MATHFUN
Discrete Mathematics and Functional Programming

Worksheet 10: Input/Output II

Introduction

This worksheet aims to provide you with further practice using Haskell's input/output mechanism as preparation for the functional programming assignment.

You will write a program that maintains a list of words in a file, and allows the user to add words, to display all words, and to display all words of a given length.

Functional Code

Begin by writing three functions:

1. A function to add a string to the end of a list:
   ```
   addWord :: String -> [String] -> [String]
   ```
   E.g., `addWord "lemon" ["apple","banana"]` gives `["apple","banana","lemon"]`.

2. A function to turn a list of strings into a multi-line string:
   ```
   wordsToString :: [String] -> String
   ```
   E.g., `wordsToString ["apple","banana"]` gives the string:
   ```
   "apple\nbanana"
   ```
   which, when output using `putStrLn` will display the words on two lines.

3. A function to give all words of a given length:
   ```
   wordsOfLength :: Int -> [String] -> [String]
   ```
   E.g., `wordsOfLength 5 ["apple","banana","lemon"] = ["apple","lemon"]`.

User Interface Code

Create a textfile words.txt which contains an initial list of words:

```
["apple"]
```

Now, write a program (i.e. a `main` function) which performs the following steps in order:

- using `readFile` and `read`, reads the contents of words.txt (as a single string) and turns this string into a list of strings (see the example use of `read` in the `getInt` function in lecture FP8/9).
- using `addWord`, adds the word "lemon" to the list
- using `wordsToString`, displays the words on the screen
- using `show` and `writeFile`, turns the list into a single string and writes it back to words.txt.

Now, modify your program so that it performs the first step (reading the list in from the File) when it starts, and then provides a menu to the user with the following options:

- add a word to the list
- display all words
- display all words of a given length
- exit

On exiting the program, the list should be written back to the file.