

- Let Σ be an alphabet and ε its empty string. Does ε belong to Σ ? Does it belong to the strings over Σ ?
 - How many possible lexicographic (canonical) orders do the strings over alphabet $\Gamma = \{a, b, c\}$ have? Let us choose the order $a < b < c$. What is the string number 121 in this order?
- Show that the set of even natural numbers is countable. Does this mean that there are as many even natural numbers as natural numbers in total?
- Show that the subsets of a countable set are also countable.
- Construct DFAs for recognizing the following languages:
 - $\{w \in \{a, b\}^* \mid w \text{ contains the substring } aba\}$
 - $\{w \in \{a, b\}^* \mid \text{the last symbol in } w \text{ is } a\}$,
 - $\{w \in \{a, b\}^* \mid \text{the second but last symbol in } w \text{ is } a\}$,
 - $\{w \in \{a, b\}^* \mid w \text{ contains an even number of the symbol } a\}$.
- Construct a DFA that accepts exactly those strings over the binary alphabet that contain an even number of zeros and ones (e.g., "0011" and "0110", but not "0001").
- Minimize the following DFA using the algorithm presented in the lectures:

