Practice problem. Add the appropriate weights to the given Phylogenetic tree $T$ for the additive distance matrix $D$.

Find neighbors $E$ & $D$. Label common parent $Y$.

\[
d_{AX} = \frac{1}{2} (d_{AE} + d_{AD} - d_{DE}) = 8
\]
\[
d_{BX} = \frac{1}{2} (d_{BE} + d_{BD} - d_{DE}) = 11
\]
\[
d_{CX} = \frac{1}{2} (d_{CE} + d_{CD} - d_{DE}) = 10
\]

Find neighbors $B$ & $C$. Label common parent $Y$.

\[
d_{AY} = \frac{1}{2} (d_{AB} + d_{AC} - d_{BC}) = 9
\]
\[
d_{XY} = \frac{1}{2} (d_{XB} + d_{XC} - d_{BC}) = 9
\]

Find neighbors $A$ & $X$. Label common parent $Z$.

\[
d_{XZ} = \frac{1}{2} (d_{AX} + d_{YX} - d_{AY}) = 4
\]