

Tutorium Funktionale Programmierung 2019

Part 6 - Type-Classes, Typing Algorithm, Guarded
Equations, Tuples and Maybe

VO - Part 3

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Exercise 6.1: Type-Classes and Tuples

The following type is given

```
data Employee = Id Integer | Person Integer Integer Integer deriving (Show)
```

SVN age Number of
 days in
 company

An employee of a company can be identified by his or her company id or some information about the person. The id can be calculated using the (simplified) hash function f .

$$Id = (SVN + age + numberOfDaysInCompany) \bmod 999331$$

Make the type *Employee* instances of the class *Eq*. **AND only implement the minimal definition** of *Eq*.

Exercise 6.1: Type-Classes and Tuples

CONTINUED

- ▶ Test your result with
- ▶ `(Person 4512121212 58 312) == (Id 142117) ~>` should be equal
- ▶ `(Person 4512121212 58 312) == (Id 142111) ~>` should NOT be equal

Exercise 6.2: Sketch of Typing Algorithm

Determine the result of the type-inference algorithm of the following examples.

- ▶ 3
- ▶ $f\ x\ y = x$
- ▶ $g\ x\ y$
 - | $x == y = x$
 - | otherwise = y
- ▶ $h\ x\ y = x + y + 2.0$
- ▶ $l\ x = \text{if } x == 2 \text{ then } x + 2.0^3 \text{ else } 4$

Maybe

`data Maybe a = Just a | Nothing`

- Something like “*maybe it will go wrong*”

data type Pair

`data Pair a b = Pair_C a b deriving (Show, Eq)`

Exercise 6.3.: Maybe and Tuples

Each polynomial of degree 2 can be expressed in the following way $f(x) = x^2 + p * x + q$. To solve $f(x) = 0$ you can use the **Quadratic Formula**:

