

Serie 7 - Denotational Semantics

Exercise 1

Answer the following questions:

- What is the difference between syntax and semantics?
- How can you specify semantics as mappings from syntax to behaviour?
- Does the calculator semantics specify strict or lazy evaluation?
- Does the implementation of the calculator semantics use strict or lazy evaluation?
- Why are semantic functions typically higher order?

Exercise 2

Consider a language of decimal numerals. The numeral '**123**' is intended to denote the number **123**, and '**876**' to denote the number **876**. We define the *syntax* of decimal numerals as:

```
N numeral ::= Digit
           | Numeral Digit
Digit ::= 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9
```

Define the semantic functions and the domain of this language. As a test evaluate '**876**'.