Exercise 1. The language contains only a symbol for a binary relation e. The theory T says that e is an equivalence relation and that there is (exactly) n classes containing n elements for each $n \in \omega \setminus \{0\}$. Most of the following questions have an almost trivial answer (a few do not).

1. Prove that every saturated model of T contains a class with infinitely many elements.
2. Prove every model containing one class with n elements for each $n \in \omega \setminus \{0\}$ and infinitely many infinite classes is saturated.
3. Prove that the theory T has quantifier elimination.
4. Is T is complete?
5. Is T countably categorical?
6. Is T categorical is some uncountable λ?
7. What is $\mathrm{acl}(\varnothing)$?
8. Let $\mathcal{U} \models T$ be saturated. Let a be an element of an finite equivalence class of e. What is $\mathrm{acl}\{a\}$?
9. Let b be an element of an infinite equivalence class. What is $\mathrm{acl}\{b\}$?
10. If b is like above. What is the orbit of b under $\mathrm{Aut}(\mathcal{U})$?
11. Is T strongly minimal?