

Homework set 15: Larger programs in the λ -calculus — due Thursday 5 April

Total number of points available on this homework is 100. Full credit is equivalent to 100 points.

Use your λ -calculus evaluator to test the programs you develop here. Report how fast the evaluator works for different inputs or input sizes. (Take into account that with a unary representation, different numbers have different sizes.)

1. (30 pts.) Implement the factorial function over Church numerals. (Use the **Y** combinator.)
2. (70 pts.) Implement a list merge-sort algorithm. It should be a direct translation of the ML program `mergeSort` from Ullman, page 83 (also see `merge`, page 68). Sort some lists of Church numerals.