

Topic 03 - Tutorial Sheet

Types and Classes

Exercise 1:

What are the types of the following values?

```
[‘a’, ‘b’, ‘c’]
(‘a’, ‘b’, ‘c’)
[(False, ‘0’), (True, ‘1’)]
([‘1’, ‘0’], [‘0’, ‘1’])
[tail, init, reverse]
```

Use GHCi (:t) to check your solutions.

Exercise 2:

Write down definitions that have the following types:

```
bools :: [Bool]
nums :: [[Int]]
add :: Int -> Int -> Int -> Int
copy :: a -> (a, a)
apply :: (a -> b) -> a -> b
```

Check your solutions using GHCi.

Exercise 3:

What are the types of the following functions?

```
copy x = (x, x)
second xs = head (tail xs)
swap (x,y) = (y,x)
pair x y = (x,y)
double x = x * 2
palindrome xs = reverse xs == xs
twice f x = f (f x)
```

Use GHCi (‘:t’) to check their types.

Exercise 4:

When writing the following functions, what type class should be used in the class constraint?

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- (i) `multiply` :: \Rightarrow `a` \rightarrow `a` \rightarrow `a`
 - (ii) `areEqual` :: \Rightarrow `a` \rightarrow `a` \rightarrow `Bool`
 - (iii) `sort` :: \Rightarrow `[a]` \rightarrow `[a]`
 - (iv) `maxList` :: \Rightarrow `[a]` \rightarrow `a`
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