This process is terminated after n-2 steps. When only two vertex are left. The tree defines the sequence

* Theorem :— The number of vertices of all degree in graph is always even.

Proof :- Let us consider a graph $G = (V, E)$ with vertices $V = V_1, V_2 \ldots V_n$ and $E = \{e_1, e_2, \ldots e_n\}$. Since each edges contributes two degrees. Therefore the sum of the degree of all vertices in G is twice the number of edges in G.

i.e. $\sum_{i=1}^{n} \deg(V_n) = 2e = 2|E| \longrightarrow ①$

If we consider the vertices odd & even degrees separately, then the quantity in the left hand sides of eqⁿ ① can be express as the sum of two sums each taken over vertices of even and odd degrees respectively as follows :—

$$\sum_{i=1}^{n} \deg(V_n) = \sum_{even} \deg(V_j) + \sum_{odd} \deg(V_k) \longrightarrow (ii)$$

Since the left ~~and~~ hand side in eqⁿ ② is even and the first expression on R.H.S is even (being a sum of even nos.) then the second expression must also be even.

i.e. $\sum_{odd} \deg(V_K) =$ an even number $\longrightarrow (iii)$

Because the eqⁿ ③ itself $\deg(V_K)$ is odd the total no. of terms in the sum must be even to make the sum and even numbers. Hence the theorem.