Problem 1.8 (handout)

A steel manufacturer produces four sizes of I beams...

Let

\[ t_{jk} \] = number of hours per week that machine \( j \) is used to produce I beams of size \( k \)

with \( j = A, B, C \)

and \( k = S \) (small), \( M \) (medium), \( L \) (large), \( E \) (extra large).

Min \[ 30t_{AS} + 30t_{AM} + 30t_{AE} + 30t_{AL} + 50t_{BS} + 50t_{BM} + 50t_{BE} + 50t_{BL} + 80t_{CS} + 80t_{CM} + 80t_{CL} + 80t_{CE} \]

s.t.

\[ t_{AS} + t_{AM} + t_{AL} + t_{AE} \leq 50 \] [Machine A hours per week]
\[ t_{BS} + t_{BM} + t_{BL} + t_{BE} \leq 50 \] [Machine B hours per week]
\[ t_{CS} + t_{CM} + t_{CL} + t_{CE} \leq 50 \] [Machine C hours per week]
\[ 300t_{AS} + 600t_{BS} + 800t_{CS} \geq 10000 \] [Weekly demand for small I beams (in feet)]
\[ 250t_{AM} + 400t_{BM} + 700t_{CM} \geq 8000 \] [Weekly demand for medium I beams (in feet)]
\[ 200t_{AL} + 350t_{BL} + 600t_{CL} \geq 6000 \] [Weekly demand for large I beams (in feet)]
\[ 100t_{AE} + 200t_{BE} + 300t_{CE} \geq 6000 \] [Weekly demand for extra large I beams (in feet)]

\[ t_{jk} \geq 0 \text{ for all } j \& k \]