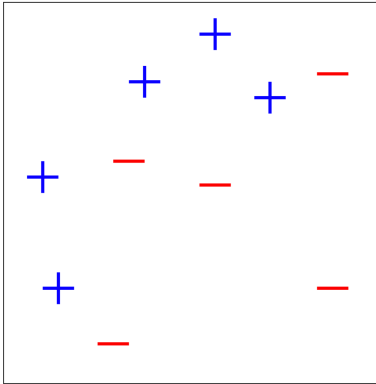


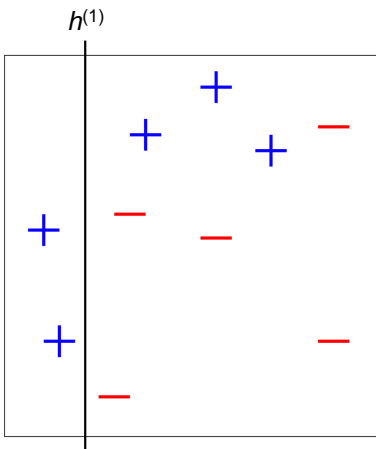
AdaBoost Example

(find and work with a partner)

Below is a toy dataset with $n = 10$ data points and two classes: + for 1 and - for -1. In the steps below you are given the classifiers at each step, and your task it to run AdaBoost to update the weights, errors, and scores for each round. At the end you should have an ensemble classifier with $T = 3$.

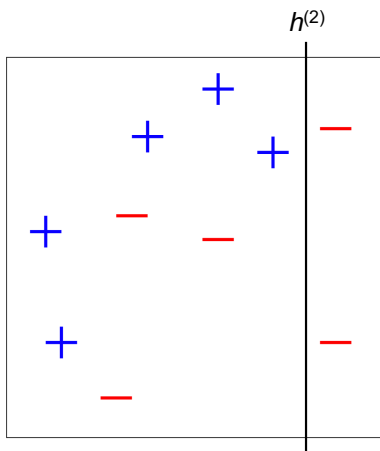


1. *Round 1:* Initially, what are the weights on each data point? Run Round 1 on the classifier $h^{(1)}$ shown below. Circle the data points that are incorrectly classified. What is the weighted error ϵ_1 ? What is the score α_1 ? Finally, adjust the weights for each data point using the score.

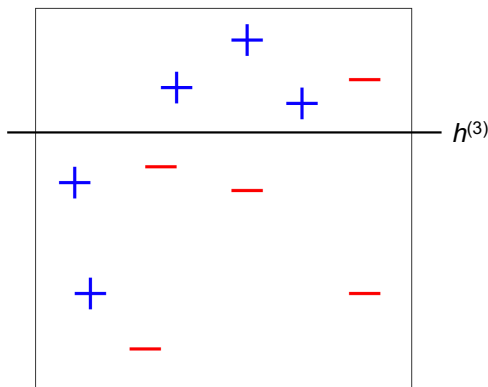


Example from "A tutorial on boosting" by Yoav Freund and Rob Schapire

2. *Round 2:* Complete Round 2 in the same fashion as Round 1, using the previously updated weights.



3. *Round 3:* Complete Round 2 in the same fashion as the previous rounds, but we don't need to update the weights.



4. Finally, sketch out the 3 boundaries together to visualize the final result (shade the areas classified as +) and write a formula for the final classifier $h(\mathbf{x})$.

