Prob. 1	Prob. 2	Prob. 3	Prob. 4

Problem 1.

Problem 2.

Problem 3.

We first want to realize that for any parenthesization. We can write the following :

$$parenthesization(x_1/x_2/.../x_n) = \prod x_i^{d_i}$$

Where $d_i = \pm 1$. For any parenthesization we always have $d_1 = 1$ and $d_2 = -1$. For the remaining d_i the optimum would be to have $d_i = 1$ when $x_i > 1$ and $d_i = -1$ when $x_i < 1$. We can obtain this result with a simple parenthesization.

When not using parenthesis the divisions are computed from the left to the right. For example the following parenthesization gives us :

$$x_1/x_2/...(x_a/.../x_b)/.../x_n = \prod x_i^{d_i}$$

with $d_a = -1$ and $d_{a+1} = ... = d_b = 1$. All other d_i but d_1 is -1. With this in head we can easily include inside parenthesis all the x_i bigger than 1. For any consecutive list of elements $x_a, ..., x_{b+1}$ where $x_a < 1$, $x_{a+1} > 1, ..., x_b > 1$ and $x_{b+1} < 1$ we just want to include inside parenthesis the elements from x_a to x_b. This gives us the optimal solution describe above and implies an easy linear time algorithm.

Problem 4.