Chapter 7 – Operations Scheduling

Fundamentals of Operations Management

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Scheduling Defined

- Scheduling refers to 'prescribing when and where each operation necessary to manufacture a product is to be performed.'

- Establishing of times at which to begin and complete each event or operation comprising a procedure.

Objectives of Scheduling

- Meet due date
- Minimize WIP inventory
- Minimize the average flow time through the system
- Provide for high machine/worker utilisation (minimize idle time)
- Reduce setup cost
- Minimize production and worker costs

Scheduling Issues

- Types of Scheduling
  - Forward scheduling: It is done by starting to schedule the raw materials to the next available slot time.
  - Backward scheduling: It is done by starting with the due date and planning backward so as to finish the job when required.

Scheduling Issues

- Scheduling Criteria
  - Minimize completion time:

    Average completion time = sum of total flow time/number of jobs
  - Maximize Utilisation

    Utilization = total job work time/sum of total flow time
  - Minimize work in progress inventory

    Average number of jobs in the system = sum of total flow time/total job work time
  - Minimize customer waiting time

    Average job lateness = total late days/number of jobs

Loading Jobs

- Loading jobs means the assignment of jobs to work centres or processing centres.
- **Infinite loading** ignores capacity constraints but helps to identify bottlenecks in a proposed schedule to enable proactive management
- **Finite Loading** allows only as much work to be assigned as can be done with available capacity.

Input-Output Control

- Input-output control is a system that allows operations personnel to manage facility work flows by tracking the work added to the work centre and the work completed from the centre.
- Advantages of Input-Output Control are:
  - Identifies overloading and under-loading conditions
  - Prompts managerial action to resolve scheduling problems
  - Can be maintained using Constant Work-In-Process cards

Gantt Charts

- Gantt charts are visual aids that are useful in loading and scheduling.
- The name is derived from Henry Gantt, who developed them in the late 1800s.
- The charts show the use of resources, such as work centres and labour.

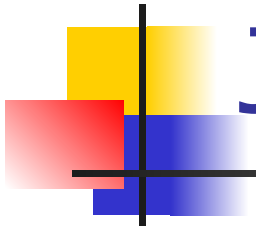
Assignment of Jobs

- Assignment method is a method of allocating organisational resources like machines, people, or workspace to particular job. Examples: assigning jobs to machines, contracts to bidders, people to projects, etc.
- The objective is to minimize the total cost or time required

Sequencing Jobs

- Sequencing specifies the order in which jobs should be done at each work center based upon the capacity and priorities.
- Priority rules provide guidelines for the sequence in which jobs should be worked.

Priority Rules for Dispatching Jobs

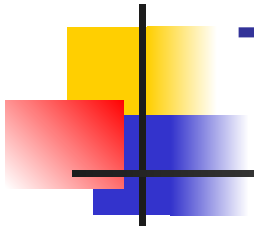


- FCFS (First Come, First Served): Jobs are completed in the order they arrive.
- SPT (Shortest Processing Time): Jobs with shortest processing time are assigned first.
- LPT (Longest processing Time): Jobs with longest processing time are assigned first.
- EDD (Early Due Date): Jobs are sequenced in increasing order of their due dates

Critical Ratio

- Critical Ratio (CR) is an index number computed by dividing the time remaining until due date by the work time remaining.

- It performs better on average job-lateness criterion



Thank You