Exercise 3
Consider two senders $A$ and $B$ using TCP AIMD. For simplicity, let $x_A(t)$ be the data rate of $A$ and $x_B(t)$ be the data round of $B$.

If the sum of the data rates $x_A(t) + x_B(t)$ in a round is larger than 10, then
\[
\begin{align*}
x_A(t+1) &= \frac{1}{2}x_A(t) \\
x_B(t+1) &= \frac{1}{2}x_B(t)
\end{align*}
\]

Otherwise we have
\[
\begin{align*}
x_A(t+1) &= x_A(t) + 1 \\
x_B(t+1) &= x_B(t) + 1
\end{align*}
\]

1. Add the fairness and efficiency lines to the diagrams.

2. Assume $A$ starts in round 0 and $B$ at round 5, i.e. $x(B)(t) = 0$ for all $t \leq 5$. Compute the first 15 values of $A$ and $B$ and add the behavior to the diagram above.

3. Now $A$ leaves in round 15, such that $x(A)(t) = 0$ for $t \geq 15$. Compute the next 10 rounds.
4. In a different scenario assumes that $A$ uses AIMD, but $B$ hast constant data rate 8, i.e. $x_B(t) = 8$. What happens?

5. In a last scenario assume that $A$ changes its behavior to AIAD (additive increase/additive decrease), i.e. replacing $x_A(t+1) = \frac{1}{2}x_A(t)$ by $x_A(t+1) = x_A(t) - 1$. Simulate 15 rounds where $A$ and $B$ start at the same time with bandwidth 0.