Project 3 (AdaBoosting)

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
```

Weak classifiers

The weak classifier produces hypotheses of the form: $x < v$, or $x > v$. It is always computed from the entire data. (No sampling.)

What should be computed

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

1. The selected weak classifier: h_t.

2. The error of h_t: ϵ_t.

3. The weight of h_t: 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:

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

What you need to submit

Submit source code of the program online at eLearning.
You must be available to demonstrate your program to the TA. Date will be announced in class.