BKA
Sheet 2
Due date: 11 May

Exercise 1.

Which of the following sets are countable? Justify your answer.

(a) $L_1 = \{w \in \{0,1\}^* : |w|_1 = 1\}$

(b) $L_2 = \{w \in \{0,1\}^* : |w| \text{ is not finite}\}$: the set of all **infinite** strings consisting only of 0s and 1s.

Exercise 2.

Let $S = \{(\langle M \rangle, \langle M' \rangle) | M \text{ and } M' \text{ are TMs and } \exists x \in \{0,1\}^* : x \in L(M) \cap L(M')\}$. Determine whether S is recursively enumerable, S is decidable and whether $\overline{S}$ is recursively enumerable. Prove your answer.

If you have any question regarding the problems, please do not hesitate to contact us.