Extra Homework 4

1. Write iterative functions (use DO) in Racket for:
   (a) The greatest common divisor of two natural numbers;
   (b) The multiplication "a la russe" (Write x and y on the same line. Divide successively x to 2, multiply y with 2, the mechanism continues until on the column of x we obtain 1. Add all the values on the column of y which correspond to the odd values from the column of x.)
   (c) The minimum of three values;
   (d) Increasing ordering of three values;
   (e) The set of digits of a natural number;
   (f) The sum of digits of a natural number;
   (g) The reversed of a natural number (e.g. for 67908 returns 80976);
   (h) The Fibonacci's set;
   (i) The factorial of a natural number;
2. Write in Racket functions: recursive, tail recursive and iterative (use DO) for each of the following:
   (a) The length of a list;
   (b) The reverse of a list;
   (c) The sum of elements of a list (ignore all the elements which are not numbers);
   (d) The sum of squared numbers from a list (ignore all the elements which are not numbers);
   (e) The list of odd numbers and the list of even numbers from a list (ignore all the elements which are not numbers);
3. Write in Racket functions for the following:
   (a) Determine the list of all symbols at any level from a nested list:

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; without keeping the structure of the sublists:
> (lis '(1 a ((b) 6) (2 (c 3)) d 4))
(A B C D)

; keep the structure of the sublists:
> (lis '(1 a ((b) 6) (2 (c 3)) d 4))
(A ((B)) ((C)) D)
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   (b) Determine the list of pairs of an atom with each of the elements from a list

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> (lista 'a '(b c d))
((A B) (A C) (A D))
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