1. For a language $M$, define $M_{2023}$ as the set of all strings in $M$ of length exactly 2023. State whether the following are true or false: (No justification required.)

(a) If $M$ is regular, then so is $M_{2023}$.  

TRUE  

(b) If $M_{2023}$ is regular, then so is $M$.  

FALSE  

2. Give 3 strings that are pairwise indistinguishable with respect to the language of all binary strings that do not contain 101 as substring.

E.g. 101, 1010, 1011

One contains 101 guaranteed to reject for all continuations

3. Give 3 strings that are pairwise distinguishable with respect to the language of all binary strings that contain an even number of 0's or an even number of 1's or both.

0, 1 01 0011

Odd 0  odd 1  odd  even

Even  1  even  0  odd  even.