Programming Language Compilation

Suggest how you would represent Lambda-expressions in a form suitable for a simple Lambda-evaluator in which the environment is represented as a linked list of name-value pairs. [5 marks]

Outline the design of the evaluator, paying particular attention to the treatment of bound variables, abstractions and applications. [5 marks]

Augment your evaluator to cope with sufficient expression operators, including a built-in version of the Y operator so that when the evaluator is given the abstract syntax tree for

\[ Y (\lambda f. \lambda n. \text{if } n=0 \text{ then } 1 \text{ else } n*f(n-1)) \]

it will yield 120. [10 marks]