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>>> Functional Programming  
>>> Using the example of Haskell
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Date: 20. January 2020
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>>> Overview

1. Introduction

2. Main differences to imperative programming

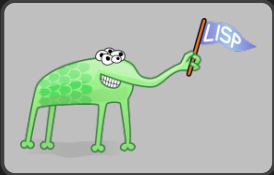
3. Examples

4. Fields of Application

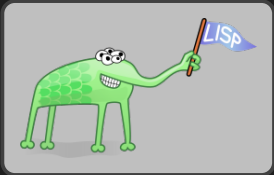
5. Conclusion

>>> Languages

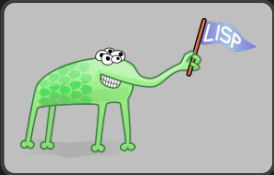
>>> Languages



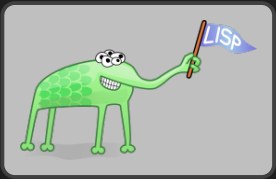
>>> Languages



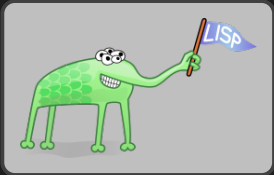
>>> Languages



>>> Languages



>>> Languages



>>> Core Concepts

- * Purity

- * Non-imperativeness

- * First Class Citizenship

- * Closures

- * Lambdas

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A function definition can take place without an explicit name in the position of a function symbol.

```
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```

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>>> Examples

```
sq :: (Floating a) => a -> a
sq x = x * x
```

```
ringArea :: (Floating a) => a -> a -> a
ringArea r1 r2 = pi * (sq r1 - sq r2)
```

```
fib :: Integer -> Integer
fib 0 = 0
fib 1 = 1
fib n = fib (n - 2) + fib (n - 1)
```

>>> Advanced Example

```
gifts :: [String]
gifts =
  [ "And a partridge in a pear tree!", "Two turtle doves,", "Three french hens,"
  , "Four calling birds,", "Five golden rings,", "Six geese a-laying,"
  , "Seven swans a-swimming,", "Eight maids a-milking,", "Nine ladies dancing,"
  , "Ten lords a-leaping,", "Eleven pipers piping,", "Twelve drummers drumming,"
  ]
```

```
days :: [String]
days = [
  "first", "second", "third", "fourth", "fifth", "sixth", "seventh", "eighth",
  "ninth", "tenth", "eleventh", "twelfth" ]
```

```
verseOfTheDay :: Int -> String
verseOfTheDay day =
  "On the " ++ days !! day ++ " day of Christmas my true love gave to me... \n"
  ++ concat (map (++ "\n") [dayGift day d | d <- [day, day-1..0]]) ++ "\n"
  where
    dayGift 0 _ = "A partridge in a pear tree!"
    dayGift _ gift = gifts !! gift
```

```
main :: IO ()
main = putStrLn (concatMap verseOfTheDay [0..11])
```

>>> Fields of Application

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- * Big Data

>>> Fields of Application

- * Big Data
- * Finance Sector

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- * Finance Sector
- * Science

>>> Fields of Application

- * Big Data
- * Finance Sector
- * Science
- * Virtually everywhere

>>> Literature recommendations

- * Learn you a Haskell for Great Good!
- * Real World Haskell
- * Parallel and Concurrent Programming in Haskell
- * The Haskell School of Music

Thank you for your attention!

This presentation is available for download at:
<https://github.com/nek0/presentation-fp-haskell>