

Abstract

A flow-shop is a type of manufacturing job shop where similar jobs follow a similar, linear sequence through the shop. Every day, flow-shops receive several different orders and it is up to the scheduler to plan the daily schedule. This schedule should be designed to prevent bottlenecks in the shop, to have on-time delivery of products, and satisfy several other requirements. Often, schedulers perform subjective scheduling and utilize simple heuristics or just intuition to schedule the jobs. With computer-based scheduling, schedulers can now create schedules and determine quantitatively what sorts of schedules work best. Currently, much of the computer-based schedules only try to optimize for one KPI such as Total Tardiness.

This paper considers incorporating multiple-criteria into computer based scheduling so that schedulers can have more flexibility and develop schedules which optimize multiple-criteria; this paper specifically considers minimizing Total Tardiness and maximizing Throughput. Comparisons between single-criterion models and the multiple-criteria model are made and it is discovered the multiple-criteria model provides a great compromise in optimizing both KPIs. A user-friendly program is developed where schedulers of any flow-shop can utilize the software to compute schedules for cases up to 10 jobs and 10 machines.