

In modern manufacturing systems, production planners create schedules by iteratively obtaining proposed schedules and adjusting input parameters to satisfy multiple, often competing, optimization goals. The goal of this thesis is to address the problem of reducing the tardiness of a particular manufacturing order in an obtained schedule, which is a practical problem commonly arising in production scheduling. We do this by identifying bottlenecks in the schedule and proposing relaxations to constraints related to the identified bottlenecks. We develop two methods for this purpose, both utilizing constraint programming. The first baseline method adapts existing approaches from the literature and proposes general relaxations. The second method identifies potential improvements in relaxed versions of the problem and proposes relaxations targeting the specific manufacturing order. Numerical experiments show that the baseline method achieves great improvements for small costs, while the second method is more reliable in achieving improvements across various problem instances.