AdaBoosting Graded Homework

This assignment is (almost) identical to the example of AdaBoosting that was discussed in class.

Input

A file containing the following information:

```
T (an integer number).
n (an integer number).
x (a list of n real numbers. These are assumed to be in increasing order).
y (a list of n numbers, each one is either 1 or -1).
p (a list of n nonnegative numbers that sum up to 1).
```

Example:

```
10 4
1 2 3.5 4.5
1 -1 1 1
0.25 0.25 0.25 0.25
```

The weak classifier

The weak classifier produces hypotheses of the form: $x < v$, or $x > v$. The threshold v is computed to minimize the probability of error over the entire data. (No sampling.)

What should be computed

Run T iterations of the AdaBoosting algorithm. For each iteration compute and print the following:

1. The weak classifier: h_t.

2. The error of h_t: ϵ_t.

3. The weight of the weak classifier: α_t.

4. The probabilities normalization factor: Z_t.

5. The probabilities after normalization: p_i.

6. The boosted classifier: f_t.

7. The error of the boosted classifier: E_t.

8. The bound on E_t:

$$\prod_{j=1}^{t} Z_t$$

What you need to submit

Submit source code and executable (if your programming language produces executable) on Elearning. You must be available to demonstrate your program to the TA.