

Lazy Lists Implementation Report

Big Step Semantics:

$$\begin{array}{l} \mathcal{E}; \mathcal{S}; M \Downarrow N; \mathcal{S}' \quad (M \text{ evaluates to } N \text{ in environment } \mathcal{E} \text{ and store } \mathcal{S}) \\ \hline \mathcal{U} = \text{"[unevaluated] LazyCons"} \\ \mathcal{E}; \mathcal{S}; \text{lcons}(M, N) \Downarrow \mathcal{U}; \mathcal{S} \end{array}$$

$$\begin{array}{l} \mathcal{E}; \mathcal{S}; M \Downarrow \text{lcons}(A, B); \mathcal{S}_1 \\ \mathcal{E}; \mathcal{S}_1; A \Downarrow V_A; \mathcal{S}_2 \quad \mathcal{E}; \mathcal{S}_2; B \Downarrow V_B; \mathcal{S}_3 \\ \mathcal{E}[x \rightarrow V_A][L \rightarrow V_B]; \mathcal{S}_3[M \rightarrow \text{cons}(V_A, V_B)]; R \Downarrow \mathcal{U}; \mathcal{S}_4 \\ \hline \mathcal{E}; \mathcal{S}; \text{match } M \{ \text{nil} \rightarrow N \mid \text{cons}(x, L) \rightarrow R \} \Downarrow \mathcal{U}; \mathcal{S}_4 \end{array}$$

Code Implementation:

To implement the Lazy Lists in the project I created the VLCons, to represent the value of a Lazy List, different from the VCons, which only represents the regular lists.

I also updated ASTMatch and the ASTCons to implement the lazy lists and their behaviour when being used and evaluated.

To make sure that when a Lazy List is accessed in a match, it creates a normal list, I made it so that VLCons, when VLCons.lazyeval() is called, it returns a new VCons with the evaluated head and a new VLCons in the tail.