Homework 4

October 2, 2018

1 Introduction

For this homework, you will implement some SML functions using pattern matching.

1. Your solution should be a working ML program in a text file that I can run on a console using command like `use "hwk4.sml";`
2. You may add comments to your program such as `(* Question 1 *)`.
3. Use 'let' expression as necessary for local variables and local functions.

2 Questions

1. Write a function `zip` that takes two lists and return a list of 2-tuples. For example, `zip ([1, 2, 3], [4, 5])` should return `[(1,4), (2,5)]`. Note that if one list is longer than the other, the unmatched portion of the longer list is ignored.
2. Write a function `unzip` that takes a list of 2-tuples and return a tuple of two lists. For example, `unzip [(1,2), (3,4), (5,6)]` should return `([1,3,5], [2,4,6])`.
3. Write a function `zip3` that takes three lists and return a list of 3-tuples. For example, `zip3 ([1, 2, 3], [4, 5], [6,7,8])` should return `[(1,4,6), (2,5,7)]`. Note that if one list is longer than the others, the unmatched portion of the longer list is ignored.
4. Write a function `unzip3` that takes a list of 3-tuples and return a tuple of three lists. For example, `unzip3 [(1,2,3), (4,5,6), (7,8,9)]` should return `([1,4,7], [2,5,8], [3,6,9])`.
5. Write a function `zipWithIndex` that takes a list and return a list of 2-tuples, where each tuple contains an index and a list element. For example, `zipWithIndex ["a", "b", "c"]` should return `[(0, "a"), (1, "b"), (2, "c")]`.

6. Write a function `flatten` that takes a list of lists and return a flattened list. For example, `flatten [[1,2], [3], [4,5,6]]` should return `[1,2,3,4,5,6]`.

7. Write a function `flatten2` that takes a list of 2-tuples and return a flattened list. For example, `flatten2 [(1,2), (3,4), (5,6)]` should return `[1,2,3,4,5,6]`.

3 Submission

Please write your solution in a text file by the name of `hwk4.sml` and submit it to the dropbox.