

Comp 314 — Worksheet (Week 3)

1 Classwork

- Write a define-type definition for the λ -calculus. You can use the grammar below:

$\Lambda \rightarrow i$

$\Lambda \rightarrow (\Lambda \Lambda)$

$\Lambda \rightarrow (\lambda i \Lambda)$

- Now design and code a **fully tested** parser for λ -calculus.

Project 2

DEADLINE: 0900 MONDAY, MAR 07

IRRELEVANT CODE WILL BE PENALISED¹ IN PROJECT SUBMISSIONS.

2 Reading

Read, solve problems from, and be prepared to discuss and answer questions on, Chapters 3, 4, 5 & 6 of PLAI² in your class.

3 Assignment

Using your data-type and parser from class, design and code functions which take fully bracketed λ -expression and produce:

²Programming Languages Application and Interpretation
<http://www.cs.brown.edu/sk/Publications/Books/ProgLangs/2007-04-26/>

- list of the unique symbols in a λ -expression.
- list of the symbols which appear as formal parameters.
- list of free identifiers
- list of bound identifiers.

Now design and code a function that takes WAE expressions and produces WAED expressions in which the identifiers are replaced with deBruijn indices. You will need to define a new abstract syntax for the deBruijnized WAED form.

Your WAE and WAED expressions should be for the multiple binary operator form that we designed in the lectures, not the version in the PLAI book.