Monday 31 January 2022

CECS 342-06 Spring 2022

Assignment 1

Homework 1

1. Browse the Haskell website: https://www.haskell.org
2. Read (at least the first two chapters of) “Learn You a Haskell for Great Good!”: http://learnyouahaskell.com/chapters

Lab Assignment 1

1. Remember the sorting algorithms quick sort (Tony Hoare, 1959) and merge sort (John von Neumann, 1945).
2. Write each sorting algorithm in C and in Haskell by implementing the following functions:

```
void qsort2(int *a, int n);  // quick sort array a with n elements in place in C
void msort(int *a, int n);   // merge sort array a with n elements in place in C

qsort :: Ord a => [a] -> [a]  -- quick sort a list in Haskell
msort :: Ord a => [a] -> [a]  -- merge sort a list in Haskell
```

3. The implementation of merge sort in C will require a temporary array. This array has to be allocated on the heap (and not the stack). Make sure to do this correctly and try to understand why this is necessary.
4. Write a simple main function (one in C and one in Haskell) with a few test cases. Make sure to cover edge cases like empty or invalid input.

Deliverable

1. Feel free to collaborate and to discuss the assignment with your fellow students.
2. The assignment will be graded with a **beachboard quiz** on (or after) the due date. This quiz will include specific questions about details of the assignment solution and in particular about differences between the C and Haskell implementations.
3. In addition you may voluntarily present your source code to the class to gain one extra credit.
4. *Due date:* **Friday 25 February 2022** at the beginning of lecture.