Aufgabe 1 (Sipser, exercise 1.17)

Use the pumping lemma to show that the following languages are not regular.

(a) $A_1 = \{0^n 1^n 2^n \,|\, n \geq 0\}$.

(b) $A_2 = \{www \,|\, w \in \{a, b\}^*\}$.

(c) $A_3 = \{a^{2^n} \,|\, n \geq 0\}$. (Here, a^{2^n} means a string of 2^n a's.)