MSCI 555 – HW

WSPT may be a bad approximation in the case of $1||\sum_{j\in J} w_j U_j$ since we may cause more jobs to be tardy than needed due to the nature of the rule.

Since WSPT prioritizes smaller ratios of $\frac{w}{p}$ this may lead to problems if the numbers themselves are out of proportion with each other. An example could give the following ratios in descending order: $\frac{91}{90}, \frac{9}{9}, \frac{8}{9}$ The largest ratio is $\frac{91}{90}$ which would lead to prioritizing a job with around ten times more processing time than the next job. This may lead to the scheduler being unable to fit in more jobs where they could've.

In Section 3.3 slide 9 we have 3 jobs and their weight, processing time and due date. Following the example 3.3.4, according to WSPT we order them in descending order of their fractions $\frac{w}{p}$: $\frac{12}{11}, \frac{9}{9}, \frac{89}{90}$. Thus, we get the job order of 1-2-3 which leaves job 3 tardy. This however does not minimize our goal as it leaves us with $\sum_{j\in J} w_j U_j = 89$. Trying 2-3-1 leaves us with $\sum_{j\in J} w_j U_j = 12$ which is optimal for this case.

Section 3.4 – Example 3.4.5:

V(J(1,5,3), 0) = min{max(0, 121 - 260) + max(0, 121 + 79 - 266) + max(0, 121 + 79 + 83 - 336) + max(0, 121 + 79 + 83 + 130 - 337), max(0, 121 - 260) + max(0, 121 + 79 - 266) + max(0, 121 + 79 + 130 - 337) + max(0, 121 + 79 + 130 + 83 - 336), max(0, 121 - 260) + max(0, 121 + 83 - 336) + max(0, 121 + 83 + 130 - 337) + max(0, 121 + 83 + 130 + 79 - 266), max(0, 121 - 260) + max(0, 121 + 130 - 337) + max(0, 121 + 130 + 83 - 336) + max(0, 121 + 130 + 83 + 79 - 266), max(0, 121 - 260) + max(0, 121 + 83 - 336) + max(0, 121 + 83 + 79 - 266) + max(0, 121 + 83 + 79 + 130 - 337), max(0, 121 - 260) + max(0, 121 + 130 - 337) + max(0, 121 + 130 + 79 - 266) + max(0, 121 + 130 + 79 + 83 - 336), … } (I promise the other permutations are larger than 76)

V(J(1,5,3), 0) = min{76, 77, 147, 147, 17 + 76, 64 + 77, …}

V(J(1,5,3), 0) = 76

V(J(1,4,3), 0) = min{max(0, 121 - 260) + max(0, 121 + 79 - 266) + max(0, 121 + 79 + 83 - 336), …}

V(J(1,4,3), 0) = min{0, …} (Cannot be less than 0, thus we will stop here.)

V(J(1,4,3), 0) = 0