Distinguishable Strings

Fix some language L.

Two strings x and y are distinguishable with respect to L if there is a string z such that xz in L & yz not in L or vice versa.

Otherwise indistinguishable.

Example L = all binary strings containing 00.

a) 0101
b) 00100
c) 1110
d) ε
e) 001

a & b distinguishable
(take $z = \varepsilon$)

a & c distinguishable
(take $z = 0$)

b & c distinguishable
(take $z = 1$)

a & d indistinguishable

Example $H = 0^n 1^n$
meaning $\{01, 0011, 000111, \ldots\}$
equal 0's & 1's, 0s first.

000 and 0000 distinguishable
(take 111)

claim: any strings of 0s distinguishable

Theorem If x and y distinguishable, then in DFA for L, must be in different states if get x or y.

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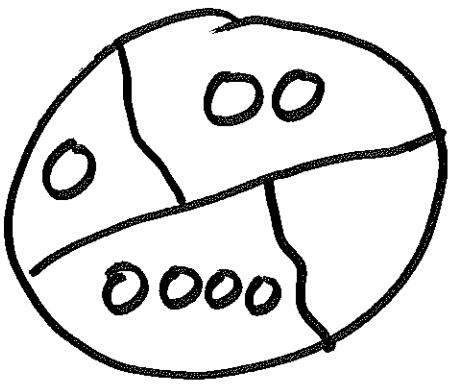
indistinguishability is an equivalence relation and partitions set of all strings into classes. Within each class strings are indistinguishable



Theorem:

If there is infinite set M such that every pair of strings in M distinguishable, then L is NOT regular.

e.g. 0^n1^n