**Answer 1**:

For Perceptron task, for linearly-separable-dataset, the algorithm terminated with 0 error in ERM case and an average error of 0.0026086956521739132 in case of 10-folds.

Observations:

* On dataset: *linearly-separable-dataset*

1. For ERM, the error is 0.

Since, ERM minimizes the error on training sample and after training, when tested on the same dataset, the error is 0. From this we can conclude that dataset is in fact linearly separable.

1. For 10 fold, the mean error is 0.0026086956521739132

In 10-folds, there is some error for 2 of the folds resulting in some small overall mean error.

Here, as we are training on 9 parts of input data and testing on the left 10th part, the weights do not give a hypothesis that perfectly classifies the data.

* On dataset: *Breast\_cancer\_data*

1. I observed that when running Perceptron algorithm on this dataset, the algorithm did not terminate. From this, I can conclude that this given dataset is not linearly separable.

**Heuristic**