

Exercises

Interactive Programming

Exercise 1

Write an I/O program which will read a line of input and test whether the input is a palindrome. The program should 'prompt' the user for its input and also output an appropriate message.

Exercise 2

Write an I/O program which will read two integers, each on a separate line and output their sum. The program should prompt for input and explain its output.

Exercise 3

Define a function

```
putNtimes :: Integer -> String -> IO ()
```

so that the effect of

```
putNtimes n str
```

is to output a string *str*, *n* times, one per line.

Hint: You can use recursion in the definition.

Exercise 4

Write an I/O program which will first read a positive integer, *n*, and then read *n* integers and write their sum. The program should prompt for input and explain its output.

Hint: use auxillary functions, e.g.

```
getInteger :: String -> IO Integer
```

```
sumNInts ::      — .... which sums n ints
```

Solutions

Solutions to exercise 1

```
interactivePalCheck :: IO ()

interactivePalCheck
= do putStr "Input a string for palindrome check: "
    st <- getLine
    if st == reverse st
    then putStr "Palindrome.\n"
    else putStr "Not a palindrome.\n"
```

Solutions to exercise 2

```
interactiveIntSum :: IO ()

interactiveIntSum
= do putStr "Input an integer (followed by Return): "
    st1 <- getLine
    let int1 = (read st1) :: Int
    putStr "Input another integer (followed by Return): "
    st2 <- getLine
    let int2 = read st2 :: Int
    putStrLn ("The sum of these integers is " ++ show (int1+int2))
```

Solutions to exercise 3

```
putNtimes :: Integer -> String -> IO ()

putNtimes n st
= if n<=0
  then return ()
  else do putStrLn st
          putNtimes (n-1) st
```

Solutions to exercise 4

— *Instead of solving this as a single function, worth thinking about how you can*
— *decompose the problem: write a function to get an integer, and another*
— *to do the summing.*

— *Useful auxiliary function, taking the prompt as parameter.*

```
getInteger :: String -> IO Integer
```

```
getInteger prompt
= do putStr prompt
     st <- getLine
     return (read st :: Integer)
```

— *Sum N integers: prompt, number to sum and "sum so far" are the parameters*

```
sumNints :: String -> Integer -> Integer -> IO Integer
```

```
sumNints prompt n s
= if n<=0
  then return s
  else do m <- getInteger prompt
         sumNints prompt (n-1) (s+m)
```

— *The function itself*

```
getNints :: IO ()
```

```
getNints
= do bound <- getInteger "Input the number of integers to add:_"
     sum <- sumNints "Input an integer:_" bound 0
     putStrLn ("The sum of these integers is_" ++ show sum)
```