

Formative Exercise 1. (Optional)

2014

- The marks given for this exercise *do not* form part of the marks for the module.
- Submit your answers *electronically*¹ at the latest by 12:00 Friday week 6 (Nov 7) you may submit any time earlier than that. Any late submissions *may* be marked if resources allow.
- Solutions submitted by the deadline will be marked and be available for you to collect in the Autumn week 8 Friday practical sessions.

Exercise 1 Write an essay, of approximately 1000 words² (*not* including program code, title, abstract or bibliography), with the following specification:

Title:

Comparison of Evaluation Strategies in Programming Languages

Abstract Expressions in programming languages are either ‘primitive’ or ‘compound’. In the latter case, the sub-expressions can themselves be primitive or compound. It is therefore important to understand the ways in which the sub-expressions are evaluated. There are two main methods for sub-expressions evaluation: *normal-order* and *applicative-order*.

This essay will firstly explain these two strategies, comparing their similarities and differences. The uses of the two methods will be discussed, illustrating these with examples from actual programming languages. Finally, the essay will conclude with a critical summary of the pros and cons of applicative-order and normal-order evaluation.

Notes

1. Start your essay with the *exact* title and abstract as given above.
2. Use the principles of writing that were taught in the Stage 1 SKIL module.
3. Full references, properly formatted, to sources of material *must* be given.
4. No more than half of the items in your bibliography can be to URLs alone — the others must be to ‘printed’ sources.³
5. *SICP*[1] gives a good introduction to the topic, so you might start from there. However, you *must* draw on other, fully-referenced, sources.
6. You *must* include appropriate program illustrations from at least *two* different programming languages, and these must all be syntactically correct. These illustrations should *not* be counted as part of the 1000 words of the essay.

¹<http://www.cs.york.ac.uk/student/assessment/submit/>

²About 2 typed (10pt), single-spaced, A4 pages

³That is: text-books, published papers, technical reports, programming language manuals etc.

7. In order to pitch the essay at the correct level, you should assume the reader has the technical knowledge of a typical CS student just starting Stage 2, who has not yet attended the POPL module.

Marking

Points for which marks will be given include:

- Clarity of explanation.
- Quality and choice of references.
- Appropriate program examples.
- Quality of argument
- Clarity of essay structure.
- Quality of the conclusion.

Penalties will be applied:

- If the word count is significantly higher or lower than required. Wordcounts within $\pm 10\%$ will not receive a penalty.
- If fewer than 2 programming languages used.
- If more than half of the references are URLs.

□

References

- [1] H. Abelson, G.J. Sussman, and J. Sussman. *Structure and Interpretation of Computer Programs*. MIT Press, 1985.