

Exercise Sheet 8

Due at the beginning of the exercise session at 16:20. A total of at least 50% of all available points is required for the “Studienleistung” (I expect there to be 12 or 13 sheets).

Exercise 1 (BDSS 21.7.3, 2 points). Let $d \geq 2$, $\mathcal{X} = \{1, \dots, d\}$, and let $\mathcal{H} = \{h_j \mid j \in [d]\}$ where $h_j(x) = 1_{[x=j]}$, meaning the function that outputs 1 if $x = j$ and 0 otherwise. Calculate $M_{\text{Halving}}(\mathcal{H})$ (more precisely, derive lower and upper bounds on $M_{\text{Halving}}(\mathcal{H})$ and prove that they are equal).

Exercise 2 (2 points). Give an example of a concept class \mathcal{C} such that $\text{Ldim}(\mathcal{C}) = 17$.

Exercise 3 (2 points, bonus). Give an example on an *infinite* concept class \mathcal{C} such that $\text{Ldim}(\mathcal{C}) = 17$.