3. LINE BALANCING

STATION TIME: The Time Assigned at different workstation is called as station time.
CYCLE TIME: The time required to produce a finished product is called as cycle time. (Product formation time/ Max. Station Time/ Bottleneck Time)

$\boldsymbol{Line/Balance\ Efficiency(L.E.)} = \frac{\sum Station\ time}{Cycle\ Time * n}$		$Where, n = No.\ of\ Workstation.$ **Cycle Time ≥ Max. Of Station time**
$\boldsymbol{Balance\ Delay} = 1 - Line/Balance\ Efficiency = 1 - \frac{\sum Station\ time}{Cycle\ Time * n} = \frac{\sum Ideal\ time}{Cycle\ Time * n}$		
$\boldsymbol{Smoothness\ Index\ (S.I.)} = \sqrt{\sum_{i=1}^{n}(Cycle\ Time - Station\ Time)^2}$		If SI = 0, Line is called perfectly balanced. Effort should be made to have S.I. as low as possible.
$\boldsymbol{n_{min}} = \left(\sum Station\ Time\right)/Cycle\ Time$	n_{min}= Minimum No of station for 100% L.E.	n_{min} is higher round up Integer

BOTTLENECK: Critical/ Trouble Making Operation. (W.R.T. Time and W.R.T. Production (in Unit))

LARGEST CANDIDATE RULE:

1. List all the elements in the decreasing order of their task time.
2. To assign an element in a workstation start from the beginning of the list moving downward searching for feasible element which can be placed in a workstation.
3. Feasible element is the one that satisfies precedence requirement and when that element is placed in a workstation.
4. Strike off the element which is assigned so that it won't be consider again.
5. Continue in the similar manner until all the elements are assigned to different workstations.

Table-I:

Element **(Given Data)**	Work Time **(Given Data)**	Precedence **(Given Data)**	Check Box (Done)

Table-II:

Work Station No.	Element **(Given Data)**	Work Time (Ti) **(Given Data)**	Cycle Time (Tsi) < **(Given Time)**	Ideal Time (Tsi- Ti)

From the above tables we can find $n, \sum Station\ Time, \sum Ideal\ time$.