

Exercises

Types and Classes

1. What are the types of the following values?

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

Use GHCi (:t) to check your answers.

2. Write down definitions that have the following types. It does not matter that the definitions actually do as long as they are type correct:

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

Check your answers using GHCi. You can do this using a script or by using the let construct:

```
GHCi, version 8.2.1: http://www.haskell.org/ghc/  :? for help  
Prelude> let bools = [True,False] in bools :: [Bool]  
[True,False]  
Prelude>
```

3. What are the types of the following functions?

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

You can check this by putting these in a script with the type. If they are not consistent, you will get an error when you run/load the script. Also, take care to include the necessary class constraints (e.g. Eq a => when you are testing for equality) if the functions are defined using overloaded operators.