Cogs 502 Fall 2018
Symbols and Programming Assignment 09 due Dec 5, 20:00

Q 1

Define `D-HOW-MANY?` from previous assignment using an accumulator.

Q 2

Define a recursive function `REM-SECOND`, which removes the second occurrence of its first argument from the second.

Q 3

Define a recursive function `REM-NTH`, which removes the *n*th occurrence of its first argument from the second.

Q 4

Re-define `MULTI-MEMBER` as `MULTI-MEMBER2` without using `MEMBER`.

Q 5

Define a recursive function that takes an integer `n` and gives a list of `n` random single digit numbers. Use the built-in `RANDOM`.

Q 6

Modify your solution to Q 5, such that no repetitions are allowed. You may find the built-in `ADJOIN` useful here. Write two versions: one with `ADJOIN`, the other without.

Q 7

Define a recursive function `FLATTEN`, which takes a possibly nested list and returns a version where all nesting is eliminated. E.g. `((1 (2) 3) 4 (((5) 6) 7))` should be returned as `(1 2 3 4 5 6 7)`.

Q 8

Write a function that computes the letter grade of a student given his/her grade record. Grade records are of the form `(<Student ID> <grade of HWs> <Midterm> <Final>)`. Take the weights to be 0.3, 0.3 and 0.4, respectively. E.g. an input like `(770084 55 75 80)` should return `CC`. You may find it useful to write separate functions for subtasks, rather than trying to handle everything with a single function.

Q 9

Define a recursive function that takes a list of integers and returns the largest integer in the list.

Q 10

Define a recursive function that takes a list of integers and returns the *second* largest integer in the list.

Q 11

Re-define `REM-LAST` from the previous exercise without using `MEMBER`, `RLAST`, `LAST`, `REVERSE`, `CHOP-END`.

Q 12

Define a recursive function that takes a list of integers and an integer `n`, and returns the `n`th largest integer in the list. You are not allowed to use any built-in sorting function.