Ariel University
Machine Learning
Homework 2

Problem 1.

a) Let hypothesis class **C** have VC-dimension **c**, and hypothesis class **D** have VC-dimension **d**. Show that the class **E = C** ∪ **D** cannot shatter **c+d**+2 points.
b) What is the VC-dimension of uni-directional balls on d-dimensional points (inside is red, outside is blue)? Prove your answer.
c) Give an upper bound for the VC-dimension of bi-directional circles in the plane.

Problem 2. Class **C** includes the infinite set of 2D-objects which are hearts, clubs, or diamonds in all sizes and centered at any point in the 2D-plane. Give an upper bound on the VC-dimension of **C**.

Problem 3. Class **C** has VC-dimension d. Class **C'** includes all objects that are formed by intersections and unions (in any order) of **s** objects in **C**. Give an upper bound on the VC-dimension of **C'**.

Problem 4. What is the VC-dimension of the infinite set of (uni-directional) convex bodies on 2-dimensional points?