

Problem Set 7

What is the type of the following values? If the expression is invalid, briefly state why.

Assume numbers have the type `Int`. Remember that the type of `True` is `Bool`.

1. `"x"`
2. `(1,'x',[True])`
3. `["x":[]]`
4. `Head`
5. `map not`
6. `(+1) . (0<)`
7. `[1, ' 2 ', "3"]`

8. Write a function `prswap` that swaps the elements of a list on a pair-wise basis. That is, the first and second elements are swapped, the third and fourth are swapped, etc. ASSUME the list has an even number of elements but is possibly empty.

9. Write a function `rotabc` that changes a's to b's, b's to c's and c's to a's in a string. Only lowercase letters are affected.

Solution

1. [Char] or String
2. (Int, Char, [Bool])
3. [[[Char]]]
4. [a] -> a
5. [Bool] -> [Bool]
6. Invalid, since (0<) produces a Bool, and Booleans can't be added.
7. Invalid, due to multiple types.

8.

```
prswap [] = []
prswap (a:b:xs) = b:a:prswap xs
```

```
prswap [] = []
prswap list = reverse (take 2 list) ++ prswap (drop 2 list)
```

9.

```
rotabc = map f
  where
    f 'a' = 'b'
    f 'b' = 'c'
    f 'c' = 'a'
    f c   = c
```

Lots of solutions were recursive and repetitious, like this:

```
rotabc [] = []
rotabc (c:cs)
  | c == 'a' = 'b': rotabc cs
  | c == 'b' = 'c': rotabc cs
  | c == 'c' = 'a': rotabc cs
  | otherwise = c : rotabc cs
```