. Looking at figure 2.4 in the book, you see that the Requirements workflow ceases at some point early in iteration 3, while the Test workflow runs from the very beginning of iteration 1 and ends at the very end of iteration 4. Make the case that the Requirements workflow should occur in all iterations. Make the case that the Test workflow should not begin until iteration 2 at the earliest.

5. **Iterative and Incremental Model** The book notes that "each iteration can be viewed as a small but complete waterfall model." This is sometimes called the cascade model. Think about your experience in building your class project. How would you explain the iterative and incremental model to a young programmer who asked you how it worked. This question calls for a reflection on your experience, not a textbook answer. (Note that the iterative and incremental model and the spiral model are *not* the same thing — in this class we are using the spiral model.)

6. The book notes that "[a] critical point regarding the waterfall model is that no phase is complete until the documentation for that phase has been completed[.]" Do you agree with this statement? If this statement were true, what changes in your personal process would you make to conform to this dictate?

7. The book discusses nine process models:

   (a) Evolution-tree Life-cycle Model
   (b) Iterative-and-incremental Life-cycle Model
   (c) Code-and-Fix Life-Cycle Model
   (d) Waterfall Life-Cycle Model
   (e) Rapid-Prototyping Life-Cycle Model
   (f) Open-Source Life-Cycle Model
   (g) Agile Processes
   (h) Synchronize-and-Stabilize Life-Cycle Model
   (i) Spiral Life-Cycle Model

   Of these seven, which do you think fits most closely with the software development process you think you would feel comfortable with? What is it about this process that appeals to you?

8. This question is semi-optional — I don't expect you to spend more that 15 minutes answering this, and I'll be very lenient in grading this question. Open the paper *Recursive Functions of Symbolic Expressions and Their Computation by Machine, Part I*, which is *recursive.pdf* in the PDF directory of my Github account. Read Part 2 **only**, pages 2 to 8. I won't ask you to study this paper, to do so would be an onerous assignment in itself. Write a one paragraph appreciation of Part 2. Those of you who are mathematically inclined may find that this suits your taste. For those of you who aren't, this is an essential paper that you should at least have seen, even if you don't have much patience with the mathematics.