$$x_1, x_2 = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q}$$

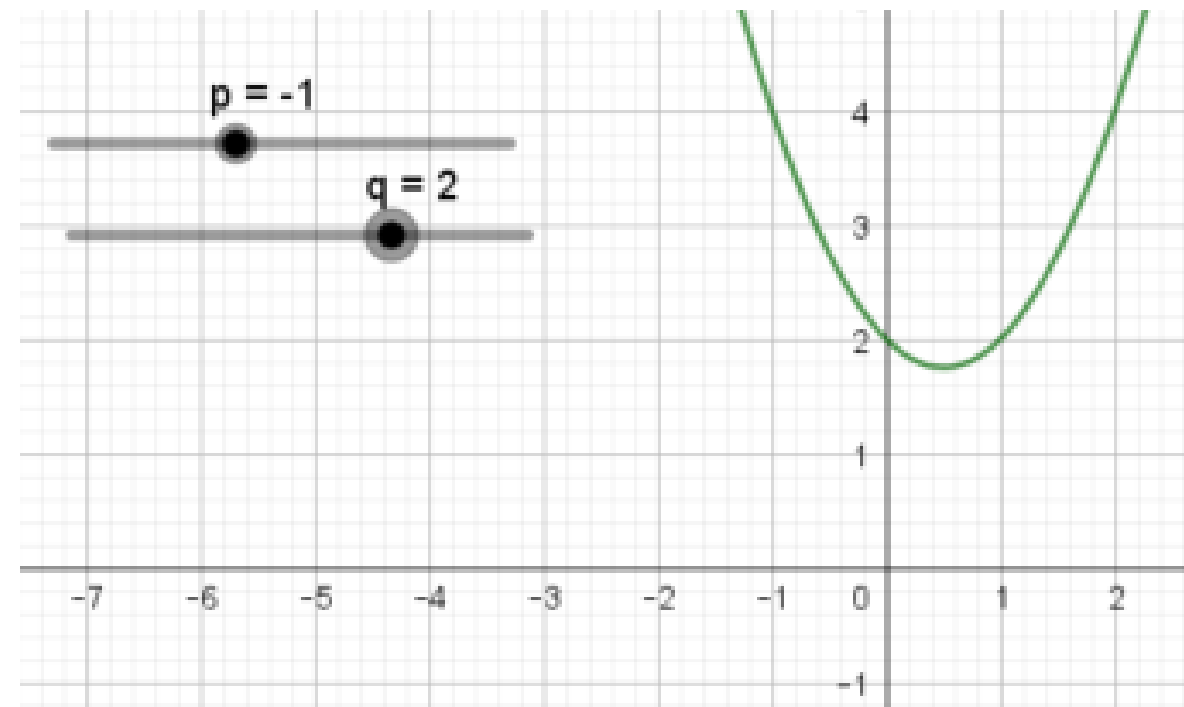
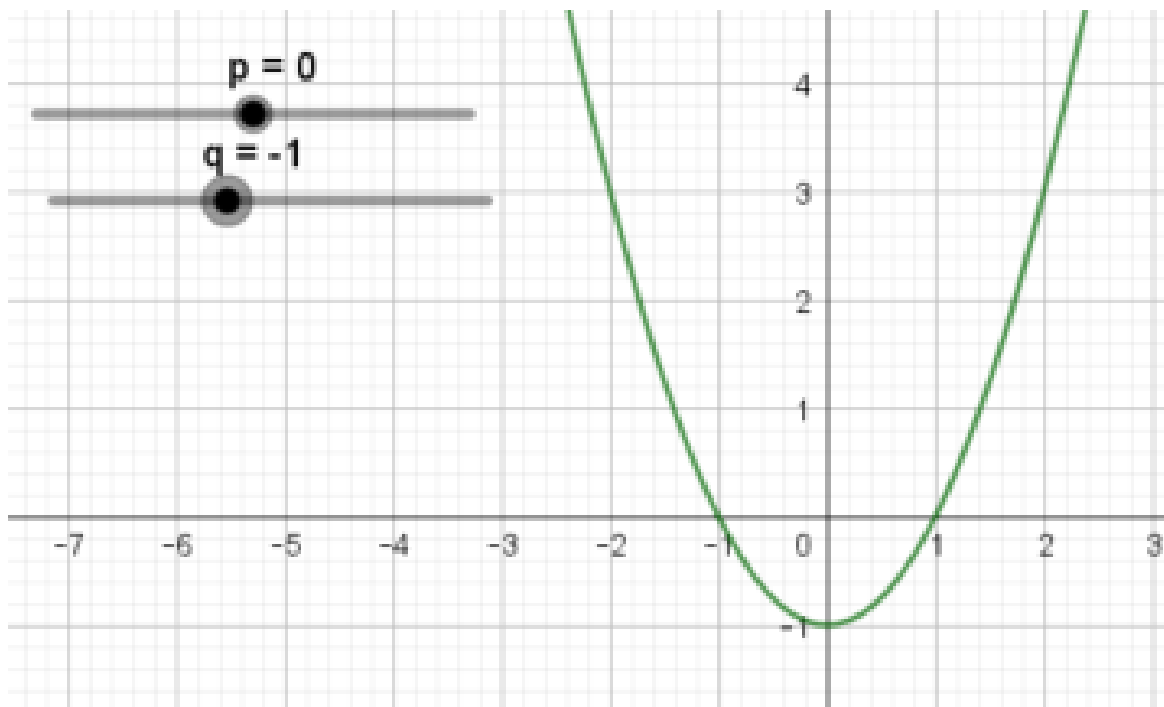
- ▶ if $\left(\frac{p}{2}\right)^2 - q < 0$... is not possible (incorrect)
- ▶ If $\left(\frac{p}{2}\right)^2 - q > 0$... two solution
- ▶ If $\left(\frac{p}{2}\right)^2 - q = 0$... $x_1 = x_2$

Create the function

quadraticFormular :: (Floating a, Ord a) => (Pair a a) -> Maybe (Pair a a)

Exercise 6.3.: Maybe and Tuples CONTINUED

Test your solution with the following values



Questions? Need help? Feedback? etc.

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