Retake Mastermath course 'Scheduling' 2019   8-7-2019

The exam consists of 5 questions worth 10 points each. Your grade is given by $1 + \frac{9p}{50}$, where p is the total number of points obtained.

Note: You are only allowed to use the handout written by the lecturers. **Good luck!**

Question 1 *(10 points)*:

Consider the following instance of problem $J2||C_{max}$:

$n = 6,\ p = \begin{pmatrix} 2 & 9 & 5 & 1 & 3 & - \\ 4 & 4 & 2 & 6 & - & 3 \end{pmatrix}$, jobs 1 and 2 have to be processed first on M_1, jobs 3 and 4 have to be processed first on M_2.

Apply the presented optimal algorithm for problem $J2||C_{max}$ to this instance. Explain the different steps, give the results of these steps and present the optimal solution.

Question 2 *(10 points)*:

Consider problem $1|d_j = d|\sum T_j$ (minimize total tardiness if all jobs have equal due date d).

Give a scheduling rule that leads to an optimal solution and proof that an optimal schedule can be found by this rule.

Question 3 *(10 points)*:

Proof that problem $P2||\sum w_j C_j$ is NP-hard.

Question 4 *(10 points)*:

Consider problem $P||C_{max}$.

Give the maximal number of jobs (dependent on the number m of machines) for which LPT leads always to an optimal solution and prove that this is true.

Question 5 *(10 points, indication 300 words)*:

Give a general description of different variants of the charging problem for electric vehicles. Describe the problems including objectives and constraints. Furthermore, give a sketch of the solution approach for the basic variant of the problem.

END OF THE EXAM