ECE 573
Problem Set 8: Common subexpression elimination

Consider the following basic block:

1: LD A, T1
2: LD B, T2
3: T3 = T1 * T2
4: T4 = T3 + T1
5: T5 = T1 * T2
6: T3 = T5 + T2
7: T6 = T3 + T1
8: T7 = T5 + T2

1. After each statement, indicate which expressions are “available.”

2. Show what this code looks like after performing CSE. If you encounter a re-used expression, replace the instruction that calculates the expression with a new instruction copying the old temporary into the new one. In other words,

\[
\begin{align*}
T3 &= T1 + T2 \\
T4 &= T1 + T2 \\
T3 &= T1 + T2 \\
T4 &= T3
\end{align*}
\]

would become

\[
\begin{align*}
T3 &= T1 + T2 \\
T4 &= T3
\end{align*}
\]