Assignment 2

Ritish Bansal
190101076

March 2, 2021

1

Language L consists of strings of length 2n where last n characters are all ones where n>=0.
Let there are 2 strings a,b where $|a| = n$ and $|b| = m$ where n≠m.
We will show that relation R_L has infinite index. Taking n<m and for all pairs of n,m appending 01^{n+1} at end of both strings.
we will show that $a01^{n+1} \in$ L and $b01^{n+1} \notin$ L.
$a01^{n+1} \in$ L as taking w as $a0$ and it has length n+1 and string has n+1 1's at end. So it belongs to L.
$b01^{n+1} \notin$ L as total length is m+n+2. So it must have $(m + n + 2)/2$ 1's at end but it have only n+1 1's which are less than required which can be shown as follows :-
n<m and add n+2 both sides gives
2n+2 < m+n+2 and dividing by 2 gives desired result.
So a and b must be in different classes for all n and m.
Hence number of classes of R_L are infinite and by Myhill-Nerode theorem L is non-regular.

2

Language L consists of strings of length 2n where last n characters are compliment of first n characters where $n >= 0$.
Let there are two strings a and b where a=0^n and b=0^m where n≠m.
We will show that relation R_L has infinite index. Taking n<m and for all pairs of n,m appending 1^n at end of both strings.
we will show that $0^n1^n \in$ L and $0^m1^n \notin$ L.
As $0^n1^n \in$ L is trivial as taking w as 0^n gives required string. Hence $0^n1^n \in$ L.
Also $0^m1^n \notin$ L is trivial as n≠m So, it can never be in L.
So a and b are in different classes for all n and m.
Hence number of classes of R_L are infinite and by Myhill-Nerode theorem L is non-regular.