Algorithm 1 AdaBoost algorithm.

Input:
\( D = \{(x_i, y_i)\}_{i=1}^n \)
Weak learning model
Positive integer \( T \)

Initialization:
Initialize sampling distribution \( p^{(1)}(i) = \frac{1}{n} \) for \( \forall i \in \{1, 2, \ldots, n\} \)

Loop:
for \( t = 1 \) to \( T \)
    Sample data set \( D^{(t)} \) from \( D \) according to \( p^{(t)}(i) \)
    Learn model \( f_t(x) \) from \( D^{(t)} \)
    Calculate error \( \epsilon_t \) on training data \( D \) as
    \[
    \epsilon_t = \sum_{i:f_t(x_i)\neq y_i} p^{(t)}(i)
    \]
    Set
    \[
    \beta_t = \frac{\epsilon_t}{1-\epsilon_t}
    \]
    Set
    \[
    w_t = \ln \frac{1}{\beta_t}
    \]
    Set
    \[
    p^{(t+1)}(i) = \frac{p^{(t)}(i)}{Z} \cdot \left\{ \begin{array}{ll}
    \beta_t & \text{if } f_t(x_i) = y_i \\
    1 & \text{otherwise}
    \end{array} \right.
    \]
    where \( Z \) is a normalizer
end

Output:
\[
 f(x) = \text{sign} \left( \sum_{t=1}^T w_t f_t(x) \right)
\]