Exercise

Apply the tabu-search technique starting out with the 2,1,4,3 as an initial sequence.
Neighbourhood: all schedules that can be obtained through adjacent pairwise interchanges.

(a) Keep the length of the tabu-list equal to 1.
Apply the technique for four iterations.

(b) Keep the length of the tabu-list equal to 3.
Apply the technique for four iterations

\[
\begin{array}{cccc}
\text{jobs} & 1 & 2 & 3 & 4 \\
\tau_j & 10 & 10 & 13 & 4 \\
p_j & 4 & 2 & 1 & 12 \\
w_j & 14 & 12 & 1 & 12 \\
\end{array}
\]

\[
F(S) = \sum w_j T_j
\]

(a) \(S_1 = 2, 1, 4, 3\)
\[
F(S_1) = 12 \cdot 8 + 14 \cdot 16 + 12 \cdot 12 + 1 \cdot 36 = 500 = F(S_{\text{best}})
\]
\[
F(1, 2, 4, 3) = 480
\]
\[
F(2, 4, 1, 3) = 436 = F(S_{\text{best}})
\]
\[
F(2, 1, 3, 4) = 652
\]
Tabu list: \((1, 4)\)

(b) \(S_1 = 2, 1, 4, 3\)
\[
F(S_1) = 500 = F(S_{\text{best}})
\]
\[
F(1, 2, 4, 3) = 480
\]
\[
F(2, 4, 1, 3) = 460
\]
\[
F(2, 1, 3, 4) = 652
\]
Tabu list: \((1, 4)\)

\[
S_2 = 4, 1, 2, 3
\]
\[
F(S_2) = 440 \quad F(S_{\text{best}})
\]
\[
F(4, 2, 1, 3) = 440
\]
Tabu list: \((4, 1)\)
\[
F(S_{\text{best}}) = 408
\]

(a) \(S_3 = 4, 2, 1, 3\)
\[
F(S_3) = 460
\]
\[
F(2, 4, 1, 3) = 460
\]
Tabu list: \((4, 1)\)
\[
F(S_{\text{best}}) = 436
\]

(b) \(S_3 = 4, 2, 1, 3\)
\[
F(S_3) = 500
\]
\[
F(2, 4, 1, 3) = 460
\]
Tabu list: \((4, 1)\)

\[
S_4 = 4, 1, 2, 3
\]
\[
F(S_4) = 440
\]
\[
F(1, 4, 2, 3) = 440
\]
Tabu list: \((2, 1), (2, 4), (1, 4)\)

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