

That is,  $\forall i \in N, 1 \leq i \leq a-1$ , there exists <sup>at least one</sup> unique vowel  $v_x \in S_{iv}$  s.t.  $v_x$  lies in between  $p_i$  and  $p_{i+1}$ .

(Otherwise we will have atleast one occurrence of two consecutive consonants in the permutation making it not a word)

So, there must exist atleast  $(a-1)$  vowels in  $S_i$ , i.e.  $|b| \geq a-1$

$\therefore a-b \leq 1$  or,  $|S_i| - |S_{iv}| \leq 1$ , which is a contradiction.

$\therefore$  No permutation of  $S_i$  is a word ■

**Claim:** If for any  $S_i$ , where  $1 \leq i \leq 6, i \in N, |S_i| = m$ , if no permutation  $\langle a_1, a_2, \dots, a_m \rangle$  of  $S_i$  is a word, then  $|S_i| - |S_{iv}| \geq 1$ .

**Proof:** We shall prove the contrapositive statement.

Suppose  $|S_i| - |S_{iv}| \leq 1$ . We shall show there exists a permutation  $\langle a_1, a_2, \dots, a_m \rangle$  of  $S_i$  which is a word.

Suppose, we take an arbitrary permutation  $\langle p_1, p_2, \dots, p_a \rangle$  of  $S_i$  where  $|S_i| = a, |S_{iv}| = b$ .

~~In order to make the~~  $a-b \leq 1 \Rightarrow a-1 \leq b$  or,  $|b| \geq a-1$

So, we have atleast  $a-1$  vowels. If for  $\forall x, 1 \leq x \leq a-1, x \in N$ , we put atleast one arbitrary <sup>unique</sup>  $v_x \in S_{iv}$  in between  $p_x$  and  $p_{x+1}$ , we will form an arbitrary permutation of  $S_i$  which is a word ■

Suppose none of the groups form a word in the language.

$\therefore \forall S_i, 1 \leq i \leq 6, i \in N, |S_i| - |S_{iv}| \geq 2$ .

$$\sum_{i=1}^6 (|S_i| - |S_{iv}|) \geq 12 \quad \text{or,} \quad |C| - |V| \geq 12$$

Given,  $C - V = 12 - 11 = 1$  (Contradiction)