1. Prove that is not a regular language.
2. For arbitrary constant , is regular or not?
3. The decimal notation for a number is the number written in the usual way, as a string over the alphabet . For example, the decimal notation for 13 is a string of length 2. In unary notation, only the symbol “I” is used; thus 5 would be represented asIIIII in unary notation. Show that each of the following is or is not a regular language.

(For regular languages, write down its regular expression or describe the automata accepting it; for languages that are not regular, prove it using pumping lemma)

* 1. { is the unary notation for a number that is a multiple of 7}
  2. { is the unary notation for }