Homework 4

1. Prove that the language $L_1 = \{0^i1^j0^k1^k \mid 1 < i < j < 5, \text{ with } i, j, k \geq 0\}$ is not regular by using the pumping lemma.

2. Using closure properties of regular languages, prove that the language $L_2 = \{0^i1^j \mid i \neq j, \text{ with } i, j \geq 0\}$ is not regular.