1. For each of the following languages, describe a Turing machine that decides the language and a Turing machine that recognizes the language but does not decide it. Give a complete description of the machine, not a high level description.

   (a) \( L = (001)^+ \) where \( \Sigma = \{0, 1\} \)

   (b) \( L = \{w \mid w \in \{a, b\}^* \text{ and } w \text{ contains an even number of } a's \text{ and an odd number of } b's\} \)

2. (10 points) Let the language \( L \) over the alphabet \( \{a, b, c, \#\} \) be defined as \( L = \{a^n \#b^n \#c^n \mid n \geq 1\} \).
   Give a high level description of a Turing machine that decides this language.

3. Give a high level description of a Turing machine that decides the language \( L = \{0^{2^n} \mid n \geq 0\} \), i.e., the language which consists of strings of zeros whose length is a power of 2. (The tape alphabet is \( \{0\} \)).