

# TabuSearch: Job-shop scheduling problem

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## 1 Introduction

The job shop scheduling problem is one of many theoretic scheduling problems. In a paper by Dell'Amico and Trubian [1] it was classified as  $J||C_{\max}$  using the notation introduced by R.L.Graham et al. [2]. Letter  $J$  represents „job shop scheduling problem”, two vertical lines with nothing in between mean no further job characteristics are given and  $C_{\max}$  defines the optimization problem as minimizing the maximum completion time of all given jobs.

Of course, there are many different types of such problems e.g. there can be a predetermined quantity of machines e.g. only one machine, jobs can have certain characteristics e.g. each job has a *fuzzy due date* etc. but in this paper the problem classified in the previous paragraph will be examined.

We are given the following resources:

1. a set  $J$  of  $n$  jobs to schedule,
2. a set  $O = \{1, \dots, N\}$  of  $N$  atomic operations
3. a set  $M$  of  $m$  machines.

For each job  $J_j$  there is a sequence of operations  $O_{i,j} \in O$  and each of these operations has to be processed without interruption separately on machine  $\mu_{i,j} \in M$  for  $d_{i,j}$  units of time using already mentioned notation [2].

For better understanding of a such schedule problem a visual aid of a Gantt chart can be used:

## References

- [1] Mauro Dell'Amico and Marco Trubian. *Applying tabu search to the job-shop scheduling problem*. Politecnico di Milano, 1-20133 Milano, Italy, 1993. doi: 10.1007/BF02023076.
- [2] R.L.Graham, E.L.Lawler, J.K. Lenstra, and A.H.G. Rinnooy Kan. *Optimization and Approximation in Deterministic Sequencing and Scheduling: a Survey*. Elsevier B.V., 1979. doi: 10.1016/S0167-5060(08)70356-X.

Figure 1: Example Gantt chart