COSC 2P03 - Assignment #1

Due Date: Oct 20, 2008, 3pm
Late Date: Oct 23, 2008, 3pm

Please read the following questions carefully before beginning the assignment.

1) Starting with a positive integer *n*, a sequence can be formed using the following rules:

   If *n* is even, divide it by 2

   If *n* is odd, multiply it by 3 and add 1

   Note: This sequence loops indefinitely once *n* becomes 1 and as a result there is no need to continue to compute the next items.

   For example, starting with the integer 3, the resulting sequence is [3, 10, 5, 16, 8, 4, 2, 1].

   a) Write a method which determines this sequence for a given number and returns a linked list containing all the elements in that order.

   b) Generate this sequence for all integers between 10 and 20 (both inclusive) and insert the resulting sequences in a linked list which is sorted at all times according to:

      a. the length of the sequence (smaller should come first)

      b. for sequences of the same length, the smaller starting value should come first

      Print out the contents of your sorted linked list.

2) Write a recursive method which, given a list of integers, prints out the elements that occur in positions which are prime numbers in order, followed by all other elements in reverse order.

   For example, [1, 2, 3, 4, 5, 6] --> 2, 3, 5, 6, 4, 1

   For example, [3, 10, 5, 16, 8, 4, 2, 1] --> 10, 5, 8, 2, 1, 4, 16, 3

   Note: Some marks will be given out for efficiency, so make sure your program works on large numbers.

Assignment Submission Guidelines

- This assignment must be submitted both in hardcopy and softcopy (electronically).
- A submitted assignment with either hardcopy or softcopy version missing is deemed incomplete and will be penalized.
- To make an electronic submission, execute the program 'submit2p03' on sandcastle.cosc.brocku.ca from the directory that contains all the files that you want to submit, and only these files. This program will copy the contents of the current directory to the marker's account.
- The hardcopy submission must include all source code (including comments) as well as a few examples of execution. These should be printed on a laser or inkjet printer.
- All the papers must be stapled together at the upper left-hand corner of the page and should be placed in a 9" x 12" sealed envelope.
- A standard assignment cover-page (http://www.cosc.brocku.ca/forms/cover) should be printed, signed and stapled to the front of the outside of the envelope.
- The submission should be placed in the Assignment Box outside of J332, in the slot labeled COSC 2P03, before the due time indicated above. Only one submission (i.e. to the box) should be made per assignment.
- Assignments not including a coversheet will NOT be marked.
- Assignments that do not follow these guidelines will be penalized.
- Familiarize yourself with the department's policy on plagiarism and the university regulations on plagiarism and academic misconduct.