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Q3.4) When there is an overhead after the pipelined stages, our pipelined solution becomes less efficient. However, for certain values, we still get more efficiency tha the unpipelined design.

Recalling from Q3.3, $T_s = 4tn$ and $T_p = t(3+n)$. Replacing t with $t+X$ (overhead), we get $T_p = (t+x)(3+n)$. In order for the pipelined design to be faster, following must hold:

$$\frac{T_s}{T_p} > 1 \Rightarrow \frac{4tn}{(t+x)(3+n)} > 1$$

Rearranging the inequality, we get the following:

$$\frac{3tn-3t}{n+3} > X$$

Whenever this equality is true, the pipelined execution is still faster than the unpipelined execution.