PPL 2021 Assignment 2

Q1.1

Why are special forms required in programming languages? Why can’t we simply define them as primitive operators? Give an example

Q1.2

Write a program in L1, containing more than one expression, where the evaluation of the program’s expression can be done in parallel (e.g., the interpreter can run a thread for each expression evaluation). Write a program in L1, containing more than one expression, where the evaluation of the program’s expression cannot be done in parallel.

Q1.3

Let us define the L0 language as L1 excluding the special form ‘define’. Is there a program in L1 which cannot be transformed to an equivalent program in L0? Explain or give a contradictory example

Q1.4

Let us define the L20 language as L2 excluding the special form ‘define’. Is there a program in L2 which cannot be transformed to an equivalent program in L20? Explain or give a contradictory example

Q1.5

For the following high-order functions in L3, which get a function and a list, indicate (and explain) whether the order of the procedure application on the list items should be sequential or can be applied in parallel: - map - reduce - filter - all (returns #t is the application of the given boolean function on each of the given list items returns #t) - compose (compose a given procedure with a given list of procedures)

Q1.6

Regarding L31 language, as defined in Q3b (below): what is the value of the following program?