Tutorium Funktionale Programmierung 2021

Part 2 -Trees and Datatypes

VO - *Tree Shaped Data and Datatypes*

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Live questions

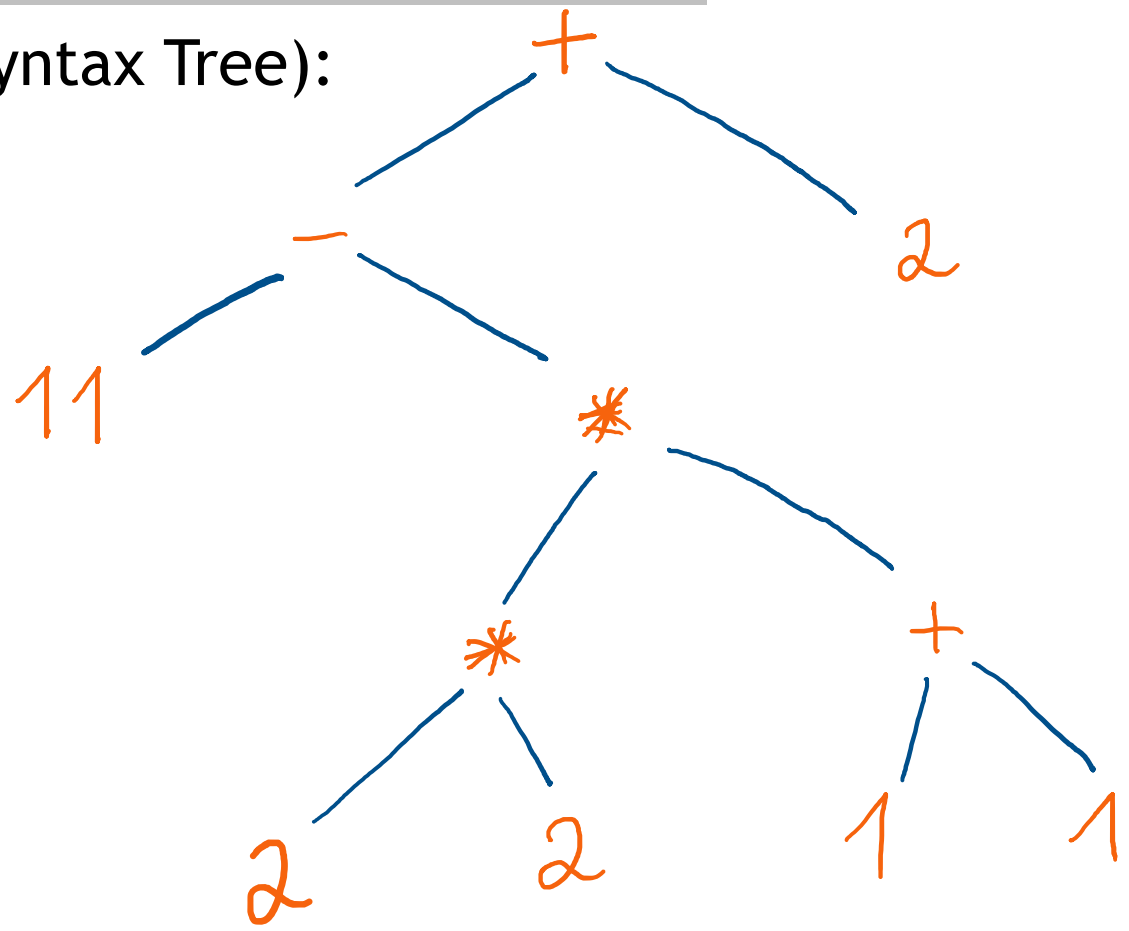
- Arsnova
- Session: 52 44 42 56

Exercise 2.1: Tree Example of a Mathematical Expression

Fill out the missing part

Expression:

AST (Abstract Syntax Tree):



Fill out the missing part

Expression:

func True True || False && False

AST (Abstract Syntax Tree):

Exercise 2.2: Abstract Syntax Tree

- *square x = x *x*
- *sum x y z = x + y + z*

Draw the *abstract syntax tree* (AST) of

square (sum 1 (2+1) 3)

Enumerations

"a **data type** where none of the
constructor functions have any arguments"

```
data Wert = One | Two | Three | Four deriving Show
```

- Give an example with a type we already know?
- What are the **data constructors**?
- What does ***deriving Show*** mean?

Ref. : https://en.wikibooks.org/wiki/Haskell/More_on_datatypes

Exercise 2.3: Enumerations

You want to create a new enumeration called **Grade**. This enumeration consists of the constructors *Excellent*, *Average*, *Poor* and *NotPossible*.

Exercise 2.4: Datatype

Create a new datatype *TrafficLight* with the constructors *Red*, *Yellow* and *Green*. For each colour the time period between the on and off period should be considered (Int or Integer).

Exercise 2.5: Datatypes Continued

Fill out the missing parts

Define new datatypes

- `data Month = January | February | March | April | May | June | July | August | September | October | November | December deriving Show`
- `data Year = Year Integer deriving Show`
- `data Day =` 
- `data Date =` 

?

Use the new datatype *Date* to express 18.02.1996

?

Questions? Need help? Feedback? etc.

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