# 6. JOB SEQUENCING

**JOB SEQUENCING:** It used to reduce idle time of the machines.

| N JOB 2 MACHINE PROBLEM (STEPS OF JOHNSON ALGORITHM) |
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| 1. Find out the minimum time between $A_i$ and $B_j$ <br>      a. If minimum occurs in $A_i$, Process or sequence the job First. <br>      b. If minimum occurs in $B_j$, Process or sequence the job Last. <br> 2. If there is a tie between $A_i$ and $B_j$ , the process the $A_i$ job first and $B_j$ job Last. <br> 3. If there is a tie between $A_i$, look for the corresponding value of $B_j$ and job having minimum $B_j$ will process Frist. <br> 4. If there is a tie between $B_j$, look for the corresponding value of $A_i$ and job having minimum $A_i$ will process Last. |

| MAKE SPAN TIME OR ELAPSE TIME (MST): <br> It's defined as equivalent to the completion time of the last job to leave the system. | $\% \ Utilisation \ of \ Machine = \left(\dfrac{MST - Idle \ Time}{MST}\right)100$ |
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| N JOB 3 MACHINE PROBLEM | | |
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| Before converting, 3 machine problem into two fictitious group of machines, it should satisfy following condition: <br> • $Min. of \ M1 \geq Max. of \ M2$ <br> • $Min. of \ M3 \geq Max. of \ M2$ | **M1 + M2** | **M3 + M2** |
| | $A_i$ | $B_j$ |
| | | |

| N JOB 1 MACHINE PROBLEM | | | |
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| 1. **SPT Rule or Shortest processing time:** Here jobs are processed in increasing order of its processing time. <br> 2. **EDD Rule or Earliest Due Date:** Here jobs are processed in the increasing order of its due date. <br> 3. **Critical Ratio:** Here jobs are processed in increasing order of its critical ratio value. | Given in the problem, | | |
| | **Job** | **Processing time** | **Due Date** |
| | | | |
| | | | |
| $Critical \ Ratio(C.R.) = \dfrac{Date \ Required - Today's \ date}{Dayes \ needed \ to \ complete \ job}$ <br> $= \dfrac{Time \ Remaining}{Work \ Remaining}$ | C.R. < 1 | Job is behind schedule | |
| | C.R. > 1 | Job is Ahead schedule | |
| | C.R. = 1 | Job is on schedule | |
| 4. **Least Slack:** Job are arranged in increasing order of slack values. | $Slack = Due \ date - Processing \ Time$ | | |

**TERMS:**

1. **JOB FLOW TIME:** The Flow time for a job is the time from starting time until the job gets completed.
2. **AVERAGE JOB FLOW TIME:** It's the ratio of total job flow time to number of jobs.
3. **AVERAGE NUMBER OF JOBS IN THE SYSTEM:** It's the ratio of the total job flow time to make span time.
4. **LATENESS:**
   The deviation between a task completion time and it's due date is called lateness (Out time-Due Date).

| +ve Lateness: Project Completes after due date. | -ve Lateness: Project Completes before due date. |
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5. **TARDINESS:** It's the amount after due date that jobs gets completed.
   Positive Lateness is also called Tardiness.
6. **AVERAGE TARDINESS:** It's the ratio of total tardiness and number of jobs.
7. Number of **tardy** means number of jobs delayed.